Chapter 12: Hazardous Materials

A. INTRODUCTION

This chapter assesses the potential impacts from hazardous materials and contaminants encountered in the soil, groundwater, or existing structures during construction on the project sites, and the likelihood of such contaminants to persist after development. The chapter also assesses and summarizes specific measures to be employed to minimize the potential for exposure to such materials.

Potential impacts related to hazardous materials can occur when an action causes disturbance of on-site contaminants present at concentrations above regulatory standards or guidance values, or introduces a new activity or industrial process that increases the risk of human exposure or poses a threat to the surrounding environment. The potential for the presence of hazardous materials or contamination at the Development Site was examined in September 2004 as part of the 2004 *No. 7 Subway Extension-Hudson Yards Rezoning and Development Program Final Generic Environmental Impact Statement ("Hudson Yards FGEIS")*. The analysis included a Phase I Environmental Site Assessment (ESA) and Phase II Environmental Site Investigation (ESI), which included subsurface soil and groundwater testing. This chapter updates the previous findings of the *Hudson Yards FGEIS* for the Development Site and summarizes the remedial actions that have been undertaken thus far to address the petroleum product contamination that was encountered during Phase II investigations pursuant to stipulated provisions of a New York State Department of Environmental Conservation (DEC) Consent Order. Relevant findings from a Phase II sampling program completed for and summarized in the 1994 *Route 9A Reconstruction Project FEIS* were also considered.

Phase I ESAs were also performed for the Additional Housing Sites ("Tenth Avenue Site" and "Ninth Avenue Site"). Since the Ninth Avenue Site (Block 1077, portion of Lot 29) is also subject to a DEC Consent Order to remediate petroleum product contamination on site, subsurface soil and groundwater testing results from previous Phase II investigations were reviewed. A Phase II ESI was not warranted at the Tenth Avenue Site (Block 1044, portion of Lot 3).

The Development Site has a long history of rail use. It contains an active commuter train storage yard and ancillary facilities operated by the Long Island Rail Road (LIRR), a private bus company parking area, a New York City Department of Sanitation (DSNY) truck parking lot, fueling and wash station, and a New York City Transit (NYCT) storage area. Constructing a platform above the rail yard within the northern two-thirds of the Development Site would entail limited excavation, disturbance, and removal of fill and soil. However, in the southern third, or "terra firma," (approximately south of the extension of West 31st Street) more extensive excavation, disturbance, and removal would be required. At the Additional Housing Sites, the Ninth Avenue Site is currently a gravel-surface parking lot associated with NYCT operations and the Tenth Avenue Site is an Amtrak railroad cut. Although building design plans have not been developed at either of these locations, the construction of a platform would be required to facilitate development over the Amtrak rail line at the Tenth Avenue Site.

In addition, due to the shallow depth to groundwater (i.e., 3 to 15 feet below grade surface) at all project sites, it is likely that dewatering would be necessary during excavation for basements and building supports. The potential of encountering contaminated groundwater therefore exists. Chapter 21, "Construction Impacts," provides more details on construction methods, sequencing, and impacts that could be associated with the Proposed Actions.

PRINCIPAL CONCLUSIONS

Based on the findings and conclusions of the environmental assessments completed for the three project sites, the Proposed Actions are not anticipated to result in a significant adverse impact with respect to hazardous materials. With the implementation of the following remediation and protective measures, the risk of exposure to contaminated soil and groundwater would be minimal:

- Prior to any excavation or construction activity prepare a site-specific Construction Health and Safety Plan (CHASP) describing precautionary measures and safety procedures to be followed to minimize pathways of exposure to contaminants, including a Materials Handling Plan identifying specific protocols and procedures to be employed to manage the contaminated soil and groundwater at the Development Site and at both the Ninth Avenue and Tenth Avenue Additional Housing Sites in accordance with applicable regulations. For the Development Site, the requirement for a CHASP will be included in the Restrictive Declaration. For the Additional Housing Sites, the requirement for a CHASP will be included in a Memorandum of Understanding (MOU) between the New York City Department of City Planning (DCP), the New York City Department of Housing Preservation and Development (HPD), and the New York City Department of Environmental Protection (DEP);
- Install appropriate vapor mitigation systems to protect buildings in "terra firma" on the Development Site and the Ninth Avenue Site. If required, the design of new buildings at both sites would consider soil vapor mitigation measures to prevent any volatile contaminants that may remain present in the soil and groundwater from migrating into the buildings. The Restrictive Declaration for the Development Site and the MOU for the Ninth Avenue Additional Housing Site will include these vapor mitigation requirements. Those documents will specify that, based upon further testing and review of any additional analytical data, the Developer (for the Development Site) and HPD (for the Ninth Avenue Additional Housing Site) will have the opportunity to demonstrate to DEP's satisfaction which of these measures are required.
- Install appropriate permanent ventilation systems for areas under the platform at the Development Site in accordance with LIRR's engineering design criteria for yard ventilation.

In summary, the initial evaluation of hazardous materials on the project sites was completed through Phase I ESAs and Phase II ESIs. Contamination was confirmed in the subsurface soils at the Development Site and the Ninth Avenue Site. Based on the results of the Phase I ESA, no contamination is anticipated at the Tenth Avenue Site. With the implementation of a variety of health and safety precautionary and/or remedial measures, no significant adverse impact related to hazardous materials are expected to occur during construction activities at any of the three project sites. In addition, with the implementation of appropriate vapor mitigation and ventilation systems, there would be no further potential for a significant adverse impact from volatile contaminants in the soil and groundwater during the operational phase of the Proposed Actions.

B. METHODOLOGY

PHASE I ESA

OBJECTIVES AND PROCEDURE

The *City Environmental Quality Review (CEQR) Technical Manual* ("*CEQR Technical Manual")* defines a hazardous material as "any substance that poses a threat to human health or the environment." Such substances include, but are not limited to metals; volatile organic compounds (VOCs) commonly found in petroleum products and solvents; semi- volatile organic compounds (SVOCs) typically associated with fuel oil, coal, and ash; and polychlorinated biphenyls (PCBs) usually associated with transformers and utilities. Hazardous materials also include substances used in building materials and fixtures, such as asbestos-containing material (ACM), lead-based paint (LBP), and mercury, and, more rarely, radon, which occurs naturally or in soils contaminated with certain industrial wastes.

The presence of hazardous materials or contamination does not necessarily indicate a threat to human health and/or the environment; a means of an exposure pathway, a receptor, and an unacceptable dose must also be present to cause a threat. The most likely routes of human exposure to hazardous materials contaminants are the inhalation of VOCs, the ingestion of particulate matter containing SVOCs or metals, or dermal (i.e., skin) contact with soils or sediments containing elevated levels of contaminants during construction activities. Following construction of the proposed buildings at the project sites, the principal potential pathway of concern would be the possible intrusion of vapors into the buildings from VOCs and SVOCs if any persist in the soil or underlying groundwater.

The Phase I ESAs identified the presence or likely presence, use, or release of hazardous substances or petroleum products from past or present uses. Each included a field reconnaissance, site interviews, and a review of relevant environmental documents and reports previously prepared for each site, as well as a review of historic maps, regulatory records, and available topographic and geologic or hydrogeologic data for the project sites and surrounding area.

The Phase I ESAs also included a preliminary evaluation of other potential environmental issues or conditions, such as radon, ACM, LBP, and PCB-containing equipment. These studies were conducted in accordance with the American Society for Testing Materials (ASTM) E-1527 Standard Practice for Environmental Site Assessments and included:

- Visual surveys of the properties and on-site facilities to identify current uses and assess existing conditions;
- Interviews with site owners, tenants, and staff whenever possible;
- Visual surveys of adjacent properties from public rights-of-way;
- Evaluation of prior land uses through reviews of available historical maps;
- Reviews of federal and State regulatory databases for environmental records listed pertaining to each of the project sites and surrounding areas within applicable ASTM search distances;
- Reviews of electronic New York City Department of Buildings (DOB) and New York City Fire Department (FDNY) files for pertinent information, including historic and current petroleum tanks;

- Reviews of previous studies completed, whenever possible; and
- Reviews of available geologic, hydrologic, hydrogeologic, and topographic information from existing data sources.

POTENTIAL CONTAMINANTS OF CONCERN

Soil and groundwater can become contaminated as a result of past or current activities on site or on adjacent areas. For example, railroad and related activities use, store, or generate contaminated materials that can be spilled, dumped, or buried. Other uses such as gas stations and auto repair shops that occur in mixed-use neighborhoods can also result in contamination due to improper management of raw product or waste materials, or inadvertent spills. Subsurface soil or groundwater contamination may remain undetected for many years without posing a threat to nearby workers, residents, passersby, or other receptors. However, excavation, earthmoving, dewatering, and other construction activities can expose the contaminants, provide a pathway of exposure, and, if such contaminants are not properly managed, introduce a potential risk of exposure to construction workers and nearby receptors. Contaminants that are typically encountered in the soil or underlying groundwater include VOCs, SVOCs, pesticides and herbicides, and metals. In addition, demolition or disturbance of existing structures with ACM, LBP, or PCB-containing electrical equipment also has the potential to release contaminants if these building materials are not properly managed.

Based on the past and current uses and activities on each of the project sites, the potential contaminants of concern were primarily related to subsurface soils containing VOCs and SVOCs as a result of petroleum product spills or historic fill material being deposited on-site, a common occurrence in urban areas. The results of the Phase I ESAs indicated that further investigation (a Phase II ESI) was warranted at the Development Site and Ninth Avenue Site, but that a Phase II ESI was not needed at the Tenth Avenue Site.

PHASE II ESI AND REMEDIAL INVESTIGATIONS

The sampling investigation program for the Development Site's 2004 Sampling Program included:

- Installation of 45 soil borings with collection and laboratory analysis of 175 soil samples;
- Screening of soil samples for VOCs and methane; and
- Collection and laboratory analysis of 11 groundwater samples.

The sampling investigation program for the Ninth Avenue Site included the installation of 12 soil borings and nine groundwater monitoring wells with collection and laboratory analysis of soil and groundwater samples during the 1997 Metropolitan Transportation Authority (MTA) Sampling Program. Subsequent sampling investigations between 2000 and 2006 included:

- Installation of 23 soil borings, six test pits, and nine groundwater monitoring wells with collection and laboratory analysis of 40 soil samples;
- Screening of soil samples for VOCs and methane; and
- Collection and laboratory analysis of 21 groundwater samples.

Results of these sampling investigations are detailed in Section C, "Existing Conditions."

REGULATIONS AND GUIDELINES

The U.S. Occupational Safety and Health Administration (OSHA) has established permissible exposure limits (PELs) for workers who are exposed to airborne particulates, and certain levels of organic and chemical vapors. Other agencies, such as DEP, DEC, New York State Department of Labor (DOL), and the U.S. Environmental Protection Agency (EPA), have set enforceable criteria to protect the public and the environment. Soil and groundwater standards and reference values are generally based on risks associated with either long-term direct contact (ingestion, inhalation, or dermal contact) or the potential impacts associated with groundwater used as a drinking water source. The standards and guidelines that are summarized below include hazardous waste regulations established by EPA, soil reference values and groundwater standards established by DEC, and other relevant regulations, standards, or guidelines for the removal of petroleum storage tanks, ACM, LBP, and PCBs.

OSHA PERMISSIBLE EXPOSURE LIMITS

OSHA sets PELs to protect workers from the health effects of short-term and long-term exposure to hazardous substances. PELs are enforceable regulatory limits on the amount or concentration of a chemical substance in the air and can also contain a skin designation. OSHA PELs are based on an 8-hour exposure. PELs for approximately 500 contaminants have been established and are set forth in OSHA'S regulations, codified at 29 CFR 1910.1000.

HAZARDOUS WASTE REGULATIONS

As defined by the Federal Resource Conservation and Recovery Act (RCRA), waste can be classified as being "hazardous waste" if it contains one of the federally "listed wastes" in the EPA's regulations (40 CFR Part 261, "Identification and Listing of Hazardous Waste") or if it has one of the four characteristics of hazardous waste: (1) ignitability, (2) reactivity, (3) corrosivity, or (4) toxicity. EPA has developed standard tests to measure these four characteristics. Toxicity, the one most frequently exceeded by contaminated soils, is tested using the Toxicity Characteristic Leaching Procedure (TCLP), which provides a conservative estimate of the concentration of contaminants that could leach into the groundwater if the material were disposed of in an unlined landfill. Based on the federal RCRA requirements, DEC promulgated similar regulations on hazardous waste in Title 6, New York Codes, Rules and Regulations (6 NYCRR) Part 371. The RCRA toxicity characteristic regulatory limits are listed in Table 12-1.

SOIL REFERENCE VALUES

Except for specific contaminants and circumstances, neither the federal government nor New York State has promulgated a comprehensive set of numerical standards for the evaluation of environmental impacts caused by chemical contaminants in soils. Therefore, guidance or reference values are used to determine whether soils require special management. The reference values have not undergone the rigorous analyses required for regulatory standards and in many cases are not directly applicable to the exposure pathways associated with the Proposed Actions. The DEC Division of Hazardous Waste Remediation's Technical and Administrative Guidance Memorandum (TAGM) #4046, "Determination of Soil Cleanup Objectives and Cleanup Levels," January 1994 (amended in December 2000) addresses contaminants in soil (i.e., VOCs, SVOCs, metals, PCBs, pesticides, and herbicides) from any potential source and includes guidance values for each potential contaminant of concern. In general, contaminants detected in soils are compared to the TAGM #4046 recommended soil cleanup objectives (RSCOs).

Table 12-1
RCRA Toxicity Characteristic Regulatory Limits

Volatile Organics	mg/l	Pesticides	mg/l
Benzene	0.5	Chlordane	0.03
Carbon tetrachloride	0.5	Endrin	0.02
Chlorobenzene	100.0	Heptachlor	0.008
Chloroform	6.0	Heptachlor epoxide	0.008
1,2 Dichloroethane	0.5	Lindane	0.4
1,1 Dichloroethylene	0.7	Methoxychlor	10.0
Methyl ethyl ketone	200.0	Toxaphene	0.5
Tetrachloroethylene	0.7	**Herbicides**	**mg/l**
Trichloroethylene	0.5	2,4-D (Dichlorophenoxyacetic acid)	10.0
Vinyl chloride	0.2	2,4,5-TP (Silvex)	1.0
Acid Extractables	**mg/l**	**Metals**	**mg/l**
o-cresol	200.0	Arsenic	5.0
m-cresol	200.0	Barium	100.0
p-cresol	200.0	Cadmium	1.0
Cresol	200.0	Chromium	5.0
Pentachlorophenol	100.0	Lead	5.0
2,4,5-Trichlorophenol	400.0	Mercury	0.2
2,4,6- Trichlorophenol	2.0	Selenium	1.0
		Silver	5.0
Base Neutrals	**mg/l**	**Base Neutrals**	**mg/l**
1,4 Dichlorobenzene	7.5	Hexachloroethane	3.0
2,4 Dinitrotoluene	0.13	Nitrobenzene	2.0
Hexachlorobenzene	0.13	Pyridine	5.0
Hexachlorobutadiene	0.5		

Note: mg/l = milligrams per liter in leachate generated from toxicity characteristic leaching procedure.
Source: 40 CFR Part 261 <*Federal regulations*> or 6 NYCRR Part 371 <*NYS regulations*>

WATER STANDARDS AND REGULATIONS

Contaminated groundwater can be encountered during excavation or dewatering activities. Although groundwater is not used for drinking water supply in Manhattan, DEC's drinking water standards, codified in 6 NYCRR Part 703, are used as reference values to evaluate groundwater quality. In cases where there are no regulatory standards for a specific contaminant present in the groundwater, DEC has developed guidance values for maximum contaminant levels that are listed in the Division of Water Technical and Operational Guidance Series (TOGS) 1.1 guidance document. These potable water quality standards (also known as "Class GA" standards) or guidance values are among the most stringent in the nation. Although these standards or guidance values are intended for public drinking water supplies, they are generally applied by DEC to all groundwater and are used to evaluate overall water quality.

DEC has also implemented the State Pollutant Discharge Elimination System (SPDES) program, which provides permit requirements and effluent limitations for discharges to the waters of the State, including stormwater discharges. The DEC SPDES permitting program was established to implement the Clean Water Act and water quality standards promulgated by EPA. DEP's Bureau of Wastewater Pollution Control has established regulations limiting the concentrations of certain constituents in effluent discharged to the municipal sewer system. DEP's regulations are based, for the most part, on the effect of the contaminants on the receiving waters or treatment plant. Before discharging to the sewer, a permit or approval from DEP is generally required.

PETROLEUM STORAGE TANKS

Site clearing, excavating, and building demolition can lead to the discovery of underground or aboveground storage tanks. The removal of such petroleum bulk storage tanks is regulated by DEC in 6 NYCRR Part 613.

FUGITIVE DUST CONTROL MEASURES

Fugitive dust is defined as particulate matter—a generic term for a broad class of chemically or physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes—which become airborne and contribute to air quality as a nuisance and threat to human health and the environment.

Solid waste containing hazardous materials contaminants would require special handling, storage, transportation, and disposal methods to minimize potential impacts on human health or the surrounding environment. DEC has developed implementation guidelines to minimize the migration of fugitive dust at sites that contain elevated concentrations (e.g., above regulatory standards or recommended soil cleanup objectives, or RSCOs listed in TAGM #4046) in TAGM #4031, "Fugitive Dust Suppression and Particulate Monitoring Program."

If deemed necessary, the implementation of a New York State Department of Health (DOH)-approved Community Air Monitoring Plan (CAMP) is used to confirm the effectiveness of the fugitive dust control measures that are developed.

ACM, LBP, AND PCB REGULATIONS AND STANDARDS

Asbestos can be encountered through alteration or demolition of buildings or other structures. The proper abatement and disposal of ACMs is addressed by Article 30 of the State of New York Labor Law—Industrial Code Rule #56 in 12 NYCRR Part 56 and the requirements of the DEP Title 15 regulations. Handling and disposal of ACM would conform to OSHA 29 CFR 1926.1101, New York State Department of Transportation (NYSDOT) 49 CFR Parts 171, 172 and 173, and EPA 40 CFR Part 61.

LBP may be present in buildings and on other structures. Surfaces coated with LBP require proper removal of paint that would generate unacceptable levels of lead-containing dust or vapors when disturbed. Lead dust could be generated through mechanical processes (e.g., scraping, demolition, scarification, etc.). Lead fumes could be generated through the heating of materials that are coated with lead-based paint. In all cases, an exposure assessment would be performed before demolition and construction. If the exposure assessment indicates the potential that airborne dust or vapor fumes exceeding health-based standards for lead would be generated, appropriate types of personal protection equipment (PPE) would be employed to counteract the exposure. In addition, different work practices could be required as a precautionary measure to protect on-site construction workers and the public. This would be done in accordance with applicable U.S. Housing and Urban Development (HUD) regulations, and other applicable federal, State, and City regulations.

Suspect PCB-containing equipment such as electric transformers would be surveyed and evaluated before demolition or renovation work. PCB-containing equipment that would be disturbed by the work would be removed and disposed of in accordance with 40 CFR Part 761 and other applicable federal, State, and local regulations.

C. EXISTING CONDITIONS

DEVELOPMENT SITE

The Development Site is bounded on the north by West 33rd Street, on the south by West 30th Street, on the west by Twelfth Avenue, and on the east by the Eleventh Avenue viaduct. The Western Rail Yard comprises the LIRR commuter train storage yard, a private bus company parking lot, a DSNY truck parking lot, fueling and wash station, a NYCT storage area, and an elevated freight railroad viaduct that is no longer operable (the "High Line").

The history of the Western Rail Yard was assessed through the review of aerial photographs and Sanborn Maps. Aerial photographs were reviewed for the following years: 1940, 1951, 1961, 1969, 1974, 1976, 1988, and 2002. Sanborn Maps were reviewed for the following years: 1890, 1899, 1911, 1930, 1950, 1976, 1979, 1980, 1982, and 1992 to 1996.

According to historical maps and other available historical documentation, much of the Development Site originally comprised riverbanks and adjacent wetland areas of the Hudson River before the industrial development in the early 19th century. During this period, significant railroad use was necessary to facilitate expanding shipping-, manufacturing-, and transportation-related industries, including the area of what is now the Development Site. Early development around the Development Site was a mix of small industries, metal works, lumberyards, sawmills, hay and freight depots, stockyards, meat processing and packing facilities, and gas tanks interspersed among row houses.

The Development Site was used as freight yards in the late 1800s by the New York Central and Hudson River Railroad Company and the New York Ontario and Western Railroad Company. Rail use increased in the early part of the 20th century, with the development of the passenger rail tunnel under the Hudson River to a new station located at West 33rd Street and Seventh Avenue. And from 1927 through the 1930s, the City implemented the West Side Improvement Project, which resulted in the elevation of Eleventh Avenue on a viaduct alongside the Development Site, the construction of the High Line in its present position on the west and south edges of the Development Site, construction of the elevated Miller Highway on Twelfth Avenue, and a number of changes to existing railroad operations, including electrification (see Chapter 8, "Historic Resources," for details).

Based on a review of the Sanborn Maps and aerial photographs, the Western Rail Yard was used as a freight yard for the offloading of materials from rail cars to local transportation by the New York Central Railroad Company from 1890 through the early 1980s, at which time it was converted to a storage yard for LIRR trains. A lumberyard was present on the southern portion of the site from 1890 to 1911. Thirty-seven tracks were identified running in an east-west direction through the site by 1890. Tracks were generally identified as running along West 33rd Street, between West 33rd Street and West 32nd Street, along West 32nd Street, and along West 31st Street. Sixteen freight sheds (eight eastbound and eight westbound) were identified on the block between West 31st and West 32nd Streets. Tracks were located north and south of the freight sheds, and the area between the freight sheds was identified as the New York Central and Hudson River Railroad Company, New York Ontario and Western Railroad Company Street Freight Station. The use of these sheds appears to have been for the offloading of materials from rail cars to local transportation.

By 1950, the freight sheds in the Western Rail Yard were no longer present and the property was identified as the New York Central Railroad Company Freight Yard. The general layout of the

tracks appears to be the same after 1976 but with fewer tracks (28). A freight terminal building was present in the northern portion of the Western Rail Yard from 1976 to the early 1980s. The western portion of the freight terminal building was used as a motor freight station, which was likely for the transfer of goods or materials from local transport to rail cars.

The High Line, which was constructed in 1934 as an elevated freight rail line, can be seen along the western and southern perimeter of the site in the 1950 Sanborn Map.

A review of the aerial photographs show that use of the Development Site for shipping and receiving decreased after 1961.

In the 1980s, the portion of the site located between West 31st Street (demapped) and West 33rd Street was redeveloped for use by LIRR as a commuter train storage and maintenance yard. The redevelopment consisted of the removal of pre-existing tracks, the construction of an approximately 12 to 18-inch slab over the entire rail yard, and the installation of new tracks that continue to New York City's Penn Station and beyond. The southern portion of the Development Site was paved and has been used for vehicle parking and storage.

Current properties adjacent to the Western Rail Yard include the Jacob K. Javits Convention Center truck marshalling lot to the north; a parking lot, a filling station, a truck rental company, and an auto repair garage to the south; the Eastern Rail Yard to the east; and Route 9a/Twelfth Avenue to the west. Adjacent properties identified as Recognized Environmental Conditions (RECs) are as follows:

- On the block south of the Development Site, a lumberyard was identified on historic Sanborn maps from 1890 to 1899; a coal yard on the map from 1911; a garage and a filling station on the map from 1950, and a truck rental company, filling station, garage, and motor freight station on maps from 1975 to 1996;
- On the train yard on the block east of the Development Site, a coal yard, locomotive house, and iron works were identified on the historic Sanborn map from 1890; a coal yard and locomotive house on maps from 1899 to 1911; a locomotive house on the map from 1930; and a metals purchasing company on the map from 1950; and
- Two off-site properties within 0.125 miles of the Development Site were identified in each of the LTANKS and NY Spills databases with open/active cases spills.

No historic properties of environmental concern were identified on the Sanborn Maps north or west of the Development Site.

SUBSURFACE INVESTIGATION RESULTS

As a result of the findings of the Phase I ESA completed in 2004, a work plan for a Phase II ESI was developed to collect samples of subsurface soil and groundwater. Specifically, 45 soil borings were advanced to a maximum depth of 45 feet below ground surface (bgs) and 11 groundwater monitoring wells were installed. In general, the geology underlying the Development Site consists of unconsolidated materials overlying bedrock. The unconsolidated materials comprise historic urban fill, organic material, sand and silt, and glacial till. The depth of the historic urban fill varies throughout the property (PB, 2004).

Soil sampling results were compared to the RSCOs contained in DEC TAGM #4046. The soil sampling results revealed no exceedances of the RSCOs for pesticides, herbicides, or PCBs. Also, no above-background levels of methane were detected, and none of the samples exhibited toxicity levels above RCRA hazardous waste characteristics. Nine soil samples containing levels

of benzene ranging from 96 to 2,200 parts per billion (ppb) were detected above the RSCO of 60 ppb. Three of these nine samples also exhibited levels of ethylbenzene, ranging from 15,000 to 120,000 ppb, above the RSCO of 5,500 ppb. Sampling revealed the presence of SVOCs, including, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, indeno(1,2,3-c,d)pyrene, pyrene, acenapthene, and phenanthrene at concentration levels exceeding their respective RSCOs. The compounds detected were part of the group of SVOCs known as polycyclic aromatic hydrocarbons (PAHs), formed during incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. Benzo(a)pyrene, a known carcinogen, ranged from not being detected to 30,000 ppb in the samples, many of which exceeded the RCSO of 61 ppb. Metals detected at levels above their respective RSCOs included arsenic, barium, beryllium, cadmium, chromium, copper, lead, magnesium, mercury, nickel, selenium, and zinc.

- Lead was detected throughout the site, ranging from 0.18 to 4,410 parts per million (ppm), many of which exceeded the RSCO of 200 to 500 ppm.
- Arsenic ranged from not detected to 65.8 ppm, many of which exceeded the RSCO of 3 to 12 ppm.
- Cadmium ranged from not detected to 19 ppm, many of which exceeded the RSCO of 0.1 to 1.0 ppm.
- Chromium ranged from 1.93 to 29,100 ppm, many of which exceeded the RSCO of 1.5 to 40 ppm.
- Mercury ranged from not detected to 75.1 ppm, many of which exceeded the RSCO of 0.001 to 0.2 ppm.

Groundwater sampling results were compared to DEC's "Class GA" Water Quality Standards or Guidance Values. No pesticides, herbicides or PCBs were detected in the groundwater samples. VOCs (i.e., benzene, ethylbenzene, total xylenes, and toluene) and SVOCs (i.e., naphthalene, 2-methylphenol, 4-methylphenol, and several polyaromatic hydrocarbons) were detected in two of the samples analyzed at concentration levels above "Class GA" standards or guidance values, which may reflect the presence of isolated petroleum contamination (VOCs) and creosote (SVOCs).

Metals exceeding the groundwater criteria included arsenic, barium beryllium, chromium, copper, magnesium, manganese, lead, and mercury. However, the contaminant levels encountered were consistent with those typically found in urban groundwater—in particular, areas with historic fill. Additionally, during the sampling event, field screening identified high turbidity levels. The presence of elevated metals is likely attributable to metals in suspended particles within the groundwater samples rather than attributable to specific releases or spills.

In addition to the "Class GA" comparisons, the groundwater sampling results were also compared to DEP's Effluent Discharge Limitations to sewers. Analytical results indicate that groundwater would likely require treatment prior to its discharge to meet DEP groundwater discharge criteria.

Other hazardous materials not sampled in the Phase II ESI may be present in the buildings/structures and small aboveground facilities at the Development Site, including ACM, LBP, and PCB-containing equipment. It is noted, however, that it is unlikely the presence of such building materials contaminants are contained within the three structures located on the western end of property. A review of the Sanborn maps show that these structures were built in the mid-1980s and consist of concrete and metal panels.

Generally, the soil sampling results were consistent with the presence of historic urban fill, which was expected at the Development Site. However, in two instances (spill cases 04-07107 and 04-07411), potential petroleum impacts were noted through field screening and DEC was notified. Laboratory analyses revealed no elevated levels of VOCs or SVOCs in the former case; the DEC was therefore requested to close spill case 04-07107. The spill case was reported closed by DEC on April 6, 2006.

In spill case 04-07411, located on the sidewalk southeast of the intersection of Twelfth Avenue and West 33rd Street, contamination consistent with petroleum was confirmed by laboratory analysis. This spill is subject to a December 2006 Consent Order between LIRR and DEC requiring implementation of a Site Investigation Work Plan and, if DEC determines that it is necessary, subsequent implementation of an appropriate Remedial Action Plan (RAP). Both plans require prior DEC approval. Following implementation of any required RAP, a Final Engineering Report would need to be submitted to and approved by DEC before the spill could be administratively closed.

A review of the sampling results for the soil and groundwater in the segment along Twelfth Avenue immediately adjacent to the Development Site (as summarized in the *Route 9AReconstruction Project FEIS*), did not reveal any additional information with regard to the nature and extent of subsurface contaminants identified in this area. Based on the findings of the Phase II ESI, the contamination identified raises no unique environmental concerns and would require protective measures to be employed during construction that are typically used at many New York City construction sites, as discussed in Section F, "Summary of Management Measures."

NINTH AVENUE SITE

The Ninth Avenue Site is located at the southeastern corner of West 54th Street and Ninth Avenue in Manhattan (Block 1044, Lot 3—western one-third of the lot). The Ninth Avenue Site is rectangular in shape and is currently utilized as a parking lot associated with the NYCT rail control center located on the remaining eastern two-thirds of the lot. No structures are present on the Ninth Avenue Site.

The entire parcel has been used for transportation-related operations since the late 1800s when it operated as a streetcar barn and stable. The parcel was eventually occupied by NYCT and operated as the 54th Street Bus Depot, which was demolished between 1996 and 1997 to allow for construction of the current NYCT rail control center. During demolition activities, eight underground storage tanks (USTs) containing diesel, gasoline, lube oil, and transmission fluids were removed from the property. The USTs were all formerly located under the footprint of the existing rail control center. Petroleum-contaminated soil was discovered during the removal activities, and the release was reported to DEC (Spill Case 96-13939). Following an initial round of sampling in 1997, subsequent rounds of subsurface sampling were performed in accordance with a Global Consent Order that was signed between NYCT and DEC in May 2001 to address the subsurface contamination issues.

ADJACENT AREA

The land uses of the surrounding properties comprise a mix of residential, commercial, and office-related uses. To the south are residential properties. To the west, across Ninth Avenue, and to the north, across West 54th Street, are several large multi-story commercial buildings. No RECs have been identified in the adjacent properties.

SUBSURFACE INVESTIGATION RESULTS

Multiple rounds of sampling were performed at the Ninth Avenue Site between 1997 and 2006. An initial round of sampling was performed in 1997 to characterize subsurface conditions as a result of the reported spill (DEC Spill Case 96-13939) followed by subsequent sampling programs in 2000, 2003, 2005, and 2006.

Results from the sampling and investigative activities conducted by NYCT at the Ninth Avenue Site between 1997 and 2006 indicate groundwater is present at a shallow depth (i.e., 7.5 to 12.5 feet bgs) with a hydraulic gradient to the west-southwest. A layer of urban fill exists (i.e., five to seven feet in thickness) on top of a fine silty natural sand deposit with some clay. Bedrock was encountered at approximately 20 feet bgs.

Soil contamination was revealed in both the saturated and unsaturated zones. No buried USTs are known to exist on the western end of the property; however, the presence of petroleum-impacted soils and suspected fuel pipelines suggest a release associated with the piping. Benzene was detected at concentrations above the TAGM RSCO of 60 ppb in two soil samples, with a maximum of 120 ppb encountered in 2003. Total xylene was detected at concentrations above the TAGM RSCO of 1,200 ppb in two soil samples, with a maximum of 1,800 ppb encountered in 2005. Other VOC constituents that were detected at concentrations above the TAGM RSCOs include 1,2,4-trimethylbenzene, isopropylbenzene, n-butylbenzene, n-propylbenzene, naphthalene, and sec-butylbenzene. In the 2003 sampling round, naphthalene was detected in one of the soil samples at 14,000 ppb slightly above the TAGM RSCO of 13,000 ppb. Other SVOC constituents detected at concentrations above the TAGM RSCOs include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and dibenz(a,h)anthraxcene. The SVOC constituents detected are interpreted to be associated with urban fill material and are not suspected to be the result of a petroleum release.

In addition, groundwater contamination was revealed in both on-site and off-site monitoring wells. Elevated levels of VOCs, including methyl tert-butyl ether (MTBE) and benzene, as well as SVOCs, have been detected in the groundwater samples. MTBE, a gasoline additive, was detected at concentrations above the "Class GA" water quality guidance value of 10 µg/l in 12 groundwater samples, with a maximum of 2,300 µg/l encountered in 2003. Benzene was detected at concentrations above the "Class GA" water quality standard of 1 µg/l in nine groundwater samples, with a maximum of 120 µg/l encountered in 2003. Other VOC constituents that were detected above the water quality standards and guidance values listed in TOGS include toluene, ethylbenzene, total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropylbenzene, n-butylbenzene, n-propylbenzene, p-cymene, and sec-butylbenzene. Naphthalene, a SVOC constituent, was detected at concentrations above the "Class GA" water quality standard of 10 µg/l in nine groundwater samples, with a maximum of 40,000 µg/l encountered in 2006. The only other SVOC constituent detected above the applicable TOGS guidance value was benzo(g,h,i)perylene.

As a result of the findings of the subsurface investigations, a remedial approach using in-situ chemical oxidation techniques was selected by NYCT (URS, 2006c). However, the contamination identified raises no unique environmental concerns and would require protective measures to be employed during construction that are typically used at many New York City construction sites, as discussed in Section F, "Summary of Management Measures."

As of August 2008, two rounds of chemical treatments were applied at injection points throughout the property. An additional injection round has been recommended by NYCT's

contractor since elevated levels of VOCs and SVOCs remained in the soil. In accordance with the DEC Global Consent Order, dated May 2001, remediation activities will continue to take place until the cleanup objectives are met.

TENTH AVENUE SITE

The Tenth Avenue Site comprises the western half of the property located at 713 Tenth Avenue in the west side of Manhattan (Block 1077, portion of Lot 29). It is a rectangular area within Lot 29 that consists of an Amtrak railroad cut. The remainder of lot 29 is being utilized by the DEP for the construction of a shaft to access the Third Water Tunnel. Three sets of railroad tracks are the only improvements present at the Tenth Avenue Site. The tracks are generally oriented in a north-south direction and are situated approximately 20 feet below grade. West 49th Street and West 48th Street form overpasses over the railroad tracks to the north and south, respectively. The Tenth Avenue Site is fenced to the east and west. Some miscellaneous trash was observed along the railroad tracks, as well as at the top and sides of the rocky embankment. A small amount of vegetative growth is present along the top of the embankment. The Tenth Avenue Site has been occupied by railroad tracks since at least 1943, based on a review of historical aerial photographs. Prior to this, the site was used for mixed residential and commercial purposes. A historic REC was noted in the Phase I ESA due to the prior commercial uses on the entire lot. However, it could not be determined whether these commercial establishments used the portion of the lot comprising the Tenth Avenue Additional Housing Site. Assuming that was the case, the depth of the railroad cut (approximately 20 feet) combined with the shallow depth to bedrock, would make it unlikely that any contamination from these facilities would remain on-site at the Tenth Avenue Additional Housing Site. Therefore, no current RECs have been identified in connection with the Tenth Avenue Site.

The property located directly adjacent to the east of the Tenth Avenue Site is being utilized by the DEP for the construction of a shaft to access the Third Water Tunnel in association with the Manhattan Tunnel Project. A mixture of residential and commercial land uses are present farther east, across Tenth Avenue, to the north across West 49th Street, to the south across West 48th Street and to the west. No RECs have been identified in the adjacent properties.

SUBSURFACE INVESTIGATION RESULTS

No sampling investigations (e.g., Phase II ESI) have been completed at the Amtrak railroad cut site, because it was not deemed necessary based on the findings of the Phase I ESA.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS

In the Future without the Proposed Actions, the Development Site is not expected to experience substantial change because of the existence of the open rail yard. Further investigation and, if necessary, remediation of the petroleum spill (case 04-07411), in accordance with the requirements of the Consent Order between DEC and LIRR would occur. At the Ninth Avenue Site, future development would not likely occur until the cleanup objectives described in the Consent Order between DEC and NYCT have been met. To date, VOCs and SVOCs are still present in the underlying soil and groundwater at concentration levels above the cleanup criteria established in the consent order. As such, an additional injection round of chemical oxidation treatment has been recommended to reduce contaminant levels in the underlying soil and groundwater. The Tenth Avenue Site is also not expected to experience substantial change without the Proposed Actions because of the existence of the open Amtrak rail cut.

Overall, without the Proposed Actions, there would be a lower potential for disturbance of hazardous materials, but, unlike conditions in the Future with the Proposed Actions, there would be less remediation of hazardous materials.

E. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

Construction resulting from the Proposed Actions would involve both the demolition or disturbance of existing structures and a variety of earthmoving or excavating activities with the potential of encountering subsurface soil contamination. Groundwater depth at the three project sites are relatively shallow (i.e., 3 to 15 feet bgs) and therefore may be encountered during earthmoving or excavation activities.

The presence of hazardous materials contamination only threatens human health or the environment when exposure to such contaminants occurs. Even in these situations, a health risk requires both an exposure pathway to the contaminants and a sufficient dose to cause adverse health effects. To prevent such exposure, the Proposed Actions would include appropriate health and safety, investigative, or remedial measures (conducted in compliance with both DEC Consent Order agreements, as well as applicable laws and regulations and conforming to appropriate engineering practice) that would be implemented before, and remain in place after, demolition and soil disturbance. These measures are discussed more fully in Section F, "Summary of Management Measures," and would include:

- Development of a CHASP for site remediation and excavation that would include detailed procedures for managing both known contamination issues and any unexpected issues. The CHASP would include a Materials Handling Plan identifying specific protocols and procedures to be employed to manage the contaminated soil and groundwater at the Development Site and both the Ninth Avenue and Tenth Avenue Additional Housing Sites. The CHASP would also include procedures for avoiding the generation of dust that could affect the construction workers on-site and the surrounding community as well as the monitoring necessary to ensure that no such impacts occur. For the Development Site, the requirement for a CHASP will be included in the Restrictive Declaration. For the Additional Housing Sites, the requirement for a CHASP will be included in a MOU between DCP, HPD, and DEP.
- Installation of appropriate vapor mitigation systems to protect buildings in "terra firma" on the Development Site and the Ninth Avenue Site. If required, based upon the proposed building parameters (e.g., building layout, foundation type, operation of HVAC systems, etc.) and environmental influencing factors (e.g., current soil and groundwater conditions, underground conduits, contaminant source location and concentration, etc.), the installation of appropriate vapor intrusion control systems or barriers would be considered for the design of the new buildings. The Restrictive Declaration for the Development Site and the MOU for the Ninth Avenue Additional Housing Site would include these vapor mitigation requirements. Those documents would specify that based upon further testing and review of any additional analytical data, the Developer (for the Development Site) and HPD (for the Ninth Avenue Additional Housing Site) would have the opportunity to demonstrate to DEP's satisfaction that some or all of these measures are not required.
- Installation of appropriate permanent ventilation systems for areas under the platform at the Development Site in accordance with LIRR's engineering design criteria for yard ventilation. The Developer would be responsible for analyzing, designing, and installing a complete ventilation system for the enclosed area created by the overbuild. The purpose of

this ventilation system would be to maintain environmental quality in the Western Rail Yard by dissipating the heat generated by the enclosure and the operational and site emissions below. The ventilation system would be designed to maintain the interior space at a maximum of 10 degrees Fahrenheit above the ambient temperature and provide continuous air exchange throughout the day (i.e., ranging from zero to eight air exchanges per hour). The system would provide a constant suitable work environment for LIRR personnel in the Western Rail Yard and comply with the emergency ventilation requirements. The system would be designed to maintain the environment when the Western Rail Yard is completely filled with trains; and

- Procedures for pre-demolition or pre-disturbance removal of asbestos and appropriate management of LBP and of PCB-containing equipment would be developed if such contaminants are identified during a hazardous materials survey.

F. SUMMARY OF MANAGEMENT MEASURES

This section includes preventive and management procedures that would be followed to minimize exposure pathways to contaminants. These measures will be included in the Restrictive Declaration for the Development Site and the MOU for the Additional Housing Sites. To avoid adverse impacts on human health or to the environment, any such required action, investigation, or management would be conducted in accordance with applicable law and any additional regulatory requirements of DEC and DEP, as appropriate. Any hazardous materials encountered during construction would be managed, isolated, and/or removed in accordance with a CHASP described below and reflective of the Phase I ESA and Phase II ESI results. The CHASP also would include a Materials Handling Plan to identify measures to address any contaminated material that would not be removed as part of construction and therefore would remain in place. Such measures could include the implementation of impermeable barriers to achieve isolation from contaminants such as SVOCs. Elements of each CHASP would address health and safety, and would include management plans for soil, soil gas, groundwater, petroleum storage tanks, ACMs, LBP, and PCB-containing equipment. The provisions of the CHASP would be mandatory for contractors and subcontractors engaged in on-site construction activities.

As described above, subsurface contamination on the Development Site and Ninth Avenue Site has been identified. However, with the implementation of a variety of measures detailed below, no significant adverse impact related to hazardous materials are expected to occur due to the construction and operation of buildings resulting from the Proposed Actions.

FURTHER INVESTIGATIONS

Additional investigations would be undertaken, as appropriate, to evaluate the extent of soil, groundwater, and soil vapor contamination present at the Development Site and Ninth Avenue Site in accordance with relevant regulatory protocols for site investigations and remediation. Findings from these additional investigations would inform the appropriate course of action required to avoid or appropriately manage volatile contaminants present in the soil and groundwater from migrating upward into buildings at the Development Site and Ninth Avenue Site. If findings from the further investigations described above indicate that vapor controls would be required, building design plans would include environmental controls that are necessary to reduce the potential risk to future occupants of the new buildings.

EXISTING STRUCTURES

ACM MANAGEMENT PLAN

Proper handling, removal, and disposal of ACM is governed by federal requirements (OSHA 29 CFR 1926.1101, NYSDOT 49 CFR Parts 171-173, and EPA 40 CFR Part 61), New York State requirements (Labor Law Article 30—Asbestos or Products Containing Asbestos Licensing and 12 NYCRR Part 56 Asbestos Regulations), and New York City requirements (Rules of the City of New York Title 15—Handling and Disposal of Asbestos). Appropriate engineering controls (e.g., wetting and other dust control measures) to minimize asbestos exposure would be implemented, if necessary, prior to and throughout demolition and renovation.

LBP MANAGEMENT PLAN

If lead-coated surfaces are present, an exposure assessment would be performed to determine whether lead exposure occurs during the demolition. If the exposure assessment indicates the potential to generate airborne dust or fumes with lead levels exceeding health-based standards, a higher personal protection equipment standard would be employed to counteract the exposure. In all cases, appropriate methods to control dust and air monitoring, as required by OSHA, would be implemented during demolition activities.

HANDLING OF PCB-CONTAINING EQUIPMENT

Suspected PCB-containing equipment (e.g., transformers, electrical feeder cables, hydraulic equipment, and fluorescent light ballasts) would be surveyed and evaluated prior to building demolition or utility relocation. PCB-containing equipment that would be disturbed by the work would be removed and disposed of in accordance with applicable federal (40 CFR Part 761), State (6 NYCRR Parts 360–376), and local regulations. Unless suspected PCB-containing equipment is labeled to be "non-PCB," it must be tested or assumed to be PCB-containing and disposed of at properly licensed facilities.

SUBSURFACE DISTURBANCE

As described above, there is a potential to encounter subsurface hazardous materials contamination at the project sites during soil-disturbing activities. The necessary remediation associated with the known petroleum spill cases at the Development Site (04-07411) and the Ninth Avenue Site (96-13939) would be expected to be completed in accordance with stipulated provisions of the applicable DEC Consent Order before commencement of any work associated with the Proposed Actions. To the extent that cleanup activities are still continuing when subsurface disturbance is to begin for the Proposed Actions, the RAP for both spill sites would be modified, subject to DEC's approval, to incorporate the remaining activities into the project's construction procedures and documents. Whether or not the spill cases are administratively closed, detailed procedures would be incorporated into the Proposed Actions' construction documents to govern the excavation work and all other activities that would require subsurface disturbance. In consideration of the various types of materials (i.e., petroleum-contaminated soils, historic fill, or native materials) that may be encountered during subsurface excavation, the environmental commitments listed below would be included in the project's construction specifications. Preventive measures would be undertaken to protect the construction workers, nearby community residents, public safety and the environment. All activities would be performed in accordance with applicable City, State, and federal requirements.

CHASP

Prior to site excavation, a CHASP would be prepared to address both the known contamination issues (based on the Phase I and Phase II findings) and contingency items (e.g., finding unexpected petroleum storage tanks or petroleum-contaminated soil). The CHASP would describe in detail the health and safety procedures to minimize exposure of hazardous materials to the construction workers, nearby community residents, as well as the surrounding public and environment. The hazards of each of the project sites would be evaluated by determining the subsurface contaminants of concern and their chemical and physical characteristics, and the health hazards associated with the work to be performed. The CHASP would be developed in accordance with OSHA regulations and guidelines, and would be expected to include the elements described below.

Appropriate personnel would be designated to ensure that all requirements of the CHASP are implemented, including the staffing of a Health and Safety Officer (HSO) and an on-site Site Safety Officer (SSO). The HSO would oversee the SSO and be responsible for coordinating and reporting all health and safety activities. The HSO must have completed a 40-hour Hazardous Waste Operations (HAZWOPER) training course, supervisory training, and updated annual refresher courses pursuant to requirements codified in 29 CFR Part 1910, Occupational Safety and Health Standards. The SSO would be a highly competent person who is responsible for the implementation of the CHASP. The SSO would have the authority to stop work upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. If the HSO is to be absent from the site, the HSO would designate a suitably qualified replacement who is familiar with the CHASP.

The CHASP would require that on-site personnel are qualified and have received the required training. All those who enter the work area while intrusive activities are being performed must receive instruction regarding the potential hazards to health and safety. On entering the site, all construction personnel must attend a training meeting to:

- Make workers aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make workers aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the construction crew would be instructed in these objectives before entering the site. The HSO, SSO, or other suitably trained individuals would be responsible for conducting the training program. Others who enter the site must be accompanied by a suitably trained construction worker.

The CHASP would include contingency response plans. All excavation would be continuously monitored for the presence of buried tanks, drums, or other containers; sludges; or soil that shows evidence of potential contamination, staining, or odors. If any of these are detected, excavation in the area would inspected by the appropriate personnel, including the HSO. If warranted, the affected area would be cordoned off and no further work would be performed at that location until the appropriate contingency response plan described in the CHASP is implemented. All contingency response actions would be carried out in accordance with special contingency health and safety procedures.

An emergency response plan would also be included in the event that monitoring data indicate a potential major hazard, and protocols for reporting spills or other concerns to relevant governmental agencies would be defined.

To prevent the potential off-site dust migration, dust control measures would be implemented during all soil-disturbing activities. Water would be available on-site for sprinkling/wetting to suppress dust in dry weather, as necessary. Water would be used to suppress dust on haul roads, to wet equipment and excavation work faces, and to spray on buckets during excavation and dumping. All haul trucks would have tarp covers, and dust or mud would be removed from the truck's wheels before they leave the site. Vehicle speeds would be limited on the project sites. Any stockpiled excavated material would be securely covered with tarps or plastic sheeting to prevent air-borne fugitive dust emissions or contact with water limiting the generation of run-off.

WASTE MANAGEMENT

The CHASP also would include a Materials Handling Plan to address procedures for stockpiling, testing, loading, transporting (including truck routes), and properly disposing of all excavated material. It is possible that some excavated material would be characterized "in-situ," i.e., sufficient sampling would be performed to classify the material (e.g., as hazardous waste, petroleum-contaminated waste, historic fill containing construction/demolition debris, or uncontaminated native soils) before it is excavated for disposal purposes. The extent and parameters of waste characterization testing are dependent on the requirements of the waste disposal facilities, each of which may have different requirements for representative waste sampling and laboratory analysis prior to accepting material for disposal.

Excavated material would be handled and disposed of properly to comply with federal, State, and City environmental regulations. Among the pertinent regulatory requirements are those found in 6 NYCRR Parts 360 through 376, which identify hazardous waste, beneficial reuse options for contaminated soils, disposal requirements and other waste management requirements. Any waste disposal that would occur outside New York State would be regulated by similar federal regulations and the accepting facility's permit requirements. According to the results of soil testing performed as a part of the Phase II ESI completed at the Development Site and Ninth Avenue Site, the soil at each respective site did not exceed the EPA threshold for hazardous waste.

Wastes containing hazardous materials require special handling, storage, transportation, and disposal methods to prevent releases that could impact human health or the environment. Depending on the nature of the material, federal, State, and City regulations require the use of special containers or stockpiling practices for on-site storage of the material to prevent the release of hazardous materials to the environment. The U.S. Department of Transportation (USDOT) has specified requirements for the safe transportation of waste containing hazardous materials in 49 CFR Parts 171 through 180. Facilities that receive hazardous materials require federal, State, and/or local permits to accept the waste, and generally require that specific representative waste sampling and laboratory analysis protocols be conducted prior to accepting material for disposal.

As possible and appropriate, for contaminated soils that would remain in place, preventive measures to reduce pathways of exposure to contaminants would be achieved through isolation. Isolation involves the construction of a barrier that prevents direct contact with contaminated soil. The use of impermeable barriers such as concrete and asphalt would also prevent percolation of surface water through subsurface soil, thus limiting the potential for contaminants

to leach from soil to groundwater. Concrete and asphalt coverage serves as an effective isolation barrier. In-place isolation is a useful method of addressing contaminants such as metals, SVOCs, and PCBs, which are generally immobile. A layer of clean soil fill could also be used to construct an isolation barrier in landscaped areas that would not be covered by impervious materials. The presence of elevated VOC concentrations in subsurface soils would limit the applicability of isolation, since vapors could migrate upward into building structures. Prior to selecting isolation for subsurface soils, soil vapor sampling and analysis as described above under "Further Investigations" would be performed to assess the VOC concentrations, and the applicability of isolation, vapor control barriers, or ventilation would be confirmed by the appropriate entity.

PETROLEUM STORAGE TANKS

Any unexpectedly encountered aboveground or underground petroleum storage tanks requiring removal for the Proposed Actions would be regulated by DEC pursuant to Section 613.9 of 6 NYCRR Part 613; which requires that tanks no longer in use be closed in place or removed according to specific requirements. Contaminated soils surrounding the tanks, petroleum floating on the water table, or contaminants dissolved in the groundwater are also subject to DEC regulations pursuant to Section 611.6 of 6 NYCRR Part 611. In addition, Article 12 of the New York Navigation Law provides notification and management requirements for spills to the waters of the State.

GROUNDWATER AND VAPOR CONTROL

As discussed above, groundwater sampling results from the Phase II ESI completed at the Development Site and the Ninth Avenue Site indicated a range of contaminants, including potentially petroleum-related VOCs. The potential concern associated with this groundwater contamination is that VOCs could migrate up from the groundwater, through the subsurface, and into the proposed buildings. Additionally, VOCs are known to be present in some of the Development Site soils and could migrate from any such soils remaining at the site (after soil removal required for the Proposed Actions). However, the designs of the proposed buildings would be required by contract to incorporate elements that provide safeguards against the migration of VOCs into the new buildings, as necessary. ✷