

APPENDIX K.1
CONTAMINATED MATERIALS

A. INTRODUCTION AND METHODOLOGY

This appendix provides further background and supporting information for the Second Avenue Subway project's assessment of potential preexisting subsurface contamination (contaminated soil, soil gas, or groundwater). Detailed discussion of the contaminated materials analysis, including potential impacts during construction and operation of the Second Avenue Subway, is presented in Chapter 14, "Contaminated Materials."

POTENTIAL CONTAMINANTS OF CONCERN

See Chapter 14 for a discussion about the potential contaminants of concern for the project alignment. As discussed in Chapter 14, the potential contaminants include those that have been found previously in New York City, particularly Manhattan, and include those associated with former or current rail yards.

Most of the Second Avenue Subway alignment is currently roadbed and the adjacent properties include residential and commercial uses. However, some of the neighborhoods served by the proposed project were once more industrial in character and those past land uses as well as current uses (such as utilities in the roadbed, adjacent gasoline stations, and dry cleaners) may have contaminated the soil, bedrock, and/or groundwater beneath the alignment. In addition to the project alignment in Manhattan, several sites outside Manhattan are being considered for use by the project as subway train storage or maintenance areas. These sites are either existing rail yards or were previously industrial in character. Normal operations at rail yards—particularly maintenance and other operations in the past, when there were fewer environmental regulations—can over time lead to contamination from spills. In addition, much of New York City, including Manhattan, has been covered with fill material in the past, and the fill materials often contain contaminants. Although some guidelines exist to determine what level of a particular constituent constitutes unacceptable contamination, these guidelines are based on specific situations (typically assuming the most sensitive land uses and that groundwater is used a source of drinking water). As such, these guidelines are not applicable in the context of the proposed new transportation use and potential exposure pathways that would be associated with construction of the Second Avenue Subway. Instead, the primary concerns for this project are worker and community health and safety and managing the products of excavation in an appropriate manner, including beneficial reuse. The Second Avenue Subway's CEPP will contain health and safety requirements specifically addressing the regulations and guidelines that must be met and followed to protect the safety of community residents and workers, as well as subway workers and the environment (e.g. spoils, dewatering, etc.). Issues related to the proper disposal of contaminated spoils are also of major importance; the project would adhere to the specific guidelines that exist concerning the transportation and disposal of contaminated spoils, including those found in 6 NYCRR Parts 360 through 376, which identifies hazardous waste and

other waste management requirements. Any waste disposal that would occur out of New York State would be regulated by similar federal and individual state requirements.

Please see Chapter 14 for an overview of the types of contaminants of concern that could exist along the alignment.

METHODOLOGY

As discussed in Chapter 14, for each area where construction activities could potentially disturb soil, soil gas, rock, or groundwater flow, a preliminary environmental study to assess issues related to contaminated materials was conducted at each proposed station area. The preliminary study was also conducted for all proposed tunnel sections to be built in soil rather than rock, as well as all potential shaft or off-street staging sites and potential storage or maintenance yard sites. As described elsewhere in the FEIS, the locations of stations have shifted slightly since issuance of the SDEIS as a result of ongoing engineering. In all cases but one, the potentially affected areas have been reduced; however, the original study areas have been retained as a conservative measure. The 125th Street Station study area has been expanded to reflect a conservative boundary around the western extent of the construction area. Following the preliminary study, the results of that assessment were evaluated to determine the likelihood for contamination at the project areas.

No assessment was performed for the portions of the subway that would be bored through rock. Because these areas would be constructed at least 30 to 80 feet below grade. It is not likely to have been adversely affected by uses located above, and construction activities would not disturb potentially contaminated materials. (There is a possibility of encountering contaminated groundwater in rock even when there are no known nearby uses that may have resulted in contamination, since groundwater may travel a long distance. This issue is discussed later in this appendix in the discussion of potential impacts during construction.)

This study was “preliminary” in the sense that no subsurface testing was performed. The American Society for Testing and Materials (ASTM) Standard E1527-00 sets out a standard practice for performing a “Phase I Environmental Site Assessment.” This approach includes four components: records review, site reconnaissance (a visual site inspection of the adjacent buildings and properties from the right-of-way), interviews, and reporting. The ASTM standard is directed toward identifying concerns related to property acquisition in connection with 42 U.S.C. Section 9601(35)(b) (“innocent landowner” defense). As this analysis was conducted for the entire long, linear Second Avenue Subway project rather than acquisition of any particular property associated with the project, a modified “Phase I”—hereinafter referred to as Preliminary Environmental Site Assessment (PESA) analysis—was performed (as described in more detail below), which focused on those aspects of the ASTM Standard that are appropriate to the project at this time.

Records review (relating to past and current site uses, spills, etc.) was performed along the alignment. However, because of the scope of the proposed subway (8 miles of tunnels through a highly developed, predominantly residential and commercial corridor), the ASTM-recommended one-mile survey was not appropriate. Instead, a narrower study area was judged appropriate, typically including all adjacent properties to the current roadway. A site reconnaissance was performed along the entire alignment, but interior inspections of buildings for all properties adjacent to the alignment were not judged appropriate and consequently were not conducted, nor were interviews with current owners or occupants of the buildings performed. In addition, the

form of report specified by ASTM was modified to consist of this appendix and its supporting tables, figures, and appendices. The PESA analysis is described below.

PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT (PESA)

The PESA employed a historical map review, regulatory database and records research, and a visual inspection either on the potential alignment/site or from the adjacent right-of-way.

- The review of historical land maps sought to determine the past uses on and adjacent to the subway alignment, each potential shaft and staging site, the various train storage solutions, and each maintenance yard. The research involved reviewing Sanborn real estate atlases and fire insurance maps dating from the present back to the late 1800s or early 1900s for such uses as gasoline stations, electric substations, gasworks, chemical works, and other uses that would be more likely to have acted as sources of contamination of underlying soil, soil gas, and groundwater. Historic land development patterns in Manhattan were also reviewed as part of ongoing engineering to determine subsurface conditions and obstructions that could affect the tunnel boring machines (TBMs). Several areas in the southern portion of the alignment were found to cross former streambeds and bulkheads from former shorelines, and on 125th Street, the alignment would pass through a thick peat layer at the site of a former lakebed.
- Federal and state database and regulatory records were reviewed—including listings of petroleum spills, petroleum storage facilities and generators of hazardous materials—to determine the regulatory status of sites and the adjacent properties.
- A visual inspection of the alignment and potential shaft sites and staging areas was performed to determine potential sources of contamination, including vent pipes and fill caps indicating the potential presence of petroleum tanks, current manufacturing/industrial use, gasoline stations, electrical transformer vaults, dry cleaners, and areas of dumping.

EVALUATION OF SITES THAT WARRANT FURTHER ANALYSIS

The information collected during the PESA process was organized, and the numerous sites identified as having potential contaminants were categorized into three groups based on the judgment of geologists, engineers, and environmental health and safety professionals. Category A includes sites that do not reasonably appear likely to have affected the soil, soil gas, or groundwater at the alignment, and therefore do not warrant additional analysis. Category B includes sites that have a slightly greater potential to have affected the alignment, but still appear unlikely to warrant additional analysis. Category C includes sites that reasonably appear to have the potential to have resulted in contamination that could have affected the alignment, and should undergo additional analysis. Examples of the types of sites identified and their categories include the following:

- Category A: Sites that do not warrant further analysis include fuel oil tanks with no known spills, electrical vaults with no known spills, closed status spills, spills confined to manholes, above-ground tanks, and spills on the surface streets.
- Category B: Sites that appear unlikely to warrant additional analysis include electric substations, known small quantity hazardous waste generators, auto repair shops, metalworkers, paints and oils shops, smaller underground tank facilities, and miscellaneous manufacturers.

- Category C: Sites that warrant additional analysis include known active status spills, known large quantity hazardous waste generators, auto wreckers, dry cleaners with a plant on the premises, gas stations, underground gasoline storage tanks, and locations with known contaminated soil and groundwater.

The potential for a given site to have affected the project site was estimated based on its proximity to the alignment, the size of facility or spill, the nature of the hazardous material associated with it, the potential for releases of a material into the environment, and the length of time a facility was present. As noted earlier, groundwater flow direction was not considered in the assessment and therefore this analysis is conservative since potential contamination from any direction is considered. Where a combination of facilities or activities were located together, that combination was judged collectively to consider its potential to have affected the alignment.

As an example of how the foregoing was applied, the presence or suspected presence of a petroleum storage tank or bulk storage facility with no evidence of spills or leaks was considered to require no additional analysis (Category A), whereas a filling station was considered to potentially require additional analysis (Category C) because of the volumes of gasoline being moved through the site and the potential for regular unreported small spills or undocumented underground releases. As another example, a recorded spill that has been “closed” by the New York State Department of Environmental Conservation (NYSDEC) was generally considered not to warrant additional investigation (Category A), while a spill still listed as “active” would warrant additional investigation (Category C). This is because a closed spill is one that has been cleaned up to the satisfaction of the NYSDEC and so is unlikely to have left contamination in soils or groundwater, whereas an open spill may still be in the process of being assessed or remediated and so provides a higher likelihood of contamination. Active spills reported for generally enclosed structures such as manholes were rated as unlikely to require further analysis (Category B), as any contamination is likely to have been limited to within the structure.

Although the presence of medical offices or dental practitioners at a site might indicate that some biohazardous material is present, or that chemicals used in the X-ray process are used on-site, such sites were considered Category A, as it is unlikely that large quantities of these chemicals might be released into the environment. In contrast, dry cleaning establishments were considered Category C. This is because dry cleaners use halogenated solvents in the cleaning process, and these are known to have a high potential to travel into soils and groundwater and to thus affect an area extending well beyond the premises. These chemicals are of particular concern to the proposed project because, without proper management, they can potentially migrate in vapor form and have a potential to enter excavations or even finished stations.

For Category C sites, the procedure would include, but would not be limited to: determining whether or not construction activities would disturb the area around the identified site; additional research to determine if there is existing data on the conditions at the site (e.g. subsurface investigations conducted by the property owner and confirmation that no dry cleaning was conducted on the premises); whether remediation has already occurred (such as spill closure reports). Together this additional analysis would guide determination of whether subsurface testing should be done. The protocol for such investigations is described later in this appendix.

Once the sites were categorized, the various locations identified were then mapped using Geographic Information System (GIS) software to show general trends or groupings of sites. The maps were used to analyze the spatial pattern of sites identified in the PESA in relation to the project alignment. Yard sites, staging areas, and shaft sites are also being evaluated.

For dredging operations, testing of sediment will be required to characterize the nature and extent of possible contamination unless an assumption of contamination is made during ongoing engineering (more information on dredging operations is included in Chapter 15, “Natural Resources”).

B. EXISTING CONDITIONS

This section summarizes the results of the PESA, which is described in Chapter 14. The uses of potential concern identified in this first phase of the assessment are depicted on the study area maps (Figures K.1-1 through K.1-17), and more information is provided in Appendix K.2 of this FEIS, “Inventory of Evaluated Sites.”

ENVIRONMENTAL SETTING

The approximately 8.5-mile Second Avenue Subway alignment, extending from 125th Street to Hanover Square, consists of a mix of bedrock (in the central area) and soil to the north and in the south. Ongoing geotechnical evaluation being undertaken for the project will refine this information.

Between approximately 92nd and 4th Streets, as well as the area south of Fletcher Street, the subsurface of the project alignment generally consists of bedrock (schist and gneiss) at varying depths below a shallow layer of glacial till, frequently with some overlying fill of unknown origin. Bedrock is generally competent (i.e., relatively intact with few significant fractures or faults). The depth of bedrock ranges from almost directly below the surface in a few locations, to roughly 10 to 40 feet below the surface. North of approximately 92nd Street and south of approximately 4th Street, the subsurface generally consists of soils and fill materials of unknown origin. (Geology along the alignment is discussed in more detail in Chapter 15, “Natural Resources.”)

Groundwater is typically found at approximately 10 to 60 feet below grade along the project alignment. Groundwater depth was estimated by assuming that the groundwater table is located at or close to the zero elevation (1929 National Geodetic Vertical Datum, an approximation of mean sea level). Precise groundwater depths will be determined from geotechnical studies of the project alignment. (However, in portions of Manhattan, especially the Upper East Side where bedrock is very close to the surface, often little or no groundwater is encountered, even at depths well below sea level.) Given the groundwater depth in the project area, most of the project alignment is partially or completely below the water table. Groundwater generally flows east towards the East River, although flow direction may vary locally. (See Chapter 15 for information on groundwater.)

In areas where bedrock is closer to the surface (generally between 92nd and 4th Streets), contamination from any of the sources identified in this evaluation is less likely, since less soil is present. In these areas, contamination could exist in substantial quantities only in the groundwater present in glacial till, as groundwater in the bedrock itself is generally somewhat isolated from the surface. In contrast, in sections of the project alignment in soft soil, contamination would be more likely, if sources of contamination were located nearby, since the more porous and permeable fill material allows contaminants to travel more readily.

125TH STREET STATION AREA AND CORRIDOR

The study area along 125th Street extends from Lenox Avenue to Second Avenue, as shown on Figure K.1-1. (While the western limit of project construction would be 525 feet west of Fifth Avenue, a larger area was reviewed to be conservative.) The PESA review revealed 59 sites in the study area with potential for petroleum or hazardous materials contamination. All the uses identified are listed in Table K.1-1 and illustrated in Figure K.1-1. There is no distinct pattern to their distribution, although they are somewhat clustered toward the northwest and southeast portions of the study area. Of these sites, six sites were identified as Category C (two dry cleaners, two sites with monitoring wells adjacent to them, one former gasoline station, and one current gasoline station,) (As described later in the discussion of impacts, this analysis will include examination into whether these dry cleaners process or formerly processed clothing on-site, among other factors.) As shown in the figure, these two dry cleaners are at Lexington and Fifth Avenues.

Table K.1-1
Summary of Preliminary Assessment Results

Location	General Results	Locations Warranting Additional Analysis
125th St Station Area and Corridor (Half block west of <u>Lenox Ave</u> to Second Ave) ¹	59 sites of potential contamination	6 sites: 2 dry cleaners 2 monitoring well sites 1 former gasoline station 1 gasoline station
Second Ave Harlem River to 120th St ²	31 sites of potential contamination	8 sites: 2 gasoline stations with known petroleum spills 2 former gasoline stations 1 NYCT 126th Street bus depot (known petroleum spills, generator of hazardous waste, and petroleum bulk storage facility) 1 dry cleaner 1 former Manhattan Railyard facility 1 former fuel company
116th St Station Area (118th St to 115th St)	30 sites of potential contamination	4 sites: 4 dry cleaners
106th St Station Area (110th St to <u>105th St</u>)	29 sites of potential contamination	3 sites: 2 dry cleaners 1 Large NYC Housing Authority fuel oil tank facility
96th St Station Area and 96th St and 92nd St Shaft Sites (99th to 91st St)	35 sites of potential contamination	9 sites: 4 dry cleaners 3 gasoline stations 1 historic utility site (manufactured gas plant between 99th and 98th Streets) 1 known active fuel oil spill
86th St Station Area (88th St to 82nd St)	49 sites of potential contamination	10 sites: 8 dry cleaners 2 active fuel oil spills
72nd St Station Area and 66th Street Shaft Site (74th St to 67th St)	49 sites of potential contamination	14 sites: 12 dry cleaners 2 active fuel oil spills
57th St Station Area (59th St to 52nd St)	44 sites of potential contamination.	6 sites: 6 dry cleaners

Table K.1-1 (cont'd)
Summary of Preliminary Assessment Results

Location	General Results	Locations Warranting Additional Analysis
42nd St Station Area (46th St to 39th St)	31 sites of potential contamination	2 sites: 2 dry cleaners
34th St Station Area and St. Vartan Park and Kips Bay Shaft Sites (37th St to 32nd St)	27 sites of potential contamination	5 sites: 3 dry cleaners 1 active spill in a Con Edison manhole (oil leaking in the walls) 1 former gasoline station
23rd St Station Area (27th St to 21st St)	24 sites of potential contamination	7 sites: 5 dry cleaners 2 active spills
14th St Station Area (16th St to 10th St)	37 sites of potential contamination	1 site: 1 dry cleaner
Houston St Station Area (6th to Houston St)	39 sites of potential contamination	4 sites: 2 dry cleaners 1 gas station 1 active test tank failure (fuel oil)
Grand St Station Area (Chrystie and Forsyth Sts between Houston St and Canal/Walker St)	92 sites of potential contamination	10 sites: 3 auto repair facilities 2 former garages 2 active spills 1 garage 1 site with an adjacent monitoring well 1 former fueling depot
Chatham Sq Area (Canal/Walker St to Pearl St)	39 sites of potential contamination	11 sites: 1 Con Ed utility site 1 substation 1 1894 Railroad powerhouse 4 gas stations 1 garage 1 dry cleaner 2 active spills
Seaport Station Area (Pearl St to Maiden Lane)	55 sites of potential contamination	8 sites: 1 filling station 2 garages 2 former garages 3 chemical facilities (unknown chemicals)
Hanover Sq Station Area and Gouverneur Lane and Old Slip Spoils Conveyance Sites (Maiden Lane to State St)	67 sites of potential contamination	10 sites: 3 dry cleaners 1 garage 2 gas stations 2 historic electrical generating stations 1 1894 Railroad powerhouse 1 hazardous waste generator with violations
36th-38th St Storage Yard	20 sites of potential contamination	1 on-site listing: The NYCT yard is a registered RCRA (Resource Conservation Recovery Act) hazardous waste generator 2 off-site listings: 1 auto service station with an active spill 1 NYCT bus depot with active spills

Table K.1-1 (cont'd)
Summary of Preliminary Assessment Results

Location	General Results	Locations Warranting Additional Analysis
Concourse Yard	17 sites of potential contamination	4 on-site listings: 2 active petroleum spills 1 hazardous waste generator 1 petroleum bulk facility 5 off-site listings: 2 gasoline stations 3 former gasoline/ auto repair facilities
207th Street Yard	1 site of potential contamination	1 on-site listing: existing subway yard
<p>Notes:</p> <p>¹ <u>The study area on 125th Street has been expanded to Lenox Avenue to account for the potential underground storage tracks that are planned. While these tracks would only extend 525 feet west of Fifth Avenue, a larger area was assessed to be conservative.</u></p> <p>² <u>The affected area between the Harlem River and 120th Street has been reduced in size since publication of the SDEIS, because the proposed underground storage yard has been scaled down and the 129th Street barge operation has been eliminated. However, the results for the entire study area are still provided here for reference.</u></p>		

SECOND AVENUE CORRIDOR NORTH OF 120TH STREET/STAGING AREA/ UNDERGROUND STORAGE AREA

The study area for the Second Avenue corridor north of 120th Street consists of Second Avenue north to the Harlem River, including a portion of the Harlem River Drive and portions of the blocks on both sides of Second Avenue between 127th and 128th Streets and the block on the west side of the avenue between 128th and 129th Streets (see Figure K.1-2). Historical and current uses in the study area include residences, commercial and retail storefronts, manufacturing facilities, automobile repair facilities, a transformer substation, a rail yard, gasoline filling stations and a recycling center. The preliminary assessment conducted identified 31 sites in the study area with the potential for petroleum or hazardous materials contamination on their own sites (see Table K.1-1). Of these, eight were considered to be Category C (two gasoline stations with known petroleum spills, two former gasoline stations, NYCT’s 126th Street depot, a dry cleaner, a former rail yard facility, and one former fuel company.

116TH STREET STATION AREA

The 116th Street Station study area includes Second Avenue between 120th and 115th Streets, as shown in Figure K.1-3. The preliminary evaluation conducted revealed 30 sites in the study area with potential for petroleum or hazardous materials contamination. The sites are illustrated in Figure K.1-3 and listed in Table K.1-1. As shown in the figure, there is no distinct pattern to the distribution of the identified sites. Four of these sites (dry cleaners) are considered to be Category C.

106TH STREET STATION AREA

The 106th Street Station study area includes the area between 110th and 104th Streets along Second Avenue, as shown in Figure K.1-4. The preliminary evaluation conducted identified 29 sites in the study area with potential for petroleum or hazardous materials contamination. All identified sites are shown in Figure K.1-4. There is no distinct pattern to their distribution. As

listed in the table, three Category C sites, two of which are dry cleaners and the other is a large fuel oil tank with active and closed spills on record.

96TH STREET STATION/SHAFT SITE/STAGING AREA

As shown in Figure K.1-5, the study area in the 96th Street Station area extends from 99th Street to 91st Street along Second Avenue. This area includes a potential shaft site from 93rd to 91st Streets and the area that would be excavated for the 96th Street Station and connecting cut-and-cover tunnels, as discussed in Chapter 3 of this FEIS (“Description of Construction Methods and Activities”). The contaminated materials assessment revealed 35 sites in the study area with potential for on-site petroleum or hazardous materials contamination, which are listed in Table K.1-1 and shown in Figure K.1-5.

While there is no distinct pattern to the distribution of the identified sites, clusters of sites are located on the two blocks between by 95th and 93rd Streets between First and Second Avenues, and the block between 97th and 96th Streets west of Second Avenue. Nine of the sites warrant further analysis, including a former manufactured gas plant (between 99th and 98th Streets on the east side of Second Avenue prior to 1939, on part of the site now occupied by Metropolitan Hospital), two current and a former gasoline station, an active spill of fuel oil, and four dry cleaners.

The area of the park on the east side of Second Avenue between 97th and 96th Streets that may be used for the project is immediately adjacent to the right-of-way analyzed for the 96th Street Station area. The assessment conducted indicated that the potential staging area near 96th Street would include one of the dry cleaner sites discussed above as part of the 96th Street Station area, requiring additional analysis. This site is located a block west of the park.

86TH STREET STATION AREA

The study area for this station is Second Avenue between 88th and 82nd Streets. The evaluation conducted identified 49 sites in the study area with potential for petroleum or hazardous materials contamination. Of these, 10 sites appear to be Category C, should the project require soil excavation nearby—eight dry cleaners and two active fuel oil spills. All identified sites are shown in Figure K.1-6. There is no distinct pattern to their distribution although they appear concentrated toward the southern two-thirds of the study area. The blocks within the study area delineated by 87th and 86th Streets and by 83rd and 82nd Streets, contained no listings that warrant additional investigation.

72ND STREET STATION AREA AND 66TH STREET SHAFT SITE

The study area for this station is Second Avenue between 74th and 67th Streets including the 66th Street shaft site. The study area for the potential shaft site along 66th Street includes the area in the 66th Street roadbed from Second Avenue westward almost toward Third Avenue. The assessment conducted revealed 49 sites with potential petroleum or hazardous materials contamination. All identified sites are shown in Figure K.1-7. Of these, 14 are Category C, should the project require soil excavation nearby: 12 dry cleaners and two active fuel oil spills.

57TH STREET STATION AREA

The study area for this station is Second Avenue between 59th and 52nd Streets, as shown on Figure K.1-8. The hazardous materials assessment revealed 44 sites in the study area that may

have on-site contamination. All identified sites are shown in Figure K.1-8 and listed in Table K.1-1. As shown in the figure, the southwestern and southernmost portions of the study area are relatively free of such sites. Of the 44 sites identified, six dry cleaners were considered Category C.

42ND STREET STATION AREA

This study area consists of Second Avenue between 46th and 39th Streets, as shown on Figure K.1-9. The contaminated materials assessment revealed 31 sites in the study area with potential for petroleum or hazardous materials contamination (see Table K.1-1 and Figure K.1-9). Of these, only two dry cleaners are considered Category C sites. In addition, heating oil is currently seeping into the Steinway subway tunnel (7 line); this petroleum release (potentially Category C) is under NYSDEC investigation.

34TH STREET STATION AREA AND ST. VARTAN PARK AND KIPS BAY SHAFT SITES

For the 34th Street Station, the study area encompasses Second Avenue between 37th and 32nd Streets, as shown on Figure K.1-10, and includes the St. Vartan Park and Kips Bay shaft sites. The study area for the potential shaft site/staging site at St. Vartan Park encompasses the full block bounded by Second Avenue, 36th and 35th Streets, and Tunnel Entrance Street (Queens-Midtown Tunnel approach). The study area for the Kips Bay shaft site/staging area is in the service road roadbed east of Second Avenue between 33rd and 32nd Streets, as well as part of the 33rd Street roadbed. The preliminary site assessment identified 27 sites in the study area with potential for petroleum or hazardous materials contamination (see Table K.1-1). These included five Category C sites: three dry cleaners, an active spill in a Con Edison manhole in which oil was leaking into the walls of the manhole, and a former gasoline station. As shown in Figure K.1-10, all blocks directly to the east of Second Avenue in this area are free of sites warranting additional analysis.

23RD STREET STATION AREA

The study area for this station is Second Avenue between 27th and 21st Streets (see Figure K.1-11). The environmental site assessment identified 24 sites in the study area with potential for contamination on their own sites (see Table K.1-1, above). Of these, seven sites were considered Category C—five dry cleaners and two active spills, one of fuel oil and one of unknown petroleum. As shown in Figure K.1-11, there is no apparent pattern to the distribution of the identified sites. The blocks delineated by 25th and 23rd Streets and First and Second Avenues are relatively free of sites warranting additional analysis.

14TH STREET STATION AREA

The study area for this station was Second Avenue between 16th and 10th Streets, as shown on Figure K.1-12. The assessment conducted identified 37 sites in the study area with potential for petroleum or hazardous materials contamination (see Table K.1-1 and Figure K.1-12). There is no apparent pattern to their distribution. Of these sites, one site (Category C) was considered to warrant further analysis if the project would involve excavation nearby, a dry cleaner.

HOUSTON STREET STATION AREA AND HOUSTON STREET SHAFT SITE

The study area for the Houston Street Station is located on Second Avenue between 6th Street and Houston Street (also encompassing a potential shaft site near Houston Street, as described in Chapter 3), as shown on Figure K.1-13. The hazardous materials assessment revealed 39 sites in this area with potential for on-site contamination, listed in Table K.1-1 and mapped on Figure K.1-13. Four of these sites are Category C, including one auto repair/filling station (which is being considered as a possible shaft site or staging area) with previous petroleum releases on record, one active tank test failure for a fuel oil storage tank, and two dry cleaners.

GRAND STREET STATION AREA (CHRYSTIE STREET AND FORSYTH STREET OPTIONS)

The study area for the Grand Street Station area encompasses both Chrystie and Forsyth Streets between Houston Street and Canal/Walker Streets, as shown on Figure K.1-14. While no project construction would occur on Forsyth Street, a larger area was conservatively assessed. In this area, the evaluation revealed 92 sites with potential for on-site petroleum or hazardous materials contamination (see Table K.1-1). Ten of these sites are Category C, including three auto repair facilities, two former garages, one active garage, two active spills, one site with an adjacent monitoring well, and one former fueling depot.

CHATHAM SQUARE STATION AREA

The Chatham Square Station study area is located on St. James Place between Canal/Walker Street and the Pearl Street (see Figure K.1-15). As listed in Table K.1-1, the preliminary assessment identified 39 sites in this study area with potential for petroleum or hazardous materials contamination. Of these, 11 are Category C. These consist of one listing for a historic utility site owned by Con Edison, one substation, one former 1894 railroad powerhouse, four gasoline stations, one garage, one dry cleaners, and two active spills.

SEAPORT STATION AREA

This study area extends from the Brooklyn Bridge ramp on Pearl Street to Maiden Lane on Water Street, as shown in Figure K.1-16. The evaluation conducted for this study area identified 55 sites in the study area with potential for petroleum or hazardous materials contamination (see Table K.1-1). Of these, eight are Category C. These consisted of one filling station, two garages (one of which was historically used for manufacturing, chemical processing, metal work, lumber, and other uses), two former garages, and three chemical facilities. As shown in the figure, there is no particular pattern to the distribution of the identified sites, although the northernmost portion of the study area is relatively free of listings.

HANOVER SQUARE STATION AREA AND LOWER MANHATTAN STAGING AND SPOILS CONVEYANCE AREAS AND SHAFT SITES

The Hanover Square Station study area consists of the area of Water Street from Maiden Lane to State Street including the Gouverneur Lane, Old Slip, and Coenties Slip staging and spoils conveyance areas. The Gouverneur Lane spoils conveyance study area is located between Water Street and South Street and is bounded to the north by 95 Wall Street and 111 Wall Street (high-rise office buildings) and to the south by 65 Water Street and 32 Old Slip (high-rise office buildings). The Old Slip spoils conveyance study area is located between Water Street and South Street and is bounded to the north by 65 Water Street and 32 Old Slip (high-rise office buildings)

Second Avenue Subway FEIS

and to the south by 55 Water Street. While spoils conveyance is no longer being considered for Vietnam Veterans Plaza/55 Water Street, the study area has been retained for a conservative analysis. The Vietnam Veterans Plaza/55 Water Street spoils conveyance study area is between Water Street and South Street and is bounded by the New York Plaza building and the American Express building to the west and the 55 Water Street building to the east.

The PESA revealed 67 sites in the study area with potential for on-site petroleum or hazardous materials contamination (see Table K.1-1). Ten of the listings are Category C: three dry cleaners, two gasoline stations, one garage, two historic power generating stations, one 1894 powerhouse, and one hazardous waste generator. These sites are illustrated in Figure K.1-17.

POTENTIAL YARD SITES

36TH-38TH STREET STORAGE YARD

This study area encompasses the existing 36th-38th Street Yard, the adjacent Jackie Gleason Bus Depot west of the yard, and sites adjacent to the yard along 39th Street and the eastern side of 9th Avenue. The PESA conducted for this study area identified 20 sites with the potential for petroleum or hazardous materials contamination (see Table K.1-1).

Three of the listings would be Category C should this yard be selected for the project, and depending on their proximity to the area to be affected by the project. The first of these is the yard itself, which is a registered Federal Resource Conservation Recovery Act (RCRA) large quantity generator of hazardous waste (mercury, lead, trichloroethene, chlordane, non-halogenated solvents, butanone, PCBs and ignitable and corrosive wastes) and which had a closed spill of unknown petroleum. The other two sites that may warrant further analysis are adjacent to the yard, and include a gas station with an active petroleum spill and the Jackie Gleason Bus depot with two active petroleum spills.

CONCOURSE YARD

The Concourse Yard study area, located in the Bronx, includes the existing yard itself, as well as properties adjacent to the central portion of the yard on Jerome Avenue, Paul Avenue, Bedford Park Boulevard, and West 205th Street. The assessment conducted for this study area identified 17 sites in the study area that have the potential for petroleum or hazardous materials contamination (see Table K.1-1). Nine of the listings warrant further analysis (Category C), should this yard be selected for use by the project. Four of these are at the Concourse Yard itself, which has two active spills related to petroleum-related compounds, and which is listed as a RCRA large quantity hazardous waste generator (mercury, lead, cadmium, and corrosive and ignitable waste) and a petroleum bulk storage facility. The other sites warranting additional analysis are two gasoline stations and three former gasoline or auto repair facilities.

207TH STREET YARD

As described in Chapter 3, the work proposed at the 207th Street Yard would take place adjacent to an existing structure in a central portion of the yard. Rail yards typically use hazardous materials and can often have spills, as noted above. Therefore, the 207th Street Yard, like the other yards, is considered to be Category C.

RESULTS OF INITIAL BORINGS PROGRAM UNDERTAKEN SINCE COMPLETION OF THE SDEIS

As described in Chapter 14, since completion of the SDEIS, NYCT has initiated an environmental sampling program from 125th Street to Pine Street to continue the environmental investigations process. A description of this effort is provided in Chapter 14, with detailed analytical results of soil sampling provided in Appendix K.3.

C. FUTURE CONDITIONS COMMON TO ALL ALTERNATIVES

See Chapter 14 for a discussion of future conditions without the Second Avenue Subway project.

D. CONSTRUCTION IMPACTS OF THE PROJECT ALTERNATIVES

NO BUILD ALTERNATIVE

There are no excavation or construction activities associated with the No Build Alternative and therefore this alternative would have no hazardous materials impacts. Note that under the No Build Alternative, contaminated sites would only be cleaned up if identified in some other way or as required under some regulatory program.

SECOND AVENUE SUBWAY

Potentially contaminated areas preliminarily identified through the PESA and initial borings program are indicative of the long use of the project corridor and adjacent area for a mix of commercial and some industrial activities. None of the past or present uses identified were unusual or of the nature to result in widespread contamination; those of greatest concern were generally dry cleaners and gasoline stations because they are common throughout the alignment. Construction of the new subway would involve a variety of earth-moving and excavating activities. During this time, construction activities could encounter soil, soil gas, or groundwater that is contaminated. To avoid adverse impacts from any contamination, preventative measures would be taken as described below. As discussed, standard mitigation/investigation measures as appropriate exist for all of the substances likely to be encountered, so with the use of such measures, significant adverse impacts would not occur.

PREVENTATIVE MEASURES TO AVOID IMPACTS

For areas where the Second Avenue Subway has the potential to encounter areas identified through the preliminary investigation (because it would involve soil excavation or earthmoving activities), preventative measures would be undertaken to protect the safety of the public, community residents, and construction workers, as well as the larger environment. The measures to be implemented include the following:

- Further investigations to better determine the nature and extent of contamination in areas where the project might encounter it; and
- Prescribed construction measures to manage contaminated materials.

These are described below.

Further Investigations

The preliminary investigation conservatively assumed that large areas of the right-of-way below which the Second Avenue Subway would operate might be excavated. In fact, many portions of the alignment would not require excavation from the street surface. For stations in rock, excavation would likely be limited to a smaller area than at stations in soil. As engineering work advances, it will better define the specific areas where excavation would be needed, additional investigation will be undertaken to determine the nature and extent of contamination at these sites. This investigation will include additional documentary research as well as possible physical testing of soil, soil gas, and groundwater in the field, as described below.

Many of the sites identified in the preliminary investigation described above under “Existing Conditions,” especially those associated with petroleum storage, may already have been reported to NYSDEC and have had some level of investigative work. Some may even have been cleaned up with oversight from NYSDEC. For those sites proximate to an area where excavation would be required for the Second Avenue Subway, more detailed research of NYSDEC’s records (including conversations with case managers) will be undertaken. This research will be used to narrow the areas of concern.

Once the areas requiring excavation are better defined and if physical testing is judged warranted, a sampling protocol will be prepared. This protocol will indicate locations based both on their potential to have caused contamination and on the site’s location relative to proposed construction activities for the Second Avenue Subway and the basis for the need for sampling. The following summarizes the protocol that will be used to conduct subsurface investigations:

- The protocol will contain illustrations that show the site location, the planned boring locations, the planned monitoring well locations, and the schedule.
- The protocol will include site background information, such as known subsurface conditions, historical site information, previous environmental investigations, and the basis for the need for sampling.
- The protocol will describe the sampling plan. The sampling plan will determine sample locations based on the proposed construction activities and subway design, as well as geology (e.g. depth of construction and location of groundwater). At a minimum, sampling will be conducted in areas where the greatest amount of soil disturbance would occur, as well as at areas identified as warranting further analysis. Additional sampling may be conducted in areas that exhibit no known evidence of environmental contamination.
- The protocol will detail the proposed monitoring well locations and plan; this will include monitoring well depths and design.
- The laboratory analysis parameters will be determined and detailed within the protocol.
- The protocol will contain a “Quality Assurance Project Plan” that will detail the quality assurance and quality control program (QA/QC). This program will be based on the NYSDEC’s QA/QC, as well as on U.S. Environmental Protection Agency (EPA) requirements. This plan will describe laboratory methods, field quality control sampling, sample custody procedures, and field decontamination procedures.
- The protocol will detail the management of investigation derived wastes including drill cuttings, drilling fluids, decontamination fluids, and monitoring well purge fluids.

- The protocol will contain site-specific Health and Safety Program (HASP) plans; more details regarding the HASP plans are presented below. The Second Avenue Subway's HASP plans will be the primary measure used to safeguard onsite workers and nearby residents during the sampling program.
- After completion of the subsurface investigation a detailed report will be prepared which summarizes the findings of field activities and compares the analytical results to the appropriate federal, state, and city standards and guidelines. The report will include soil boring and monitoring well installation logs and soil gas readings.

Measures to Manage Contaminated Materials During Construction

As described in Chapter 14, a number of measures would be taken to manage contaminated materials during construction. Among these measures are the preparation of Health and Safety Plans (HASPs). The following section provides more detailed information on HASP Plans than that provided in the chapter. Please see Chapter 14 for more information on how contaminated materials would be managed.

As part of the Construction Environment Protection Program (CEPP), HASP plans would be developed for the various construction activities associated with the project. Since the exposure pathways and other safety concerns associated with different construction methods vary (for example, those associated with a tunnel boring machine in rock are very different from those associated with workers digging in shallow soil at street level), it is anticipated that several plans would be required. Each plan would address both the known contamination issues (e.g., air monitoring if boring would be going through solvent contaminated soil) as well as contingency items (e.g., if unknown tanks are encountered under a sidewalk). HASP plans would be developed in accordance with U.S. Occupational Health and Safety Administration (OSHA) regulations and guidelines.

The site-specific HASP plans would be the primary measure used to safeguard construction workers and nearby residents during construction work. This document would describe in detail the guidelines and work practices that must be adhered to. These HASP plan elements are listed below:

- A detailed project description indicating the work to be performed and special details such as confined spaces.
- A description of the health and safety guidelines and procedures to be followed. The hazards will be evaluated by determining the contaminants of concern (such as volatile organic compounds, particulates and methane) and their chemical and physical characteristics (e.g. liquid, sludge, vapor, or gas) and health hazards considered within the potential exposure associated with the work to be performed.
- Air, soil, and water sampling and monitoring that would take place during the work would be consistent with the appropriate regulations and guidelines. An emergency response plan would also be included in the event that monitoring data indicates a potential major hazard. Appropriate ventilation, if necessary, and treatment of ventilated air would be conducted in accordance with applicable city, state, and federal regulations.
- A definition of the appropriate designated personnel (e.g., the designated Site Safety Officer) to ensure that all requirements of the HASP plans are implemented. The plan will define the required training and qualifications that onsite personnel must have.

Second Avenue Subway FEIS

- A definition of the appropriate training for personnel performing the work. This training will allow personnel to recognize and understand the potential hazards to health and safety and provide knowledge and skills necessary for them to perform the work with minimal risk to health and safety and ensure that they can safely avoid or escape from emergencies.
- A medical surveillance program to be developed as necessary in accordance with OSHA regulation 29 CFR 1910.120 (f)
- Site work zones will be defined (e.g., exclusion zones, support zones and contamination reduction zones)
- A definition of the air monitoring necessary to identify any exposure of the field personnel or the public to potential environmental hazards in the soil, soil gas, vapors, sewer gas, or groundwater. This monitoring will be defined for the appropriate environment such as dust monitoring around spoils removal areas. During subsurface work (especially within confined spaces), air monitoring would be conducted for (but not limited to) oxygen, carbon dioxide, methane, VOCs, respirable dust, and hydrogen sulfide. All TBMs used to excavate tunnels would be equipped with gas detection equipment to warn workers in the event that gas is encountered in the tunnels. A community air monitoring program will be designed to monitor for respirable dust, gases and vapors that have the potential to leave the work area.
- Work within confined and permit confined spaces (as defined by OSHA) would be conducted in accordance with OSHA 29 CFR 1910.146 (j).
- A definition of appropriate personal protective equipment (PPE), such as respirators, to be used by workers in various activities excavation based on 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."*
- This plan will discuss specifically the dust and vapor control measures and emergency procedures that are to be followed.

Given the scale of the project and the variability in conditions over relatively limited areas, it is likely that unexpected contaminated soils would be encountered during construction. The HASP plans would also set out appropriate procedures for handling such situations (e.g., unexpected tanks under the sidewalk or discovery of contaminated soils). These procedures would include requirements to notify appropriate regulatory agencies as well as procedures to quickly and safely address the issue (e.g., how to remove the tank and any associated contaminated material followed by confirmatory endpoint sampling) so as to avoid undue delays to the construction. The HASP plans would also include routine monitoring of both air and soil/rock (in place and/or as spoils) to identify both the potential for unacceptable exposures and unforeseen contamination and the need for testing, special handling or disposal of materials.

It is also possible that volatile gases may be encountered during the excavation, even with management of hazardous materials. Temporary measures to prevent such a situation from becoming a hazard might include the use of ventilation systems within the excavation and the use of appropriate personal protective equipment. These potential hazards would be addressed in the HASPs.

E. PERMANENT IMPACTS OF THE PROJECT ALTERNATIVES

See Chapter 14 for a discussion of the permanent impacts of the No Build Alternative and the Second Avenue Subway, including measures that would be employed as part of the proposed project to prevent potential impacts from contaminated materials.

F. MITIGATION MEASURES

See Chapter 14 for a discussion of mitigation measures that would be employed as part of the proposed project to minimize any potential contaminated materials impacts.

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