

A. INTRODUCTION

This chapter assesses the potential for the presence of hazardous materials in the project area, the potential for exposure to hazardous materials following construction, and the specific measures that would be employed to protect public health and worker safety. This chapter focuses on potential human health effects. Potential effects on natural resources are assessed in Chapters 5.6, “Natural Resources,” and 6.5, “Construction—Natural Resources.” A “hazardous material” is generally defined as any substance that poses a threat to human health or the environment. It is often used interchangeably with “contaminated material,” but should not be confused with the term “hazardous waste,” which is a regulatory term.¹

The project area has a long history of commercial/industrial and residential uses. Based on the area’s history, subsurface contaminants would be expected to include those related to gasoline and petroleum, manufactured gas plants (MGPs) that were historically located nearby, as well as other subsurface contamination (in the fill, soil, and/or groundwater).

The proposed project would involve the installation of a flood protection system generally located within City parkland and streets between Montgomery Street to the south and East 25th Street to the north. The proposed flood protection system would consist of a combination of floodwalls, levees, and/or closure structures that, together with other infrastructure improvements, would improve the resiliency of this area to coastal flooding while simultaneously improving access and community connectivity to the waterfront. The proposed project would require the demolition or disturbance of existing structures, excavation,² and disturbance and removal of some of the existing fill and soil, with the importation of fill material to raise the ground level throughout East River Park. Dewatering of groundwater would also be required. A detailed description of the alternatives analyzed in this chapter is provided in Chapter 2.0, “Project Alternatives.”

A detailed assessment of potential human health effects of hazardous materials during construction is described in Chapter 6.6, “Construction—Hazardous Materials.” The assessment below focuses on the potential effects of hazardous materials following construction (i.e., during the operational stage of the proposed project).

¹ “Hazardous waste” is defined in both the U.S. Environmental Protection Agency (EPA) regulations (40 CFR Part 261) and New York State regulations (6 NYCRR Part 371), and refers to a subset of solid wastes that are either specific wastes listed in the regulations (listed wastes) or solid wastes possessing the characteristic of ignitability, reactivity, corrosivity, or toxicity (characteristic wastes).

² Excavation for the proposed project would be more extensive for the construction of flood walls than for both levees and raised landscapes.

PROJECT AREA

The project area for the analysis of hazardous materials is as follows: for Project Area One, an approximately 100- to 300-foot-wide area extending from Montgomery Street on the south to East 13th Street on the north; for Project Area Two, an approximately 100-foot-wide area (centered approximately on the eastern extent of the FDR Drive) extending from approximately East 18th Street on the south to East 25th Street on the north. The area between approximately East 13th Street and East 15th Street on the west side of the FDR Drive was not investigated since there is no proposed disturbance here. In this area, walls associated with the nearby Consolidated Edison Company of New York (Con Edison) facility already exist and would connect with the proposed alignment. The section of the proposed alignment between approximately East 15th Street and East 18th Street was not investigated since the design for the flyover bridge that is contemplated to be constructed in this area has not been completed and therefore the need for and scope of any additional soil and groundwater testing (testing has been conducted in the vicinity on behalf of Con Edison) is not yet known. If additional testing is needed beyond soil waste characterization, it would be conducted, prior to construction, in accordance with a work plan and HASP submitted to DEP for review and approval.

In Project Area One, where the alignment of the flood protection system was modified to be closer to the waterfront, additional analysis (a supplemental subsurface investigation) for hazardous materials was conducted. This investigation also addressed the (modified) proposed locations of the interceptor gates near the northern and southern ends of the project area.

B. PRINCIPAL CONCLUSIONS

During the subsurface investigations of the study area, subsurface contamination consistent with historical MGPs and other sources of petroleum waste were found in both soil and groundwater of Project Area One (predominately in the northern portion) and throughout the majority of Project Area Two. The contamination included MGP-related free product (also known as non-aqueous phase liquid or NAPL). Three nearby former MGPs (historically known as East 11th Street Works, East 14th Street Works, and East 21st Street Works) have been or are being investigated and, as deemed necessary by the New York State Department of Environmental Conservation (NYSDEC) to protect human health or the environment, remediated by Con Edison. These activities were being conducted under the former NYSDEC Voluntary Cleanup Program (VCP) (Sites V00534, V00535, and V00536) and now, following termination of the VCP statewide by NYSDEC, under an Order on Consent and Administrative Settlement with NYSDEC. In addition, historical fill material of unknown origin was encountered throughout the project area, as expected. Laboratory analysis found, as is typical of historical fill material, variable, and sometimes elevated levels of a range of contaminants especially certain metals and semi-volatile organic compounds (SVOCs).

Within the northern portion of Project Area Two, at the Asser Levy Recreation Center, there is known petroleum contamination from a No. 2 fuel oil release (open-status NYSDEC Spill No. 0814102). Additionally, within the northern portion of Project Area Two, at the Solar One site in Stuyvesant Cove Park, there is known gasoline and No. 6 fuel oil contamination (NYSDEC Spill No. 9506959). In both areas, there are active remediation systems. There are also several projects planned or under construction in the project area that might disturb the subsurface and any hazardous materials present there. These projects, including the Pier 42 project and the Solar One Environmental Education Center project, are independent of the proposed project, but would be subject to applicable regulatory requirements.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, no new comprehensive coastal protection system would be implemented. However, the No Action Alternative assumes that projects planned or currently under construction near the project area are completed by the 2025 analysis year (i.e., No Action projects). These planned projects might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure, but these projects would need to comply with applicable regulatory requirements.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative would involve demolition and excavation activities and would have their potential to disturb hazardous materials in existing structures and the subsurface. However, with the implementation of appropriate protection measures—described further in Section F below, governing the construction phase—the potential for significant adverse effects related to hazardous materials would be avoided. Following construction, with the capping layer in landscaped areas and the implementation of Site Management Plans (SMPs) that address long-term management of residual hazardous materials, there would be no pathways for exposure to park users from remaining subsurface contaminants beneath the project construction areas. Therefore, the Preferred Alternative would not have the potential for significant adverse effects related to hazardous materials during the operational stage of the proposed project.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in that they all include the potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for operational-phase effects would be avoided in the same manner as described above for the Preferred Alternative.

C. REGULATORY CONTEXT

A hazardous material is any substance that poses a threat to human health or the environment. Substances that may be of concern in the subsurface include heavy metals, volatile organic compounds (VOCs), SVOCs, methane, polychlorinated biphenyls (PCBs), pesticides, and hazardous wastes. Asbestos-containing materials (ACM) and lead-based paint (LBP) or lead-containing paint (LCP) are the most common aboveground (e.g., on or within building materials) hazardous materials. LBP is defined as containing 1 milligram per square centimeter or 0.5 percent by weight lead or more, whereas LCP is defined as containing in excess of 0.06 percent lead by weight. Management of hazardous materials is subject to numerous regulatory programs, including those of the United States Environmental Protection Agency (EPA), NYSDEC, and DEP. For example, a subset of hazardous materials, when disposed of are considered Hazardous Wastes and are subject to a variety of stringent cradle-to-grave requirements (set out in 40 CFR Parts 261-264 and 268).

This assessment follows the methodology in the 2014 New York City Environmental Quality Review (CEQR) Technical Manual. For hazardous materials, the goal for CEQR is to determine

whether a proposed project may increase the exposure of people or the environment to hazardous materials, and, if so, whether this increased exposure would result in potentially significant public health or environmental effects. Additionally, the regulatory context for the proposed project includes the following requirements and policies for which each of the alternatives have been analyzed with respect to in order to make a determination of potential environmental effects associated with project implementation.

EO 13045 – PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS

Executive Order (EO) 13045, Protection of Children from Environmental Health Risks and Safety Risks, specifies prioritization of the identification and assessment of potential environmental health and safety risks that may disproportionately affect children (it should be however be noted that in general the regulatory standards and guidelines, used for comparison purposes, already incorporate protection of sensitive individuals, including children). If adverse effects are identified, CEQR requires that the effects be disclosed and mitigated or avoided to the greatest extent practicable.

HUD POLICY – RELATED FEDERAL LAWS AND AUTHORITIES (24 CFR § 58.5)

The United States Department of Housing and Urban Development (HUD) policy (at 24 CFR Part 58.5[i][2]) sets out that properties proposed for use in HUD programs should be free of hazardous materials, where a hazard could affect the health and safety of users of the property, and that particular attention be paid to properties on or near dumps, landfills, industrial sites, etc.

D. METHODOLOGY

Historically, almost the entire study area was within the East River until it was filled in the 19th and 20th centuries. The source and quality of this fill material are unknown. As such, testing of the fill material (especially the shallow fill, since this would be more likely to be disturbed as a result of the proposed project) was performed in Spring 2015, Summer 2016, and Summer 2019, via subsurface investigations. Deeper testing was also conducted, since new walls would require relatively deep foundations. In addition, groundwater was tested, since construction would require dewatering. In addition to the initial quality of the fill material itself, migration of contaminants from former MGP facilities, operated by predecessors of Con Edison, inland has occurred primarily between East 11th and East 14th Streets, and East 20th and East 22nd Streets. Petroleum releases in the northern portion of Project Area Two are known to have resulted in some subsurface contamination. Historical piers and bulkheads, including railroad piers that were located along most of the East River shoreline, could also have resulted in subsurface contamination.

POTENTIAL CONTAMINANTS OF CONCERN

Soil and groundwater can become contaminated as a result of past or current activities on a project site or on adjacent areas. Many industrial activities use, store, or generate contaminated materials that can be spilled, dumped, or buried nearby. Other activities common in mixed-use neighborhoods, such as gas stations and auto repair shops, can also result in contamination due to improper handling/management of raw product and/or waste materials, or inadvertent spills/release.

Of particular concern for the study area are MGPs. These plants existed from the early 1800s to the mid-1900s, before the construction of natural gas pipelines, and converted coal (oven gas) or a combination of coke or coal, oil and water in the form of steam (carbureted water gas) into a gas that could be distributed and used as a fuel for heating, cooking, and lighting. Byproducts of the gas production, such as coal tar (wastes containing volatile and non-volatile organic chemicals) may pose a threat to human health and the environment. Con Edison has conducted investigations to characterize and delineate the nature and extent of contamination from these historic facilities and remediated areas of residual contamination from these facilities where it was determined to be necessary by NYSDEC to protect human health or the environment.

Human exposure to contaminants from the former MGP or other sources can potentially occur through direct contact when there is an exposure pathway, e.g., when excavation is occurring. Exposure to contaminated groundwater through ingestion is not expected as Manhattan is served by municipal water systems that rely on upstate reservoirs, but exposure could occur during dewatering. Therefore, if such contaminants are not properly managed, the proposed excavation, earthmoving, dewatering, and other construction activities can introduce potential risk to construction workers and others nearby by providing a pathway of exposure from contaminants. Demolition or disturbance of existing structures that have ACM, LBP/LCP, electrical equipment containing PCBs, or fluorescent lights or older thermostats containing mercury have the potential to release contaminants if these materials are not properly managed.

Based on the types of contaminants that are typically found in New York City, some of the potential contaminants of concern are described below. The list provides a summary of potential categories of contaminants and is not a comprehensive list of all contaminants that may be encountered:

1. **Volatile organic compounds (VOCs):** These include aromatic compounds—such as benzene, toluene, ethylbenzene, xylene (BTEX), which may be found in MGP wastes and petroleum products (especially gasoline, which can also contain methyl tertiary butyl ether [MTBE])—and chlorinated compounds, such as tetrachloroethene (also known as perchloroethylene or “perc”) and trichloroethene, which are common ingredients in solvents, degreasers, and cleansers. VOCs represent the greatest potential for contamination since, in addition to soil and groundwater contamination, they can generate organic vapors.
2. **Semivolatile organic compounds (SVOCs):** The most common SVOCs in urban areas are polycyclic aromatic hydrocarbons (PAHs), which are constituents of partially combusted coal- or petroleum-derived products, and some MGP wastes. PAHs are commonly found in New York City urban fill material, which seemingly underlies the entire study area. Petroleum-related SVOCs could be present and are typically associated with buried tanks currently or formerly located in the study area. SVOCs can also be present in creosote-treated timber (e.g., piles from former bulkheads or piers).
3. **Polychlorinated biphenyls (PCBs):** PCBs and/or PCB-containing materials were once widely used in manufacturing and industrial applications (e.g., hydraulic equipment, plastics manufacturing, as dielectric fluid in transformers, and in some underground high-voltage electric lines). PCBs tend to travel only short distances in soil, except in unusual circumstances (e.g., large spills of PCB-containing oils over many years).
4. **Pesticides, herbicides, and rodenticides:** These are commonly used to control rodents and/or insects and vegetation in vacant structures or in vegetated areas, including parks. Pesticides/herbicides are relatively immobile and tend to be persistent in surface soils.

5. **Metals (including lead, arsenic, cadmium, chromium, mercury and cyanide):** Metals are often used in smelters, foundries, and metal works and are found as components in MGP wastes, paint, ink, petroleum products, fluorescent lights, older thermostats, and coal ash, and were used in the past (copper, chrome, and arsenic) as wood preservatives (e.g., on piles). These metals tend not to migrate far in soil; therefore, they would be of greater concern at the site where they were generated than at off-site areas. Metals at levels above natural background levels are frequently present in fill material throughout the New York metropolitan area.

6. **Fuel oil and gasoline from storage tanks:** Numerous residences and businesses upland of (or less likely in) the project area could have had above-ground storage tanks and/or underground storage tanks for fuels, including heating oil and gasoline. Some of the MGP facilities stored large volumes of oil. Although the MGP-related tanks have been removed, underground storage tanks at other locations, although no longer in use, may remain buried in place. Some of the tanks are known to have leaked, and others have possibly leaked despite no record of a spill reported. Some spills have been cleaned up in accordance with state regulations, but others have not because they have not yet been discovered or because cleanup, which can take several years, is ongoing.

7. **Fill materials of unknown origin:** In the past, waste materials, including coal and incinerator ash, demolition debris (including from demolished cinder blocks), and industrial wastes, were commonly used as fill in urban areas. Even fill material consisting primarily of soil may exhibit elevated levels of PAHs, metals, PCBs, SVOCs, and other contaminants. Such materials are potentially present throughout the project area.

8. **Asbestos:** Asbestos is a common component of building materials, especially insulation, fireproofing, tile flooring, plaster, sheetrock, ceiling tiles, mastic, and roofing materials. In addition to materials within existing structures, subsurface utility lines may be coated with asbestos or encased in “transite,” an ACM. Asbestos was widely used before 1980. Because of the age of many of the buildings and bridges in the project area, ACMs are almost certainly present.

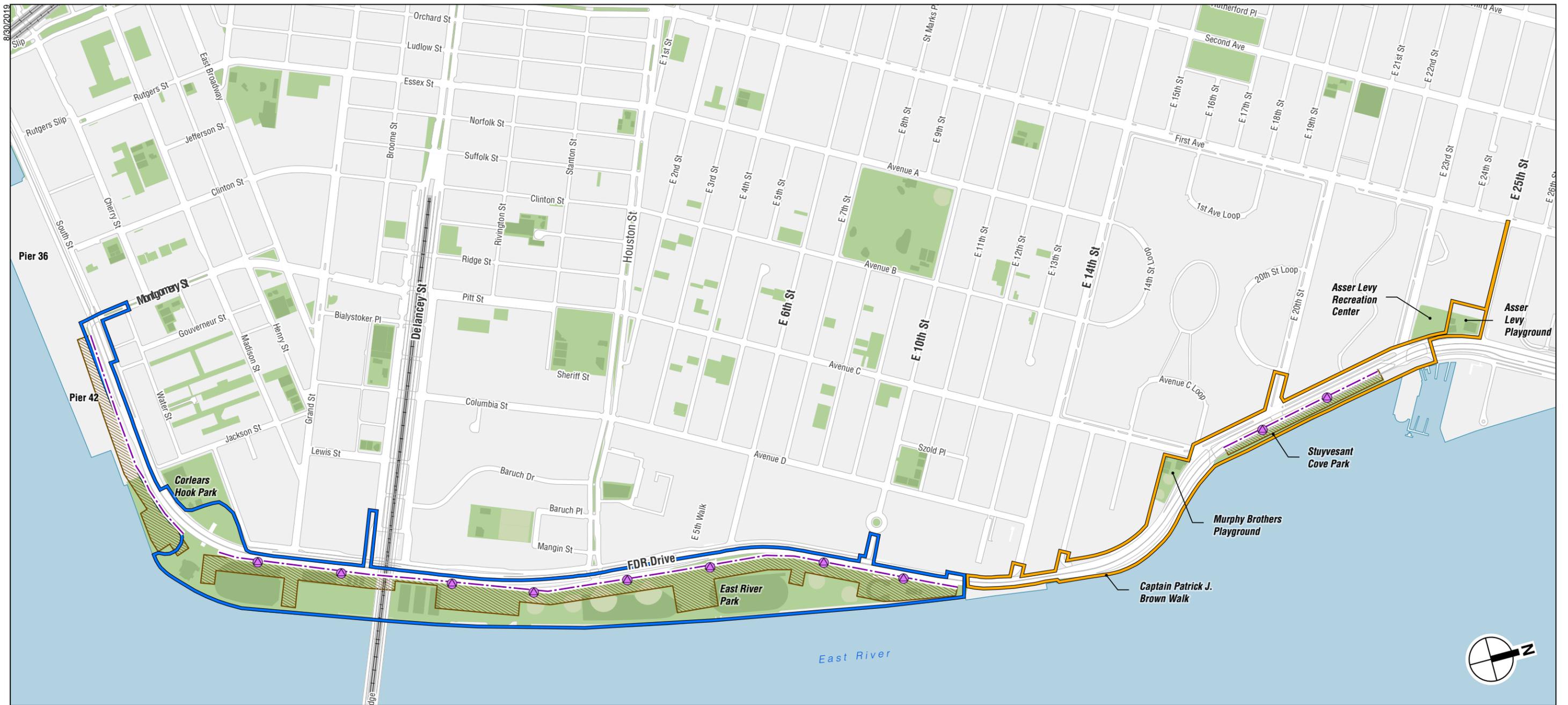
9. **Lead-based paint (LBP) and Lead-containing Paint (LCP):** The use of LBP in New York City residential buildings was banned in 1960. Its use in other buildings and outdoors was severely restricted by the Consumer Products Safety Commission in 1977. Lead-containing paint is regulated under the OSHA Lead Exposure in Construction standard (29 CFR 1926.62). Lead that is released as dust (or as a fume if heated) is potentially hazardous, especially to children. Older buildings, bridges, and other painted structures or elements are likely to include LBP or LCP.

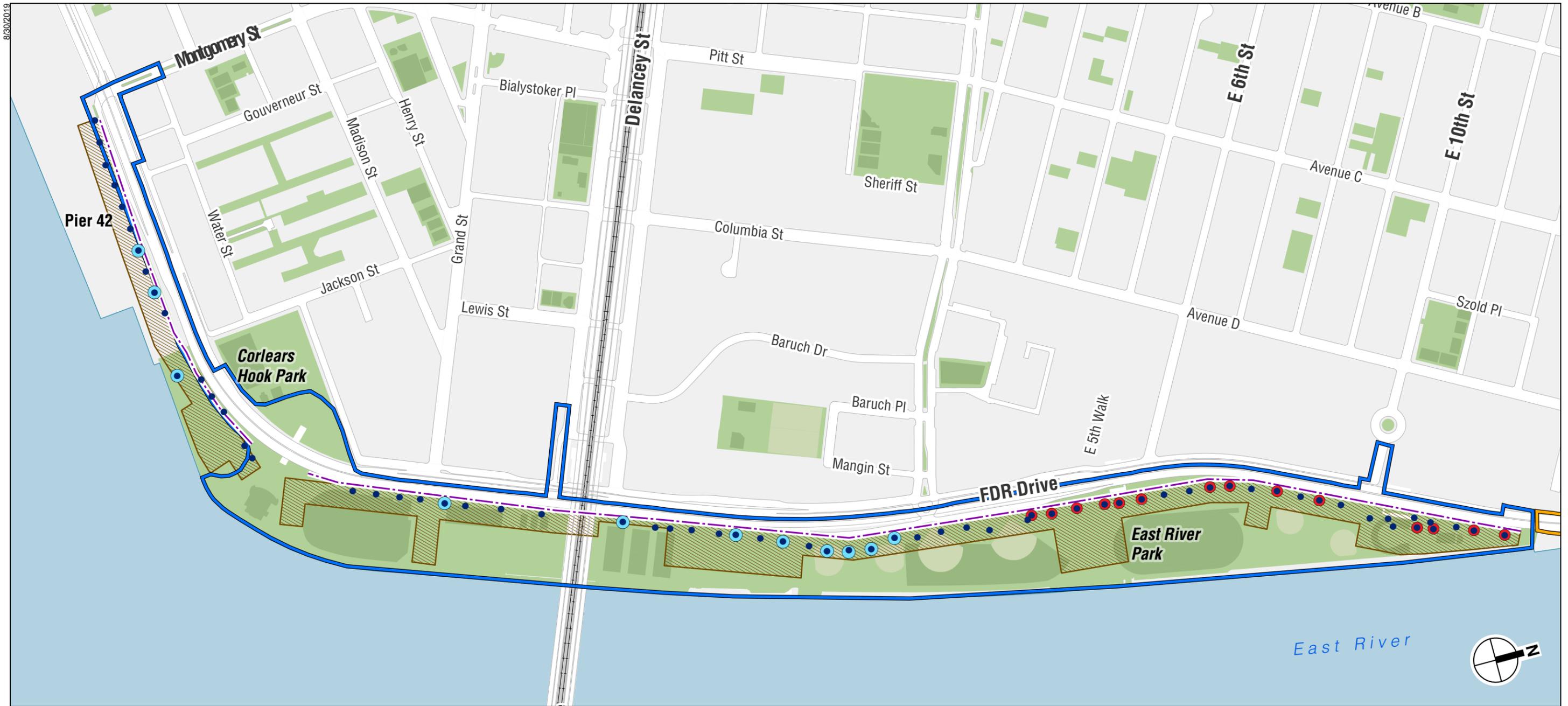
SOIL AND GROUNDWATER INVESTIGATIONS³

SOIL AND GROUNDWATER INVESTIGATION (SPRING 2015)

For this investigation, conducted between April and June 2015, both Project Areas One (south of East 14th Street) and Two (north of East 14th Street) were analyzed and further divided into 100-foot grids for analysis purposes (see **Figures 5.7-1 through 5.7-3**). In each grid, one deep boring (up to 40 feet) was conducted as well as four additional shallow borings. The shallow samples were generally analyzed as composites (i.e., mixture) of shallow soil from the five borings within the grid. For Project Areas One and Two, this resulted in 83 deep samples and 98 shallow samples.

³ *Subsurface Investigation Report for East Side Coastal Resiliency Project Area 2*, AKRF, Inc. July 2015
Subsurface Investigation Report for East Side Coastal Resiliency Project Area 1, AKRF, Inc. October 2015
Supplemental Subsurface Investigation Report for East Side Coastal Resiliency, AKRF, Inc. November 2016





- Project Area One
- Project Area Two
- Deep Boring Alignment
- Shallow Boring Areas
- Deep Soil Boring Location & Designation
- Deep Soil Borings with Petroleum-Like Contamination Encountered at Depths
- Deep Soil Borings with Coal Tar-Like Contamination Encountered at Depths

0 1,000 FEET



- Project Area One
- Project Area Two
- Shallow Boring Areas
- Deep Soil Boring Location & Designation
- Soil Boring with Coal Tar & Potential Petroleum Impacts
- Soil Borings with Coal Tar-Like Contamination Encountered at Depths

0 1,000 FEET



Ten of the borings were retrofitted with temporary monitoring wells, allowing collection of a groundwater sample from each. Soil samples were analyzed for a suite of parameters (VOCs, SVOCs, metals, pesticides, and PCBs) with certain samples also analyzed for a set of parameters that determine whether the material, if excavated, would be likely to require management as a hazardous waste, as defined by EPA and NYSDEC regulations. Groundwater samples were analyzed for a similar set of parameters to the soil samples with certain samples also analyzed for a set of parameters that determine whether the water would be likely to require pre-treatment prior to discharge, should dewatering be necessary.

No borings were performed along the waterfront walkway and Captain Patrick J. Brown Walk located between East 13th and East 18th Streets since the area contains numerous subsurface utilities (associated with the nearby Con Edison power plant). As the design for the flyover bridge that is contemplated to be constructed in this area has not been completed, the need for and scope of any additional soil and groundwater testing (testing has been conducted in the vicinity on behalf of Con Edison) is not yet known. If additional testing is needed, beyond soil waste characterization, it would be conducted, prior to construction, in accordance with a work plan and HASP submitted to DEP for review and approval. In addition, if portions of the final alignment are within a regulated water body or wetland adjacent area, any necessary NYSDEC/USACE permitting requirements would be followed.

SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION (SUMMER 2016)

Supplemental soil and groundwater investigations were conducted in July 2016 (see **Figures 5.7-4 through 5.7-6**), as follows: (1) in areas where the potential for subsurface soil disturbance was better defined based on the project design; (2) in two shallow soil locations where the Spring 2015 investigation identified elevated levels of lead and/or chromium in composite samples; and (3) to obtain additional groundwater quality data in the northern end of East River Park at depths where contamination from former MGPs was identified during the Spring 2015 investigation.

Under this investigation, seventy borings were advanced for the collection of soil samples. Fifteen of these were retrofitted with temporary monitoring wells allowing collection of groundwater samples. Samples were collected and analyzed for similar parameters to the Spring 2015 investigation, with the exception of soil samples in the area with elevated lead and/or chromium where analysis was limited to these specific metals.

SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION (SUMMER 2019)

A supplemental soil and groundwater investigation was conducted in June and July 2019 to evaluate subsurface conditions in previously untested areas (see **Figures 5.7-7 through 5.7-9**), where subsurface disturbance would occur based upon the changes in the alignment of the flood protection system in Project Area One, and upon the modified proposed locations of two interceptor gates at the northern and southern portions of the project area.

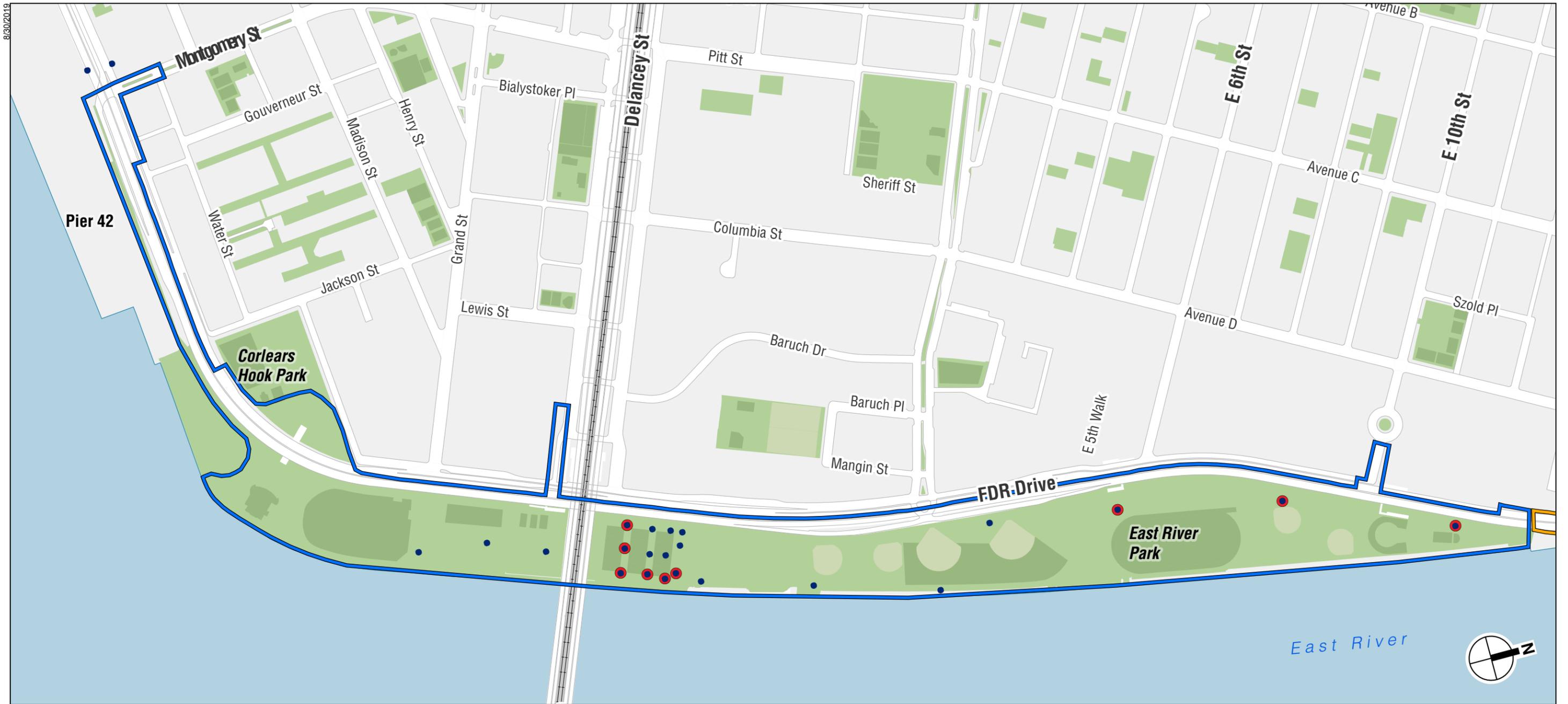
Under this investigation, thirty borings were advanced for the collection of soil samples. Seven of these were retrofitted with temporary monitoring wells allowing collection of groundwater samples. Samples were collected and analyzed for similar parameters to the two previous investigations, with the exception that groundwater samples were not analyzed for the set of parameters that determine if pre-treatment might be required prior to discharge, should dewatering be necessary.



- Project Area One
- Project Area Two
- Soil Boring Location & Designation
- ▲ Groundwater Sample Locations

0 1,000 FEET



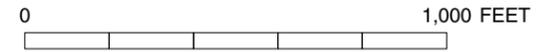


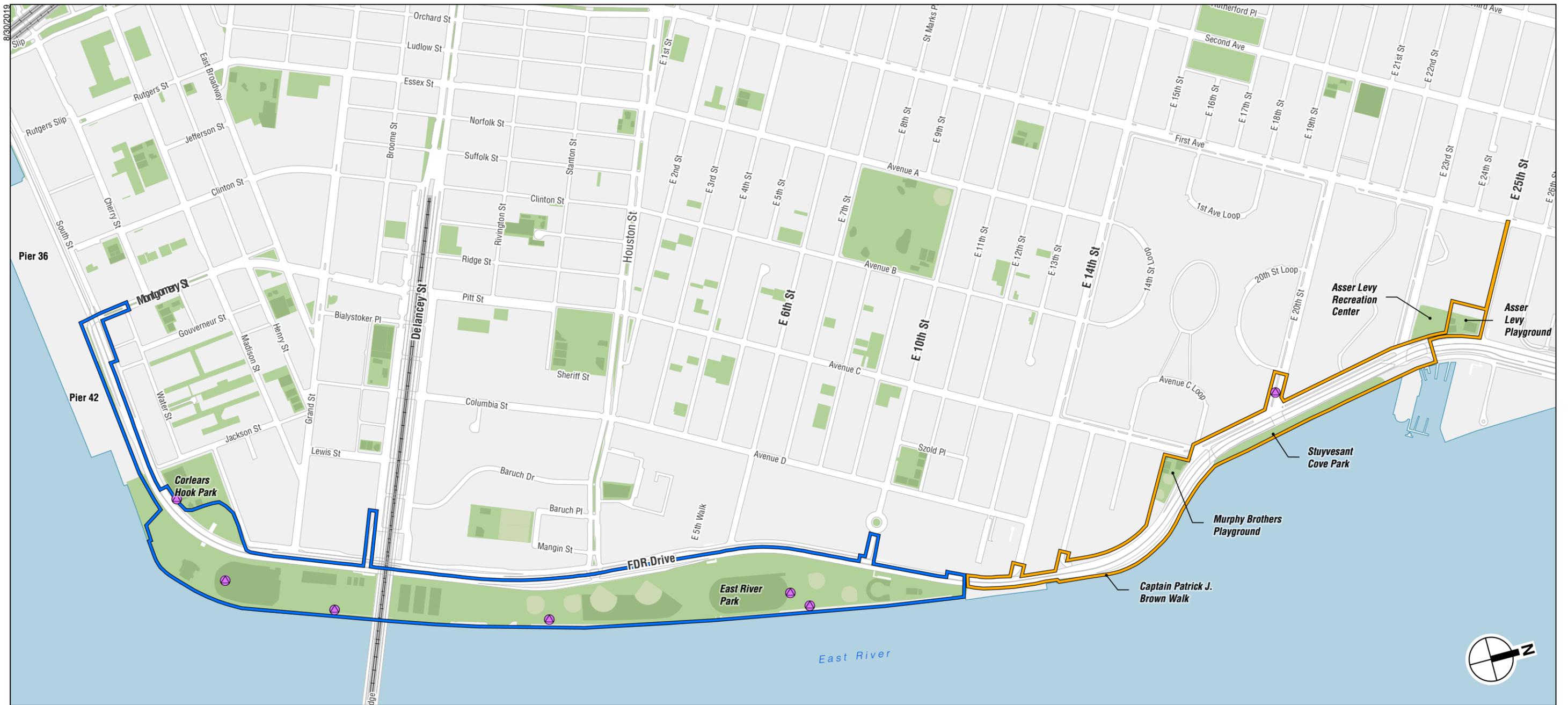
- Project Area One
- Project Area Two
- Soil Boring Location & Designation
- Soil Borings with Coal Tar-Like Contamination Encountered at Depths

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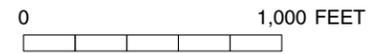


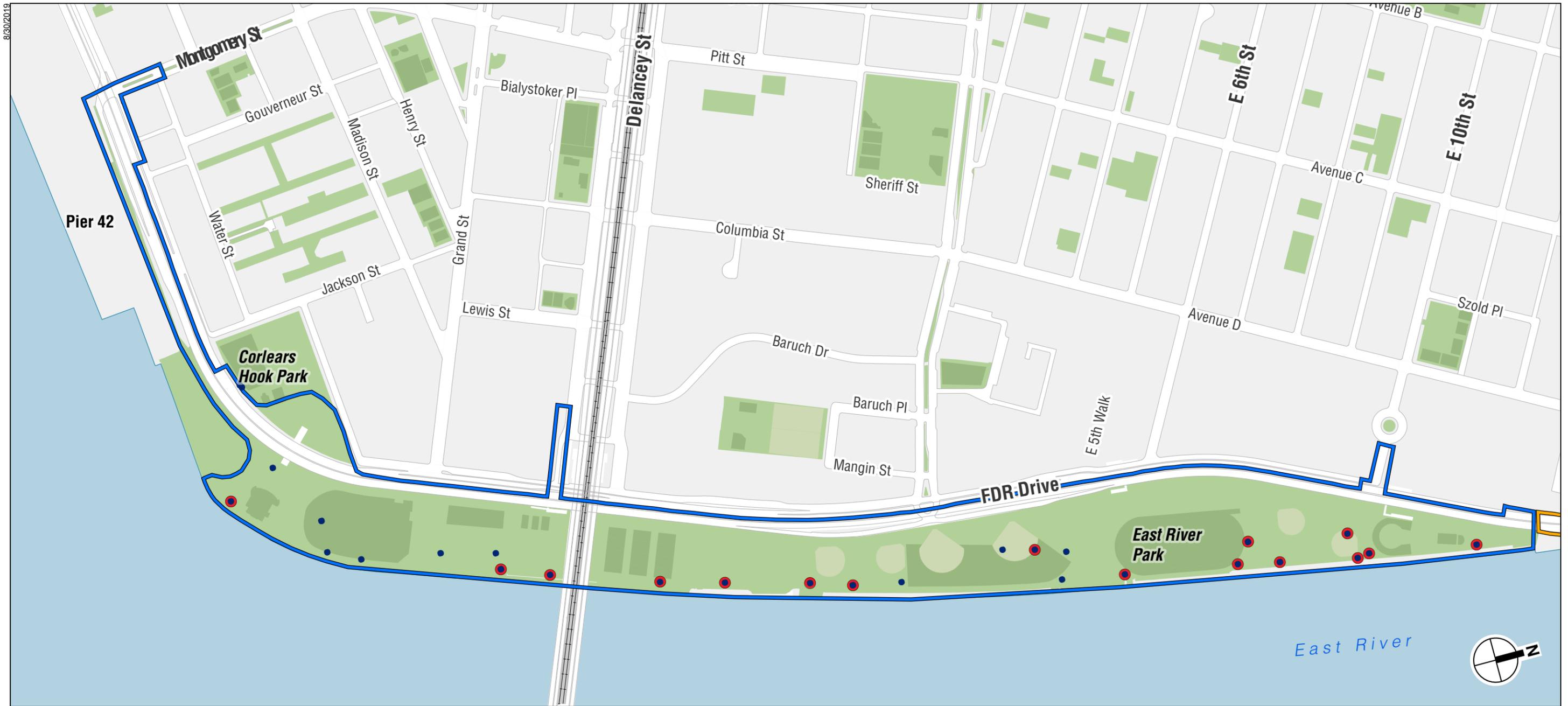
- Project Area One
- Project Area Two
- Soil Boring Location & Designation
- Soil Borings with Coal Tar-Like Contamination Encountered at Depths





- Project Area One
- Project Area Two
- Groundwater Sample Locations



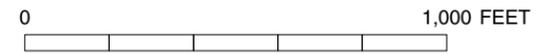


- Project Area One
- Project Area Two
- Soil Boring Location & Designation
- Soil Borings with Coal Tar-Like Contamination Encountered at Depths

0 1,000 FEET



- Project Area One
- Soil Boring Location & Designation
- Project Area Two
- Soil Borings with Coal Tar-Like Contamination Encountered at Depths



E. AFFECTED ENVIRONMENT

TOPOGRAPHY, GEOLOGY, AND GROUNDWATER

The topography of the project area is generally level and approximately 5 to 10 feet above mean sea level (NAVD88). The topography of the study area slopes toward the East River, generally in the form of a human-made park and bulkhead. The land typically slopes gently upward inland of the project area.

A comparison of current maps with historical maps of Manhattan shows that essentially all of the land in the project area was formerly underwater (a portion of the area around Corlears Hook Park is the possible exception). More recent filling was associated with construction of the FDR Drive, which began in 1934, and East River Park, which opened between 1939 and 1941. Therefore, soils under and in the vicinity of the project area are expected to include fill material.

Groundwater during the soil and groundwater investigations was first encountered at approximately 5 to 13 feet below grade; however, more precise groundwater measurements obtained from temporary wells identified the water table at between 5 and 16 feet below grade. While groundwater throughout the project area would be expected to flow toward the East River, local variations are possible due to intervening subsurface structures (such as former or current bulkheads), tidal fluctuation, and past filling. Groundwater in Manhattan is not used as a source of drinking water (see **Figures 5.7-1, 5.7-4, and 5.7-7**).

SOIL AND GROUNDWATER CONDITIONS

SOIL AND GROUNDWATER INVESTIGATION (SPRING 2015)

Project Area One

Soil Conditions

Soil encountered throughout Project Area One generally included sandy fill materials (including brick and asphalt with gravel and at some locations peat), underlain in some locations by sand and silts with gravel and rock fragments (presumed to also be fill material). Laboratory analysis of shallow soils generally exhibited levels of constituents including metals and SVOCs consistent with urban fill.

Field observations, laboratory data, and historical findings related to the former MGP facilities operated by predecessors of Con Edison at East 11th Street and East 14th Street indicated the potential presence of MGP wastes, including coal tar, in the subsurface soil extending from Captain Patrick J. Brown Walk south to East 13th Street. Contamination was mostly found at and below the water table and in some cases extended to (and is therefore likely located beyond) the bottom of the borings, which extended up to 40 feet. The shallowest contamination potentially consistent with MGP waste was encountered at five feet below grade. Laboratory analysis of these samples identified BTEX and the SVOC naphthalene in deep soil samples at concentrations above various NYSDEC Soil Cleanup Objectives (SCOs), though it should be noted these SCOs assume routine public exposure at the surface, so comparison is highly conservative as this material would not be used to form the top layer of a levee, raised landscape or other surface in the park. Although many of these compounds are also present in gasoline and other petroleum products, especially when encountered well below the water table, they may also be indicative of MGP contamination. The data was generally consistent with data generated during investigations conducted on behalf

of Con Edison as a part of their investigations of MGP facilities in the area as part of its Voluntary Cleanup Agreement (VCA) with NYSDEC.⁴

Petroleum-like odors and or low-level photoionization detector (PID) readings, indicating the presence of VOCs, were noted during the field screening of soil from 12 borings as shown on **Figures 5.7-2, 5.7-3, 5.7.5, 5.7.6, 5.7.8, and 5.7.9**. However, laboratory data indicated potential petroleum contamination in only three of these borings—one located slightly south of East Houston Street, one just north of the Williamsburg Bridge, and another near the Solar One site.

One deep soil sample across from Gouverneur Slip East had an unusually elevated level of lead and, to a lesser extent, mercury and silver. A shallow soil sample collected just north of Grand Street contained a relatively high level of lead, and another shallow soil sample collected just north of the East River Park Amphitheater (located at the eastern end of the Corlears Hook Park pedestrian bridge) had a relatively high level of chromium. Following sampling, these borings were backfilled in a manner so that there is no potential for exposure to these materials from the surface. These metals are most likely attributable to the fill materials rather than contamination from the former MGP and/or on-site or off-site facilities/uses.

Groundwater Conditions

Groundwater within the temporary monitoring wells was first encountered at between approximately 5 and 9 feet below grade in Project Area One. A petroleum-like sheen was observed in a temporary well just north of East Houston Street, but laboratory analytical data identified no significant exceedances of NYSDEC Class GA water quality standards in the shallow water table. Some metals showed exceedances but the levels were typical of waterfront locations and urban areas; Class GA standards were developed assuming use for drinking water supply, a scenario that does not occur in Manhattan. However, based on field observations and chemical data from the soil boring program, and the data contained in the December 2009 Remedial Investigation Report prepared on behalf of Con Edison for the former East 11th Street Works site (submitted to and publicly available from NYSDEC), deeper groundwater contamination (associated with the Former 11th Street Works) is present between East 14th Street and East 4th Walk (essentially an extension of East 4th Street) and contains elevated levels of VOCs and SVOCs associated with MGP wastes.

The results for the groundwater discharge parameters indicated that the only exceedance of the DEP limitations for effluent to the sanitary/combined sewer system was for total suspended solids (TSS) indicating the potential need for treatment in the form of settling and/or filtration prior to discharge. However, the groundwater samples were collected from shallow temporary wells, and based on the findings of the deep soil samples and Con Edison data for deeper wells located inland of the project area, there is likely more extensive deeper groundwater contamination. Therefore, it is probable that groundwater pumped during construction throughout much of the project area, especially in the vicinity of the former MGP facilities, would require treatment for organic compounds, e.g., by using oil-water separators or absorption on granulated activated carbon, before discharge.

⁴ More information on the Con Edison studies for the various sites is available from NYSDEC and online at http://www.coned.com/publicissues/manufactured_gas_plants.asp.

Project Area Two

Soil Conditions

Similar to Project Area One, soil encountered in Project Area Two generally included sandy fill materials (including brick and asphalt with gravel and at some locations peat), underlain in some locations by sand and silts with gravel and rock fragments (presumed to also be fill material). Laboratory analysis of shallow soils generally exhibited levels of constituents including metals and SVOCs consistent with urban fill. As noted above, no borings were performed between East 13th and East 18th Streets. Similarly, no sampling (in the Spring 2015 investigation) was conducted north of East 23rd Street or west of the FDR Drive.

Field observations, laboratory data, and historical findings related to the former MGP facilities operated by predecessors of Con Edison within the current locations of Stuyvesant Town (former East 14th, East 17th, and East 19th Street Stations) and Peter Cooper Village (formerly East 21st Street Works) indicated the likely presence of MGP wastes, including coal tar, in the subsurface soil in Project Area Two. Contamination was mostly found at and below the water table and in some cases extended to (and is therefore likely located beyond) the bottom of the borings, which extended up to 40 feet. The shallowest contamination potentially consistent with MGP waste was at six feet below grade. Typically, this contamination was first encountered at or below the water table and extended down the remainder of the boring. Laboratory analysis of these samples identified BTEX and the SVOC naphthalene in deep soil samples at concentrations above various NYSDEC SCOs, though it should be noted these SCOs assume routine public exposure at the surface so comparison is highly conservative as this material would not be used to form the top layer of a levee, landscaped berm, or other surface in the park. Although many of these compounds are found in gasoline and other petroleum products, especially when encountered well below the water table, they are more likely indicative of MGP contamination. Furthermore, the data were generally consistent with data generated on behalf of Con Edison as a part of their VCA with NYSDEC.⁵ The two areas where sampling was not conducted (between East 13th and East 18th Streets, and north of East 23rd Street or west of the FDR Drive) could also have MGP contamination based on data generated on behalf of Con Edison. However, they would be anticipated to be less contaminated than the area directly east of Peter Cooper Village, which was where the majority of wastes were generated/released, based on both historical information and Con Edison investigation data.

Data from the northernmost sample (near Solar One), adjacent to an active gasoline station at the foot of East 23rd Street, indicated likely petroleum-related contamination in the subsurface closer to the soil/water interface. This gasoline station is known to have had spills in the past. Due to the limited nature of the groundwater assessment, it is not clear to what extent groundwater quality has been affected by this gasoline station.

Groundwater Conditions

Groundwater within the temporary monitoring wells was first encountered at approximately seven feet below grade in Project Area Two. Groundwater, consistent with the deep soil samples, appeared to be affected by MGP contamination and had levels of VOCs and naphthalene well above Class GA standards.

⁵ More information on the Con Edison studies for the various sites is available from NYSDEC and online at http://www.coned.com/publicissues/manufactured_gas_plants.asp

The results for the groundwater discharge parameters indicate that naphthalene and BTEX were above the DEP limits in the sample collected across from Peter Cooper Village. Based on these results, treatment of groundwater for organic compounds e.g., by using oil-water separators or absorption on granulated activated carbon (as well as TSS) would likely be required prior to discharge to the sewer system, should dewatering be required. The other groundwater samples indicated either compliance with all DEP limits or, in one sample, exceedance only for TSS, which might require treatment in the form of settling or filtration prior to discharge.

SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION – SUMMER 2016

Soil Conditions

Soil encountered during the summer of 2016 supplemental investigation was similar to the Spring 2015 investigation and generally included sandy fill materials underlain (unless the boring encountered refusal) by native sand, clays, and silts with little to trace gravel and rock fragments. Shallow borings mostly consisted of only sandy fill materials. As with the Spring 2015 investigation, laboratory analysis of soil samples generally exhibited levels of constituents including metals and SVOCs consistent with urban fill.

Relating to MGP wastes, field observations, laboratory data, and historical findings were also generally similar to the Spring 2015 investigation, and indicated the presence of MGP wastes, including coal tar, in the deeper soil (at and below the water table) in the northern portion of Project Area One and throughout Project Area Two. Laboratory analysis of these samples again identified BTEX and the SVOC naphthalene in deep soil samples at concentrations above various NYSDEC SCOs and most likely indicative of MGP contamination.

However, suspected MGP-related wastes were identified just north of the Williamsburg Bridge within East River Park, well beyond the southern-extent of MGP effects identified in investigations conducted on behalf of Con Edison under the VCP. This contamination was identified from approximately 10 feet below grade to the bottom of the boring at 30 feet below grade. Forensic fingerprint laboratory analysis (i.e., where an attempt is made to match the mix of compounds in the sample to known mixtures) was performed and confirmed that it was likely related to coal tar. Additionally, hydrocarbon contamination, potentially petroleum, was identified adjacent to this location at depths ranging from approximately 5 to 15 feet below grade. NYSDEC was informed of both the identified coal tar and hydrocarbon contamination and Spill No. 1605942 was assigned.

Groundwater Conditions

Groundwater within the temporary monitoring wells was first encountered at between approximately 6 and 16 feet below grade. Groundwater, consistent with the associated soil samples and/or field observations (and the Spring 2015 investigation), appeared to be affected by MGP-related contamination (and had levels of VOCs and naphthalene well above Class GA standards).

The results for the groundwater discharge parameters indicate that VOCs and/or naphthalene were present above the DEP discharge limits in samples collected adjacent to Peter Cooper Village (located between East 20th Street and East 23rd Street) and Murphy Brothers Playground (located between East 16th Street and Avenue C Loop [approximately in line with extension of East 18th Street]), while TSS were present above the DEP limits in 10 of the 15 samples. Based on these results, treatment of certain groundwater for organic compounds as well as TSS could well be

required in certain areas prior to discharge to the combined or sanitary sewer system, should dewatering be required. The other groundwater samples indicate compliance with the DEP limits.

SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION – SUMMER 2019

Soil Conditions

Similar to the both earlier investigations, soil encountered during the Summer 2019 investigation generally included sandy fill materials underlain (unless the boring encountered refusal) by native sand, clays, and silts with little to trace gravel. Shallow borings mostly consisted of only sandy fill materials. As with the earlier investigations, laboratory analysis of soil samples generally exhibited levels of constituents, including metals and SVOCs, consistent with urban fill.

Relating to MGP wastes, field observations, and laboratory data were also generally similar to the earlier investigations indicating MGP wastes, including coal tar, in the deeper soil (at and below the water table) in the northern portion of Project Area One and at the proposed northern interceptor gate location within Project Area Two. Laboratory analysis of these samples identified BTEX and naphthalene in deep soil samples at concentrations above certain NYSDEC SCOs and most likely indicative of MGP contamination.

Suspected MGP wastes were identified 300 feet south of the Williamsburg Bridge at 15 to 25 feet below grade, and just south of the amphitheater at 35 to 45 feet below grade. Notably, these locations are further south than the southern-extent of MGP wastes identified in investigations conducted on behalf of Con Edison under the VCP and the Spring 2015 and Summer 2016 Investigations.

Groundwater Conditions

The water table within the temporary monitoring wells was first encountered at between approximately 7 and 13 feet below grade. Groundwater, consistent with the associated soil samples and/or field observations (and the Spring 2015 and Summer 2016 investigations), appeared to be affected by MGP-related contamination (and had levels of VOCs and naphthalene well above Class GA standards).

MANUFACTURED GAS PLANT CONTAMINATION

As noted above, contamination consistent with wastes from historical MGP operation were found in both soil and groundwater in Project Area One (predominately in the northern portion) and throughout the majority of Project Area Two (and as noted above, it may also be present in the two portions of Project Area Two where testing did not occur). MGPs existed from the early 1800s to the mid-1900s (prior to natural gas production and pipelines), to convert coal (oven gas) or a combination of coke or coal, oil and water in the form of steam (carbureted water gas) into gas for lighting, cooking, and heating. These plants produced byproducts such as coal tar and oils that are known to be present beneath (and migrated away from) these former MGPs. Predecessors of Con Edison operated three MGPs in the vicinity of the project area. Decommissioning and dismantling/demolition of these facilities occurred more than 50 years ago.

In 2002, Con Edison entered into a VCA with NYSDEC, and in 2018 when NYSDEC ended the VCP statewide, into an Order on Consent and Administrative Settlement with NYSDEC to investigate and, if necessary to protect human health and the environment as determined by

NYSDEC, remediate all of their former MGP and gas holder facilities including those near the project area. The Con Edison documents for the various sites⁶ near the project area indicate:

- At the former East 11th Street Works, there is potential subsurface contamination, but the areas are capped and there are no indoor air effects to nearby buildings;
- At the former East 14th Street Works, although there is deeper soil contamination beneath the northernmost end of East River Park, these soils are now covered, which avoids the potential for human exposure;
- At Stuyvesant Town, limited MGP soil contamination was found in three small areas well below the surface. Based on the results of indoor air tests conducted on behalf of Con Edison, indoor air quality has not been affected by MGP contamination; and
- At Peter Cooper Village, while MGP soil contamination was found there is minimal potential for human exposure due to the depth of the contaminated soil and groundwater. Indoor air testing has shown no evidence of MGP-related contamination.

ASBESTOS-CONTAINING MATERIALS AND LEAD-CONTAINING PAINT

ACM and lead-containing paint (LCP) surveys were conducted in 2018 of the East 10th Street Comfort Station, and the East 10th Street and Delancey Street Bridges (*Asbestos and Lead Paint Survey Report for East Side Coastal Resiliency*, AKRF, Inc., revised June 2018).

- No ACM was identified in samples collected within the accessible study areas. It is, however, possible that ACM may be present in areas that were not accessible. Before any demolition or other disturbance, additional testing would be performed once it is possible to obtain samples from the inaccessible areas and contractor specifications would address the contingency that ACM is hidden or will otherwise not be encountered until later.
- Lead was detected in nine of the 22 paint chip samples. Demolition or other activities with the potential to disturb lead-based paint and lead-containing paint must be performed in accordance with applicable regulations (including OSHA 29 CFR 1926.62-Lead Exposure in Construction). Based on the testing results, all paint on steel components of the East 10th Street Comfort Station and East 10th Street Bridge, and all paint throughout the Delancey Street bridge should be considered to be LCP.

Independent of the environmental review associated with the proposed project, management and/or removal of these materials during construction is subject to a large number of federal, state, and local regulatory requirements that would be incorporated into the project documents and contractor specifications.

F. ENVIRONMENTAL EFFECTS

A detailed assessment of potential human health effects of hazardous materials during construction is described in Chapter 6.6, “Construction—Hazardous Materials.” The assessment presented below focuses on the potential human health effects of the subsurface hazardous materials following construction (i.e., during the operational stage of the proposed project) and how applicable federal, state and local laws and guidelines will be complied with. A detailed description of the alternatives analyzed in this chapter is provided in Chapter 2.0, “Project Alternatives.”

⁶ See http://www.coned.com/publicissues/manufactured_gas_plants.asp.

NO ACTION (ALTERNATIVE 1)

The No Active Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects). These planned projects might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure. These projects, including the Pier 42 project and the Solar One Environmental Education Center project, would need to comply with applicable regulatory requirements.

PREFERRED ALTERNATIVE: FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK (ALTERNATIVE 4)

A detailed assessment of potential effects of hazardous materials during construction is described in Chapter 6.6, “Construction—Hazardous Materials.”

As described in that chapter, the Preferred Alternative would include a final soil cover that would be provided in accordance with a plan approved by DEP and cover soils meeting the criteria included in the Remedial Action Plan (RAP), and or impervious paving (e.g., asphalt or concrete). This final cover and the Site Management Plans (described below) would ensure there would be no pathways for exposure and hence no potential for impacts to park users from subsurface contaminants beneath the project construction areas.

As also discussed in greater detail in Chapter 6.6, “Construction—Hazardous Materials,” the Preferred Alternative would also, in an effort coordinated with NYSDEC, attempt to reduce the potential for subsurface elements of the proposed project (e.g., foundations of the flood walls and shoreline solidification) to cause migration of MGP-related contamination to areas not currently affected by MGP wastes. This would be accomplished through include installing a series of recovery wells landward (west) of the proposed alignment. Operation and maintenance of these wells would be established in accordance with an MGP Site Management Plan (MGP-SMP), discussed below.

The potential for exposure to contaminated material would only occur if planned or emergency repair, utility, or other subsurface work, were to require disturbance beneath the capping layer the horizontal and vertical extent of which would be documented in two SMPs. One SMP would be developed (subject to DEP approval) to establish procedures for safely performing construction activities beneath the entire capping layer as well as the necessary inspection and maintenance. The required procedures and the areas/depths at which additional safety measures (addressing MGP contamination) would be established in a second SMP, the MGP-SMP, which would be subject to NYSDEC approval. With these measures in place, the Preferred Alternative would not have the potential for significant adverse effects related to hazardous materials during the operational stage of the proposed project.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in terms of their potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for operational-phase effects would be avoided in the same manner as described above for the Preferred Alternative. *