

A. INTRODUCTION

This chapter assesses the potential for the presence of hazardous materials for the Proposed Project, 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. A “hazardous material,” as used herein, means 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

Newtown Creek and numerous adjoining and nearby industrial properties served as a major waterway and industrial hub through which materials were brought to and from area industries, including major oil refineries and terminals, smelting operations, manufactured gas plants (MGP) and other heavy industries. Because of these heavy industrial uses, Newtown Creek itself was designated as a Superfund site by EPA in 2010 under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) due to discharges and contamination from neighboring and nearby industrial uses. In addition, many industrial parcels surrounding Newtown Creek have resulted in site-specific subsurface contamination from operations, including parcels that may require acquisition for the Proposed Project, which are currently in regulated programs including, but not limited to, the New York State Department of Environmental Conservation (NYSDEC) State Superfund, Brownfield Cleanup Program (BCP), as well as registered chemical or petroleum bulk storage facilities (CBS/PBS) or major oil storage facilities (MOSF).

As described in Chapter 1, “Project Description,” the New York City Department of Environmental Protection (DEP) is proposing a 3.26-mile-long tunnel with a storage volume of 50 million gallons (MG) to divert overflows from the four largest combined sewer overflow (CSO) outfalls to Newtown Creek in the Boroughs of Brooklyn and Queens (see Figure 1-5). The Proposed Project includes construction of diversion facilities for the four outfalls to convey wet-weather flows to the tunnel, a gravity diversion sewer to connect the diversion facility at outfall BB-026 to the tunnel, and a tunnel dewatering pump station (TDPS) and discharge pipe to convey stored sewer overflows to the Newtown Creek Wastewater Resource Recovery Facility (WRRF), located in the Greenpoint neighborhood of Brooklyn.

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).

As discussed in Chapter 1, “Project Description,” and as depicted on Figure- 1-5, the CSO tunnel would be constructed under Newtown Creek into the Blissville neighborhood of Queens originating from the TDPS on the south side of Newtown Creek. The CSO storage tunnel would be installed at a depth ranging from 80 to 130 feet below existing ground surface. Construction would involve disturbance and generation of soil, fill material and bedrock. Dewatering would also be required for construction of the Proposed Project facilities due to shallow groundwater elevation.

The hazardous materials analysis provided herein evaluates potential impacts associated with the study area, as defined in Chapter 1, “Project Description.” For the purposes of the hazardous materials analysis, the study area is referenced as the “Project Area” in this chapter, which collectively includes the CSO tunnel, gravity diversion sewer, TDPS site, discharge pipe, and diversion facilities.

PRINCIPAL CONCLUSIONS

A review of historic resources including Sanborn maps, aerial photographs, topographic maps and previously prepared environmental assessments revealed widespread contamination throughout the vicinity of the Project Area. Many of the contaminants documented are associated with numerous remedial efforts across several regulatory programs. These programs include the Federal Superfund, State Superfund (Registry of Inactive Hazardous Waste Disposal Sites [SHWS]), the Voluntary Cleanup Program (VCP), and the NYSDEC BCP, among others. Several high priority remediation sites characterized as part of this analysis are located directly within, adjacent to, or proximate to the CSO tunnel corridor and gravity diversion sewer. Remediation sites in regulatory programs are similarly located adjacent and/or proximate to the TDPS site, discharge pipe, and diversion facility parcels. Further, certain parcels associated with two of the four diversion facilities (Block 2984 Lot 85 at the NCB-083 diversion facility site and Block 2575 Lot 26 at the NCQ-077 diversion facility site) are participating in remedial regulatory programs which have specific regulatory requirements that must be followed. Based on this review, contamination may be, or is likely present in the soil and groundwater, which could be encountered during construction at all locations (i.e., along the CSO tunnel corridor, along the gravity diversion sewer, and at the TDPS site, discharge pipe, and all diversion facility parcels).

The CSO tunnel corridor has historically and primarily consisted of public-rights-of-way along with industrial parcels. Portions of the CSO tunnel alignment corridor pass beneath Newtown Creek, as well as beneath historically low-laying wetlands associated with its tributaries and canal extensions (Maspeth Creek, East Branch and English Kills) prior to filling, bulkheading and regrading. The CSO tunnel will be built beneath neighborhoods that were developed with heavy industry as early as the 1880s. Numerous oil terminals, refineries, manufacturing facilities, freight warehouses and other heavy industrial uses have been documented on numerous parcels within or adjacent to the CSO tunnel. Documented petroleum contamination in soil and groundwater is widespread in and around Newtown Creek and its tributaries due to numerous and extensive current and former oil and gas operations. Further, subsurface contaminants within the CSO tunnel corridor were confirmed during a limited, preliminary subsurface investigation performed in 2024 (known as Part 1 of the subsurface investigation). Deeper contamination has also been documented in the general vicinity due to releases of dense non-aqueous phase liquid (DNAPL) such as chlorinated volatile organic compounds (VOC)

and solvents, as well as coal tar from former MGP facilities. As such, there is a potential for contaminants including DNAPL to be present in soil, groundwater, and bedrock which could be encountered during construction.

To address any hazardous materials located within the Project Areas during construction, supplemental investigations would be conducted to properly characterize subsurface conditions within the limits of disturbance.

Subsurface investigations for city-owned parcels (with the exception of Block 2575 Lot 26 at the NCQ-077 diversion facility), as well as portions of the CSO tunnel corridor, TDPS discharge pipe and gravity diversion sewer that are accessible from public rights-of-way, would be performed when design nears or reaches 60 percent completion (estimated 2026/2027). The subsurface investigations would be conducted as supplements to the Part 1 investigation and will be labeled in sequence as Part 2 and Part 3, to be completed in accordance with respective Subsurface Investigation Work Plans and associated Health and Safety Plans (HASPs) to be prepared and submitted to DEP for review and approval. Part 2 would be considered a comprehensive investigation of soil, groundwater, soil vapor, and potentially bedrock, to further characterize the Project Areas. The Part 3 Supplemental Subsurface Investigation would be conducted to delineate contamination that may be identified from previous investigations, including Parts 1 and 2, and would be similarly subject to a Work Plan and HASP to be prepared and submitted to DEP for review and approval. For parcels under consideration for acquisition by DEP, supplemental subsurface investigations may be conducted post-acquisition (acquisition scheduled between February 2026 and February 2029). If the acquisition schedule does not align with the Part 2 and Part 3 investigations described above, then City-acquired parcels may require their own parcel- or site-specific Subsurface Investigation Work Plans and HASPs which would similarly require review and approval by DEP.

Two parcels in the Project Area associated with certain diversion facilities are currently in NYSDEC programs (Block 2984 Lot 85 at the NCB-083 diversion facility site in the BCP, and the City-owned Block 2575 Lot 26 at the NCQ-077 diversion facility site in the Environmental Restoration Program [ERP]). NYSDEC would maintain regulatory oversight for subsurface investigations conducted on these parcels, which would be subject to Remedial Investigation Work Plans (RIWPs) that would be prepared and submitted to NYSDEC for review and approval in accordance with the requirements of the respective program(s). Investigation of the City-owned NCQ-077 diversion facility site would likely be conducted in parallel with Parts 2 and 3 of the subsurface investigations when design reaches 60 percent completion (estimated 2026/2027). As it is not yet known whether subsurface investigations on Block 2984 Lot 85 of NCB-083 in the BCP would be conducted prior to or after acquisition, coordination with NYSDEC and/or the parcel owners would be conducted should the investigation be scheduled prior to acquisition.

Overall, all required permits, as well as entry and testing agreements, would be obtained for any supplemental sampling conducted within public rights-of-way or on privately-owned parcels. During construction, soil and materials management procedures would be implemented to minimize impacts of earth disturbing excavation activities. In addition, the following would also be conducted:

- For corridors (CSO Tunnel, TPDS discharge pipe, and gravity diversion sewer), the TDPS site, and the diversion facility parcels not in NYSDEC programs (the BB-026 diversion facility site; Block 2974 Lots 165 and 170 at the NCB-015 diversion facility site; and Block 2585 Lots 225 and 240 at the NCQ-077 diversion facility site) – Preparation of Remedial Action Plans (RAPs) and Construction Health & Safety Plans (CHASPs) would set out the procedures to be followed to avoid the potential for adverse impacts related to hazardous materials identified by the Parts 2 and 3 subsurface investigations, as well as other hazardous materials that could (unexpectedly) be encountered. The RAPs would incorporate the soil and materials management procedures (including stockpiling, handling, transportation, and disposal), as well as Community Air Monitoring Plan (CAMP) requirements, odor suppression means and methods, and contingency measures to be implemented should USTs or soil contamination be encountered. Furthermore, procedures for treatment of contaminated groundwater would be provided in the RAPs to be followed during dewatering operations. Dewatering operations would either follow DEP permitting requirements for treatment and discharge to the sewer system, or NYSDEC State Pollution Discharge Elimination System (SPDES) requirements for treatment and discharge to a surface water body or DEP outfall. The CHASP would present a hazard assessment for the construction workers during portions of the subsurface disturbance to protect construction workers and occupants during construction. Upon completion of construction, an RCR would be prepared and submitted to DEP for review and approval. The RCR would document environmental procedures that were followed during construction, provide photographic documentation, as-built drawings, sample results, disposal manifests, air monitoring data and field logs, and would be certified by a New York-licensed PE.
- Diversion facility parcels in NYSDEC programs (NCB-083 Block 2984 Lot 85 and NCQ-077 Block 2575 Lot 26) - Remedial Action Work Plans (RAWPs) or Interim Remedial Measure (IRM) Work Plans (IRMWP) would be prepared for each parcel in consultation with NYSDEC (Block 2984 Lot 85 at NCB-083 in the BCP; and Block 2575 Lot 26 at NCQ-077 in the ERP). The RAWPs/IRMWPs would be certified by a New York-licensed PE and would similarly set out procedures to be followed to avoid the potential for adverse impacts related to hazardous materials identified by the supplemental subsurface investigations, as well as other hazardous materials that could (unexpectedly) be encountered. The RAWPs or IRMWPs would address requirements for items such as soil, groundwater and bedrock management (including stockpiling, handling, transportation, and disposal), odor control mitigation, dust control and air monitoring, daily reporting to NYSDEC, and contingency measures should USTs or contamination be encountered. Soil and materials management measures included in the RAWPs or IRMWPs are expected to be similar to the procedures followed for portions of the Project Area not in NYSDEC programs and would similarly include CAMP monitoring and odor suppression means and methods. However, these measures would be subject to NYSDEC's review and approval. Dewatering operations would follow DEP requirements for treatment and discharge to the sewer system, or NYSDEC SPDES requirements for treatment and discharge to a surface water body or outfall. The RAWPs or IRMWPs would also include CHASPs which would present a hazard assessment for the construction workers during

portions of the subsurface disturbance to protect construction workers and occupants during construction. Upon completion of construction, RCRs, Final Engineering Reports (FERs), IRM or Construction Completion Reports (IRMRs/CCRs) would be prepared and submitted to NYSDEC for review and approval. The FERs, RCRs or IRMRs or CCRs would each be certified by a New York-licensed PE and would provide photographic documentation, as-built drawings, sample results, disposal manifests, air monitoring data and field logs and document environmental procedures that were followed during construction.

Demolition of several existing structures is anticipated at the TDPS site as well as certain diversion facility parcels. Any suspect asbestos-containing material (ACM), lead-based paint (LBP) or polychlorinated biphenyl (PCB)-containing building materials, if potentially present or encountered during construction of the Proposed Project, would be evaluated and abated in accordance with applicable local, state and federal regulatory requirements as part of standard demolition procedures.

Although immediate exposure to contamination would be addressed during construction, NYSDEC and DEP may require institutional controls (ICs) and/or operational site management of engineering controls (ECs) on certain portions of the Project Areas. Examples of ICs include deed restrictions which could prohibit certain sensitive uses that would increase the potential for exposure to hazardous materials, and regulatory (programmatic) requirements for future investigation and remediation should modifications to the Project Areas be contemplated that may increase exposure to hazardous materials. Examples of ECs include a regulatory agency-approved site cap to prevent dermal or future exposure to contamination, if present, and long-term monitoring or remediation through the use of a mitigation system (i.e., groundwater treatment system, soil vapor extraction (SVE) system, etc.). Potential ECs would be implemented as part of remedial action and ICs would be determined upon completion of any remedial action conducted during construction. Any future ICs that are placed on any portions of the Project Area would be followed in accordance with the specified control's requirements. Operations, maintenance and management (O&M) of post-construction ECs to prevent operational exposure to hazardous materials would be implemented through Site Management Plans (SMP), which would be submitted to, and approved by the agency that oversees the respective portion of the Project Area (i.e., DEP, NYSDEC or EPA). Any potential hazardous materials, including petroleum products, that would be required for use as part of future CSO tunnel operations would be stored, handled and/or disposed of in accordance with applicable local, state and federal requirements.

Based upon the requirement to investigate and remediate potential hazardous materials within the Project Area in accordance with agency oversight (DEP or NYSDEC), the potential for exposure to hazardous materials would be minimized during construction. Beyond construction, all post-remedial requirements during operation, including any potential future ICs or ECs placed within the Project Area, would be followed in accordance with regulatory agency-approved SMPs. Therefore, with the measures described above, no significant adverse impacts relating to hazardous materials would result from construction or operation of the Proposed Project.

B. 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, VOCs, semi-volatile organic compounds (SVOC), methane, PCBs, pesticides, and hazardous wastes. ACM and LBP or lead-containing paint (LCP) are the most common aboveground (e.g., on or within building materials) hazardous materials. Mercury and PCBs may also be found in certain building materials. Management of hazardous materials can be subject to numerous regulatory requirements, including those of the 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 2021 *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. The regulatory context for the Proposed Project includes requirements and policies to determine whether the proposed action would result in significant adverse impacts relating to hazardous materials. For the Proposed Project, DEP would maintain compliance in accordance with the *CEQR Technical Manual* for parcels and corridors not participating in a NYSDEC regulatory program (CSO Tunnel, TPDS discharge pipe, gravity diversion sewer, the lots at the BB-026 diversion facility site, the lot at the NCB-015 diversion facility site, and two lots at the NCQ-077 site). NYSDEC would provide regulatory oversight for one lot at the NCB-083 diversion facility site and at the NCQ-077 diversion facility site.

METHODOLOGY

Newtown Creek and numerous adjoining industrial properties served as a major waterway and industrial hub through which materials were brought to and from area industries, including major oil refineries and terminals, smelting operations, manufactured gas plants and other heavy industries. Because of these heavy industrial uses, Newtown Creek itself was designated as a Superfund site by the EPA in 2010 under CERCLA due to discharges and contamination from neighboring industry. In addition, many industrial parcels surrounding Newtown Creek have resulted in site-specific subsurface contamination from on-site operations, including Block 2984 Lot 85 at the NCB-083 diversion facility site and Block 2575 Lot 26 at the NCQ-077 diversion facility site (required for the Proposed Project), which are currently in NYSDEC regulatory programs.

Given the extended industrial history and contaminants in the areas surrounding Newtown Creek, an assessment of hazardous materials relating to the corridors (CSO Tunnel, TPDS discharge pipe, and gravity diversion sewer), the TDPS site, and proposed easement/acquisition parcels is warranted to determine what regulatory procedures would be followed to remain in conformance with requirements of any parcel-specific remedial programs as well as an evaluation of potential contaminants within the public rights-of-way and easement and/or acquisition parcels that are not currently involved in regulatory programs.

Given the geographic extent and restricted access to privately-owned parcels throughout the Project Area, preparation of an American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA) was not practical. Alternatively, in accordance with the draft scope of work, a desktop review of available resources was conducted to evaluate existing conditions and the extent of potential hazardous materials within the Project Area. The following resources (provided in Appendix E) were reviewed:

- A review of the NYSDEC infoLocator was conducted to understand if any parcels or facilities within the Project Area are participating in remedial programs, whether the potential for adverse subsurface impacts exists, and whether certain regulatory requirements are present on the parcels that must be followed prior to and during construction. The NYSDEC infoLocator often provides a document repository and summarizes environmental conditions of sites enrolled in the regulatory programs it administers.
- Historic resources including Sanborn Fire Insurance maps, aerial photographs and topographic maps were reviewed to develop a profile of the historical uses of the TDPS site, existing rights-of-way, as well as the easement and acquisition parcels for the CSO tunnel, TDPS discharge pipe, and gravity diversion sewer. The aforementioned resources were also utilized to determine if any historic uses in the general vicinity of the Project Area have the potential to adversely impact subsurface conditions within the Project Area.
- A review of existing environmental assessments performed within the Project Area was conducted. The assessments included a review of available online resources and public regulatory records maintained by EPA and NYSDEC, as well as review of local, state, and federal regulatory database listings to understand documented conditions and any nearby environmental features that may have adversely impacted subsurface environmental conditions within the Project Area.² A preliminary subsurface investigation (hereinafter referred to as Part 1) was also conducted between March and May 2024 to evaluate site-specific conditions that may warrant supplemental investigation.

POTENTIAL CONTAMINANTS OF CONCERN

Soil and groundwater can become contaminated as a result of past or current activities on a project site or in adjacent areas. Many industrial activities use, store, or generate contaminated materials that can be spilled, dumped, emitted, or buried nearby. Other facilities 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. As previously indicated, Newtown Creek and numerous adjoining industrial properties served as a major waterway and industrial hub through which materials were brought to and from area industries, including major oil refineries and terminals, smelting operations, manufactured gas plants and other heavy industries. Many industrial parcels surrounding Newtown Creek are currently in regulated

² The results of the previous assessments were summarized in *Technical Memorandum 11 – Assessment of Available Environmental Information*, dated March 2024 prepared by McMillen JA Engineering PLLC/Bown and Caldwell Associates, a Joint Venture (JV). Review of this document is provided in this chapter.

programs including, but not limited to, NYSDEC State Superfund, BCP, as well as registered chemical or petroleum bulk or major oil storage facilities. Given the variety of current historic industrial uses within and/or proximate to the Project Area, a variety of contaminants of concern (COC) may be present with the potential to be encountered during construction. Further, human exposure to COCs can potentially occur through direct contact when there is an exposure pathway, e.g., when excavation or tunneling is occurring. Exposure to contaminated groundwater through ingestion is not expected as Queens and Brooklyn are 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 of any existing structures that have ACM, LBP/LCP, electrical equipment or other building materials containing PCBs, or fluorescent lights or older thermostats containing mercury have the potential to release contaminants if these materials are not properly abated or managed.

Based on the types of contaminants that are typically found in New York City, some of the potential COCs 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:

- **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” or “PCE”) and trichloroethene (TCE), which are common ingredients in solvents, degreasers, and dry-cleaning agents. VOCs represent the greatest potential for exposure since, in addition to soil and groundwater contamination, they can generate organic vapors.
- **SVOCs:** The most common SVOCs in urban areas are polycyclic aromatic hydrocarbons (PAH), which are constituents of partially combusted coal- or petroleum-derived products, and some MGP wastes. PAHs are commonly found in New York City fill material, which, given the development history, likely underlies the Project Area. Petroleum-related SVOCs could be present and are typically associated with buried tanks currently or formerly located in the Project Area. SVOCs can also be present in creosote-treated timber (e.g., piles from former bulkheads or piers).
- **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).
- **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.

- **Metals and cyanide:** Metals, including lead, arsenic, cadmium, chromium and mercury, 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.
- **Fuel oil and gasoline from storage tanks:** Businesses or residences within or upland of the Project Area could have had aboveground storage tanks (AST) and/or USTs 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, USTs at other locations, although no longer in use, may remain buried in place. Tanks have the potential to have leaked despite no record of a reported spill.
- **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.
- **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. ACM can also be present in soil or fill from construction and demolition debris. Asbestos was widely used before 1980.
- **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 Occupational Safety and Health Administration (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.

C. EXISTING CONDITIONS

UPDATED ONLINE RECORDS REVIEW

Review of the NYSDEC infoLocator was conducted to ascertain whether any parcels or facilities within the Project Area are participating in remedial programs, whether the potential for adverse subsurface impacts exists, and whether certain regulatory requirements are present on the parcels that must be followed prior to and during construction. The findings of the online records review are provided below.

TDPS SITE AND DISCHARGE PIPE, BB-026 DIVERSION FACILITY SITE (QUEENS BLOCK 115, LOTS 56, 86 AND 150), GRAVITY DIVERSION SEWER, AND NCB-015 DIVERSION FACILITY SITE (BROOKLYN BLOCK 2974, LOTS 162 AND 170)

The additional review of online public records and resources revealed that none of these parcels or corridors are participating in remedial regulatory programs.

NCB-083 DIVERSION FACILITY SITE (BROOKLYN BLOCK 2948, LOT 85)

This parcel on Block 2984, Lot 85 is enrolled in the NYSDEC BCP as Site No. C224344 (1301 Metropolitan Avenue; see **Figure 12-1**). Records indicate a subsurface investigation was conducted in April 2015. Minor Low-level concentrations of VOCs, SVOCs, and metals were detected in soil, stormwater sediment, and groundwater samples. A more recent Phase II ESA was completed in March and April 2021, which indicated petroleum contamination (black staining and the presence of oil/sheen in soil and groundwater) was present in the area of a former AST and minor petroleum impacts to soil and groundwater throughout the parcel. Based on the results of the Phase II ESA, NYSDEC Spill #2102352 was assigned to the site on June 11, 2021. The spill incident is currently active, and no additional records were available via the NYSDEC infoLocator for this parcel.

NCQ-077 DIVERSION FACILITY SITE (QUEENS BLOCK 2575, LOTS 26, 225 AND 240)

Lot 26 for the NCQ-077 diversion facility is listed as Site B00152 in the NYSDEC ERP database due to several commercial and industrial uses, with the most recent being a bus maintenance facility (see **Figure 12-1**). Concerns were also identified relating to a former chemical blending operation that was located immediately adjacent to Lot 26 that could have contaminated the parcel from an off-site source. A Remedial Investigation (RI) was conducted under the ERP, but no remedial action plan was finalized. In 2008, an IRM was implemented that included removal of a 20,000-gallon storage tank found during the RI and removal of over 100 yards of contaminated soil. The project was closed in the ERP in 2010, and all future site work is to be conducted under the NYSDEC spills program.

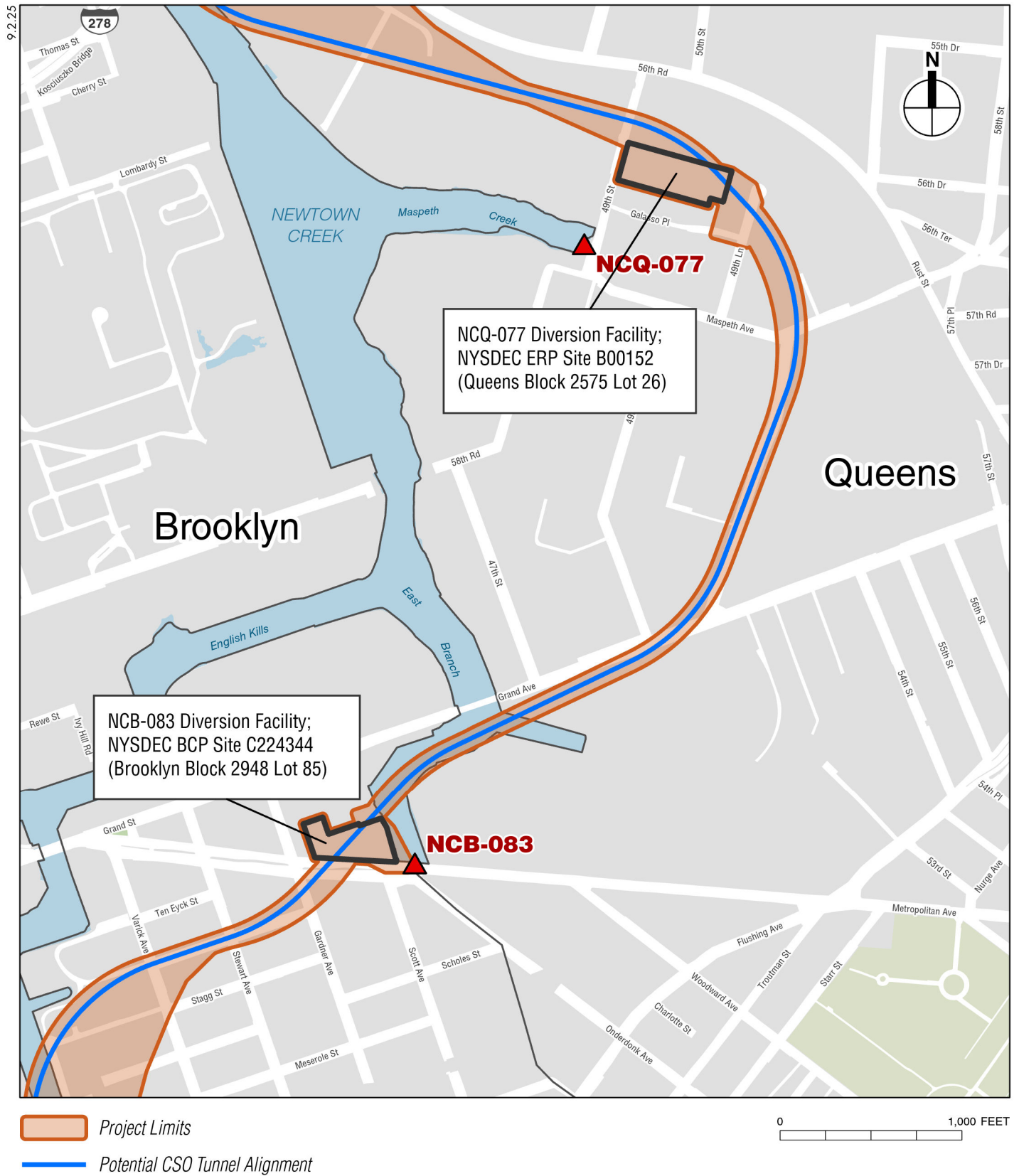
The two additional lots for the NCQ-077 diversion facility (Lots 225 and 240) are not in regulatory or remedial programs.

Online records reviewed for the BCP and ERP parcels are provided in Appendix E.

REVIEW OF HISTORIC MAPS

A review of existing information including historic Sanborn Fire Insurance maps, aerial photographs and topographic maps was conducted to develop a profile of the historical use of the CSO tunnel and gravity diversion sewer, the TDPS site, discharge pipe, and proposed easement/acquisition parcels for the diversion facilities. Given the size of the Project Area, a review of City Directory data was not practical; however, analysis of historic maps described below, and other resources provided sufficient history of the Project Area to develop the findings for this hazardous materials analysis.

A review of the historic maps is provided in the subsections below.



Diversion Facility Parcels in Regulatory Programs

HISTORIC SANBORN FIRE INSURANCE MAPS

Sanborn Fire Insurance maps of the CSO tunnel and gravity diversion sewer, TDPS site, discharge pipe, and diversion facility parcels were provided by Environmental Data Resources, Inc. (EDR) for the years 1887, 1888, 1898, 1902, 1905, 1907, 1914, 1915, 1916, 1921, 1922, 1928, 1933, 1936, 1942, 1947, 1950, 1951, 1965, 1968, 1970, 1971, 1976-1983, 1985-1996, 1999, and 2001-2007. Sanborn maps are highly detailed, large-scale maps created by the Sanborn Map Company that depict the layout of cities, including information about individual buildings including construction materials, size, use, and proximity to streets, as well as utilities. Sanborn maps are useful for historic research by essentially providing a snapshot of a city's urban landscape at a specific point in time. **Table 12-1** provides a summary of the Sanborn maps for the Project Area.

Table 12-1
Summary of Sanborn Fire Insurance Maps

Year(s)	Summary/Description
1887-1902	The area now occupied by the Newtown Creek WRRF is vacant and part of a larger paper roadway network. Low-lying wetlands are present where Provost Street currently traverses. An oil refinery (Sone & Fleming Manufacturing Co. and Kings County Oil Works) and freight houses are present along the southern banks of Newtown Creek in Brooklyn (depicted as bulkheaded). Further, the A.K. Bolan Empire Refining Co. is present along the eastern side of Whale Creek (on the TDPS site). East Branch is depicted as primarily vacant, low-lying wetlands with the Brooklyn Bushwick and Queens Co. Railroad facility to the west along Metropolitan Avenue. English Kills is depicted to the west of Varick Avenue, of which the properties to the east are vacant/undeveloped. A rail right-of-way traverses to the west of Varick Avenue. Lumber Yards and coal piles are depicted in the East Branch area and along English Kills. Dwellings are depicted along the south banks of Newtown Creek, near Meeker Avenue. A former Draw Bridge over Newtown Creek is present. Orton Street (now 30th Street) is depicted primarily with vacant properties surrounding. Dutch Kills is depicted as "proposed" in 1887 but was present in 1898, with a draw bridge proposed for Hunters Point Avenue. Additional properties adjacent to Newtown Creek and within or proximate to the CSO tunnel corridor include the Long Island Railroad, the Charles Pratt Oil Refinery, the Preson Oil and Fertilizer Works, Eastern Distilling Co., Nichols Chemical Company (copper refinery), The American Agricultural Chemical Co., and General Chemical Co. The eastern end of Newtown Creek is depicted as low-lying marshlands associated with Maspeth Creek.
1905-1915	A tin can factory with rail spurs is present on the southern banks of Newtown Creek in the areas proximate to the present Newtown Creek WRRF. Standard Oil Works is located on the southern banks of Newtown Creek where Greenpoint Avenue crosses. The northern portions of the now present Newtown Creek WRRF are occupied by several industrial properties including a steam laundry facility, a bronze company, a coal and brick yard, a machine shop and a lumber company, with the southern portions vacant. Along the western banks of East Branch, within the CSO tunnel corridor is improved with coal and lumber yards along Metropolitan Avenue. Areas south of Metropolitan Avenue are depicted as vacant. The southern terminus of English Kills along Johnson Avenue is improved with lumber and coal yards, along with a depot and mason supply facility. Properties along English Kills include an ice company, masonry and asphalt plants. Lumber yards abut East Branch in each direction to the south of Grand Avenue, and north of Metropolitan Avenue. In Queens, the northern banks of Maspeth Creek are improved with the National Enameling Stamping Co.. to the south of the Long Island Railroad (LIRR) tracks. The Nichols Copper Co. Laurel Hill Works is also present along the northern banks of Newtown Creek. The Redlan piano repair company is present on Review Avenue, to the south of Borden Avenue. Further south, The General Vehicle Co. Inc.. is present along the east side of Review Avenue.
1916-1928	The Standard Oil Co. Kings No. 2 grease works is present along the southern banks of Newtown Creek, where the CSO tunnel corridor would pass beneath Newtown Creek. Oil terminal tanks associated with the Standard Oil Company are present within the Newtown Creek WRRF along the north side of Greenpoint Avenue proximate to the proposed TDPS discharge pipe corridor. The TDPS site is depicted as excavated and a commercial slip to the east of Whale Creek. Further west, a bronze works, lumber yard, granite works and oil company are depicted within the Newtown Creek WRRF along the east side of Provost Street. In Queens, industrial uses are present including a steel works and lead manufacturer along the south side of Review Avenue along Newtown Creek, within the CSO tunnel corridor. An oil company is present along the south side of Review Avenue where it terminates at Borden Avenue and Dutch Kills.
1936	The northern terminus of Dutch Kills is depicted as primarily vacant along the northern banks, with rail spurs traveling to several industrial facilities (the BB-026 diversion facility parcels). Along 30th Street, industrial properties are present

Table 12-1
Summary of Sanborn Fire Insurance Maps

Year(s)	Summary/Description
	on the eastern and western side including a pipe shop, a heating company and a steel yard. 30th Street is depicted as vacant from Hunts Point Avenue down to Borden Avenue. Along the northern banks of Newtown Creek, the Standard Oil Company is present along the south side of Review Avenue with numerous bulk storage tanks and buildings, with the Calvary Cemetery to the north. Maspeth Creek bisects the CSO tunnel corridor to the south of Railroad Place (the NCQ-077 diversion facility parcels). Properties to the north of 56th Road (between 46th Street and 50th Street) are vacant, with the LIRR tracks adjacent to the south and the National Enamel Stamping Co. and Nichols Copper Co. Laurel Hill Works further south along the northern banks of Newtown Creek. General Chemical Co. is located to the north of 56th Road at 43rd Street. The Diamond Chemical Company is located along the south side of Laurel Hill Boulevard, where Review Avenue begins. In Brooklyn, the southern terminus of English Kills is depicted with lumber, coal and building material yards (the NCB-015 diversion facility parcels). Several chemical companies are present along the eastern and western sides of English Kills just north of Meserole Street. Brooklyn Union Gas MGP is present at the corner of Bogard Street and Meserole Street. Between East Branch and English Kills, lumber yards and lighter industrial uses are present along Stewart Avenue at Stagg Street, within the CSO tunnel corridor, along with lumber and asphalt yards. The majority of the parcels where the CSO tunnel corridor bisects Grand Avenue and continues north beneath Page Place are vacant. Residential uses and a gasoline filling station are present along the east side of Review Ave where Van Dam Street begins. A rail yard, pickle factory, granite works and lead manufacturing facility are located along the south side of Review Avenue to the west of Greenpoint Avenue.
1942-1950	The southern portions of the Newtown Creek WRRF between Huron Street and Greenpoint Avenue are primarily occupied by lumber yards with some limited industrial woodworking along Greenpoint Avenue to the south. The northern portions are occupied by the Colonial Beacon Oil Co., a bronze foundry and a cleaning compound manufacturing facility. The Standard Oil Company Sone & Fleming Works is located within the eastern portions of the present Newtown Creek WRRF, just south of Kingsland Avenue, as well as north of Kingsland Avenue, along the south side of Newtown Creek within and proximate to the TDPS discharge pipe corridor. The Calvary Cemetery remains along the north side of Review Avenue between 56th Road and 37th Street. The Standard Oil Company with numerous major oil storage tanks is located along the south side of Review Avenue, west of Laurel Hill Boulevard, with the LIRR tracks further south. Further north, a pumice stone and sponge manufacturer is present along the west side of 30th Street, north of Hunter's Point Avenue. The northern terminus of Dutch Kills remains similar with rail spurs traveling to their respective manufacturing facilities. R.H. Macy & Co. mattress manufacturing is present along the east side of 30th Street, south of 47th Avenue. Along the north side of Review Avenue west of Van Dam Street, numerous warehouses and manufacturers are present including a Sears Roebuck & Co. warehouse, a corrugated pipeline manufacturer and a structural steel warehouse. The Texas Company oil terminal and a rail yard are present to the south of Review Avenue, where the CSO tunnel corridor would traverse south and proceed beneath Newtown Creek into Brooklyn toward the Newtown Creek WRRF. To the south, along Grand Avenue and Page Place is a commercial bakery, metal works and an electric wire and cable corporation within the CSO tunnel corridor. 56th Road near 43rd Street is abutted to the south by the LIRR tracks followed by the Phelps-Dodge Refining Corp. Laurel Hill Works. To the north is a tallow plant and garage. The National Enameling & Stamping Company remains present to the south of the LIRR tracks near 49th Street, within the CSO tunnel corridor. The Diamond Chemical Co. and General Chemical Co remain present along 56th Road at Laurel Hill Boulevard, where Review Avenue begins.
1951-1968	The southern terminus of English Kills is similar to the 1950 Sanborn map depiction, remaining vacant between the Creek and Johnson Avenue but occupied by an auto wrecking yard with repair, warehouses and a surface parking lot. The Standard Oil Company continued to maintain a presence. To the east of Whale Creek, a grease and compounding works is present at the terminus of Kingsland Avenue along the southern banks of Newtown Creek. Farther south, oil terminals and refineries (Sinclair Refining Co. and Great Eastern Oil Co.) are present along the eastern banks of English Kills, near Metropolitan Avenue where the CSO tunnel corridor would traverse beneath. The Cross, Austin and Ireland Lumber Co. is present through much of the areas northwest of Metropolitan Avenue near East Branch where the CSO would traverse, with additional manufacturing constructed along the south side of Metropolitan Avenue. The parcels currently occupied by the Newtown Creek WRRF are similar to the 1950 depictions along the southern side, but the northern portions are occupied by the Humble Oil & Refining Co. and the Esso Standard Oil Terminal, along with Williamsburg Steel Products Co. The TDPS site was filled and aligned with the southern banks of Newtown Creek, and the Greenpoint Department of Sanitation Incinerator and Marine Transfer Station is present to the east of Whale Creek Canal, along the southern banks of Newtown Creek. In Queens, properties previously associated with the Standard Oil Co. along the south side of Review Avenue, to the west of Laurel Hill Boulevard have been converted to warehouse and light manufacturing uses. Further north, properties along the east and west sides of 30th Street, north of the Long Island Expressway (shown as the Mid-Town Highway), consist of a radio lab, additional warehouse uses, a container corporation, an iron and steel company, a drug warehouse, and additional light industrial and commercial uses. The northern terminus of Dutch Kills remains vacant to the south of 47th Avenue and rail rights-of-way, with light industrial uses along the west side.

Table 12-1
Summary of Sanborn Fire Insurance Maps

Year(s)	Summary/Description
1970-1980	In Queens, properties to the north of Review Avenue between the Long Island Expressway and Van Dam Street are improved with numerous manufacturing and warehouse uses including a corrugated paper container manufacturer and a metal purchasing and processing facility, with rail spurs present throughout. Properties to the south of Review Avenue along the same corridor are improved with light manufacturing, warehouses, an oil refinery, and animal feed manufacturers to the south along the northern banks of Newtown Creek. A rail yard remains present south of Review Avenue. The properties along the northern terminus of Dutch Kills and 30th Avenue to the east of Dutch Kills remain similar to their earlier Sanborn map configurations. North of Maspeth Creek to the west of 49th Street consists of a large cardboard container manufacturer along with the Phelps Dodge Refining Corporation with rail tracks to the north. The existing United Parcel Service (UPS) Maspeth warehouse has been constructed north of 56th Road, adjacent to the north of the CSO tunnel corridor. Further south within the CSO tunnel corridor, the Esso Standard Oil Terminal has been rebranded as the AFA Terminal with numerous major oil storage tanks along East Branch to the south of Grand Street. Along Metropolitan Avenue near East Branch, manufacturing, auto repair and commercial uses are present where the CSO tunnel traverses. Along the south banks of Newtown Creek, to the west of Whale Creek, the Newtown Creek WRRF has been constructed between Greenpoint Avenue and Green Street with an oil terminal, refining company and steel products facility located north of Green Street. Many former manufacturing facilities along the Page Place portion of the CSO tunnel corridor have been converted to freight and warehouse uses. The remaining properties adjacent and proximate to the CSO tunnel corridor are generally similar to their earlier Sanborn map depictions.
1981-1991	In Queens, properties to the north of Review Avenue between the Long Island Expressway and Van Dam Street continue to be utilized for manufacturing, warehouse and auto repair. Properties to the south of Review Avenue have been converted primarily to freight and warehouse uses. Oil refineries remain present south of Review Avenue, to the south of the rail tracks along the northern banks of Newtown Creek. The Triplex Oil Refining Co., remains present along Review Avenue near Calvary Cemetery. The northern terminus of Dutch Kills consists of undeveloped parcels with railroad spurs further north. The properties along the east and west sides of 30th Avenue remain similar consisting of freight, warehouse and furniture assembly/storage. The Phelps-Dodge Refining Corp – Laurel Hill Works remains present south of 56th Road further east, followed by a plumbing supply facility and a chemical and dye manufacturer at 43rd Street within the CSO tunnel corridor. Properties along Page Place remain similar consisting of warehouse, freight and presumably light manufacturing uses within the CSO tunnel corridor. The southern terminus of English Kills remains similar (NCB-015 diversion facility parcels), with a warehouse along the western portions, and undeveloped areas occupied by parking and auto storage along the southeastern portions. Properties along the east side of English Kills within the CSO tunnel corridor are similar to their earlier uses consisting of storage, freight and some manufacturing. The remaining properties along the CSO tunnel corridor are generally similar mostly consisting of light manufacturing, freight and storage warehouses.
1992-2002	In Queens, the northern terminus of Dutch Kills remains of similar configuration, with a concrete manufacturing plant on the western portions and vacant undeveloped land abutting the Dutch Kills terminus to the north, followed by rail spurs. Properties along the east and west sides of 30th Street remain of similar configuration consisting of warehouses and furniture storage. Adjacent properties along Review Avenue between Laurel Hill Road and 30th Street remain similar to their earlier depictions, consisting of freight, commercial warehouses and oil refineries with Calvary Cemetery to the north of Review Avenue, east of Van Dam Street. Properties along the north and south side of 56th Road are similar to their earlier depictions, consisting of a plumbing supply warehouse and freight uses. Several heavy industrial properties, including the former chemical manufacturer along the south side of 56th Road, have been converted to light manufacturing or industrial uses or are vacant. Further east, the CSO tunnel corridor remains similar moving south along Page Place, consisting of freight stations, warehouses and unspecified manufacturing uses. In Brooklyn, freight and garages are present along the north side of Metropolitan Avenue to the west of East Branch within the CSO tunnel corridor. Further south, the adjacent properties along the eastern banks of English Kills are similar to their earlier depictions, consisting of freight, scrap yards and storage. The southern terminus of English Kills remains similar, with undeveloped parcels occupied by parking and auto storage to the north of Johnson Avenue. Further north, properties adjacent to Whale Creek Canal to the east are consistent with their 1991 depictions, consisting of Department of Sanitation facilities (the TDPS site). To the west of Whale Creek, the Newtown Creek WRRF remains in similar configuration to the south of Green Street and north of Greenpoint Avenue, with oil refining and freight auto repair north of Green Street to the west of Whale Creek.
2003-2007	The majority of the parcels along the CSO tunnel corridor and additional improvement areas are similar to their 2002 Sanborn configurations. Many of the adjacent properties to the CSO tunnel rights-of-way consist of warehouse, freight, light manufacturing and commercial uses. Rail rights-of-way and rail spurs remain present throughout many of the areas that the CSO tunnel traverses, consistent with previous Sanborn configurations.

HISTORIC AERIAL PHOTOGRAPHS

Historic aerial photographs of the CSO tunnel, gravity diversion sewer, and diversion facility parcels were provided by EDR for the years 1924, 1941, 1951, 1954, 1966, 1974, 1976, 1980, 1984, 1991, 1994, 2006, 2011, 2015 and 2019. **Table 12-2** provides a summary of the aerial photographs of the Project Area.

Table 12-2
Summary of Aerial Photographs

Year(s)	Summary/Description
1924	In Queens, Dutch Kills is shown as a spur of Newtown Creek to the north, with disturbed land at the northern terminus. 30th Street to the east consists of a right-of-way with primarily vacant land along the east and west side. Heavy Industrial uses are present further south of Borden Avenue along the CSO tunnel corridor, along Review Avenue to the north and south. From Van Dam Street east, Review Avenue is depicted as wider, with Calvary Cemetery to the north, and oil refineries to the south followed by a railroad corridor and additional heavy industrial uses along the north banks of Newtown Creek. East of Laurel Hill Boulevard, the CSO tunnel corridor continues beneath 56th Road before turning south around 49th Street. The majority of the parcels south of 56th Road consists of industrial uses consistent with earlier Sanborn map depictions, with some vacant parcels to the north. Wetlands associated with Maspeth Creek are present in the areas that are now Page Place and Maspeth Avenue, within the CSO tunnel corridor. In Brooklyn, the TDPS site is shown as a commercial docking slip, consistent with Sanborn map depictions. Whale Creek is shown as a canal extending further south within the areas of the current Newtown Creek WRRF. Grand Street is present as well as East Branch, with numerous industrial uses along the CSO tunnel corridor. English Kills is also present where Metropolitan Avenue and Grand Avenue join. Properties within this portion of the CSO tunnel corridor are improved with heavy industry along with major oil storage tanks, consistent with earlier Sanborn map depictions.
1941	The CSO tunnel corridor is generally similar to the 1924 aerial photograph; however, there is additional development along 30th Street to the east of Dutch Kills in Queens, along with construction of the Long Island Expressway within the Borden Avenue right-of-way. Additional industrial development is shown along the south side of Review Avenue, consistent with Sanborn maps. Further east, the Brooklyn-Queens Expressway and Kosciuszko Bridge have been constructed connecting Brooklyn and Queens via interstate highway. Moving east, low laying areas associated with Maspeth Creek have been filled but are not yet developed. In Brooklyn, the southern portions of Whale Creek canal have been partially filled, but not yet developed. The remaining properties within the CSO tunnel corridor that traverses further south near East Branch and along the eastern side of English Kills are generally similar, occupied by heavy industrial facilities (i.e., warehouses, freight terminals, oil terminals, etc.).
1951-1954	The CSO tunnel corridor continues to be improved with additional industrial development. Along 30th Street in Queens additional warehouse and manufacturing uses have been added north of Hunter's Point Avenue. The CSO tunnel corridor under Review Avenue remains similar to the 1941 aerial. Further east, Maspeth Creek has been fully reconfigured to its current bulkheaded state. Within the CSO tunnel corridor, heavy industrial properties are located south of 56th Road and along Page Place to the east. To the west of Page Place is a Federal Government-owned facility (US Naval Reservation) at the eastern terminus of Maspeth Creek down to Grand Street. The remaining properties along East Branch and along English Kills are depicted similar to the 1941 aerial, consisting of dense industrial development.
1966	In Queens, warehouses and manufacturing buildings have been constructed along 30th Street within the CSO tunnel corridor. Along Review Avenue, properties are depicted at similar configuration to the 1954 aerial photograph. Further east along 56th Road, industrial properties are present to the south and within the CSO tunnel corridor. Along Page Place, the US Naval Reservation has been demolished and replaced with a series of individual warehouses to the west. Along the southern banks of Newtown Creek, the Newtown Creek WRRF has been constructed south of Green Street and north of Greenpoint Avenue. The commercial docking slip to the east of Whale Creek (the TPDS site) has been filled and is improved with the existing NYC Department of Sanitation facility. The remaining properties along East Branch near Grand Avenue, south to Metropolitan Avenue and along the east side of English Kills to the southern terminus are similar to their 1954 aerial photograph. Notable changes to tenants and building sizes is not discernable.
1974-1976	Although the building configurations and tenant changes are not discernable, the CSO tunnel corridor and adjacent properties remain generally similar to the 1966 aerial photograph, except oil refinery operations along the south side of Review Avenue between Van Dam Street and Laurel Hill Boulevard have been presumably decommissioned and replaced with industrial warehouse uses.
1980-1991	Several industrial-use properties along Review Avenue have been converted into warehouses. The remaining configuration of the majority of the parcels adjacent to, or within the CSO tunnel corridor are generally similar to their earlier aerial photograph depictions.

Table 12-2
Summary of Aerial Photographs

Year(s)	Summary/Description
1994	Demolition of the oil refinery is visible along the south side of 56th Road to the east of the Kosciusko Bridge with site clearing activities. The remaining configuration of the majority of the parcels adjacent to, or within the CSO tunnel corridor are generally similar to their earlier aerial photograph depictions.
2006-2019	The majority of the parcels along the CSO tunnel corridor and additional improvement areas are similar to their 1994 aerial photograph configurations. Additional freight warehouses can be seen constructed along the CSO tunnel corridor (specifically along 56th Road within the areas of the former oil refinery), consistent with the area's transformation away from heavy industry to freight and logistics.

HISTORIC TOPOGRAPHIC MAPS

Historic topographic maps of the Project Area were provided by EDR for the years 1897, 1898, 1900, 1947, 1956, 1967, 1979, 1995, 2013, 2016 and 2019. **Table 12-3** provides a summary of the topographic maps for the Project Area.

Table 12-3
Summary of Topographic Maps

Year(S)	Summary/Description
1897-1900	The overall areas of the Proposed Project are sparsely developed but industrial in nature along the western portions of Newtown Creek. Dutch Kills is at its original configuration as a tributary to Newtown Creek and has not yet been bulkheaded. Rail tracks are depicted along the northern banks of Newtown Creek, with industrial-use properties and major storage tanks to the north and south. Maspeth Creek and East Branch are at their original configurations as tributaries to Newtown Creek with low-lying wetlands. Grand Street and Metropolitan Avenue are present traveling west into Williamsburg, which is depicted with urban development. English Kills has been bulkheaded and is at its current configuration.
1947	The majority of Newtown Creek and its tributaries, including Dutch Kills, Maspeth Creek, East Branch and English Kills are at their current configurations. The CSO tunnel corridor is depicted with buildings, rail corridors, rail spurs and urban development. Oil refineries are visible along the south side of Review Avenue, with Calvary Cemetery to the north. Although uses are not indicated, additional industrial buildings are visible along the CSO tunnel corridor near Grand Avenue and Metropolitan Avenue and further south toward English Kills.
1956	The majority of the Project Area is depicted as either urban areas or with buildings consistent with Sanborn and aerial photograph configurations from the northern terminus of Dutch Kills, south along 30th Street, then east along Review Avenue, 56th Road, and south along Page Place (with a US Naval Reservation along the west side), then west across East Branch and south toward English Kills.
1967-1995	The Project Areas are similar to the 1956 topographic map, with minor changes in building configuration and sizes along Review Avenue, 56th Road and English Kills. The US Naval Reservation has been demolished and shown as urban development. The remaining portions of the Project Area are depicted as urban with no additional information.
2013-2019	Development information for the Project Areas is not available on topographic maps provided from 2013 to 2019.

REVIEW OF REGULATORY DATABASES AND ONLINE RECORDS

The potential for adverse subsurface environmental conditions within the Project Area was evaluated in a technical memorandum (*Technical Memorandum 11 – Assessment of Available Environmental Information*, dated March 2024 prepared by McMillen JA Engineering PLLC/Brown and Caldwell

Associates, a Joint Venture [the “JV”; see Appendix E]) (the TM). In addition, a supplemental review of online records was conducted to obtain additional information on the Project Area.

According to the TM, the Project and surrounding areas consisted of a creek and its tributaries with adjacent low-lying marshlands and was home to villages and camps prior to the mid-1600s. The Project Area was a long shallow tidal waterway with islands. Since the mid-1800s, the Project Area has had a history of extensive industrial development. The development resulted in changes in configuration to Newtown Creek and its tributaries from a natural drainage/creek to one controlled by engineering and institutional systems. The development resulted in alterations to the banks and channels with significant filling and dredging events and bulkhead construction.

Significant filling of low-lying marshlands and its tributaries likely included trash, construction and demolition debris, cinders and ash, industrial waste and dredge spoils. Increases in commercial and industrial development along the Creek yielded an increase in seaway traffic that resulted in the widening and deepening of the waterways associated with Newtown Creek. The present-day configuration of Newtown Creek was established in the 1930s.

To understand potential subsurface environmental conditions within the Proposed Project Areas, the following resources were reviewed:

1. A search of environmental databases maintained by local, State and Federal government agencies was conducted by EDR. The geographic extent extended one-quarter mile beyond the Project Areas from the NCB-015 outfall at the southern terminus of English Kills, to the WRRF on the southern banks of Newtown Creek;
2. The *Draft Data Applicability Report* (DAR) for the Remedial Investigation/Feasibility Study of Newtown Creek, prepared in 2012 by Anchor QEA in support of the Superfund investigation of Newtown Creek to summarize historical documentation and data collected pertaining to the Creek; and
3. Site investigation and remediation reports available in public document repositories that were established for sites in regulatory programs overseen by EPA and NYSDEC.

Based upon a review of the above-listed resources, specific uses along the Creek as well as neighboring sites included heavy industry such as ship building, oil refining, MGPs, fertilizer manufacturing and fat rendering, metal production and metal works, varnish, paint and dye manufacturing and incinerators. Additional industry in the general area included building materials (lumber, brick, concrete and asphalt), sugar refineries and textile manufacturing. The likelihood of widespread subsurface contamination within and proximate to the Project Area due to the known prolonged industrial and commercial uses surrounding Newtown Creek within Brooklyn and Queens was identified.

Based upon available geologic information, it is anticipated that the stratigraphy for the Project Area from surface down consists of fill, Holocene alluvium and organic tidal marsh deposits (meadow mat), Pleistocene glacial deposits (undifferentiated), Gardiners/Raritan clays, decomposed (weathered) rock and bedrock. Groundwater within the Project Area is anticipated to be within 20 feet below grade. Due to the proximity to the East River, groundwater may be brackish and locally influenced by tidal

variances. Groundwater is anticipated to flow toward Newtown Creek and its tributaries throughout the Project Area.

To evaluate potential sources of contamination within the Project Area, two broad categories of potential contaminants were defined:

- Deep contamination that has migrated to depths being considered for the CSO tunnel areas; and
- Shallow contamination that could impact construction of vertical access shafts, diversion facilities and near-surface conveyance conduits which is less likely to have migrated downward to the depths of the tunnel.

Potential deeper contamination included DNAPL, such as chlorinated solvents, MGP tars, or elemental mercury. DNAPL can migrate downward through water-saturated overburden and fractured bedrock. DNAPL can also mobilize and transport contaminants such as PCBs or pesticides that would otherwise be retained in shallower soils. Potential shallower contamination included light nonaqueous-phase liquid (LNAPL) including gasoline, fuel oil and petroleum hydrocarbon solvents (i.e., paint thinners, etc.). LNAPLs are less dense than water and (with some exceptions) are absent below the zone of water table fluctuation. Shallow contaminants could also include aqueous-phase (or dissolved) chemicals and metals migrating around a vertical shaft under a horizontal groundwater gradient, which requires contaminated water management when dewatering the shaft. Contaminated soils from vertical shaft excavation may also include LNAPL residue and typical contaminants associated with fill, including PAHs, mercury, lead, arsenic, pesticides, and PCBs.

Review of EDR database listings and the DAR identified numerous contaminated or potentially contaminated sites proximate to the Project Area based upon the prolonged heavy industrial development in the surrounding areas. Sites reviewed from the EDR database reports were categorized into two “tiers” based upon the potential for adverse environmental conditions that could impact the Project Area. The first tier was characterized as sites with a greater potential to have impacted the Project Area and warranted further review. These sites included the following:

- Hazardous Substance/Inactive Hazardous Waste Disposal Sites in New York State (State Superfund, etc.)
- Voluntary Cleanup Agreement sites, which includes State and City sites that have entered into cleanup agreements with the overseeing regulatory agency (NYSDEC or New York City Mayor’s Office of Environmental Remediation [OER]).
- State or Federal Brownfield sites, which include privately and publicly funded brownfield remediation sites.
- The National Priority List (NPL), or Superfund under CERCLA. The NPL identified sites for priority cleanup under the federal Superfund program.
- MGP facilities, which includes records of coal gas plants.
- EC/IC sites, which includes remediation sites that have EC or ICs as part of their remedial strategy.

Second-tier sites were deemed less likely to have released contamination in quantities that could adversely impact the Project Area. Sites typically found in the second tier included Resource Conservation and Recovery Act (RCRA) hazardous waste generators, registered PBS/CBS facilities, solid waste/landfill sites, reported NYSDEC spill incidents and/or registered or historic dry-cleaning facilities.

The DAR summarizes 91 sites within the vicinity of the Project Area and within the Newtown Creek drainage area (see **Figure 12-2**). The summaries identified current and historical sources of contaminants of potential concern (COPC) in the study area, and contaminant transport mechanisms from the sources to Newtown Creek.

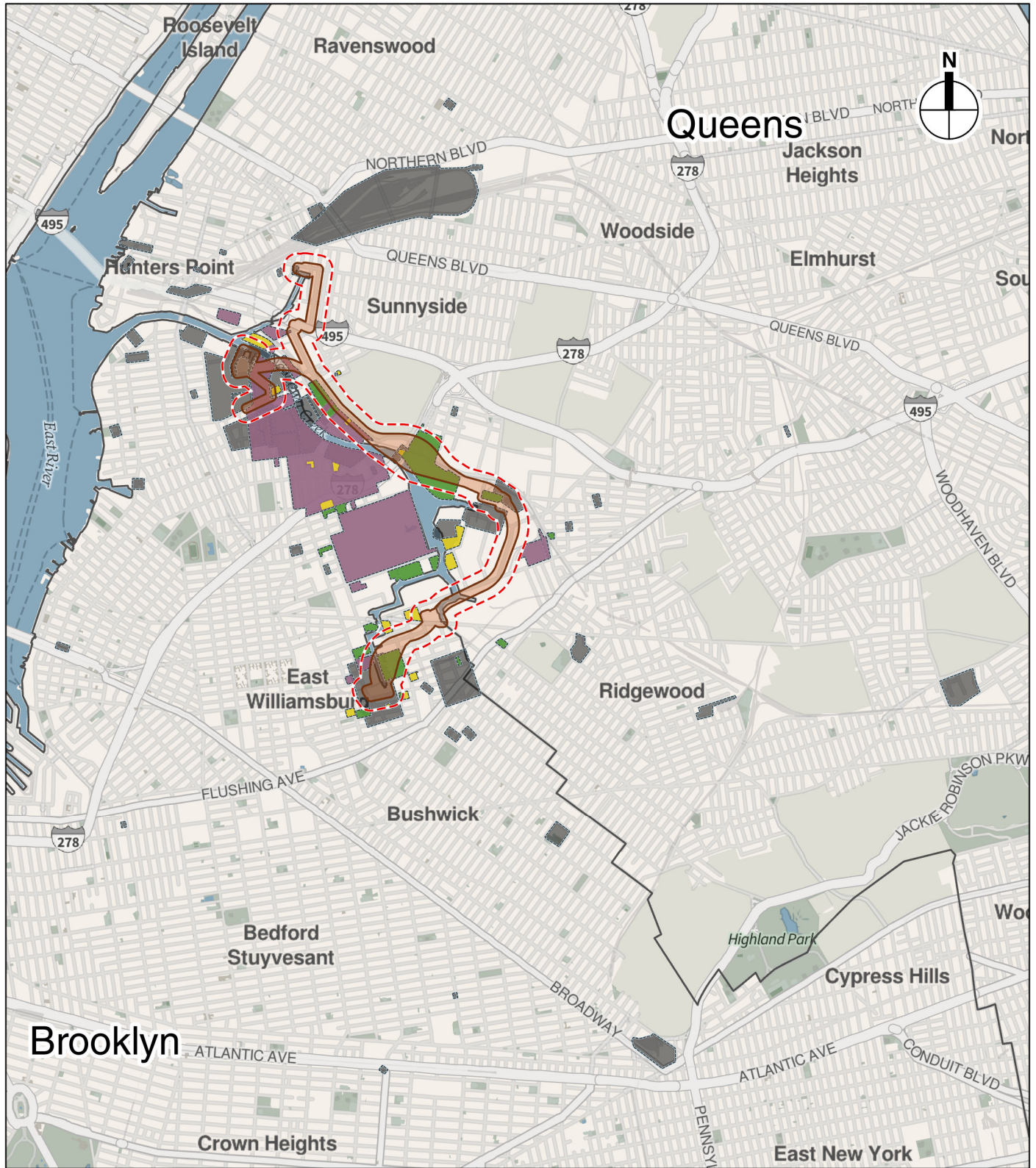
Based on information provided in the DAR, sites in the vicinity of the CSO tunnel and other Project Areas were classified into the following categories:

- Sites with potential or documented COPCs in groundwater and an unknown potential for nonaqueous-phase liquid (NAPL) in groundwater.
- Sites with analytical documentation of COPCs in groundwater and no identified NAPL in groundwater.
- Sites with analytical documentation of COPCs in groundwater and documented NAPL in groundwater.

Fifty-six first tier EDR and DAR sites identified in the TM were advanced for additional consideration due to their greater potential for adverse subsurface environmental impacts within the vicinity of the Project Areas (see **Table 12-4**). Of the 56 first tier sites, each site was assigned a low, medium or high priority based upon the known conditions associated with each site, whether the site information was provided in the DAR (DAR site numbers also included), the EDR database report, or both resources. Details relating to the contaminants of concern (either potential or confirmed) are provided for each site based upon the available information.

The first-tier sites are summarized in **Table 12-4**, with reference to their respective remedial programs, description, COCs, and additional contaminant information. Each of the sites identified that are proximate to the diversion facility sites has a potential to impact shallow soil and/or fill material that would be excavated during the construction of vertical shafts or utilities. In addition, certain high-priority sites listed on **Table 12-4** have the potential to impact the deeper CSO tunnel corridor due to confirmed or suspected presence of DNAPL. Most of the sites with confirmed DNAPL are located to the east of Newtown Creek and are due to the use of chlorinated solvents. Undetected DNAPL residue, if any, could be encountered in soil, rock and groundwater within deeper areas of excavations east of Newtown Creek. To the west and south of Newtown Creek, chlorinated and MGP DNAPLs have been documented at elevations lower than the creek bottom. The PCE and TCE plume associated with the Meeker Avenue Plume Trackdown site³ exists in the fill and underlying glacial sand. Chlorinated

³ The Meeker Avenue Plume Trackdown is an area south of Newtown Creek spanning several City blocks in Greenpoint/East Williamsburg Brooklyn where soil, groundwater, and soil vapor are contaminated with



Sites Summarized in Draft Data Applicability Study (DAR)

DNAPL associated with the Meeker Avenue Plume Trackdown site may have migrated downward to surfaces of less-permeable layers. As such, DNAPL may have migrated in directions independent of the groundwater gradient based on confining layers. COPCs and NAPL in groundwater within and proximate to the TDPS site were also documented.

It was recommended that environmental samples be collected in three separate investigations (Parts 1, 2 and 3) concurrently with the geotechnical investigation for the purposes of evaluating for potential COCs. Part 1, which was conducted during the first phase of the geotechnical investigation, was limited in nature to potentially resolve environmental uncertainties or identify unexpected impacts that require further investigation. Part 1 of the subsurface investigation was conducted between February and May of 2024 and is summarized below. At 60 percent design, a data gap study would be conducted to identify key environmental concerns relating to waste management, groundwater management and worker health and safety, identify data needs to address such concerns, and develop the scope for a more comprehensive subsurface investigation (or Part 2). The Part 2 subsurface investigation is proposed to occur within or proximate to the CSO tunnel corridor, gravity diversion sewer, diversion facility parcels, and the TDPS site. After implementation of the Part 2 subsurface investigation, a Part 3 subsurface investigation would be conducted to target specific areas of concern (AOCs) and further delineate contaminants identified in the Part 2 investigation. The Parts 2 and 3 investigations would be conducted in accordance with Subsurface Investigation Work Plans to be submitted to and approved by DEP.

SOIL AND GROUNDWATER INVESTIGATION

A preliminary subsurface investigation (known as Part 1 of the Subsurface Investigation) was performed by the JV concurrently with the first part of a Geotechnical Investigation. The results of this investigation were summarized in the *CSO-NC-DEC: Phase I Environmental Data Report* (the Report), prepared by the JV and issued to DEP on November 14, 2024 (see Appendix E).

Borings were advanced at seven locations (Borings B-101 through B-107) along the CSO tunnel corridor using mud rotary or sonic drilling equipment. At each boring location, hand clearing was conducted to approximately 5 to 6 feet below grade. Continuous sampling of borings was conducted to depths ranging from approximately 12 to 14 feet below grade. Sampling below 14 feet below grade was conducted in 5-foot increments, with continuous sampling conducted for limited intervals at deeper depths for geotechnical evaluation. Five-foot soil cores were also collected at three locations using sonic drilling techniques. Deeper rock coring was also conducted at six of the seven boring locations. Figure A.1 of the Report (included in Appendix E) depicts boring locations where environmental samples were collected.

chlorinated VOCs. The site was added to the EPA Superfund program's NPL in March 2022. It is not located directly within the Project Area.

Table 12-4
TM Sites Advanced for Review

Site No.	Site Name	EDR Database	History	DAR Site No.	Priority	COCs	Details
1	2 Ingram St	SHWS, VCP, Brownfields	Metal Plating, cloth mfg and warehouse.	24	Medium	VOCs, chlorinated volatile organic compounds (CVOCs), Metals, *DNAPL	Confirmed PCE, TCE, lead, nickel, chromium.
2	23-30 Borden Avenue Development	Brownfields	Railroad switch yard, coal gas purifier and gas holders.	N/A	High	VOCs, CVOCs, SVOCs, Metals and DNAPL	MGP DNAPL in several borings and well clustered in south-central portion of the site. PCE in soil vapor.
3	255 Randolph St	Brownfields	Sheet metal fabrication, ammonia mfg	N/A	Medium	VOCs, CVOCs, SVOCs, Metals, PCBs, DNAPL	Confirmed PCE, TCE in groundwater.
4	28-90 Review Avenue	Brownfields	Auto repair, PBS	N/A	High	VOCs, CVOCs, SVOCs, metals, PCBs LNAPL, DNAPL	PCE in soil vapor. Soil not tested for VOCs, LNAPL and DNAPL present in monitoring wells.
5	353 McKibbin Street	ECs/ICs	Lacquer spraying, chemical works	111	Low	SVOCs, metals.	Remediation Complete. SMP lists PAHs and metals including mercury and lead as remaining COCs.
6	36-04-36-08 Review Avenue	SHWS, Brownfields	Sheet metal mfg., smelting, bottler of dry-cleaning solvent, wood products	N/A	Medium	VOCs, CVOCs, metals, LNAPL, *DNAPL	Carbon tetrachloride and PCE in soil and groundwater.
7	37-88 Review Avenue	Brownfields	Petroleum refining, chemical mfg., waste transfer	N/A	Medium	VOCs, CVOCs, SVOCs, metals, LNAPL, *DNAPL	Petroleum LNAPL, groundwater impacts considered from off-site sources, portion of former Pratt Oil Works.
8	460 Kingsland Ave	SHWS, Spills	Distilling, boiler works, petroleum refinery	N/A	High	VOCs, SVOCs, LNAPL	Greenpoint remediation; one of the largest sources of contamination in area of tunnel corridor.
9	83 Apollo Street	VCP	Unknown	N/A	N/A	Low	Listed NYSDEC VCP, but no details provided.
10	ACME Steel/Brass Foundry	SHWS	Brass foundry, truck maintenance, marble/granite distribution	25	Medium	VOCs, SVOCs LNAPL	Greenpoint remediation one of the largest sources of contamination in area of tunnel corridor.
11	ACME Steel Metal Works	SHWS	Metal fabrication, printing facility	100	Medium	VOCs, CVOCs, *DNAPL	High CVOCs and proximate to the CSO tunnel corridor.
12	Bayside Fuel Oil Depot	MOSF	PBS, coal storage, ice block generator	51	Medium	VOCs, SVOCs, LNAPL	History of petroleum bulk storage, DAR identifies NAPL.

Table 12-4
TM Sites Advanced for Review

Site No.	Site Name	EDR Database	History	DAR Site No.	Priority	COCs	Details
13	BCF Oil Refining Inc.	SHWS, VCP	Oil terminal, waste oil recycling	27	Medium	VOCs, SVOCs, *LNAPL	History of petroleum contamination.
14	Brooklyn Terminal	SHWS, leaking underground storage tanks (LTANKS), Spills, MOSF	Petroleum terminal	53	High	VOCs, SVOCs, LNAPL	Greenpoint remediation; one of the largest sources of contamination in area of tunnel corridor.
15	Buckeye Pipeline Facility	RCRA Generator	Transfer of petroleum products, railroad tracks, petroleum pipeline	106	High	VOCs, SVOCs, LNAPL	DAR identifies presence of LNAPL from petroleum operations.
16	Cornish Knit Goods/Cornish MiniMills	VCP, EC/ICs	Textile mfg., dry cleaning, scrap yard	28	Medium	VOCs, CVOCs, SVOCs, metals, *DNAPL	DAR identifies former illegal dry cleaning, illegal dumping of solvents.
17	DSNY Queens District 5/5a Garage	LTANKS, spills	Sanitation truck maintenance	45	Low	*VOCs, *SVOCs, *LNAPL	DAR does not indicate confirmed contamination. Truck maintenance may be associated with petroleum impacts.
18	Empire Varnish Company, Inc.	SHWS	Paint and varnish mfg.	113	Low	VOCs, SVOCs, metals, LNAPL	Site No Further Action (NFA) after remediation, Property currently used to recover LNAPL as part of larger Exxon Greenpoint Remediation.
19	Enequist Chemical Co.	LTANKS	Unknown	8	Low	*VOCs, *SVOCs, *metals	DAR does not indicate confirmed contamination. Former industrial chemical distribution may be associated with petroleum impacts and metals.
20	Equity Works	MGP	MGP	33	High	VOCs, SVOCs, metals, LNAPL, DNAPL	MGP at risk for significant contamination source, close proximity to creek/tunnel.
21	Former ACME Steel Partition Co.	SHWS	Steel partition Co., staging yard for bridge construction, park.	100	Low	VOCs, CVOCs	Comparatively lower CVOCs in groundwater, distance from creek tunnel corridor.
22	Former Gulf Oil Terminal	LTANKS, Spills, CBS, MOSF	Bulk petroleum, glue mfg., impound lot	123	Medium	VOCs, SVOCs, metals, LNAPL	NAPL identified in DAR, close proximity to Creek, scarce remedial information available.
23	Former Klink Cosmo Cleaners	SHWS	Sheet metal mfg., dry cleaner.	101	Medium	VOCs, CVOCs, metals, LNAPL, *DNAPL	High CVOCs in groundwater, upgradient of known contaminated site, distance from creek and tunnel.
24	Former Lombardy	SHWS	Lacquer storage, soap mfg.,	104	High	VOCs, CVOCs, LNAPL, *DNAPL	High CVOCs, close distance to creek tunnel corridor.

Table 12-4
TM Sites Advanced for Review

Site No.	Site Name	EDR Database	History	DAR Site No.	Priority	COCs	Details
	Street Lacquer and Soap Mfg.						
25	Former Manhattan Adhesives Plant	SHWS	Unknown	N/A	Low	N/A	Records indicates no contamination related to this site.
26	Former Paragon Oil Terminal	N/A	PBS	200	Low	VOCs, SVOCs, LNAPL	N/A
27	Former Pratt Oil Works	N/A	Oil works, mfg., warehousing.	56	High	VOCs, SVOCs, metals, LNAPL	Elevated concentrations of total petroleum hydrocarbons (TPH) and MTBE also present.
28	Former Spic and Span Cleaners	SHWS	Cleaning/Dyeing	115	High	VOCs, CVOCs, DNAPL	High CVOCs, DNAPL, close proximity to tunnel corridors.
29	Former WLK Corp.	SHWS	Oil companies, gas station, radiator sales, steel pipe sales, recycling	30	High	VOCs, CVOCs, DNAPL	High concentration of CVOCs in groundwater (TCE). DNAPL at approximately 10 feet below water table.
30	Frito Lay	Brownfields, ECs/ICs	Scrap metal yard	31	Medium	VOCs, CVOCs, metals, *DNAPL	Elevated PCE and TCE concentrations in soil but not groundwater.
31	Getty Terminals Corp. #58220	LTANKS, Spills, CBS, MOSF	Lumber, gasoline storage and distribution	47	N/A	VOCs, SVOCs, LNAPL	Elevated concentrations of TPH, BTEX, PAHs and NAPL present.
32	Greenpoint Petroleum Remediation Project	N/A	Multiple petroleum terminals	N/A	High	N/A	Vertically and laterally extensive NAPL contamination.
33	Hugo Neu Schnitzer	N/A	Scrap metal recycling loading from barges, USTs for fuel oil and diesel	125	Medium	*VOCs, *SVOCs, *LNAPL	Contamination not confirmed. Potential petroleum contamination present.
34	Joyva Vacant Lot	VCP	Unknown	N/A	Low	N/A	Site is listed in leaking tanks and VCP databases but does not qualify for registry of inactive hazardous waste sites. No information regarding COCs.

Table 12-4
TM Sites Advanced for Review

Site No.	Site Name	EDR Database	History	DAR Site No.	Priority	COCs	Details
35	Kalex Chemical Products Inc.	LTANKS, CBS	Lumber, plastics mfg.	127	Low	*VOCs, *CVOCs and *SVOCs	History of plastic manufacturing but COCs not confirmed.
36	Manhattan Poly Bag	N/A	Asphalt, Oil Company, Plastics	130	Low	VOCs, SVOCs, metals.	Contaminants attributed to use of asphalt and plastics.
37	Maspeth Project	UST	Parking for school buses	35	Medium	VOCs, SVOCs, metals, PCBs, LNAPL	Diesel fuel storage. Contaminated soil relating to a removed 20,000-gallon fuel storage tank.
38	Maspeth Substation	VCP, Spills	Electrical Transformers	4	Medium	VOCs, CVOCs, PCBs, LNAPL	VCP site with remediation of petroleum/PCB transfer fluid.
39	Meeker Avenue Plume Trackdown	SHWS	Multiple sites	N/A	High	N/A	Large CVOC plume. LNAPL close proximity to Creek.
40	Morgan Oil Terminal	SHWS, MOSF, Spills, Liens	Oil mfg., asphalt mfg., coal and salt distribution, sawmill	60	High	VOCs, CVOCs, SVOCs, metals, LNAPL	Confirmed contamination with ongoing remedial action.
41	National Grid Greenpoint MGP	SHWS, spills, LTANKS, VCP, MGP	MGP, liquified natural gas (LNG) storage	32	High	N/A	Significant documented contamination, DNAPL, impacts to Creek.
42	Newtown Creek Wastewater Treatment Plant	Spills, RCRA generator, UST/ASTs	Wastewater treatment, oil storage	11	N/A	N/A	Numerous spill incidents and storage tanks.
43	NYS Department of Transportation (NYSDOT) Bin 1075910	RCRA Generator	Unknown	21	Low	*VOCs, *SVOCs, *metals.	RCRA hazardous waste generator. Contamination not confirmed.
44	Pebble Lane Associates	LTANKS	Fill recycling, solid waste transfer	134	Low	*VOCs, *SVOCs, *metals.	Contamination not confirmed. Site is a solid waste facility for asphalt recycling.
45	Phelps Dodge Refining Corp.	SHWS, Spills, ECs/ICs	Pesticide mfg., copper refining	16	Medium	CVOCs, SVOCs, metals, PCBs	No potential DNAPL from SVOCs. Potential DNAPL from dense metal brines.
46	Popular Hand Laundry	VCP, ECs/ICs	Dry cleaning	38	Low	VOCs, CVOCs, SVOCs, metals, *DNAPL	NAPL not confirmed due to use of dry cleaning chemicals.

Table 12-4
TM Sites Advanced for Review

Site No.	Site Name	EDR Database	History	DAR Site No.	Priority	COCs	Details
47	Queens Animal Shelter and Care Center	Brownfields, Spills	Auto wrecking yard, Auto repair	N/A	Medium	VOCs, SVOCs, metals, PCBs	BCP site, low MTBE in groundwater. Petroleum and PCBs in soil remediated.
48	Review Avenue Development I	Brownfields, Spills, ECs/ICs	Distilling, poultry feed, truck repair, warehousing, vehicle parking	41	Medium	VOCs, CVOCs, SVOCs, metals, PCBs, LNAPL, *DNAPL	Petroleum LNAPL confirmed, remediation conducted with ECs and ICs in place.
49	Review Avenue Development II/Qanta Resources	SHWS, Brownfields	Oil refinery	39	High	VOCs, CVOCs, SVOCs, metals, PCBs, *DNAPL	Elevated TCE in soil vapor suggests potential for DNAPL in soil and groundwater.
50	Roehr Chemicals	SHWS, ECs/ICs	Pharmaceutical mfg.	42	Low	VOCs	Confirmed BTEX which was remediated using air sparging.
51	Scholes St. Station	MGP	MGP gas holder site, not manufacturing	N/A	High	*VOCs, *SVOCs, *DNAPL	Former MGP site with no available investigation information.
52	STAR Corrugated Box	RCRA generator, Spills, UST, LTANKS	Mfg. of corrugated boxes and displays	143	High	VOCs, CVOCs, SVOCs, LNAPL, *DNAPL	NAPL present. Petroleum from leaking tanks and CVOCs confirmed suggesting potential DNAPL.
53	Town, County and State Recycling, Inc.	Spills	Unknown, no information in DAR	145	Low	N/A	No available testing information.
54	Transon Lines Terminal	LTANKS	Lumber and coal distribution, concrete mixing	59	Medium	VOCs, SVOCs	Leaking tank, remediation completed with NFA issued.
55	Varick Avenue	SHWS	Asphalt company, lumber	N/A	Medium	VOCs, SVOCs, metals.	Soil and groundwater contaminated with metals and TPH.
56	Waste Management of NY	Spills/AST	Waste transfer	46	Medium	*VOCs, *SVOCs, *LNAPL	Contamination not confirmed. Potential for petroleum contamination was identified.

Notes:

* Potential contaminants of concern based on available information.

N/A = Not Available/Not Applicable

Subsurface materials evaluated at each boring location were screened for VOCs using a photoionization detector (PID); a handheld field instrument capable of detecting a wide range of VOCs. Subsurface materials were also evaluated for staining, odors, sheens, discoloration or any additional visual or olfactory evidence of contamination. Soils were evaluated at various intervals based upon the subsurface geology. Soil samples were analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) laboratory for VOCs, SVOCs, pesticides, PCBs, metals and free cyanide. Soil analytical data was compared to the 6 NYCRR Part 375 Soil Clean-Up Objectives (SCOs) for Protection of Groundwater, Protection of Human Health – Residential Use and Protection of Human Health – Industrial Use.

Elevated PID detections ranged from 0.2 parts per million (ppm) in the 10-to-11-foot interval of Boring B-104 to 49.9 ppm in the 25-to-27-foot interval of Boring B-106. A light sheen was observed in the 35- to 37-foot interval of Boring B-106. There were no odors in the majority of the intervals screened during the limited investigation; however, mild organic odors were observed in the 12- to 14-foot and the 136.8- to 137-foot intervals of Boring B-103, as well as the 20- to 22- and 25- to 27-foot intervals of Boring B-106. A slight petroleum odor was observed in the surficial (one-to-three foot) interval of Boring B-106.

Groundwater samples were collected from the three northern-most borings (Borings B-101, B-102 and B-103). Groundwater was analyzed by a NYSDOH ELAP laboratory for VOCs, SVOCs, pesticides, PCBs, metals and free cyanide. Groundwater analytical data was compared to the 6 NYCRR Part 703 standards for groundwater. For parameters with no promulgated groundwater standard, the concentrations were also compared to the Ambient Water Quality Standards and Guidance Values (AWQSGVs) found in NYSDEC's Technical and Operational Guidance Series (TOGS) 1.1.1 (NYSDEC, 1998).

SOIL ANALYTICAL RESULTS

There were no pesticide detections in any soil samples analyzed as part of the limited subsurface investigation. Further, no PCBs were detected in any soil samples analyzed at concentrations that exceeded the relevant SCOs.

No VOCs were detected in any samples at concentrations above the NYSDEC Part 375 Residential or Industrial Use SCOs. One VOC, acetone, was detected at concentrations above the NYSDEC Part 375 Protection of Groundwater SCO in fill samples from two locations (Borings B-103 and B-106). Further, although CVOCs were detected in deeper intervals of the glacial outwash and clay layers at B-101, B-104, B-105 and B-107, the total CVOCs concentration was generally less than 1 part per billion (ppb), and did not suggest a potential DNAPL condition proximate to the boring locations.

Several SVOCs were detected above relevant SCOs. These SVOCs (specifically PAHs), have relatively low SCOs for the NYSDEC Part 375 Protection of Groundwater and Residential Use SCOs. PAHs are common in fill as a result of soot, residues of certain types of petroleum products and asphalt paving.

The metals arsenic, lead, mercury and silver were detected above the NYSDEC Part 375 Protection of Groundwater and Residential Use SCOs in the fill layers analyzed from Borings B-101, B-103, B-106 and B-107. Lead and arsenic were similarly detected above Protection of Groundwater and Residential

Use SCOs in the deeper glacial outwash sample from B-101. The source of the deeper detection is unknown.

Free cyanide was detected at concentrations ranging from 0.97 to 1.8 parts per million (ppm) in each boring, except for Boring B-106. Although there are no SCOs for free cyanide, detections can often be associated with MGP purifier waste.

GROUNDWATER ANALYTICAL RESULTS

The VOC chloroform was detected in two groundwater samples above the NYSDEC Part 703 standard of 7 ppb. Toluene was detected in one sample slightly above the NYSDEC Part 703 of 5 ppb. The source of chloroform and toluene was not identified in the Report. The CVOC cis-1,2 dichloroethene (cis-DCE) was detected in both groundwater samples from Boring B-101. Cis-DCE is a breakdown product of the chlorinated solvents PCE and TCE, which are commonly associated with dry cleaning activities or industrial solvents.

No SVOCs were detected above their respective AWQSGVs. Further, no free cyanide was detected in any of the groundwater samples analyzed.

The metals chromium, copper, iron, lead, manganese, nickel, silver and/or sodium were detected above groundwater standards in each of the samples. Magnesium was detected above the guidance value in both samples analyzed from Boring B-101. Elevated metal concentrations in unfiltered turbid groundwater samples obtained from open boreholes may reflect the presence of suspended solids as well as the dissolved phase.

CONCLUSIONS

Soil and groundwater contamination was identified that may impact construction. Exceedances of relevant SCOs for arsenic, lead, silver and/or mercury would prevent unrestricted reuse of soil in four of the seven boring locations. CVOCs were noted in deeper intervals of glacial outwash and marine clay, as well as in groundwater sampled from boring B-101. Although the CVOC detections were low, the Report suggests the presence of higher concentrations or even DNAPL at some distance from the boring locations. Potential chlorinated DNAPL was previously identified at several sites reviewed near the Project Area. Further, VOCs (chloroform and toluene) and metals (chromium, copper, iron, lead, manganese, nickel, silver and sodium) in groundwater sampled from the three northern-most borings indicating construction dewatering would likely require treatment to meet the NYSDEC SPDES surface water body discharge parameters or DEP sewer discharge parameters.

Although the subsurface investigation indicated contaminants of concern in the soil and groundwater that may impact CSO tunnel construction activities, it is noted that the investigation summarized in the Report was limited to seven borings over a large Project Area, with distance between borings greater than 2,300 feet. As such, it is likely significant data gaps exist, and further characterization of subsurface conditions requires supplemental sampling.

ASBESTOS-CONTAINING MATERIALS, LEAD-CONTAINING PAINT AND OTHER HAZARDOUS BUILDING MATERIALS

Demolition of several existing structures is anticipated at the TDPS site as well as certain diversion facility parcels. Given the age of the majority of the aboveground buildings on the TDPS site and diversion facility parcels, as well as subgrade utilities in the remaining Project Area, there is a potential for ACM, LCP, and other building materials containing PCBs and/or mercury to be encountered or disturbed during demolition.

Management and/or removal of these materials during construction is subject to federal, state, and local regulatory requirements that must be followed during construction.

D. FUTURE WITHOUT THE PROPOSED PROJECT

In the No Action condition, it is assumed that the Proposed Project would not be constructed, and the sewer infrastructure in the area of Newtown Creek would remain in its existing condition. The sites that would be affected by the Proposed Project for construction of the diversion facilities and the TDPS (discussed in Chapter 1, “Project Description”) would also remain in their existing condition. The TDPS site would be vacated by the New York City Department of Sanitation (DSNY). There would be no reduction in CSO volumes discharged to Newtown Creek from outfalls BB-026, NCQ-077, NCB-083, and NCB-015.

With regard to hazardous materials, supplemental subsurface investigations of soil, groundwater and bedrock would not be conducted within the CSO tunnel corridor and gravity diversion sewer, as well as the TDPS site and diversion facility sites that are not participating in remedial programs. Contaminants in soil and groundwater would remain in-place and regulatory compliance for parcels participating in NYSDEC programs would remain the responsibility of the parcel owner(s), volunteer or participant. Furthermore, remedial action and/or proper handling and disposal of contaminated soil, groundwater and/or bedrock within the remaining Project Areas would not be conducted under a DEP-approved RAP and CHASP. Surface waters of Newtown Creek would continue to receive CSO discharges potentially adding to existing contamination.

In addition to the above, any potential ACM, LCP, or PCB-containing building materials present within the Project Area with the potential to be disturbed would go unabated or unmitigated and would remain in-place.

E. FUTURE WITH THE PROPOSED PROJECT

In the With Action condition, the Proposed Project, which includes the construction of a 50-MG CSO storage tunnel, TDPS, diversion chambers, drop shafts, conveyance sewers, new outfalls, and odor control systems, would control CSO discharges from outfalls BB-026, NCQ-077, NCB-083, and NCB-015, as described in Chapter 1, “Project Description.” The greatest potential for exposure to hazardous materials would result from construction. Analysis of potential construction and operational impacts that may result from the Proposed Project are provided below.

CONSTRUCTION IMPACTS OF THE PROPOSED PROJECT

To address any hazardous materials located within the Project Areas during construction, supplemental investigations would be conducted to properly characterize subsurface conditions within the limits of disturbance.

Subsurface investigations for city-owned parcels (with the exception of Block 2575 Lot 26 at the NCQ-077 diversion facility), as well as portions of the CSO tunnel, TDPS discharge pipe and gravity diversion sewer that are accessible from public rights-of-way, would be performed when design nears or reaches 60 percent completion (estimated 2026/2027). As previously indicated, the subsurface investigations would be conducted as supplements to the Part 1 investigation and will be labeled in sequence as Part 2 and Part 3, to be completed in accordance with respective Subsurface Investigation Work Plans and associated HASPs to be prepared and submitted to DEP for review and approval. Part 2 would be considered a comprehensive investigation of soil, groundwater, soil vapor, and potentially bedrock, to further characterize the Project Areas. The Part 3 Supplemental Subsurface Investigation would be conducted to delineate contamination that may be identified from previous investigations, including Parts 1 and 2, and would be similarly subject to a Work Plan and HASP to be prepared and submitted to DEP for review and approval. For parcels under consideration for acquisition by DEP, supplemental subsurface investigations may be conducted post-acquisition (acquisition scheduled between February 2026 and February 2029). If the acquisition schedule does not align with the Part 2 and Part 3 investigations described above, then City-acquired parcels may require their own parcel- or site-specific Subsurface Investigation Work Plans and HASPs which would similarly require review and approval by DEP.

Two parcels in the Project Area associated with certain diversion facilities are currently in NYSDEC programs (Block 2984 Lot 85 at the NCB-083 diversion facility site in the BCP, and the City-owned Block 2575 Lot 26 at the NCQ-077 diversion facility site in the ERP). NYSDEC would maintain regulatory oversight for subsurface investigations conducted on these parcels, which would be subject to RIWPs that would be prepared and submitted to NYSDEC for review and approval in accordance with the requirements of the respective program(s). Investigation of the City-owned NCQ-077 diversion facility site would likely be conducted in parallel with Parts 2 and 3 of the subsurface investigations when design reaches 60 percent completion (estimated 2026/2027). As it is not yet known whether subsurface investigations on Block 2984 Lot 85 of NCB-083 in the BCP would be conducted prior to or after acquisition, coordination with NYSDEC and/or the parcel owners would be conducted should the investigation be scheduled prior to acquisition.

Overall, all required permits, as well as entry and testing agreements, would be obtained for any supplemental sampling conducted within public rights-of-way or on privately-owned parcels.

During construction, soil and materials management procedures would be implemented to minimize impacts of earth disturbing excavation activities. The following subsections describe procedures that would be followed.

*EXCAVATED MATERIALS MANAGEMENT PROCEDURES**Excavated Materials Generating Activities*

As discussed in Chapter 3, “Construction Means and Methods,” for construction of the Proposed Project, excavated materials would primarily be removed during tunnel construction and construction of the screening and pump station shafts at the TDPS site. There would also be some excavated materials removed from the starter and connector tunnels at the TDPS site as well as from the construction of the outfall structures and drop shafts at the four diversion facility sites.

Tunnel Construction

As discussed in Chapter 1, “Project Description,” the proposed CSO storage tunnel would be approximately 26 feet in outer diameter and at a depth ranging from 80 to 130 feet below existing ground surface; the tunnel mining operation would start in bedrock at the TDPS site then transition to a mixed face condition before ending in soil. A TBM would be used for tunnel construction and mining of tunnel spoils, consisting of soil and bedrock. It is anticipated that it would mine approximately 14,500 linear feet of soil and 2,500 feet of bedrock throughout the tunnel alignment. Soil is anticipated to be a mixture of clay and glacial deposits, and accounting for a 1.5 bulking factor (the bulking factor is a ratio that accounts for the increase in volume of a material after it is being disturbed from its original state.), the tunneling operation is estimated to generate approximately 11.5 million cubic feet of excavated soil during tunnel construction. Tunneling rates in soil range from an average of 30 feet per day to a maximum of approximately 120 feet per day, therefore the estimated excavated soil volume would range from approximately 900 cubic yards per day to up to approximately 3,500 cubic yards per day. As for bedrock, assuming a bulking factor of 1.7, the tunneling operation is estimated to generate approximately 2.3 million cubic feet of excavated rock during tunnel construction. Tunneling rates in rock range from an average of 30 feet per day to a maximum of 100 feet per day, therefore, the excavated rock volume would range from approximately 1,000 cubic yards per day up to 3,300 cubic yards per day. Combined, approximately 13.8 million cubic feet of tunnel spoils are anticipated to be generated during tunnel construction. Tunnel construction is anticipated to take approximately two years to complete, from August 2031 to July 2033.

For tunnel construction, the excavated materials from the face of the TBM would first pass through the trailing gear⁴ before discharging to a continuous conveyor system or a locomotive system that connects to the base of the TDPS screening shaft. At that point, the excavated material would be transferred from the base of the shaft to the ground surface. There are several excavated material handling options that the contractor may use. One option is to use a crawler crane or a gantry crane at the surface to lift the excavated material (in boxes) and then discharge the contents to a temporary surface stockpile. Another option is to use a vertical conveyor system to transport the excavated material up to the surface before being discharged to either a temporary stockpile or directly to trucks or barges for off-site disposal. Based on the daily tunnel excavation rates identified above and any overlapping activities that may

⁴ The trailing gear includes computerized control rooms as well as support equipment such as pumps, transformers, grouting equipment, and conveyors (see Figure 3-8)

occur during tunnel excavation (i.e., pump station shaft work), it is anticipated that up to 4 daily barge trips or 141 daily truck trips would be generated during peak construction activities. If the TBM incorporates a slurry system, the slurry mix with the excavated materials would be pumped from the TBM through slurry pipes and up the shaft to a slurry treatment plant. The slurry system would be a closed circuit until the slurry reaches the enclosed slurry treatment plant.

Pump Station and Screening Shaft Construction

As presented in Figures 3-4 and 3-5 in Chapter 3, “Construction Means and Methods”, the screening shaft would have an inner diameter of approximately 62 feet at an elevation of 132 feet below grade during the construction period without final lining while the pump station shaft would have an inner diameter of approximately 110 feet at an elevation of 134 feet below grade. Based on an assumed streamlined excavation rate of two to three feet per day, approximately 850 cubic yards of excavated materials per day would be generated during shaft construction activities. The screening shaft is anticipated to take approximately 15 months to complete, from October 2029 to January 2031, while the pump station shaft is anticipated to take approximately two years to complete, from June 2030 to July 2032.

For shaft construction, a crawler crane or a gantry crane at the surface would be used to lift the excavated material (in boxes) and then discharge the contents to a temporary surface stockpile. Based on the excavation rates identified above, it is anticipated that up to 1 daily barge trip or 30 daily truck trips would be generated during shaft construction activities.

Stockpile Methods

Stockpiles of excavated material would be used only when necessary and would be removed as soon as practicable. While stockpiles are on site, they would be inspected daily, and before and after every storm event to ensure they are not subject to excessive erosion. Stockpiles of soil would be covered with anchored plastic tarps as needed when not being loaded/unloaded. Stockpiles would be surrounded with rigid barriers and/or silt fencing. All stockpile areas would be kept free of standing water. Stockpiles would be managed to control run-off in accordance with applicable regulatory requirements. Stockpiles would be located away from Newtown Creek and property boundaries, where possible.

Odor Control

As described in Chapter 17, “Air Quality,” the Proposed Project would implement a CAMP during soil disturbance activities to monitor applicable threshold levels and to implement any corrective actions if necessary. If applicable threshold levels in the CAMP are exceeded, to minimize and control on- and off-site odor nuisances, the Proposed Project would implement odor control measures (see Table 17-15) during construction that could include wet suppression, daily cover foams/shells, covered conveyors, and activated carbon scrubbers. Table 17-15 also details where these odor control measures could be applied during the excavated material handling process.

Off-Site Transportation and Disposal

Outbound trucks would be inspected and cleaned, if necessary, before leaving the project sites; access/egress points for trucks and equipment would be kept clean of site-derived materials. Exit locations would be inspected daily for evidence that soil is being transported off premises. Truck wash facilities would be used as necessary to limit soil transport onto adjacent streets, and adjacent streets

would be cleaned, as needed. Loaded vehicles leaving the site would comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws, regulations, and guidelines and be transported to appropriately licensed reuse/disposal facilities. Inbound trucks to the project sites would be regimented and scheduled to minimize truck queuing. A manifest-based tracking system would be used to document the proper management of material to its destination. Truck transport routes would consider the following: (1) limiting transport through residential areas and near sensitive sites; (2) using mapped truck routes; (3) using schedules to minimize or avoid queuing of trucks entering the work area; (4) limiting total distance to major highways; (5) promoting safety in access to highways; and (6) increasing overall safety in transport. All material would be managed as regulated material and would be reused or disposed in accordance with applicable laws, regulations and guidelines. A documentation/manifest process would be used to document conformance with applicable laws, regulations and guidelines.

Barging may be used in lieu of trucks to transport excavated materials generated during construction from the TDPS site since it is the location where excavated materials would be removed from tunnel construction, screening shaft, and pump station shaft construction. Being adjacent to Newtown Creek and its inlet, Whale Creek, the TDPS site contains the former Greenpoint Marine Transfer Station (MTS) where indoor and outdoor mooring slips exist to accommodate barge loading. Loaded barges leaving the site would comply with applicable materials transportation requirements (including required covering, manifests, and placards), which are generally similar to truck transportation, in addition to U.S. Coast Guard requirements and, depending on the type of waste, New York City Fire Department requirements. Loaded barges would be transported to appropriately licensed disposal facilities.

Dust Control and Monitoring

Dust management during soil-disturbing work would include the following: (1) use of water spray for roads, trucks, excavation areas and stockpiles; (2) use of truck covers during soil transport within site limits and during off-site transport; (3) employment of extra care during dry and/or high-wind periods; and (4) use of a truck wheel wash at site access/egress points to prevent fugitive dust and off-site migration of dust and other particulates. During construction, real-time dust monitoring would be performed through a CAMP. If any issues arise, the source(s) of any dust emissions would be identified and addressed immediately and appropriately.

Materials Handling

A Materials Handling Plan that covers the management, handling, transportation, and disposal of non-hazardous contaminated soils, regulated hazardous wastes, and all other soil/fill would be prepared and submitted to DEP for review and approval. The Materials Handling Plan would also be incorporated into remedial plans that would similarly be subject to agency approval (see below).

In addition to the materials management procedures identified above, the following would also be conducted:

- For corridors (CSO Tunnel, TPDS discharge pipe, and gravity diversion sewer), the TDPS site, and the diversion facility parcels not in NYSDEC programs (the BB-026 diversion facility site; Block 2974 Lots 165 and 170 at the NCB-015 diversion facility site; and Block 2585 Lots 225 and 240 at the NCQ-077 diversion facility site) – Preparation of RAPs and CHASPs would set

out the procedures to be followed to avoid the potential for adverse impacts related to hazardous materials identified by the Parts 2 and 3 subsurface investigations, as well as other hazardous materials that could (unexpectedly) be encountered. The RAPs would incorporate the soil and materials management procedures previously discussed, as well as CAMP requirements, odor suppression means and methods, and contingency measures to be implemented should USTs or soil contamination be encountered. Furthermore, procedures for treatment of contaminated groundwater would be provided in the RAPs to be followed during dewatering operations. Dewatering operations would either follow DEP permitting requirements for treatment and discharge to the sewer system, or NYSDEC SPDES requirements for treatment and discharge to a surface water body or DEP outfall. The CHASP would present a hazard assessment for the construction workers during portions of the subsurface disturbance to protect construction workers and occupants during construction. Upon completion of construction, a RCR would be prepared and submitted to DEP for review and approval, and would be certified by a New York-licensed PE.

- For diversion facility parcels in NYSDEC programs (NCB-083 Block 2984 Lot 85 and NCQ-077 Block 2575 Lot 26) - RAWPs or IRMWPs would be prepared for each parcel in consultation with NYSDEC (Block 2984 Lot 85 at NCB-083 in the BCP; and Block 2575 Lot 26 at NCQ-077 in the ERP). The RAWPs/IRMWPs would be certified by a New York-licensed PE and would similarly set out procedures to be followed to avoid the potential for adverse impacts related to hazardous materials identified by the supplemental subsurface investigations, as well as other hazardous materials that could (unexpectedly) be encountered. The RAWPs or IRMWPs would address requirements for items such as soil, groundwater and bedrock management (including stockpiling, handling, transportation, and disposal), odor control mitigation, dust control and air monitoring, daily reporting to NYSDEC, and contingency measures should USTs or contamination be encountered. Soil and materials management measures included in the RAWPs or IRMWPs are expected to be similar to those previously discussed and would include CAMP monitoring and odor suppression means and methods. However, these measures would be subject to NYSDEC's review and approval. Dewatering operations would follow DEP requirements for treatment and discharge to the sewer system, or NYSDEC SPDES requirements for treatment and discharge to a surface water body or outfall. The RAWPs or IRMWPs would also include CHASPs which would present a hazard assessment for the construction workers during portions of the subsurface disturbance to protect construction workers and occupants during construction. Upon completion of construction, RCRs, FERs, IRM or Construction Completion Reports (IRMRs/CCRs) would be prepared and submitted to NYSDEC for review and approval. The FERs, RCRs or IRMRs or CCRs would each be certified by a New York-licensed PE and would provide photographic documentation, as-built drawings, sample results, disposal manifests, air monitoring data and field logs and document environmental procedures that were followed during construction.

Demolition of several existing structures is anticipated at the TDPS site as well as certain diversion facility parcels. Any suspect ACM, LBP or PCB-containing building materials, if potentially present or encountered during construction of the Proposed Project, would be evaluated and abated in

accordance with applicable local, state and federal regulatory requirements as part of standard demolition procedures.

Based upon the requirement to investigate and remediate potential hazardous materials within the Project Area in accordance with agency oversight (DEP or NYSDEC), the potential for exposure to hazardous materials would be minimized during construction. Therefore, with the measures described above, no significant adverse impacts relating to hazardous materials would result from construction of the Proposed Project.

OPERATIONAL IMPACTS OF THE PROPOSED PROJECT

Although immediate exposure to contamination would be addressed during construction, NYSDEC and DEP may require ICs and/or operational site management of ECs on certain portions of the Project Areas. Examples of ICs include deed restrictions which could prohibit certain sensitive uses that would increase the potential for exposure to hazardous materials, and regulatory (programmatic) requirements for future investigation and remediation should modifications to the Project Areas be contemplated that may increase exposure to hazardous materials. Examples of ECs include a regulatory agency-approved site cap to prevent dermal or future exposure to contamination, if present, and long-term monitoring or remediation through the use of a mitigation system (i.e., groundwater treatment system, SVE system, etc.). Potential ECs would be implemented as part of remedial action and ICs would be determined upon completion of any remedial action conducted during construction. Any future ICs that are placed on any portions of the Project Area would be followed in accordance with the specified control's requirements. O&M of post-construction ECs to prevent operational exposure to hazardous materials would be implemented through SMP, which would be submitted to, and approved by the regulatory agency that maintains jurisdiction of the respective portion of the Project Area (i.e., DEP, NYSDEC or EPA). Any potential hazardous materials, including petroleum products, that would be required for use as part of future CSO tunnel operations would be stored, handled and/or disposed of in accordance with applicable local, state and federal requirements. With the measures described above, no significant adverse impacts relating to hazardous materials would result from operation of the Proposed Project.

CONCLUSIONS

The potential for exposure to hazardous materials would be minimized during construction based upon the requirement to investigate and remediate potential hazardous materials within the Project Area in accordance with regulatory oversight (by DEP or NYSDEC). In addition, any suspect ACM, LBP and mercury and/or PCB-containing building materials, if encountered during construction on the diversion facility parcels subject to regulatory program requirements, would be evaluated and abated in accordance with applicable local, state and federal regulatory requirements as part of standard demolition procedures.

Beyond construction, all post-remedial requirements during operation, including potential future ICs or ECs placed within the Project Area would be followed in accordance with regulatory agency-approved SMPs.

With the measures described above, no significant adverse construction or operational impacts relating to hazardous materials would result from the Proposed Project.