PROPOSED REMEDIAL ACTION PLAN

K - Dangman Park MGP
Operable Unit Number 01: Remedial Program
Manufactured Gas Plant Program
Brooklyn, Kings County
Site No. 224047
February 2020

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site resulted in threats to public health and the environment that were addressed by actions known as interim remedial measures (IRMs), which were undertaken at the site. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation (RI) or feasibility study (FS). The IRMs undertaken at this site are discussed in Section 6.2.

Based on the implementation of the IRM(s), the findings of the RI indicate that the site no longer poses a threat to human health or the environment. The IRM(s) conducted at the site attained the remediation objectives identified for this site, which are presented in Section 6.5, for the protection of public health and the environment. No Further Action is the remedy proposed by this Proposed Remedial Action Plan (PRAP). A No Further Action remedy may include site management, which will include continued operation of any remedial system installed during the IRM and the implementation of any prescribed institutional controls/engineering controls (ICs/ECs) that have been identified as being part of the proposed remedy for the site. This PRAP identifies the IRM(s) conducted and discusses the basis for No Further Action.

The New York State Manufactured Gas Plant Program (also known as the MGP Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the

reports and documents, which are available at the following repositories:

NYSDEC Central Office
Attn: John Miller
625 Broadway Floor 12
Albany, NY 12233-7014
Phone: 518-402-9589

Brooklyn Community Board 13
1201 Surf Ave Floor 3
Brooklyn, NY 11224
Phone: 718-266-3001

Key project documents are also included on DEC Info Locator:
https://www.dec.ny.gov/data/DecDocs/224047

A public comment period has been set from:

02/26/2020 to 03/27/2020

A public meeting is scheduled for the following date:

March 16, 2020

Public meeting location:

Temple Beth Abraham
301 Sea Breeze Avenue
Brooklyn, NY

At the meeting, the findings of the remedial investigation (RI) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through 03/27/2020 to:

John Miller
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
john.miller@dec.ny.gov

The Department may modify the proposed remedy presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the

Department's final selection of the remedy for this site.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Dangman Park MGP site is located in an urban area, in Coney Island, Brooklyn. The site totals approximately 1 acre of land bounded by Neptune Avenue to the north, W. 5th St. to the east, a residential parcel to the south, and a commercial parcel to the west. The site is contained within Lots 1R and 25 of Block 7273.

Site Features: A large portion of the former shopping center was demolished which allowed for remediation activities and redevelopment. A portion of the former shopping center structure still exists off-site to the west, but is vacant. A one-story commercial structure was recently constructed across a major portion of the site which houses various businesses including a bank, a bagel shop and a drug store. The site is approximately 1,300 feet southeast of Coney Island Creek and approximately 2,400 feet north of New York Bay.

Current Zoning and Land Use: The site has been developed for commercial use and is zoned for residential and commercial uses. The surrounding parcels are currently used for a combination of commercial and residential purposes. The site is located within a special purpose zoning district designated as the "Special Ocean Parkway District."

Past Use of the Site: A manufactured gas plant (MGP) operated on-site from approximately 1895 until sometime between 1906 and 1930. As a result of the MGP operations, coal tar has impacted the subsurface soil and groundwater on parts of the site. The above-grade MGP structures were removed sometime between 1906 and 1930. The below grade portions of the former gas holders, tar tank, and cistern are all likely sources of the tar releases from the former MGP. By 1930, the site was occupied by a club house. By 1966, the Trump Village Shopping Center occupied the northern and central portions of Lot 1R. During the winter of 2016-2017, a substantial part of the Trump Village Shopping Center was demolished to make way for new development, making the underlying contamination accessible for cleanup.

There are two operable units defined for this MGP site. Operable unit 1 (OU-1) occupies the northern and eastern portion of Lot 1R and a portion of the parking area on lot 25 is designated as operable unit 2 (OU-2).

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Site Geology and Hydrogeology: The subsurface soils under the site consist of approximately 5 to 15 feet of fill material overlying glacial sand deposits. The groundwater table is approximately 6.5 to 7.5 feet below ground surface and ground water flows northwest, toward Coney Island Creek.

Operable Unit (OU) Number 01 is the subject of this document.

A Record of Decision will be issued for OU 02 in the future.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted residential as described in Part 375-1.8(g) is/are being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

National Grid

The Department and Brooklyn Union Gas Company, Keyspan Energy Delivery NY, KeySpan Gas East Corporation d/b/a and KeySpan Energy Delivery Long Island entered into a Consent Order (Index #A2-0552-0606) on February 22, 2007. The Order obligates the responsible parties to implement a full remedial program for MGP-related contamination. As a successor to KeySpan, National Grid remains bound by the terms of this consent order.

Non-MGP contamination was also found in soil vapor samples, for which National Grid is not responsible. There is currently insufficient data to conclusively determine whether this site is the source of the chlorinated organic compounds identified.

On-site and off-site contamination unrelated to the former MGP activities identified during the environmental investigations will be addressed separately by the NYSDEC. The responsible party, in accordance with the Order on Consent, is not responsible for non-MGP related

contamination.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminants of concern identified for this Operable Unit at this site are:

coal tar	benzene, toluene, ethylbenzene and xylenes
polycyclic aromatic hydrocarbons	(BTEX)
(PAHS), total	tetrachloroethene (PCE)

Based on the investigation results, comparison to the SCGs, and the potential public health and environmental exposure routes, certain media and areas of the site required remediation. These media were addressed by the IRM(s) described in Section 6.2. More complete information can be found in the RI Report and the IRM Construction Completion Report.

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

Interim Remedial Measure

In 2017 several interim remedial measures were implemented to address coal tar contamination at the site.

Soil Excavation

Excavation was implemented at the site to remove accessible coal tar saturated soils. In general, excavation was targeted for areas where significant shallow contamination was observed during the RI. The goal was to remove contamination that was present within the top fifteen feet of the ground surface. Three areas were initially identified for removal as shown on Figure 4. However, “Area 2” was not excavated as planned. (See note 4 in Figure 4)

"Area 1" consisted of three discrete locations (1A, 1B, 1C) associated with the northwest gas holder and cistern areas. Excavation was completed to approximately fifteen feet at each location for a total removal of approximately 429 cubic yards of impacted soil.

"Area 3" is located in the former southern gas holder. This area is also where numerous fuel oil tanks had existed historically. Contamination in this area was identified in the upper fifteen feet and included soil saturated with coal tar and petroleum. Approximately 823 cubic yards of soil

was removed. In addition, about 16,000 pounds of gypsum was amended with the clean soil used to backfill the area to enhance future degradation of remaining impacted soils at the site.

Gypsum Injections

Anaerobic oxidation of contaminant source material was completed using injections of gypsum slurry. The gypsum stimulates the existing bacteria to accelerate the degradation of petroleum and MGP related contaminants. The gypsum was injected at 58 locations over an area of approximately 15,000 square feet. The treatment depth was from approximately seven feet to 15 feet below grade over the treatment area. In total approximately 58,500 pounds of gypsum was injected to the treatment area. (See Figure 3). Groundwater monitoring will be completed during Site Management to assess degradation of the contamination.

A detailed description of the IRMs can be found in the site's May 2018 IRM Construction Completion report.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.
Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU 01.

Nature and Extent of Contamination:

Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs) and pesticides. Based upon investigations conducted to date, the primary contaminant of concern is coal tar and its associated compounds including benzene, toluene, ethylbenzenes, and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs).

Soil - Coal tar impacts have caused exceedances of both unrestricted soil cleanup objectives (SCOs) and restricted residential SCOs. Coal tar impacts were observed in areas generally within the footprint of the former MGP operations and areas located directly downgradient of those operations. Coal tar saturated or coated soil was not observed within the first five feet below ground surface (bgs) in any of the soil borings. Several soil borings contained MGP coal tar saturated soil within the first fifteen feet bgs, with most of the heavy soil contamination being observed at depths greater than fifteen feet across the site. Coal tar impacted soil within the first fifteen feet bgs was removed during the IRMs discussed in Section 6.2.

BTEX and PAH compounds were generally detected in soil samples that corresponded with areas of visual coal tar and petroleum hydrocarbon impacts. The highest levels of BTEX and PAHs were observed in a sample collected from soil boring SB-9, at the 72-73.5-foot interval. This sample contained 1,629 parts per million (ppm) of total BTEX with concentrations of

benzene at 19 ppm, toluene at 550 ppm, ethylbenzene at 320 ppm and xylene at 740 ppm. These concentrations exceed the restricted residential use SCOs of 4.8 ppm, 100 ppm, 41 ppm and 100 ppm, respectively for the compounds. The same depth interval in SB-9 contained 6,046 ppm of total PAHs, which exceeds the 500 ppm SCO guideline for total PAHs. Some of the most frequently detected PAHs included chrysene at a maximum concentration of 260 ppm, benzo(a)pyrene at a maximum concentration of 330 ppm and indeno(1,2,3-cd)pyrene at 200 ppm. Coal tar contamination has not been observed to have migrated off-site in soil.

Groundwater - Coal tar and petroleum hydrocarbon impacts were detected in groundwater during the RI at concentrations above groundwater quality standards (GWQS). The highest BTEX and PAH concentrations in groundwater were detected in MW-5 and MW-11, each screened from 30 to 40 ft bgs. Pre-IRM, MW-5 had total BTEX and PAH concentrations of 25,000 parts per billion (ppb) and 12,000 ppb, respectively. Pre-IRM, MW-11 had total BTEX and PAH concentrations of 2,160 and 8,500 ppb respectively. Both wells are located near historic MGP structures including the former gas holders and tar tank. Pre-IRM maximum concentrations of BTEX detected in groundwater were benzene at 6,800 ppb (GWQS of 1 ppb), toluene at 10,000 ppb (GWQS of 5 ppb), ethylbenzene at 5,300 ppb (GWQS of 5 ppb) and xylene at 2,900 ppb (GWQS of 5 ppb). Naphthalene (GWQS of 10 ppb) and acenaphthene (GWQS of 20 ppb) were the primary PAHs detected in groundwater, with maximum detections of 12,000 ppb and 450 ppb, respectively. Groundwater samples were collected post-IRM and observed significant increases in sulfate concentrations across the site. This will promote future anaerobic oxidation of remaining contamination in groundwater.

Concentrations of BTEX and PAHs at the Lot 1 northern boundary persist only at depth and are associated with the deeper tar-related impacts encountered in the upgradient SB-9 area. Groundwater contamination likely extends off-site to the north, as indicated on Figure 6, but the well across Neptune Avenue, (MW-20), indicates that groundwater contamination does not appear to go beyond this street. Groundwater impacts do extend to the south but have not been detected outside of OU-2 (northeast corner of Lot 25).

Soil Vapor and Indoor Air – Concurrent sub-slab, indoor air and outdoor ambient air samples were collected within the former strip mall in 2010. Sub-slab air samples were collected from three of the tenant spaces with an indoor air sample collected from seven of the tenant spaces. MGP related contaminants were detected in the sub-slab vapor samples, but indoor air samples did not show concentrations of MGP-related contaminants above typical background levels. A non-MGP contaminant, tetrachloroethene (PCE), was detected above background indoor air concentrations in two of the strip mall stores, which may be attributed to a dry cleaner in the former plaza. PCE was detected at a maximum concentration of 606,000 micrograms per cubic meter (ug/m^3) in sub-slab soil vapor sample SSSV-6. The maximum concentration of PCE detected in the indoor air of the shopping plaza was 18 ug/m^3. The former shopping plaza was demolished in 2016 and a new building was recently constructed which included a vapor barrier.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People who dig below the ground surface may come into contact with contaminants in subsurface soil and groundwater. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in soil vapor (air spaces within the soil) may move into buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The potential exists for the inhalation of site contaminants due to soil vapor intrusion for both on- and off-site structures and for any future redevelopment.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or

impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: SUMMARY OF PROPOSED REMEDY

Based on the results of the investigations at the site, the IRMs that have been performed, and the evaluation presented here; the Department is proposing No Further Action with the implementation of engineering and institutional controls as the proposed remedy for the site. The Department believes that this remedy is protective of human health and the environment and satisfies the remediation objectives described in Section 6.5 of this PRAP. The elements of the IRM already completed are discussed in Section 6.2 of this PRAP, while the institutional and engineering controls are listed below:

1. Cover System

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for restricted residential use of the site. Any site redevelopment will maintain the existing site cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper two feet of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for restricted residential use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

2. Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for restricted residential, commercial use or industrial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH;
- require compliance with the Department approved Site Management Plan.

3. Site Management Plan

A Site Management Plan is required, which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 2 above.

Engineering Controls: The cover system discussed in Paragraph 1 above.

This Institutional and Engineering Control Plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible. The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan approved by the Department. Based on the investigation results and the Department determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment. This includes areas under existing buildings on OU1;

- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

- a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings developed on the site including provision for implementing actions recommended to address exposures related to soil vapor intrusion;

- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 1 above will be placed in any areas where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);

- a provision for future excavation and remediation of area 2, described above in Section 6.2, Interim Remedial Measure, if the area becomes accessible in the future;

- provisions for the management and inspection of the identified engineering controls;

- maintaining site access controls and Department notification; and

- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of groundwater to assess the performance and effectiveness of the remedy;

- monitoring for vapor intrusion for any new buildings developed on the site as may be required by the Institutional and Engineering Control Plan discussed above; and

- a schedule of monitoring and frequency of submittals to the Department.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants of concern at the site are coal tar, PAHs BTEX and PCE compounds. For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and are impacting groundwater and soil.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium.

The Waste and Source areas identified at the site were observed in areas corresponding with the footprint of the former MGP and in areas directly adjacent to those operations. Data collected during the remedial investigation indicates that the primary contaminants of concern include MGP related coal tar and its associated compounds (PAHs and BTEX). Soil saturated with coal tar was observed near and/or within historic structures including the former gas holders, the cistern and the tar tank. Figure 5 shows the limits of the area where source material was observed during the RI. As discussed in Section 6.2, IRMs were implemented in 2017 to address the source areas that were accessible within the top fifteen feet from the ground surface. Contamination was removed from several discrete areas where coal tar saturated soil was observed in the top 15 feet, and in-situ oxidation was utilized to treat a larger area of source material that remained. See Figures 3 and 4 for IRM areas.

Groundwater

During the RI, groundwater samples were collected from 20 monitoring wells to determine the nature and extent of contamination in the groundwater. Five of the wells were temporary monitoring points and fifteen were permanent wells. The wells are all screened in the overburden water table, to depths ranging from 16 to 103 feet below ground surface (bgs). The wells were located in areas that allowed for an assessment of dissolved phase groundwater contamination. 17 of the wells are located onsite (3 within the footprint of former MGP) and 3 wells were installed off-site to assess contaminant migration. MGP related coal tar was observed in two of the onsite monitoring wells, MW-5 and MW-11.

Figure 6 depicts the well locations and concentrations of the BTEX groundwater plume. Contaminated groundwater has likely migrated off-site to the north under Neptune Avenue. However, contamination was not observed in the downgradient monitoring well, MW-20, located across Neptune Avenue.

As indicated in Table 1, the SCGs for the contaminants of concern were exceeded in groundwater across the site. The most impacted well was MW-5, which is located just downgradient of the former MGP gas holders. High levels of contaminants were also observed in well MW-11. Both wells are screened at depths from 30 to 40 feet deep.

Table #1 – Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Benzene	ND – 6,800	1	11 of 20
Ethylbenzene	ND – 5,300	5	10 of 20
Toluene	ND – 10,000	5	8 of 20
Xylene	ND – 2,900	5	11 of 20
SVOCs			
Naphthalene	ND – 12,000	10	13 of 20
Acenaphthene	ND - 450	20	6 of 20
Benzo(a)anthracene	ND - 2.8	.002	4 of 20
Benzo(b)fluoranthene	ND – 1.6	.002	3 of 20
Phenanthrene	ND - 96	50	2 of 20
1,1'- Biphenyl	ND - 28	5	2 of 20

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

The in-situ oxidation IRM that was implemented will provide a stable source of sulfate over time to enhance the degradation of dissolved phase MGP contamination existing at the site. Groundwater samples taken from on-site wells following the IRM confirmed significant increases in sulfate concentrations across the site, which will promote future anaerobic degradation of remaining groundwater contamination. The IRM, combined with institutional controls, is expected to meet the site's cleanup objectives for groundwater by reducing future contaminant concentrations and limiting the potential for exposure to contaminated groundwater. Groundwater monitoring will be performed to evaluate the effectiveness of this IRM over time.

Soil

There were no surface soil samples collected during the RI since the entire site is either paved or covered by structures. During the RI, a total of 32 soil borings were advanced and 26 soil samples were collected to evaluate subsurface soil conditions. Borings were installed to depths ranging from 15 to 115 feet bgs, using both direct push and sonic drilling techniques. The cores were continuously sampled and logged for soil classification types.

Figure 7 shows the locations of the soil borings and summarizes the sampling results for SVOC exceedances at various depths across the site. The results of the sampling indicated that MGP related contamination (PAHs, BTEX) are present in subsurface soil. The contamination is present in the source areas (holders, cistern, tar tank) within the footprint of the former MGP and has migrated to adjacent areas. The highest concentrations were detected in soil boring SB-9 in the 72-73 ft depth interval. This boring is located north of the MGP under the parking lot area of the former shopping center. Significant contamination was also detected in soil boring SB-22 in the 33-34 ft interval. This boring is located just south of the former MGP operations on OU-2.

Table 2 summarizes the results for the subsurface soil samples that were collected during the RI. It should be noted that MGP contamination in soil is readily identifiable visually. Therefore, it was not necessary to submit samples for laboratory analysis in the instances where grossly contaminated soil was encountered. As such, Table 2 understates the extent of soil contamination at the site. MGP related coal tar was visually identified across the site at depths ranging from 5 to 73 feet bgs.

Table #2 – Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
VOCs					
Benzene	ND - 19	0.06	1 of 26	4.8	1 of 26
Ethylbenzene	ND - 320	1	3 of 26	41	3 of 26
Toluene	ND - 550	0.7	2 of 26	100	2 of 26
Xylene	ND - 740	0.26	3 of 26	100	3 of 26
SVOCs					
Naphthalene	ND - 94	12	2 of 26	100	2 of 26
Acenaphthylene	ND - 450	100	1 of 26	100	1 of 26
Acenaphthene	ND - 160	20	2 of 26	100	1 of 26
Fluorene	ND - 320	30	2 of 26	100	1 of 26
Phenathrene	ND – 1,600	100	2 of 26	100	2 of 26
Anthracene	ND - 320	100	1 of 26	100	1 of 26
Fluoranthene	ND - 660	100	2 of 26	100	2 of 26

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Pyrene	ND - 880	100	3 of 26	100	3 of 26
Benzo(a)anthracene	ND - 300	1	16 of 26	1	16 of 26
Chrysene	ND - 260	1	17 of 26	3.9	17 of 26
Benzo(b)fluoranthene	ND - 240	1	18 of 26	1	18 of 26
Benzo(k)fluoranthene	ND - 81	0.8	13 of 26	3.9	13 of 26
Benzo(a)pyrene	ND - 330	1	18 of 26	1	18 of 26
Indeno(1,2,3-cd)pyrene	ND - 200	0.5	21 of 26	0.5	21 of 26
Dibenz(a,h)anthracene	ND - 49	0.33	17 of 26	0.33	17 of 26
Benzo(g,h,i)perylene	ND - 240	100	1 of 26	100	1 of 26

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Restricted Residential Use.

The excavation IRMs addressed MGP contaminant source areas that were identified within the top fifteen feet at the site. The IRM, combined with an engineering control in the form of an existing cover system, will limit human health exposures to contamination remaining at the site. Additionally, institutional controls (ICs) will be placed on the site in the form of an environmental easement which will place restrictions on the future site usage. Future site ground intrusive activities, including those below the demarcation barrier, will be managed by a Site Management Plan. ICs will also be documented in the SMP to address the potential for future excavation activities at the site.

Soil Vapor

The soil vapor intrusion pathway was assessed due to the presence of contamination in the site's soil and groundwater. This was achieved by the collection of sub-slab and indoor air samples at seven tenant spaces in the former shopping plaza in 2010. The locations of the samples are shown on Figure 8. MGP related contaminants were generally detected at low level concentrations in the sub-slab soil vapor at the site with the highest concentration being benzene which was detected at 114 ug/m^3 in SSSV-1 collected from the former martial arts studio tenant space. MGP contaminants were not detected in the indoor air samples at concentrations above typical background levels. This shopping center has since been demolished. During the RI, four soil vapor points were also installed and sampled from areas across the site. Toluene, a potential MGP related contaminant, was detected in soil vapor points SV-1 and SV-2. There were no MGP related contaminants present in the other two samples.

Non-MGP contaminants were detected in the soil vapor samples collected at the site. The contaminant, PCE, was detected at a maximum concentration of 606,000 micrograms per cubic meter (ug/m^3) in sub-slab soil vapor sample SSSV-6 collected from the former pharmacy in the strip mall. The maximum concentration of PCE detected in the indoor air of the shopping plaza was 18 ug/m^3. The building where these samples were collected has since been demolished, and the property owner is currently developing the site for commercial and restricted residential use and has installed a vapor barrier in the new building. Non MGP contaminants identified during the environmental investigations will be addressed separately by the NYSDEC.

No off-site soil vapor intrusion sampling was determined necessary.

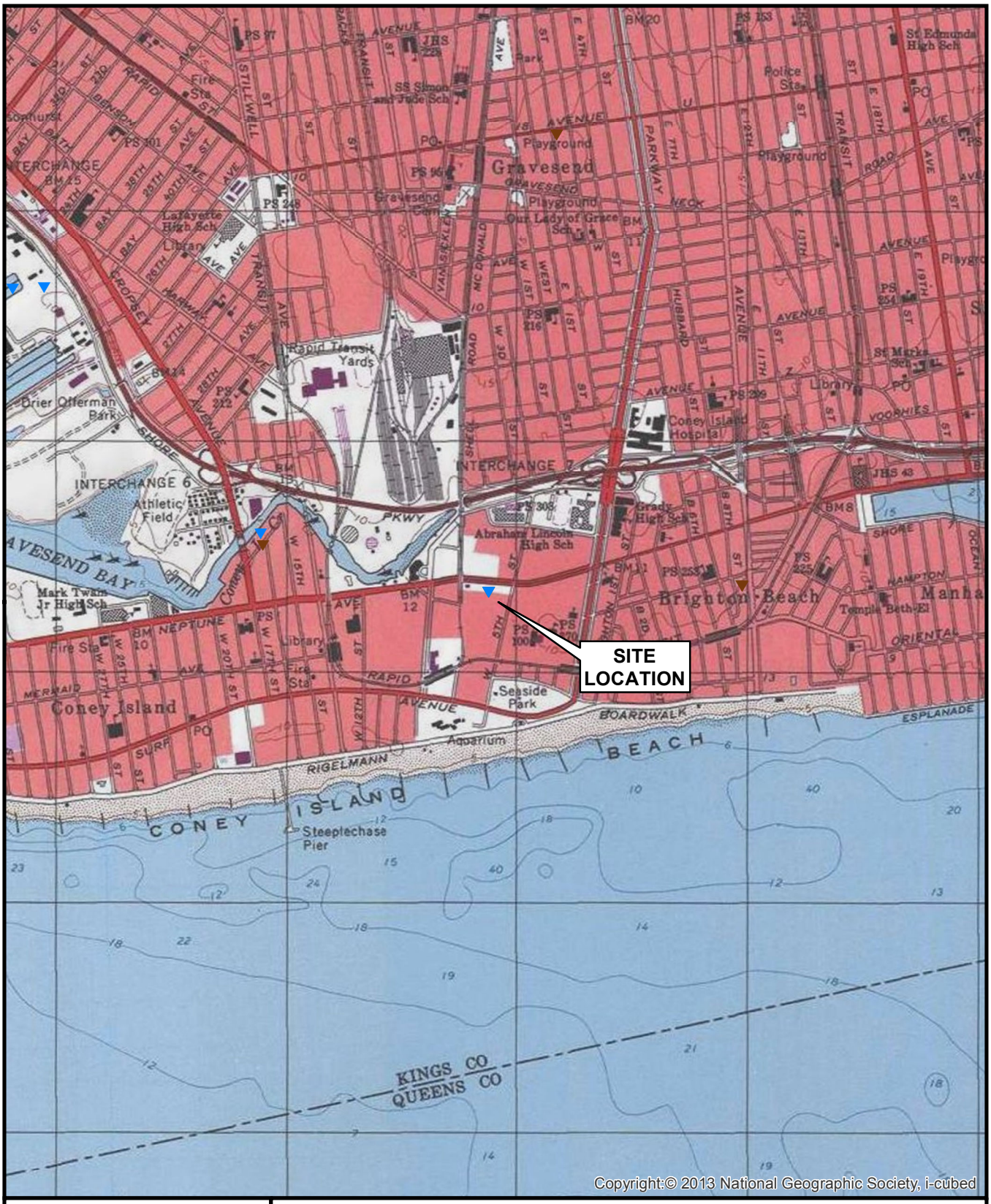

Figure 1

Site Location Map

Former Dangman Park MGP Site
Brooklyn
Site No. 224047

DEPARTMENT OF ENVIRONMENTAL CONSERVATION • NEW YORK STATE •

Dangman Park MGP Site (224047)
486 Neptune Avenue, Brooklyn, NY
Figure 2 - Site Boundary

80 40 0 80 Meters

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation

NOTES:

1. TEMPORARY MONITORING WELL, GYPSUM SLURRY INJECTION, AND POST-GYPSUM INJECTION SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF FORMER MGP FEATURES ARE APPROXIMATE.
3. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
4. IN-SITU TREATMENT LOCATIONS ARE THE INJECTION LOCATIONS (IP-1A THROUGH IP-7D) WHERE GYPSUM SLURRY WAS INJECTED AND EXCAVATION AREA 3 WHERE THE BACKFILL WAS AMENDED WITH GYPSUM. ALL WORK WAS CONDUCTED IN 2017.

NATIONAL GRID
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK

IN-SITU TREATMENT LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

LOT 1R

CISTERN (1906)

1A

1B

1C

EXCAVATION AREA 1

CONC. CURB

CONC. WALK

WEST 5TH STREET

PURIFYING HOUSE (1895)

FORMER SHOPPING CENTER BUILDING

GAS HOLDER (1906)

TAR TANK (1895)

GENERATING HOUSE (1895)

OIL TANK

EXCAVATION AREA 3
BACKFILL AMENDED WITH GYPSUM

IRM-13

IRM-14

IRM-15

ASPHALT DRIVE

CONC. CURB

STORAGE

RETORT HOUSE (1895)

OU-1

OU-2

LOT 25

AREA 2
DEMARCATION LAYER PLACED
(SEE NOTE 4)

FORMER SHEEPSHEAD BAY ROAD

ASPHALT DRIVE

LEGEND:

- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 1R
- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 25
- APPROXIMATE FORMER MGP SITE BOUNDARY
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS)
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS) ADJUSTED BASED ON FIELD OBSERVATIONS OF POTENTIAL GAS HOLDER WALL DURING THE SUPPLEMENTAL REMEDIAL INVESTIGATION
- EXCAVATION AREA BOUNDARY
- DEMARCATION LAYER BOUNDARY
- EXCAVATION IRM SOIL BORING LOCATION (ARCADIS 2017)

EXCAVATION QUANTITIES		
Excavation Area ID	Excavation Surface AREA (SQUARE FEET)	Excavation Volume (CUBIC YARDS)
Area 1A	226	124
Area 1B	294	175
Area 1C	215	130
Area 3	1,445	823
Totals	2,180	1,252

TABLE NOTES:

1. THE TARGET EXCAVATION DEPTH OF 15 FT BELOW LAND SURFACE (BLS) WAS ACHIEVED (OR EXCEEDED) AT EACH IRM EXCAVATION AREA, EXCEPT IN THE SOUTHWEST CORNER OF AREA 1B WHERE THE FINAL DEPTH WAS 14.9 FT BLS BECAUSE OF A CONCRETE OBSTRUCTION THAT EXTENDED DEEPER THAN 16.5 FT BLS.
2. THE APPROXIMATE LOCATION OF THE OBSTRUCTION AND THE EXCAVATION ELEVATIONS ARE SHOWN ON THE AS-BUILT SURVEY DRAWING (CCR APPENDIX I).

0 20' 40'
APPROXIMATE SCALE IN FEET

NOTES:

1. HORIZONTAL LIMITS OF THE EXCAVATION IRM AREAS AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF FORMER MGP FEATURES ARE APPROXIMATE.
3. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
4. Excavation was not completed from Area 2 due to access and feasibility constraints. An orange, high-density polyethylene demarcation layer was placed within Area 2 to help alert future workers of underlying MGP related impacts.

NATIONAL GRID
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK

HORIZONTAL LIMITS OF EXCAVATION IRM

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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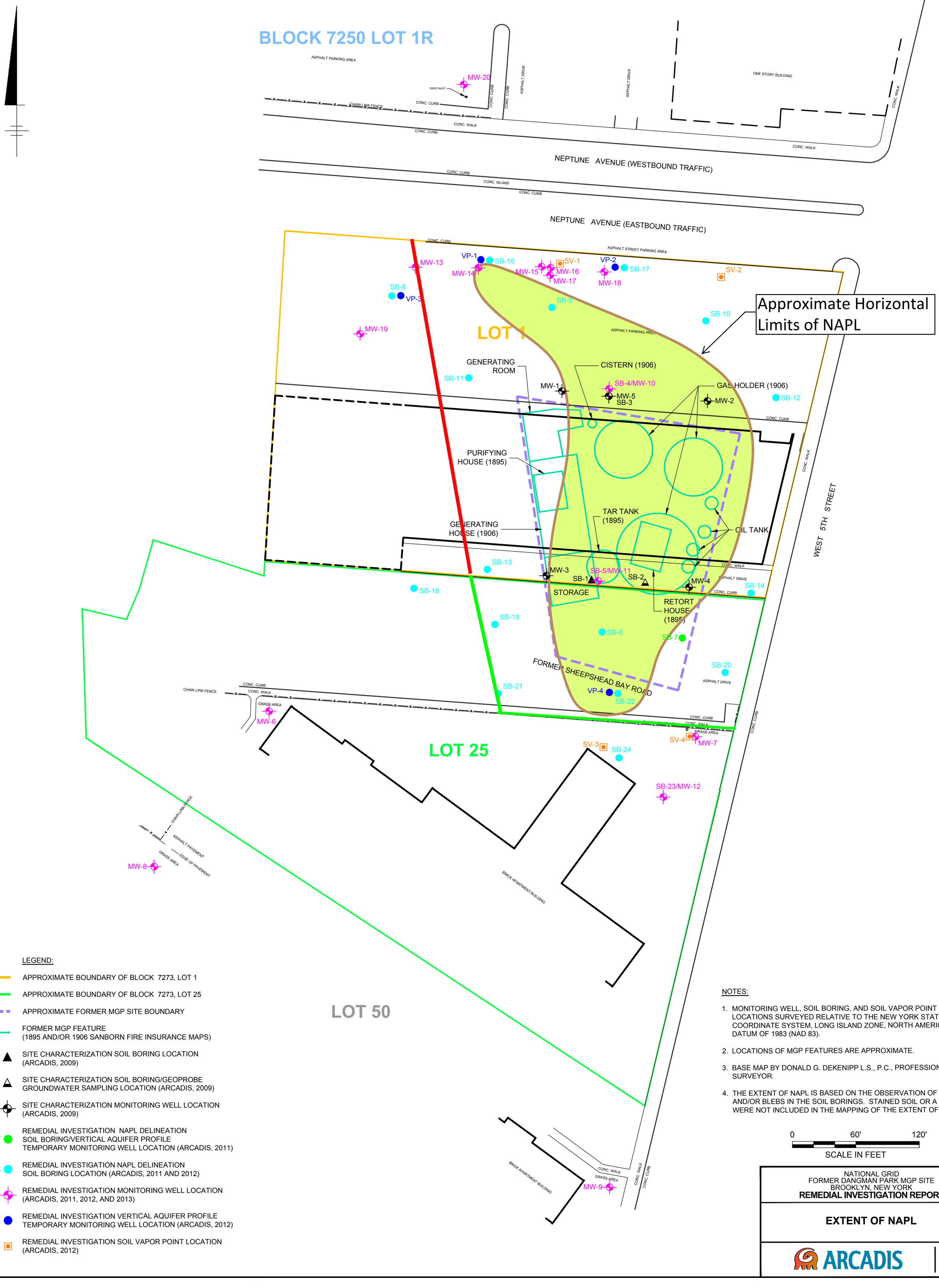
Xref_02
Xref_01



LEGEND:

- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 1
- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 25
- APPROXIMATE FORMER MGP SITE BOUNDARY
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS)
- SB-1 ▲ SITE CHARACTERIZATION SOIL BORING LOCATION (ARCADIS, 2009)
- SB-2 △ SITE CHARACTERIZATION SOIL BORING/GEOPROBE GROUNDWATER SAMPLING LOCATION (ARCADIS, 2009)
- MW-1 ⊕ SITE CHARACTERIZATION MONITORING WELL LOCATION (ARCADIS, 2009)
- SB-7 ● REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING/VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2011)
- SB-8 ● REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING LOCATION (ARCADIS, 2011 AND 2012)
- MW-6 ⊕ REMEDIAL INVESTIGATION MONITORING WELL LOCATION (ARCADIS, 2011, 2012, AND 2013)
- VP-1 ● REMEDIAL INVESTIGATION VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2012)
- SV-1 ◙ REMEDIAL INVESTIGATION SOIL VAPOR POINT LOCATION (ARCADIS, 2012)

NOTES:

1. MONITORING WELL, SOIL BORING, AND SOIL VAPOR POINT LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF MGP FEATURES ARE APPROXIMATE.
3. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
4. THE EXTENT OF NAPL IS BASED ON THE OBSERVATION OF TAR AND/OR BLEBS IN THE SOIL BORINGS. STAINED SOIL OR A SHEEN WERE NOT INCLUDED IN THE MAPPING OF THE EXTENT OF NAPL.

0 60' 120'
SCALE IN FEET

NATIONAL GRID
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK
REMEDIAL INVESTIGATION REPORT

EXTENT OF NAPL

ARCADIS

FIGURE 5

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0036704\0001\00414\B36704_B02 11-13.dwg LAYOUT: 11 SAVED: 6/6/2014 11:27 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 6/9/2014 12:40 PM BY: SANCHEZ, ADRIAN
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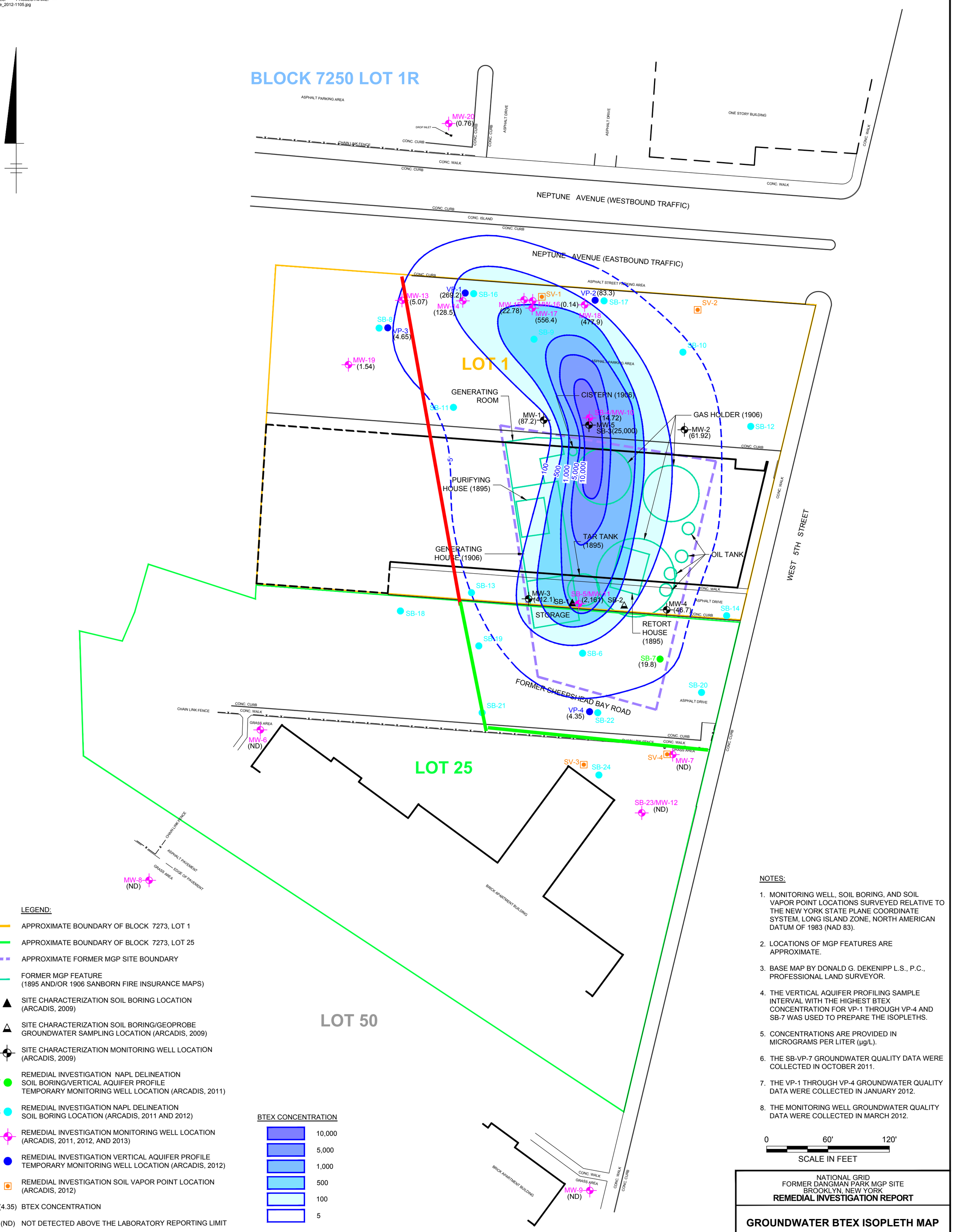
Xref_01



LEGEND:

- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 1
- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 25
- APPROXIMATE FORMER MGP SITE BOUNDARY
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS)
- SB-1 SITE CHARACTERIZATION SOIL BORING LOCATION (ARCADIS, 2009)
- SB-2 SITE CHARACTERIZATION SOIL BORING/GEOPROBE GROUNDWATER SAMPLING LOCATION (ARCADIS, 2009)
- MW-1 SITE CHARACTERIZATION MONITORING WELL LOCATION (ARCADIS, 2009)
- SB-7 REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING/VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2011)
- SB-8 REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING LOCATION (ARCADIS, 2011 AND 2012)
- MW-6 REMEDIAL INVESTIGATION MONITORING WELL LOCATION (ARCADIS, 2011, 2012, AND 2013)
- VP-1 REMEDIAL INVESTIGATION VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2012)
- SV-1 REMEDIAL INVESTIGATION SOIL VAPOR POINT LOCATION (ARCADIS, 2012)
- (4.35) BTEX CONCENTRATION
- (ND) NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT

BTEX CONCENTRATION

- 10,000
- 5,000
- 1,000
- 500
- 100
- 5

NOTES:

1. MONITORING WELL, SOIL BORING, AND SOIL VAPOR POINT LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF MGP FEATURES ARE APPROXIMATE.
3. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
4. THE VERTICAL AQUIFER PROFILING SAMPLE INTERVAL WITH THE HIGHEST BTEX CONCENTRATION FOR VP-1 THROUGH VP-4 AND SB-7 WAS USED TO PREPARE THE ISOPLETHS.
5. CONCENTRATIONS ARE PROVIDED IN MICROGRAMS PER LITER (µg/L).
6. THE SB-VP-7 GROUNDWATER QUALITY DATA WERE COLLECTED IN OCTOBER 2011.
7. THE VP-1 THROUGH VP-4 GROUNDWATER QUALITY DATA WERE COLLECTED IN JANUARY 2012.
8. THE MONITORING WELL GROUNDWATER QUALITY DATA WERE COLLECTED IN MARCH 2012.

0 60' 120'

SCALE IN FEET

NATIONAL GRID
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK
REMEDIAL INVESTIGATION REPORT

GROUNDWATER BTEX ISOPLETH MAP

ARCADIS

FIGURE 6

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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BLOCK 7250 LOT 1R

LOT 1

LOT 25

LOT 50

SB-8	
Sample ID	SB-8 (2-3')
Sample Date	12/8/2011
Sample Depth (ft)	2 - 3
Compound	
Benzo[a]anthracene	1,600
Chrysene	1,800
Benzo[b]fluoranthene	2,200
Benzo[k]fluoranthene	900
Benzo[a]pyrene	2,000
Indeno[1,2,3-cd]pyrene	1,400
Dibenz(a,h)anthracene	420

SB-16	
Sample ID	SB-16 (2-3')
Sample Date	12/14/2011
Sample Depth (ft)	2 - 3
Compound	
Benzo[b]fluoranthene	1,100
Indeno[1,2,3-cd]pyrene	560

MW-17	
Sample ID	MW-17 (7-9')
Sample Date	2/15/2012
Sample Depth (ft)	7 - 9
Compound	
Benzo[a]anthracene	9,800
Chrysene	9,600
Benzo[b]fluoranthene	5,800
Benzo[k]fluoranthene	2,300
Benzo[a]pyrene	7,800
Indeno[1,2,3-cd]pyrene	3,600
Dibenz(a,h)anthracene	720

SB-17	
Sample ID	SB-17 (2-3')
Sample Date	12/9/2011
Sample Depth (ft)	2 - 3
Compound	
Benzo[a]anthracene	4,900
Chrysene	5,100
Benzo[b]fluoranthene	4,000
Benzo[k]fluoranthene	1,900
Benzo[a]pyrene	3,800
Indeno[1,2,3-cd]pyrene	2,800
Dibenz(a,h)anthracene	750

MW-19		
Sample ID	MW-19 (2-3')	MW-19 (5-7')
Sample Date	2/20/2012	2/20/2012
Sample Depth (ft)	2 - 3	5 - 7
Compound		
Benzo[a]anthracene	2,200	2,500
Chrysene	2,500	2,700
Benzo[b]fluoranthene	2,300	2,400
Benzo[k]fluoranthene	900	960
Benzo[a]pyrene	2,100	2,900
Indeno[1,2,3-cd]pyrene	1,600	2,200
Dibenz(a,h)anthracene	400	520

SB-10	
Sample ID	SB-10 (2-3')
Sample Date	12/12/2011
Sample Depth (ft)	2 - 3
Compound	
Indeno[1,2,3-cd]pyrene	650 J

SB-11		
Sample ID	SB-11 (2-3')	SB-11 (6-8')
Sample Date	12/6/2011	12/6/2011
Sample Depth (ft)	2 - 3	6 - 8
Compound		
Benzo[a]anthracene	7,600	- -
Chrysene	8,400	- -
Benzo[b]fluoranthene	10,000	- -
Benzo[k]fluoranthene	4,800	- -
Benzo[a]pyrene	8,800	- -
Indeno[1,2,3-cd]pyrene	6,300	8,200
Dibenz(a,h)anthracene	1,700	620

SB-12	
Sample ID	SB-12 (2-3')
Sample Date	12/13/2011
Sample Depth (ft)	2 - 3
Compound	
Benzo[a]anthracene	1,900
Chrysene	2,600
Benzo[b]fluoranthene	1,800
Benzo[a]pyrene	1,800 J
Indeno[1,2,3-cd]pyrene	1,300

SB-9			
Sample ID	SB-9 (2-3')	SB-9 (6-8')	SB-9 (72-73.5')
Sample Date	12/7/2011	12/7/2011	12/8/2011
Sample Depth (ft)	2 - 3	6 - 8	72 - 73.5
Compound			
Naphthalene	- -	- -	71,000 J
Acenaphthylene	- -	- -	450,000 J
Acenaphthene	- -	- -	45,000 J
Fluorene	- -	- -	320,000 J
Phenanthrene	- -	- -	1,600,000 J
Anthracene	- -	- -	320,000 J
Fluoranthene	- -	- -	660,000 J
Pyrene	- -	- -	880,000 J
Benzo[a]anthracene	11,000	- -	300,000 J
Chrysene	12,000	2,000	260,000 J
Benzo[b]fluoranthene	15,000	1,600	240,000 J
Benzo[k]fluoranthene	7,500	- -	81,000 J
Benzo[a]pyrene	13,000	6,300	330,000 J
Indeno[1,2,3-cd]pyrene	10,000	6,300	200,000 J
Dibenz(a,h)anthracene	2,800	940	49,000 J
Benzo[g,h,i]perylene	- -	- -	240,000 J

SB-7	
Sample ID	SB-7 (6-8')
Sample Date	10/18/2011
Sample Depth (ft)	6 - 8
Compound	
Benzo[a]anthracene	1,500
Chrysene	2,200
Benzo[b]fluoranthene	1,900
Benzo[a]pyrene	3,400
Indeno[1,2,3-cd]pyrene	3,700
Dibenz(a,h)anthracene	480

SB-13			
Sample ID	SB-13 (2-3')	Dup103111	SB-13 (6-8')
Sample Date	10/31/2011	10/31/2011	10/31/2011
Sample Depth (ft)	2 - 3	2 - 3	6 - 8
Compound			
Benzo[a]anthracene	5,500	5,500	- -
Chrysene	6,600	5,900	- -
Benzo[b]fluoranthene	6,600	6,600	- -
Benzo[k]fluoranthene	2,600	2,600	- -
Benzo[a]pyrene	6,300	6,200	1,800
Indeno[1,2,3-cd]pyrene	5,500	5,400	2,100
Dibenz(a,h)anthracene	1,200	1,200	- -

SB-6		
Sample ID	SB-6 (2-3')	SB-6 (43-45')
Sample Date	10/17/2011	10/17/2011
Sample Depth (ft)	2 - 3	43 - 45
Compound		
Pyrene	140,000 J	- -
Benzo[a]anthracene	61,000 J	6,200 J
Chrysene	75,000 J	5,900 J
Benzo[b]fluoranthene	46,000 J	4,000 J
Benzo[k]fluoranthene	20,000 J	1,700 J
Benzo[a]pyrene	31,000 J	5,600 J
Indeno[1,2,3-cd]pyrene	35,000 J	2,200 J
Dibenz(a,h)anthracene	9,600 J	490 J

SB-19	
Sample ID	SB-19 (2-3')
Sample Date	12/15/2011
Sample Depth (ft)	2 - 3
Compound	
Benzo[a]anthracene	3,500
Chrysene	4,200
Benzo[b]fluoranthene	4,100
Benzo[k]fluoranthene	1,500
Benzo[a]pyrene	3,800
Indeno[1,2,3-cd]pyrene	2,500
Dibenz(a,h)anthracene	640

SB-22	
Sample ID	SB-22 (33-34')
Sample Date	1/19/2012
Sample Depth (ft)	33 - 34
Compound	
Naphthalene	94,000 J
Acenaphthene	160,000 J
Fluorene	69,000 J
Phenanthrene	330,000 J
Fluoranthene	120,000 J
Pyrene	190,000 J
Benzo[a]anthracene	59,000 J
Chrysene	47,000 J
Benzo[b]fluoranthene	33,000 J
Benzo[k]fluoranthene	13,000 J
Benzo[a]pyrene	44,000 J
Indeno[1,2,3-cd]pyrene	21,000 J
Dibenz(a,h)anthracene	3,300 J

LEGEND:

- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 1
- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 25
- APPROXIMATE FORMER MGP SITE BOUNDARY
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS)
- SB-1 ▲ SITE CHARACTERIZATION SOIL BORING LOCATION (ARCADIS, 2009)
- SB-2 △ SITE CHARACTERIZATION SOIL BORING/GEOPROBE GROUNDWATER SAMPLING LOCATION (ARCADIS, 2009)
- MW-1 SITE CHARACTERIZATION MONITORING WELL LOCATION (ARCADIS, 2009)
- SB-7 REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING/VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2011)
- SB-8 REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING LOCATION (ARCADIS, 2011 AND 2012)
- MW-6 REMEDIAL INVESTIGATION MONITORING WELL LOCATION (ARCADIS, 2011, 2012, AND 2013)
- VP-1 REMEDIAL INVESTIGATION VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2012)
- SV-1 REMEDIAL INVESTIGATION SOIL VAPOR POINT LOCATION (ARCADIS, 2012)
- **BOLD** COMPOUND CONCENTRATION EXCEEDS UNRESTRICTED USE SCO
- - - NO EXCEEDANCE
- SCO SOIL CLEANUP OBJECTIVE
- J ESTIMATED VALUE

NOTES:

1. MONITORING WELL, SOIL BORING, AND SOIL VAPOR POINT LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF MGP FEATURES ARE APPROXIMATE.
3. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
4. CONCENTRATIONS ARE PROVIDED IN MICROGRAMS PER KILOGRAM (µg/kg).

0 60' 120'
SCALE IN FEET

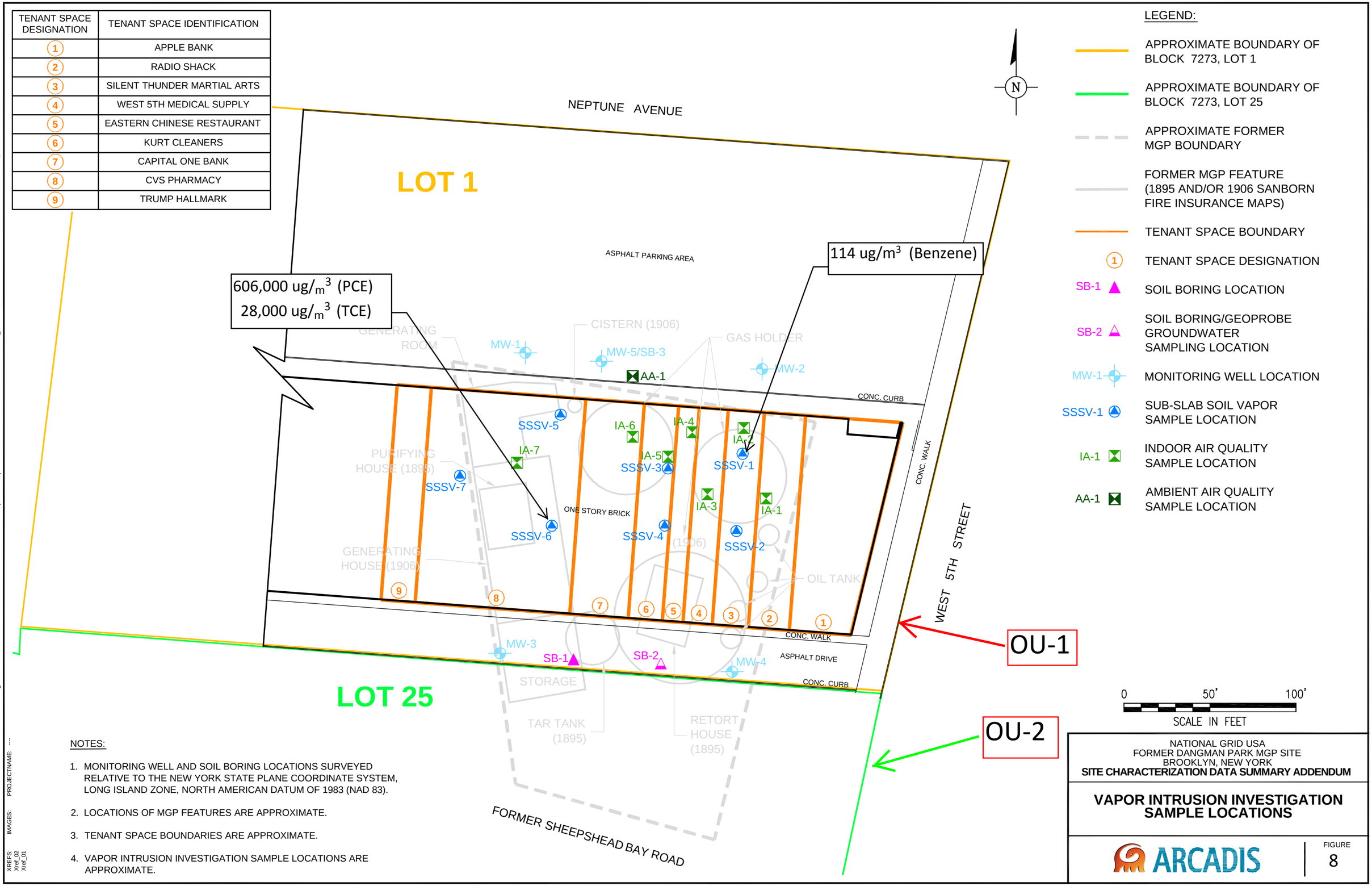
NATIONAL GRID
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK
REMEDIAL INVESTIGATION REPORT

SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING UNRESTRICTED USE SCOs

ARCADIS

FIGURE 7

TENANT SPACE DESIGNATION	TENANT SPACE IDENTIFICATION
1	APPLE BANK
2	RADIO SHACK
3	SILENT THUNDER MARTIAL ARTS
4	WEST 5TH MEDICAL SUPPLY
5	EASTERN CHINESE RESTAURANT
6	KURT CLEANERS
7	CAPITAL ONE BANK
8	CVS PHARMACY
9	TRUMP HALLMARK



LEGEND:

- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 1
- APPROXIMATE BOUNDARY OF BLOCK 7273, LOT 25
- APPROXIMATE FORMER MGP BOUNDARY
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS)
- TENANT SPACE BOUNDARY
- 1 TENANT SPACE DESIGNATION
- SB-1 SOIL BORING LOCATION
- SB-2 SOIL BORING/GEOPROBE GROUNDWATER SAMPLING LOCATION
- MW-1 MONITORING WELL LOCATION
- SSSV-1 SUB-SLAB SOIL VAPOR SAMPLE LOCATION
- IA-1 INDOOR AIR QUALITY SAMPLE LOCATION
- AA-1 AMBIENT AIR QUALITY SAMPLE LOCATION

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF MGP FEATURES ARE APPROXIMATE.
3. TENANT SPACE BOUNDARIES ARE APPROXIMATE.
4. VAPOR INTRUSION INVESTIGATION SAMPLE LOCATIONS ARE APPROXIMATE.

NATIONAL GRID USA
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK
SITE CHARACTERIZATION DATA SUMMARY ADDENDUM

VAPOR INTRUSION INVESTIGATION SAMPLE LOCATIONS

ARCADIS

FIGURE 8