RECORD OF DECISION

NM - Hill St. - Gloversville MGP
State Superfund Project
Gloversville, Fulton County
Site No. 518021
March 2019

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

DECLARATION STATEMENT - RECORD OF DECISION

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Statement of Purpose and Basis

This document presents the remedy for the NM - Hill St. - Gloversville MGP site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the 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 and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the NM - Hill St. - Gloversville MGP site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. A predesign investigation (PDI) work plan will be developed and implemented to further refine the nature and extent of contamination determined during remedial investigation and to facilitate the design of the remedy. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;

- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of contaminant source areas, including:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- concentrated solid or semi-solid hazardous substances per 6 NYCRR Part 375-1.2(au)(1);
- non-aqueous phase liquids;
- soil with visual waste material or non-aqueous phase liquid;
- soil containing total SVOCs exceeding 500 ppm; and
- soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Based on these criteria, the following areas will be excavated:

- Approximately 14,800 cubic yards (cy) of source material containing non-aqueous phase liquid (NAPL) identified above the silt layer approximately 14 feet below grade (fbg) in the area down gradient of the NAPL barrier wall and NAPL identified underneath the silt layer in the areas (GB-88 and GB-434) down gradient of the NAPL barrier wall;

- Approximately 3,000 cy of shallow purifier waste located along the eastern boundary of the service center area to an approximate depth of five feet;

- Shallow soil (to 2 feet below grade) located on-site but outside of the fenced service center area that exceeds residential SCOs; and

- Approximately 520 cy of soil to facilitate the construction of a permeable NAPL barrier wall.

- All off-site soils which exceed unrestricted SCOs, as defined by 6 NYCRR Part 375-6.8(a), will be excavated and transported off-site for disposal.

- For the protection of the ecological resources in southern area, soils in top 2 feet which exceed ecological SCOs as defined by 6 NYCRR Part 375-6.8(b), will be excavated and transported off-site for disposal.

The excavation in the ecological resources area will be backfilled with the clean fill material meeting the ecological SCOs specified in 6 NYCRR Part 375-6.8(b).

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for commercial use will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the site in the service center portion of the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for unrestricted use will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades in the off-site areas.

3. Cover System

A site cover will be required to allow for commercial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

4. Sediment and Bank Soils Removal

Excavation and off-site disposal of Cayadutta Creek sediments and bank soils located adjacent to and downstream of the site including soil or sediment:

- that is grossly contaminated, as defined in 6 NYCRR Part 375-1.2(u);
- that contains visual impacts of non-aqueous phase liquids, sheen or which produce a visible sheen when agitated in-situ;
- that are discolored and smell like coal tar;
- bank soils which exceed unrestricted use SCOs; and
- sediment impacted by site-related PAHs at concentrations greater than background levels.

Sediment will be accessed through the construction of a temporary diversion system to facilitate sediment removal and backfilling in a dry condition to the extent practicable. Approximately 1,300 cubic yards of sediment and bank soil will be excavated. The full extent of the removal will be determined based on the results of the pre-design investigation. The pre-remedial investigation shall extend to the section of the creek in the vicinity of the Harrison Street where the sheen was observed in the past. Excavated sediment will be processed on-site and larger materials (cobbles and boulders) will be cleaned for reuse in the river. Finer materials will be sent off-site for disposal.

In areas where the bedrock is exposed during excavation and visual coal tar is observed, the bedrock surface will be cleaned prior to backfilling.

Water generated by the sediment removal and/or sediment handling processes will be treated prior to discharge. Sediment removal will be conducted in a manner which minimizes and controls resuspension of sediments during dredging. The means of sediment removal will be determined during the remedial design phase.

Clean fill material placed in the Cayadutta Creek stream bed and the stream corridor area will meet the ecological SCOs specified in 6 NYCRR Part 375-6.8(b). Any demarcation layer placed along the stream and within the 100-year floodplain will be fully bio-degradable and will not contain plastic or a geomembrane.

5. Barrier Wall

A non-aqueous phase liquid (NAPL) barrier wall will be constructed perpendicular to groundwater flow in the northwest corner of the southern portion of the site to prevent off-site migration of NAPL to Cayadutta creek and to enable NAPL recovery to the extent practicable, as described below. The NAPL barrier will be keyed into the silt unit to intercept and collect mobile and non-aqueous phase liquid (NAPL), if present, in recovery wells. The pre-design investigation will provide details which will inform design of the wall.

6. Coal Tar NAPL (Non aqueous phase liquid) Recovery

Installation and operation of coal tar NAPL recovery wells in area southern portion of the service center area to remove potentially mobile NAPL and coal tar from the subsurface. The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy. Coal tar NAPL in excess of 6 inches will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of coal tar NAPL over extended time periods, they will be converted to automated collection.

7. Groundwater and Storm Water Collection and Treatment

The existing groundwater and stormwater collection and treatment systems will continue to be operated. If any component of the existing system is dismantled or disturbed to accommodate the construction of the remedy, those components will be restored for the remedy to be continually effective. Operation, maintenance and optimization of the system will be addressed in the Site Management Plan.

8. Restoration of Dredged/Excavation Areas

The bed, bank and floodplain of Cayadutta Creek will be restored following a habitat restoration plan developed during the remedial design. The goal of the restoration plan will be to restore in-kind to the extent practical the bed bathymetry and floodplain topography including appropriate stream bed material, natural stream channel design techniques, and replacement plantings. If present, submerged aquatic vegetation in the remediation area will also be restored. The design will include a monitoring plan for areas disturbed by the remedy and all activities will be consistent with the requirements of 6 NYCRR Part 608.

9. Institutional Control

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 commercial 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; and
- require compliance with the Department approved Site Management Plan.

10. Site Management Plan

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

1. 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 9 above.

Engineering Controls: The site cover, barrier wall, NAPL recovery system and groundwater and storm water collection and treatment system discussed in Paragraphs 3, 5, 6 and 7 above.

This 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 the service center building, open garage, and groundwater treatment system building.

- a provision to address the source area located south of the service center building (area known as probable NAPL source), if the coal tar NAPL recovery remedy described in paragraph 6 above is deemed ineffective.

- 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 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 3 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);

- 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.

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

- monitoring of groundwater, surface water and NAPL to assess the performance and effectiveness of the remedy;

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

- monitoring for vapor intrusion for any occupied existing or future buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

- Monitoring for the success of stream and habitat restoration. The monitoring plan will include repair and replacement action as necessary.

3. Operation and Maintenance (O&M) Plan for the Groundwater and Surface Water Collection and Treatment System to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- procedures for operating and maintaining the remedy;

- procedures for, and collection of appropriate data to optimize the system on a periodic basis.

- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;

- maintaining site access controls and Department notification; and

- providing the Department access to the site and O&M records.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 21, 2019	
Date	Michael J. Ryan, P.E., Director Division of Environmental Remediation

RECORD OF DECISION

NM - Hill St. - Gloversville MGP
Gloversville, Fulton County
Site No. 518021
March 2019

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund 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 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repository:

Gloversville Public Library
58 East Fulton Street
Gloversville, NY 12078
Phone: 518-725-2819

A public meeting was also conducted. At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) were presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the ROD.

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 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 Niagara Mohawk - Hill Street manufactured gas plant (MGP) site is located at 20 Hill Street in an urban section of Gloversville, Fulton County. The site is bordered to the north by Hill Street, by South Boulevard to the east, a vacant wooded area to the south, and the recreational walking/biking trail and Cayadutta Creek to the west.

Site Features: The site is approximately 13 acres. Eight acres of the site are fenced and comprise the active National Grid Service Center area. Approximately five acres are located outside the fence and are referred to as the southern area. The service center consists of an office/garage building (the service center building), storage buildings and sheds, an open garage, a groundwater treatment system building, and various outdoor storage areas for utility maintenance equipment (e.g., poles, transformers, cable, piping, etc.). Along the western side of the site is a bike path. The northern portion of the service center area is generally covered by impervious surfaces such as the building slab and asphalt pavement. Additional asphalt pavement is present proximate to the pole barn in the southern portion of the service center area. The balance of the service center area is covered with gravel. A storm water drainage ditch runs along the western site perimeter which drains surface water runoff into to a settling basin located in the southwest corner, and from there into to Cayadutta Creek though the culvert. Cayadutta Creek is classified as a Class C(T) water body which indicates best usage is for fishing. The site generally slopes downward from the northern to the southern portion of the site and from the eastern to the western portion of the site towards Cayadutta Creek. A small perennial stream and a wetland are present in the southern area. The stream enters the southern area via culvert which runs underneath the Southern Blvd and meanders through the wetland prior to entering another culvert and discharging to Cayadutta Creek.

Current Zoning/Use: The service center portion of the site is zoned for industrial use. The southern wooded area is zoned for commercial use. A residential area is located east of the site. The area immediately to the north of the site and further west of Cayadutta Creek is mixed industrial and commercial.

Past Use of the Site: The site was operated as an MGP from 1898 until 1952. The facility was shut down in 1952 and the majority of the MGP structures were demolished. At that time, the site was converted to a service center and office. The service center building initially consisted of a two-story office that included a loading dock and storage area. The building was expanded in the late 1960s and early 1970s to include the garage area to service fleet vehicles.

Site Geology and Hydrogeology: The two top stratigraphic units form the one highly permeable upper aquifer, consisting of fill and highly heterogeneous alluvial sand and gravel deposits. The thickness of the fill material varies from a few feet to 15 feet in the northern portion of the site. The upper sand and gravel unit thickness varies from as little as a few feet to as many as 15 feet thick. Below these alluvial deposits are relatively impermeable interlayered silts and clays known as the silt unit which varies from between 5 feet to 20 feet thick, but is generally thinner in southern portion of the site. Below the silt layer is the second, lower, aquifer, a 30 to 70 feet thick layer of sand and gravel. The shale bedrock was encountered at approximately 50 feet to 110 feet bgs, generally deeper in the northern end of the site and shallower in the southern end of the site.

In the upper aquifer, groundwater flows southwest towards the Cayadutta Creek. In the service center area, the depth of the groundwater in the upper aquifer is 10 feet below the ground surface and in the southern area it is 1 to 5 feet. In the lower, confined glacial outwash deposits, groundwater flows south, with the exception of groundwater near the silt window, an area in the southern part of the site where the silt unit is missing. In the area of the silt window, groundwater in the confined aquifer flows towards the window and upwards into the unconfined aquifer.

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 commercial use (which allows for industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the RI 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:

Niagara Mohawk Power Corporation dba National Grid

The Department and the Niagara Mohawk Power Corporation (National Grid) entered into a Consent Order A4-0473-0000 on November 07, 2003 which superseded and replaced Consent Order D0-0001-9210 executed on December 7, 1992. The Orders obligate the responsible party to implement a full remedial program.

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:

- air
- groundwater
- surface water
- soil
- sediment
- 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 contaminant(s) of concern identified at this site is/are:

coal tar
polycyclic aromatic hydrocarbons (PAHS), total
benzene
ethylbenzene
toluene
xylene (mixed)
cyanides (soluble cyanide salts)
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
naphthalene
benzo(b)fluoranthene
chrysene
dibenz[a,h]anthracene
fluoranthene
phenanthrene
carbon tetrachloride
trichloroethene (TCE)

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil
- sediment
- soil vapor intrusion

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.

Purifier Waste Removal

Approximately 370 tons of soil containing purifier waste was removed from the eastern portion of the site (east of the former holders). Excavated material was shipped off-site for pretreatment by thermal desorption, processed with hot mix asphalt, and reused in asphaltic concrete. The IRM Closure report was approved on May 3, 1995.

Former Gas Holder No. 3 Removal

The former 57,000 cubic feet gas holder was removed. Approximately 7,900 tons of MGP impacted material (coal tar and coal tar impacted soil) were removed from within, immediately surrounding, and below the former holder and transported off-site for thermal treatment and disposal. Approximately 570 tons of construction debris (including the holder wall and foundation) was transported off-site and disposed as a non-hazardous waste. The approximate depth of the excavation was 21 feet bgs, requiring dewatering from the depth of 7 feet onwards. Post excavation documentation samples were collected from three locations from the base of the excavation and two from the side wall. Benzene, ethylbenzene, toluene, xylenes, naphthalene and certain poly aromatic hydrocarbon compounds were found to exceed their respective soil cleanup objectives for the protection of groundwater in both floor and side wall samples. The excavation was backfilled with gravel below the water table and with graded soil above the water table. The “Former Holder No. 3 Interim Remedial Measure (IRM) Summary Report”, October 2001 and Addendum 1 dated July 2002, detailing the construction activities, were approved on August 13, 2002.

Storm sewer system modification

The storm sewer system which existed prior to October 2006 was modified to create a passive underdrain system that facilitated collection of non-aqueous phase liquid (NAPL) and NAPL-impacted groundwater separately from storm water. Storm water is now conveyed to a new lined storm water drainage ditch located along the western portion of the service center area and a lined storm water detention basin located in the southwest corner of the service center area (at the location of the former NAPL settling basin) prior to overflowing to Cayadutta Creek. NAPL and NAPL impacted groundwater intercepted by the underdrains beneath the service center building and a new French drain located in the southwest portion of the service center, is pumped to an on-site groundwater treatment system building constructed as part of this IRM for treatment. Treated groundwater is subsequently discharged to a nearby sanitary sewer for further treatment at the Gloversville-Johnstown Joint Wastewater Treatment Facility. The “Storm Sewer Interim Remedial Measure Engineering Certification Report” dated July 2011 detailing construction activities was approved on November 17, 2011.

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: The primary contaminants of concern at the site include manufactured gas plant (MGP) wastes, primarily coal tar and purifier waste. The tar is an oily, black liquid which formed as a condensate in the gas manufacturing process. Coal tar contains high levels of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds and polycyclic aromatic hydrocarbon (PAH) compounds. Purifier waste is a solid material which contains these compounds and complexed cyanide compounds as well.

Non Aqueous Phase Liquid (NAPL): Coal tar in the form of NAPL was observed in a significant number of the borings across the site. Coal tar was predominantly observed in the area south of the service center building extending to the northwest corner of the southern wooded area in the upper 20 feet of fill and upper sand gravel layer above the silt layer. Coal tar was observed below the silt layer at only three locations (GB-14 at the service center area and GB-88 and SB-434 in the southern area). Coal tar and sheens in subsurface soil were primarily constrained to within the site boundary with the exception of the isolated pockets west of Cayadutta Creek.

Coal tar was observed in the Cayadutta Creek stream bank soils at isolated areas along the eastern bank. Coal tar was also observed in isolated sediment pockets adjacent to and downstream of the site in Cayadutta Creek, and in sediments at the bottom of the creek approximately 50 feet downstream from the storm sewer outfall adjacent to the site. In the past, visibly contaminated sediments have been observed as far south as the Harrison Street bridge, approximately 2000 feet downstream of the site, however such impacts were not observed in subsequent investigations.

Between 2000 and 2007, approximately 8,000 gallons of coal tar and contaminated water were removed from well MW-8 located along the southern boundary of service center area. The mixture of coal tar and contaminated ground water were found to be hazardous waste and was disposed at permitted hazardous waste facility.

Near Surface Soil: A total of 49 samples were collected from 0-6 inches below ground surface (bgs) and analyzed for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), metals, cyanide, PCBs and pesticides. Out of 49 samples, 31 samples were collected from the off-site area. There were no exceedances of unrestricted use Soil Cleanup Objectives (SCOs) for benzene, ethylbenzene and xylenes. There were no exceedances of commercial use SCOs for any of the VOCs. Only methylene chloride slightly exceeded the unrestricted SCO of 0.05 ppm (0.08 ppm) in one of the five samples. Numerous polycyclic aromatic hydrocarbons (PAHs) exceeded unrestricted use SCOs in a significant number of samples. Several PAHs exceeded their respective commercial use SCOs including benzo(a)pyrene and Benzo(a)anthracene. Benzo(a)pyrene ranged from not detected (ND) to 5.6 parts per million (ppm), exceeding the commercial use SCOs of 1 ppm in 21 out of 46 samples. Benzo(a)anthracene ranged from ND-9.3 ppm, exceeding the commercial SCO of 5.6 ppm in 1 out of 46 samples. The maximum total PAH concentration was 130 ppm. Total PCBs ranged from ND-18 ppm, exceeding both the commercial and unrestricted SCOs in one sample out of six. Several metals and three pesticides exceeded their respective unrestricted use SCOs. Cyanide did not exceed the unrestricted SCO in any of the samples.

Subsurface Soil: A total of 231 subsurface soil samples were collected from up to 32 feet bgs and were analyzed for VOCs, SVOCs, PCBs, pesticides, metals and cyanide. Out of 231 samples, 35 were collected off-site, predominantly east and west of the site boundary, to evaluate off-site impacts. BTEX, several PAHs, cyanide and PCBs exceeded their respective commercial SCOs. The maximum total PAH concentration of 27,000 ppm (2 feet-4 feet) was observed just outside the eastern site boundary. The maximum total BTEX concentration was 1,310 ppm (2 feet-4 feet) was observed in the vicinity of the service center building. The maximum cyanide concentration was 3,020 ppm (at 4 feet) was observed at just outside the eastern site boundary. The maximum total PCB concentration of 24 ppm (3.5 feet-5.5 feet) was observed in the open garage located in the service center portion of the site. The highest concentrations of BTEX and PAHs were generally found in soil samples which contained observable coal tar. The majority of the MGP related impacts in the subsurface were observed below the water table and above the silt (confining) unit. An area of purifier waste placed as fill material to an approximate depth of five feet is present along the eastern fence line of the service center area.

Groundwater: A total of 109 groundwater samples were collected and analyzed for VOCs, SVOCs, metals and cyanide. Groundwater was not analyzed for PCBs and pesticides. MGP related constituents (i.e., BTEX, PAHs, and cyanide) were detected in concentrations above NYS groundwater quality standards in a majority of the monitoring wells sampled. Benzene concentrations ranged from non-detect (ND) to 2,800 parts per billion (ppb) and exceeded the groundwater standard of 1 ppb in 35 out of 108 samples. Total xylene concentrations ranged from ND-7,000 ppb and exceeded the groundwater standard of 5 ppb in 33 of 108 samples. Ethylbenzene concentrations ranged from ND-2,900 ppb and exceeded the groundwater standard of 5 ppb in 29 out of 108 samples. Several PAHs exceeded their respective groundwater standards, including benzo(a)anthracene, which ranged from ND-8,600 ppb and exceeded the groundwater standard of 0.002 ppb in 32 out of 109 samples. Cyanide concentrations ranged from ND-323,000 ppb and exceeded the groundwater standard of 200 ppb in 15 out of 47 samples. The MGP impacts on groundwater are primarily confined to upper sand and gravel fill layer. Sampling events performed in 2004 and 2008 did not identify off-site MGP-related groundwater impacts in the wells sampled along South Boulevard on the east of the site and wells along the western site boundary.

Sediments: The Cayadutta Creek investigation consisted of probing the creek sediments looking for coal tar impacts, and sampling surface water and sediments. Sheens resulting from the physical disturbance of fine-grained sediments were noted upstream, adjacent to, and downstream from the site. Composition of the PAHs in the upstream sediments was found to be similar to the compositions seen in urban and industrial area sediments. The PAHs likely may have been deposited through surface runoff and storm water discharges. Intermittent sheens were observed as far downstream as the Harrison Street Bridge (approximately 2,500 feet downstream). The sediment sampling conducted in 2006 revealed the highest concentrations of PAHs in small depositional areas located in the vicinity of the storm water outfall in the creek near the site. The maximum total BTEX concentration of 31.8 ppm was observed in the sample collected at the storm water outfall. Numerous PAHs were detected in the sediments including acenaphthene at concentrations ranging from ND-300 ppm, fluorene ranging from ND-240 ppm, pyrene ranging from ND-270 ppm and benzo(k)fluoranthene ranging from ND-300 ppm. The maximum total PAH concentration of 2,600 ppm. was observed in the sediment sample collected from the storm water detention basin. The maximum concentration of total PAHs in Cayadutta Creek was 1,100 ppm was found in the sediment sample collected immediately downstream of the storm water outfall. The guidance value of 4 ppm for Class A Freshwater Sediment ("Screening and Assessment of Contaminated Sediment", 2014) was exceeded in 88 samples out of 128 samples.

Surface Water: A total of 22 surface water samples were collected from Cayadutta Creek adjacent to the site, from the stream located in the southern area, and from the former drainage ditch that discharged to Cayadutta Creek. Samples were analyzed for VOCs, SVOCs, metals and cyanide. Benzene, ethylbenzene, and xylene were detected in concentrations exceeding NYS Ambient Water Quality Standards. Benzene concentrations ranged from ND-32 ppb and exceeded the surface water standard of 10 ppb in 3 out of 21 samples. Total xylene concentrations ranged from ND-19 ppb (standard of 5 ppb) in 1 out of 12 samples. Ethylbenzene concentrations ranged from ND-30 ppb (standard of 5 ppb) in 3 out of 21 samples. There were no exceedances of standards for SVOCs or cyanide. The maximum total PAH concentration was 28 ppb.

Soil Vapor: Both sub slab and soil vapor sampling were performed in the service center building and in the service center area, respectively. Concurrent with soil vapor sampling, indoor air samples were collected. Ethylbenzene was detected at 19 micrograms per cubic meter (ug/m3) (with a corresponding indoor air concentration of 0.868 ug/m3), total xylenes 110.9 ug/m3 (with an indoor air concentration of 1.85 ug/m3), toluene 46.1 ug/m3 (with an indoor air concentration of 5.77 ug/m3), 1,2,4 trimethylbenzene maximum 37.5 ug/m3 (with an indoor air concentration of 1.25 ug/m3), 1,3,5 trimethylbenzene maximum 12.2 ug/m3 (with an indoor air concentration of 0.982 ug/m3) and acetone 135 ug/m3 (with an indoor air concentration of 20.6 ug/m3) were detected in sub slab samples collected from the service center building. The following chlorinated VOCs were also detected: trans-1, 2 Dichloroethene at 45.4 ug/m3 (with an indoor air concentration of 56.6 ug/3), chloroform at 16.3 ug/m3 (with an indoor air concentration of 0.976 ug/m3), carbon tetrachloride at 12.6 ug/m3 in sub slab vapor sample (with an indoor air concentration of 0.464 ug/m3), tetrachloroethene at13.6 ug/m3 (with an indoor air concentration of 1.67 ug/m3), and trichloroethene at 10.7 ug/m3 (with an indoor air concentration of 1.07 ug/m3). Based on the above sampling results, further monitoring, and if necessary, mitigation may be required.

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*.

The site is partially fenced, which restricts most public access. However, persons who enter the site could contact contaminants in the soil by walking on the site, digging or otherwise disturbing the soil. People may come in contact with contaminants present in off-site soil and shallow creek sediments while entering or exiting the creek. People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying 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. Soil vapor intrusion sampling identified the need for future monitoring of the on-site structure and evaluation of soil vapor intrusion for any future on-site buildings.

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.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water 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 or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Sediment

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of (ambient water quality criteria).

- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

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 THE SELECTED REMEDY

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study (FS) report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's remedy is set forth at Exhibit D.

The selected remedy is referred to as the NAPL Barrier Wall, NAPL Recovery, Soil and Sediment Removal and Cover System remedy (Remedial Alternative 5).

The estimated present worth cost to implement the remedy is $18,150,000. The cost to construct the remedy is estimated to be $8,110,000 and the estimated average annual cost is $617,000.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. A predesign investigation (PDI) work plan will be developed and implemented to further refine the nature and extent of contamination determined during remedial investigation and to facilitate the design of the remedy. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of contaminant source areas, including:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- concentrated solid or semi-solid hazardous substances per 6 NYCRR Part 375-1.2(au)(1);
- non-aqueous phase liquids;
- soil with visual waste material or non-aqueous phase liquid;
- soil containing total SVOCs exceeding 500 ppm; and
- soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Based on these criteria, the following areas will be excavated:

- Approximately 14,800 cubic yards (cy) of source material containing non-aqueous phase liquid (NAPL) identified above the silt layer approximately 14 feet below grade (fbg) in the area down gradient of the NAPL barrier wall and NAPL identified underneath the silt layer in the areas (GB-88 and GB-434) down gradient of the NAPL barrier wall;

- Approximately 3,000 cy of shallow purifier waste located along the eastern boundary of the service center area to an approximate depth of five feet;

- Shallow soil (to 2 feet below grade) located on-site but outside of the fenced service center area that exceeds residential SCOs; and

- Approximately 520 cy of soil to facilitate the construction of a permeable NAPL barrier wall.

- All off-site soils which exceed unrestricted SCOs, as defined by 6 NYCRR Part 375-6.8(a), will be excavated and transported off-site for disposal.

- For the protection of the ecological resources in southern area, soils in top 2 feet which exceed ecological SCOs as defined by 6 NYCRR Part 375-6.8(b), will be excavated and transported off-site for disposal.

The excavation in the ecological resources area will be backfilled with the clean fill material meeting the ecological SCOs specified in 6 NYCRR Part 375-6.8(b).

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for commercial use will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the site in the service center portion of the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for unrestricted use will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades in the off-site areas.

3. Cover System

A site cover will be required to allow for commercial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

4. Sediment and Bank Soils Removal

Excavation and off-site disposal of Cayadutta Creek sediments and bank soils located adjacent to and downstream of the site including soil or sediment:

- that is grossly contaminated, as defined in 6 NYCRR Part 375-1.2(u);
- that contains visual impacts of non-aqueous phase liquids, sheen or which produce a visible sheen when agitated in-situ;
- that are discolored and smell like coal tar;
- bank soils which exceed unrestricted use SCOs; and
- sediment impacted by site-related PAHs at concentrations greater than background levels.

Sediment will be accessed through the construction of a temporary diversion system to facilitate sediment removal and backfilling in a dry condition to the extent practicable. Approximately 1,300 cubic yards of sediment and bank soil will be excavated. The full extent of the removal will be determined based on the results of the pre-design investigation. The pre-remedial investigation shall extend to the section of the creek in the vicinity of the Harrison Street where the sheen was observed in the past. Excavated sediment will be processed on-site and larger materials (cobbles and boulders) will be cleaned for reuse in the river. Finer materials will be sent off-site for disposal.

In areas where the bedrock is exposed during excavation and visual coal tar is observed, the bedrock surface will be cleaned prior to backfilling.

Water generated by the sediment removal and/or sediment handling processes will be treated prior to discharge. Sediment removal will be conducted in a manner which minimizes and controls resuspension of sediments during dredging. The means of sediment removal will be determined during the remedial design phase.

Clean fill material placed in the Cayadutta Creek stream bed and the stream corridor area will meet the ecological SCOs specified in 6 NYCRR Part 375-6.8(b). Any demarcation layer placed along the stream and within the 100-year floodplain will be fully bio-degradable and will not contain plastic or a geomembrane.

5. Barrier Wall

A non-aqueous phase liquid (NAPL) barrier wall will be constructed perpendicular to groundwater flow in the northwest corner of the southern portion of the site to prevent off-site migration of NAPL to Cayadutta creek and to enable NAPL recovery to the extent practicable, as described below. The NAPL barrier will be keyed into the silt unit to intercept and collect mobile and non-aqueous phase liquid (NAPL), if present, in recovery wells. The pre-design investigation will provide details which will inform design of the wall.

6. Coal Tar NAPL (Non aqueous phase liquid) Recovery

Installation and operation of coal tar NAPL recovery wells in area southern portion of the service center area to remove potentially mobile NAPL and coal tar from the subsurface. The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy. Coal tar NAPL in excess of 6 inches will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of coal tar NAPL over extended time periods, they will be converted to automated collection.

7. Groundwater and Storm Water Collection and Treatment

The existing groundwater and stormwater collection and treatment systems will continue to be operated. If any component of the existing system is dismantled or disturbed to accommodate the construction of the remedy, those components will be restored for the remedy to be continually effective. Operation, maintenance and optimization of the system will be addressed in the Site Management Plan.

8. Restoration of Dredged/Excavation Areas

The bed, bank and floodplain of Cayadutta Creek will be restored following a habitat restoration plan developed during the remedial design. The goal of the restoration plan will be to restore in-kind to the extent practical the bed bathymetry and floodplain topography including appropriate stream bed material, natural stream channel design techniques, and replacement plantings. If present, submerged aquatic vegetation in the remediation area will also be restored. The design will include a monitoring plan for areas disturbed by the remedy and all activities will be consistent with the requirements of 6 NYCRR Part 608.

9. Institutional Control

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 commercial 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; and
- require compliance with the Department approved Site Management Plan.

10. Site Management Plan

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

1. 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 9 above.

Engineering Controls: The site cover, barrier wall, NAPL recovery system and groundwater and storm water collection and treatment system discussed in Paragraphs 3, 5, 6 and 7 above.

This 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 the service center building, open garage, and groundwater treatment system building.

- a provision to address the source area located south of the service center building (area known as probable NAPL source), if the coal tar NAPL recovery remedy described in paragraph 6 above is deemed ineffective.

- 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 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 3 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);

- 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.

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

- monitoring of groundwater, surface water and NAPL to assess the performance and effectiveness of the remedy;

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

- monitoring for vapor intrusion for any occupied existing or future buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

- Monitoring for the success of stream and habitat restoration. The monitoring plan will include repair and replacement action as necessary.

3. Operation and Maintenance (O&M) Plan for the Groundwater and Surface Water Collection and Treatment System to ensure continued operation, maintenance,

optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- procedures for operating and maintaining the remedy;
- procedures for, and collection of appropriate data to optimize the system on a periodic basis.
- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

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 are arranged into four categories: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). 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, soil, surface water and sediment.

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 were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and source areas identified at the site include coal tar in the form of non-aqueous phase liquid (NAPL), which was observed in the area south of the service center building extending to southwest towards Cayadutta Creek. Coal tar was primarily observed in the upper 20’ of the fill and upper sand and gravel layer above the silt layer. However, a silt layer is not present in the southern area of the site, and the lower sand and gravel appears to contain minor amounts of NAPL near/at these areas, generally in the upper few feet at the base of the silt. Approximately 3,000 cubic yards of purifier waste placed as a fill material is also present along the eastern fence line of the service center area. Figure 4 shows the extent of NAPL and sheen observed during the RI which is generally associated with the former MGP structures and purifier waste placed as fill.

Certain waste/source areas identified at the site were addressed by the IRM(s) described in Section 6.2. The remaining waste/source area(s) identified during the RI will be addressed in the remedy selection process.

Groundwater

Groundwater samples were collected from monitoring wells installed in the upper and lower sand and gravel units. The samples were collected to assess groundwater conditions on and off-site. The results indicate that contamination in the upper sand and gravel zone exceeds the SCGs for MGP related constituents e.g. benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene, poly aromatic hydrocarbons (PAHs), and cyanide at 16 sampling locations primarily in the service center area. DNAPL was observed in seven groundwater monitoring locations in the area south of the service center building. The MGP impacts on groundwater are primarily confined to upper sand and gravel fill layer. The majority of the groundwater sampled from monitoring wells screened in the lower sand and gravel does not contain MGP-related constituents. However, NAPL was observed in the upper few feet of lower sand and gravel unit in the former relief holder and in the southern area where silt layer is thin or absent (“silt window area”). The impacted shallow groundwater discharges into Cayadutta Creek.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppm)	Frequency Exceeding SCG
VOCs			
1,2,4-Trimethylbenzene	ND – 780	5	19 of 64
1,3,5-Trimethylbenzene	ND – 1,800	5	15 of 64
Benzene	ND – 2,800	1	35 of 108
Chloroform	ND – 31	7	1 of 7
Ethylbenzene	ND – 2,900	5	29 of 108
o-Xylene	ND – 380	5	3 of 12
Toluene	ND – 2,800	5	17 of 108
Xylenes (total)	ND – 7,000	5	33 of 108
SVOCs			
Anthracene	ND – 20,000	50	13 of 109
Benzo(a)anthracene	ND – 8,600	0.002	32 of 109
Benzo(a)pyrene	ND – 5,100	0	30 of 109
Benzo(b)fluoranthene	ND – 2,500	0.002	27 of 109
Benzo(k)fluoranthene	ND – 3,100	0.002	27 of 109
Chrysene	ND – 9,300	0.002	32 of 109
Fluoranthene	ND – 14,000	50	11 of 109
Fluorene	ND – 22,000	50	18 of 109
Indeno(1,2,3-cd)pyrene	ND – 1,200	0.002	24 of 109
Phenanthrene	ND – 62,000	50	19 of 109
Pyrene	ND – 21,000	50	13 of 109
Inorganics			
Aluminum	ND – 153,000	2,000	27 of 65
Arsenic	ND – 59.5	25	4 of 65
Chloride	12,900 – 557,000	250,000	6 of 65
Chromium	ND – 11,100	50	8 of 65
Cyanide	ND – 323,000	200	15 of 47
Magnesium	7,720 – 82,300	35,000	5 of 65
Sodium	12,400 – 200,000	20,000	62 of 65

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 primary groundwater contaminants are benzene, toluene, ethylbenzene, and xylene (BTEX), PAHs, and cyanide associated with operation of the former MGP. As noted on Figure 5, the primary groundwater contamination is associated with the former gas holder located south east of the service center building and purifier waste placed as fill material along the eastern site boundary of the service center area.

The metals found in groundwater are not considered to be MGP related contaminants of concern.

Based on the findings of the RI, the past disposal of MGP related hazardous waste has resulted in the contamination of the groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: BTEX, PAHs and cyanide.

Near Surface Soil

Near surface soil samples were collected from the on-site and off-site areas adjacent to the site and along the banks of the Cayadutta Creek from a depth of 0-6 inches. Samples were analyzed for volatile and semi volatile organic compounds, metals, PCBs and pesticides. Surface soil samples were collected from bank areas, the undeveloped area and service center area. The results indicate that soils at the site exceed the unrestricted soil cleanup objectives (SCOs) for volatile and semi-volatile organics, inorganics and pesticides.

Table 2 – Near Surface Soil

Detected Constituents	Detected Concentration Range (ppm)[a]	Restricted Use SCG[b] (ppm)	Frequency Exceeding Restricted Use SCG	Unrestricted SCG[c] (ppm)	Frequency Exceeding Unrestricted Use SCG
VOCs					
Benzene	ND	44	0 of 14	0.06	0 of 14
Ethylbenzene	ND	390	0 of 13	1	0 of 13
Methylene Chloride	ND – 0.08	500	0 of 5	0.05	1 of 5
Toluene	ND	500	0 of 14	0.7	0 of 14
Xylenes (total)	ND	500	0 of 13	0.26	0 of 13
Total BTEX	ND	- -	- -	- -	- -
SVOCs					
2-Methylnaphthalene	ND – 1.4	- -	- -	- -	- -
Acenaphthene	ND – 2.6	500	0 of 46	20	0 of 46
Acenaphthylene	ND – 4.5	500	0 of 46	100	0 of 46
Anthracene	ND – 2.9	500	0 of 46	100	0 of 46
Benzo(a)anthracene	ND – 9.3	5.6	1of 46	1	20 of 46
Benzo(a)pyrene	ND – 5.6	1	21 of 46	1	23 of 53
Benzo(b)fluoranthene	ND – 7.1	5.6	1 of 46	1	26 of 46
Benzo(g,h,i)perylene	ND – 5.4	500	0 of 46	100	0 of 53
Benzo(k)fluoranthene	ND – 3.1	56	0 of 46	0.8	12 of 46
bis(2-Ethylhexyl)phthalate	ND –0.89	- -	- -	- -	- -
Chrysene	ND – 4.2	56	0 of 46	1	25 of 53
Dibenzo(a,h)anthracene	ND – 0.47	0.56	0 of 46	0.33	1 of 46
Fluoranthene	ND – 3.2	500	0 of 46	100	0 of 46
Fluorene	ND – 2.2	500	0 of 46	30	0 of 53
Indeno(1,2,3-cd)pyrene	ND – 3.8	5.6	0 of 46	0.5	20 of 46
Naphthalene	ND – 0.59	500	0 of 46	12	0 of 46
N-Nitrosodiphenylamine	ND – 0.37	- -	- -	- -	- -
Phenanthrene	ND – 21	500	0 of 46	100	0 of 46

Detected Constituents	Detected Concentration Range (ppm)[a]	Restricted Use SCG[b] (ppm)	Frequency Exceeding Restricted Use SCG	Unrestricted SCG[c] (ppm)	Frequency Exceeding Unrestricted Use SCG
Phenol	ND – 0.11	500	0 of 5	0.33	0 of 5
Pyrene	ND – 42	500	0 of 46	100	0 of 46
Total carcinogenic PAHs	ND – 22	- -	- -	- -	- -
Total PAHs	ND – 130	- -	- -	- -	- -
Inorganics					
Aluminum	2,300 – 8,250	- -	- -	- -	- -
Antimony	ND – 17.7	- -	- -	- -	- -
Arsenic	ND – 6.5	16	0 of 4	13	0 of 4
Barium	25.3 – 433	400	1 of 4	350	1 of 4
Cadmium	ND	9.3	0 of 4	2.5	0 of 4
Calcium	5,050 – 42,600	- -	- -	- -	- -
Chromium	10.5 – 23.5	- -	- -	- -	- -
Cobalt	ND – 6.9	- -	- -	- -	- -
Copper	12 – 264	270	0 of 4	50	2 of 4
Cyanide	ND – 0.15	27	0 of 16	27	0 of 16
Iron	9,090 – 21,100	- -	- -	- -	- -
Lead	46.4 – 1,160	1,000	1 of 4	63	3 of 4
Magnesium	1,520 – 3,500	- -	- -	- -	- -
Manganese	127 – 879	10,000	0 of 4	1,600	0 of 4
Mercury	ND – 0.43	2.8	0 of 4	0.18	2 of 4
Nickel	ND – 21.7	310	0 of 4	30	0 of 4
Potassium	ND – 770	- -	- -	- -	- -
Vanadium	24.4 – 39.8	- -	- -	- -	- -
Zinc	47.9 – 2,490	10,000	0 of 4	109	1 of 4
Pesticides/PCBs					
4,4'-DDD	ND – 0.0062	62	0 of 4	0.0033	1 of 4
4,4'-DDE	ND – 0.0094	47	0 of 4	0.0033	1 of 4
4,4'-DDT	ND – 0.026	92	0 of 4	0.0033	2 of 4
Endrin Aldehyde	ND	- -	- -	- -	- -
Total PCBs	ND – 18	1	1 of 6	1	1 of 6

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

The primary soil contaminants are polycyclic aromatic hydrocarbons (PAHs) associated with residues from the operation of the former MGP.

Only barium was found above commercial use SCOs in one sample, which is not a constituent of concern for MGP sites. Lead and mercury exceeded unrestricted use SCOs in one and two samples respectively, however were below commercial use SCOs.

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are PAHs.

Subsurface Soil

Subsurface soil samples were collected from the soil borings and test pits from the on-site and off-site areas during the RI. Subsurface soil samples were collected from a depth of up to 32 feet to assess soil contamination impacts resulting from the past MGP operations. Samples were analyzed for volatile and semi volatile organic compounds, inorganics, PCBs and pesticides. NAPL and sheen were observed in the borings and test pits performed in the area south of service center building. NAPL is predominantly confined to the upper sand and gravel layers, and the upper few feet of the silt layer. NAPL was observed below the silt layer at three locations (one in service center and at two locations in southern area). The results indicate that soils at the site exceed the unrestricted SCOs for BTEX, PAHs, naphthalene and cyanide. The majority of the exceedances occur below the water table and above confining silt layer. The MGP impacted area encompasses areas in the vicinity of the detention basin, area south of the basin and purifier waste area located along the eastern boundary of the service center area.

Table 3 – Sub-Surface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted Use SCG	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted Use SCG
PCBs					
Total PCBs	ND – 24	1.0	1 of 25	0.10	5 of 25
VOCs					
1,2,4-Trimethylbenzene	2.70	- -	- -	- -	- -
1,3,5-Trimethylbenzene	ND – 190	- -	- -	- -	- -
2-Butanone	ND – 0.0420	- -	- -	- -	- -
Acetone	ND – 0.590	500	0 of 13	100	0 of 13
Benzene	ND – 61	44	1 of 189	0.06	38 of 189
Ethylbenzene	ND – 310	390	0 of 189	1	50 of 189
Methylene Chloride	ND – 0.110	500	0 of 23	0.05	5 of 23
Styrene	ND – 0.460	- -	- -	- -	- -
Toluene	ND – 190	500	0 of 189	0.7	20 of 189
Xylenes (total)	ND – 1,100	500	2 of 167	0.26	53 of 167
Total BTEX	ND – 1,310	- -	- -	- -	- -

Detected Constituents	Concentration Range Detected (ppm)[a]	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted Use SCG	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted Use SCG
SVOCs					
2-Methylnaphthalene	ND – 4,800	- -	- -	- -	- -
Acenaphthene	ND – 760	500	2 of 228	20	37 of 228
Acenaphthylene	ND – 720	500	2 of 227	100	8 of 227
Anthracene	ND – 660	500	3 of 230	100	6 of 230
Benzo(a)anthracene	ND – 290	5.6	41 of 227	1	75 of 227
Benzo(a)pyrene	ND – 160	1	60 of 231	1	60 of 231
Benzo(b)fluoranthene	ND – 88	5.6	19 of 227	1	56 of 227
Benzo(g,h,i)perylene	ND – 68	500	0 of 226	100	0 of 226
Benzo(k)fluoranthene	ND – 110	56	3 of 227	0.8	65 of 227
Chrysene	ND – 280	56	9 of 231	1	79 of 231
Dibenzo(a,h)anthracene	ND – 29	0.56	25 of 226	0.33	32 of 226
Fluoranthene	ND – 420	500	0 of 227	100	4 of 227
Fluorene	ND – 940	500	3 of 225	30	32 of 225
Indeno(1,2,3-cd)pyrene	ND – 69	5.6	9 of 226	0.5	49 of 226
Naphthalene	ND – 26,000	500	14 of 230	12	56 of 230
Phenanthrene	ND – 1,700	500	5 of 227	100	25 of 227
Pyrene	ND – 660	500	3 of 231	0.33	113 of 231
Total PAHs	ND – 27,000	- -	- -	- -	- -
Inorganics					
Arsenic	1.80 – 52.8	16	1 of 11	13	2 of 11
Barium	12.7 – 144	400	0 of 10	350	0 of 10
Beryllium	ND – 1.10	590	0 of 11	7.2	0 of 11
Cadmium	ND – 4.10	9.3	0 of 11	2.5	1 of 11
Chromium	4.20 – 91.4	400	0 of 11	1	11 of 11
Copper	ND – 70.4	270	0 of 11	50	1 of 11
Cyanide	ND – 3,020	27	17 of 165	27	17 of 165
Lead	5.7 – 130	1,000	0 of 11	63	4 of 11
Magnesium	ND – 68,200	- -	- -	- -	- -
Manganese	55 – 1,160	10,000	0 of 10	1,600	0 of 10
Mercury	0.0120 – 0.780	2.8	0 of 11	0.18	2 of 11
Nickel	ND – 44.2	310	0 of 11	30	2 of 11
Selenium	ND – 6.7	1,500	0 of 11	3.9	2 of 11
Vanadium	11.5 – 61.1	- -	- -	- -	- -
Zinc	12.5 – 270	10,000	0 of 11	109	3 of 11
Pesticides					
4,4'-DDT	ND – 0.016	47	0 of 10	0.0033	1 of 10
Detected Constituents	Concentration	Restricted Use	Frequency	Unrestricted	

	Range Detected (ppm)[a]	SCG[c] (ppm)	Exceeding Restricted Use SCG	SCG[b] (ppm)	Frequency Exceeding Unrestricted Use SCG
Aldrin	ND	0.68	0 of 10	0.05	0 of 10
Alpha-Chlordane	ND – 0.0047	24	0 of 10	0.094	0 of 10
Delta-BHC	ND – 0.011	500	0 of 10	0.04	0 of 10
Dieldrin	ND – 12	1.4	1 of 10	0.005	2 of 10
Endosulfan I	ND – 0.0071	200	0 of 10	2.4	0 of 10
Endosulfan II	ND – 0.017	200	0 of 10	2.4	0 of 10
Endosulfan Sulfate	ND – 0.017	200	0 of 10	2.4	0 of 10
Endrin	ND – 1.8	89	0 of 10	0.014	3 of 10
Endrin Aldehyde	ND – 0.035	- -	- -	- -	- -
Endrin Ketone	ND – 0.021	- -	- -	- -	- -
Gamma-BHC (Lindane)	ND – 0.52	9.2	0 of 10	0.1	1 of 10
Gamma-Chlordane	ND – 0.014	- -	- -	- -	- -
Heptachlor Epoxide	ND – 0.36	- -	- -	- -	- -

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

The primary soil contaminants are polycyclic aromatic hydrocarbons (PAHs), BTEX, naphthalene and cyanide associated with the operation of the former MGP.

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are, BTEX, PAHs, naphthalene and cyanide.

Surface Water

Surface water samples were collected during the RI from Cayadutta Creek adjacent to the site, from the former drainage ditch which drained into Cayadutta Creek, and from the unnamed stream flowing east to west in the southern portion of the site. The samples were collected to assess the surface water conditions on and off-site. The samples in which benzene, ethylbenzene and xylene exceeded SCGs were collected onsite within or at the former drainage ditch that discharged to Cayadutta Creek at the southwest corner of the service center area. Surface water samples collected from Cayadutta Creek offsite, did not contain detectable concentrations of BTEX and PAHs. Lead and mercury concentrations exceeded SCGs in a surface water sample collected from stream/wetland area in the southern area of the site. Additionally, inorganics (antimony, lead, and magnesium) exceeded SCGs in a surface water sample collected from Cayadutta Creek upstream of the site, and are not attributed to MGP impacts observed onsite or in the sediments.

Table 4 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
2-Butanone	ND – 3	50	0 of 12
Benzene	ND – 32	10	3 of 21
Ethylbenzene	ND – 30	5	3 of 21
Methylene Chloride	ND – 11	200	0 of 21
Styrene	ND – 9	5	1 of 12
Xylenes (total)	ND – 19	5	1 of 12
Total BTEX	ND – 62	- -	0 of 21
SVOCs			
2-Methylphenol	ND – 7	- -	0 of 12
2-Propanone	ND – 8	- -	0 of 6
4-Methylphenol	ND – 11	- -	0 of 12
Acenaphthene	ND – 10	- -	0 of 19
Diethylphthalate	ND – 2	50	0 of 16
Naphthalene	ND – 14	- -	0 of 19
Phenanthrene	ND – 14	50	0 of 19
Phenol	ND – 40	- -	0 of 21
Total PAHs	ND – 28	- -	0 of 19
Inorganics			
Aluminum	ND – 3,430	- -	0 of 12
Antimony	ND – 39.4	3	1 of 12
Arsenic	ND – 35	50	0 of 12
Barium	ND – 232	1,000	0 of 12
Calcium	49,000 – 197,000	- -	0 of 12
Chromium	ND – 35.6	50	0 of 12
Cobalt	ND – 9.3	- -	0 of 12
Copper	ND – 11.1	200	0 of 12
Cyanide	ND – 120	9,000	0 of 22
Iron	186 – 70,000	- -	0 of 12
Lead	ND – 125	50	2 of 12
Magnesium	8,370 – 51,700	35,000	1 of 12
Manganese	16.4 – 5,560	- -	0 of 12
Mercury	ND – 0.2	0.0007	1 of 12
Potassium	ND – 10,100	- -	0 of 12
Sodium	31,300 – 110,000	- -	0 of 12
Vanadium	ND – 50.9	- -	0 of 12
Zinc	ND – 313	2,000	0 of 12

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.

b - SCG: Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.

The primary surface water contaminants are benzene, ethylbenzene and xylene and PAHs associated with the former drainage ditch located west and south west of the service center area, which collected both overland flow and NAPL impacted groundwater. The surface water contamination was addressed during the IRM described in Section 6.2. As a result, no site related surface water contamination of concern was identified after the construction of the IRM. Additionally, removal of the contaminated sediment will eliminate any future potential of surface water contamination. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

Sediment samples were collected from upstream and downstream of the site in Cayadutta Creek. Samples were also collected from the stream/wetland located in the southern portion of the site and former drainage ditch. The samples were collected to assess the potential for impacts Cayadutta creek sediments from the site. The results indicate that sediment samples collected adjacent to the site exceeded the Department's SCGs for sediments for several PAHs. Elevated concentrations of total PAHs were observed in the samples collected in the area of the storm water outfall and immediately downstream. However, the maximum total PAH concentration of 2600 ppm was observed in the sample collected from the former drainage ditch. Coal tar was observed in the Cayadutta Creek stream bank soils at isolated areas along the eastern bank. Coal tar was also observed in isolated sediment pockets adjacent to and downstream of the site in Cayadutta Creek, and in sediments at the bottom of the creek approximately 50 feet downstream from the storm sewer outfall adjacent to the site. A localized sediment deposit containing sheen was observed in the past at the Harrison Street Bridge, and based on the physical characteristics suggested that the sheen is MGP-related, however no samples were taken.

Table 5 – Sediment (Cayadutta Creek, stream/wetland & ditch)

Detected Constituents	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)	Frequency Exceeding SCG
VOCs			
2-Butanone	ND – 0.0450	- -	- -
Acetone	ND – 0.150	- -	- -
Benzene	ND – 0.370	0.53	0 of 25
Carbon Disulfide	ND – 0.013	- -	- -
Ethylbenzene	ND – 14.0	0.43	3 of 25
Methylene Chloride	ND – 0.350	- -	- -
Styrene	ND – 0.013	- -	- -
Toluene	ND – 0.460	0.93	0 of 25
Xylenes (total)	ND – 17	0.59	3 of 24
Total BTEX	ND – 31.8	- -	- -
SVOCs			
2,4-Dimethylphenol	ND – 0.36	- -	- -
2-Methylnaphthalene	ND – 120	- -	- -
2-Methylphenol	ND – 0.31	- -	- -
4-Methylphenol	ND – 0.86	- -	- -

Detected Constituents	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)	Frequency Exceeding SCG
Acenaphthene	ND – 300	- -	- -
Acenaphthylene	ND – 95	- -	- -
Anthracene	ND – 190	- -	- -
Benzo(a)anthracene	ND – 100	- -	- -
Benzo(a)pyrene	ND – 72	- -	- -
Benzo(b)fluoranthene	ND – 31	- -	- -
Benzo(g,h,i)perylene	ND – 230	- -	- -
Benzo(k)fluoranthene	ND – 300	- -	- -
bis(2-Ethylhexyl)phthalate	ND – 4.6	360	0 of 14
Butylbenzylphthalate	ND – 10	- -	- -
Carbazole	ND – 5.2	- -	- -
Chrysene	ND – 110	- -	- -
Dibenzo(a,h)anthracene	ND – 4.5	- -	- -
Dibenzofuran	ND – 7.3	- -	- -
Di-n-Butylphthalate	ND – 2.4	- -	- -
Fluoranthene	ND – 220	- -	- -
Fluorene	ND – 240	- -	- -
Indeno(1,2,3-cd)pyrene	ND – 24	- -	- -
Naphthalene	ND – 220	- -	- -
Phenanthrene	ND – 690	- -	- -
Phenol	ND – 0.54	- -	- -
Pyrene	ND – 270	- -	- -
Total carcinogenic PAHs	ND – 110	- -	- -
Total PAHs	ND – 2,600	4	88 of 128
Inorganics			
Aluminum	ND – 10,100	- -	- -
Antimony	ND – 262	- -	- -
Arsenic	ND – 13.5	10	1of 18
Barium	ND – 104	- -	- -
Cadmium	ND – 0.860	1	0 of 18
Calcium	ND – 109,000	- -	- -
Chromium	ND – 67	43	3 of 18
Copper	ND – 38.1	32	1 of 18
Cyanide	ND – 3.3	- -	- -
Iron	ND – 28,600	- -	- -
Lead	ND – 2,920	36	15 of 18
Magnesium	ND – 52,600	- -	- -
Manganese	ND – 1020	- -	- -
Mercury	ND – 0.580	0.2	1 of 18

Detected Constituents	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)	Frequency Exceeding SCG
Nickel	ND – 11.7	23	0 of 18
Potassium	ND – 646	- -	- -
Silver	ND – 0.83	1	0 of 18
Vanadium	ND – 50.0	- -	- -
Zinc	ND – 800	120	4 of 18
PCBs			
Aroclor-1260	ND – 1.9	0.1	1 of 18
Pesticides			
4,4'-DDD	ND – 0.0071	- -	- -
4,4'-DDT	ND – 0.0090	- -	- -

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;
b - SCG: New York State Department of Environmental Conservation Division of Fish, Wildlife and Marine Resources Bureau of Habitat Screening and Assessment of Contaminated Sediment – Class A Freshwater Sediment Guidance Values (Table 5)

The primary sediment contaminants are PAHs associated with the past MGP operations conducted at the site. The primary sediment contamination is found in the section of the Cayadutta Creek where it bends and flows east and the immediate downstream area.

Based on the findings of the Remedial Investigation, the disposal of coal tar NAPL has resulted in the contamination of sediment. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of sediment to be addressed by the remedy selection process are PAHs.

Soil Vapor

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site due to the presence of buildings in the impacted area a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

Soil vapor samples were collected from the sub-slab of the service center building, along with indoor air and outdoor air samples. Acetone was detected in sub-slab vapor at 135 ug/m3 (with an indoor air concentration of 20.6 ug/m3), ethylbenzene at 19 ug/m3 (with an indoor air concentration of 0.868 ug/m3), toluene at 46.1 ug/m3 (with an indoor air concentration of 5.77 ug/m3), xylene at 110.9 ug/m3 (with an indoor air concentration of 1.85 ug/m3), 1,2,4 trimethylbenzene at 37.5 ug/m3 (with an indoor air concentration of 1.25 ug/m3), and 1,3,5 trimethylbenzene at 12.2 ug/m3 (with an indoor air concentration of 0.982 ug/m3) in the service center building. The following chlorinated VOCs were also detected: trans-1, 2 dichloroethene at 45.4 ug/m3 (with an indoor air concentration of 56.6 ug/3), chloroform at 16.3 ug/m3 (with an indoor air concentration of 0.976 ug/m3), carbon tetrachloride at 12.6 ug/m3 in sub slab vapor sample (with an indoor air concentration of 0.464 ug/m3), tetrachloroethene at13.6 ug/m3 (with an indoor air concentration of 1.67 ug/m3), and trichloroethene at 10.7 ug/m3 (with an indoor air concentration of 1.07 ug/m3). The above sub slab vapor concentrations of carbon tetrachloride, trichloroethene, and tetrachloroethene are estimated values which are at or below the reported detection limit.

Based on the comparison of the detected concentrations of trichloroethene and carbon tetrachloride in sub slab vapor and indoor air with the NYSDOH Soil Vapor Intrusion Guidance, soil vapor contamination of concern was identified during the RI. The presence of these contaminants will drive the monitoring and/or mitigation of the soil vapor intrusion.

Exhibit B

<u>Description of Remedial Alternatives</u>

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: No Further Action with Continued Operation of Groundwater and Stormwater Collection and Treatment Systems

This alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2 and includes continuation of the operation of the on-site groundwater and storm water collection and treatment systems. Collected groundwater is treated on-site and then discharged to the Gloversville-Johnstown Joint Wastewater Treatment Facility. Collected NAPL is transported for off-site treatment/disposal. Storm water is collected in a drainage ditch which flows into the detention basin and overflows into Cayadutta creek.

Present Worth:	*$ 8,300,000*
Capital Cost:	*$ 0*
Annual Costs:	*$ 480,000*

Alternative 3: Site Cover, Groundwater and Non-Aqueous Phase Liquid (NAPL) Monitoring, Monitored Natural Recovery (MNR) of Sediment, and Site Management

This alternative consists of a site cover for continued commercial use of the property and long-term monitoring and management of the site. The site cover would consist of a minimum of one foot of soil placed over a demarcation layer, or pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs. This alternative also includes continuous operation of on-site storm and groundwater collection and treatment system. Periodic groundwater monitoring would be conducted using the existing monitoring well network to document the expected reduction in contaminant concentrations in site groundwater. NAPL that accumulates into existing monitoring wells would be removed as part of a long-term NAPL monitoring and recovery program. Long-term sampling of surficial sediments would be performed to determine whether monitored natural recovery (MNR) is effective in reducing contaminant levels in the sediments of Cayadutta creek. An Environmental Easement would be placed on the site, restricting land use, prohibiting use of the site groundwater and requiring implementation of the Department approved Site Management Plan (SMP). The SMP would require monitoring of storm and groundwater collection and treatment system. The SMP would also contain an excavation plan to require proper management of MGP contamination and structures encountered during ground intrusive activities. The SMP would also contain an environmental monitoring plan. The SMP would also require a soil vapor intrusion evaluation of the future buildings constructed on the site. Periodic certification of the institutional and engineering controls (IC/ECs) would be required.

Present Worth: *$10,100,000*
Capital Cost: *$156,000*

Annual Costs:..*$573,000*

Alternative 4: NAPL Barrier Wall, NAPL Recovery, Soil Removal, and Capping of Sediments

This alternative consists of constructing a NAPL barrier wall, installing NAPL recovery wells, capping MGP-contaminated sediments, installing a site cover for commercial use of the property, and excavating the following areas:

- source material containing NAPL downgradient of the NAPL barrier wall,
- surface soil outside of the fenced service center area upgradient of the NAPL barrier wall; and
- shallow purifier waste located along the eastern boundary of the service center area.

A sediment cap would be installed, consisting of a bottom synthetic layer (i.e. geotextile) overlain by a one-foot silt/sand layer to match existing sediment characteristics. This alternative also includes continuous operation of on-site storm and groundwater collection and treatment system. An Environmental Easement would be placed on the site, restricting land use, prohibiting use of site groundwater and requiring implementation of the Department approved Site Management Plan (SMP). As a part of site management, a monitoring program consisting of periodic monitoring of groundwater, storm and groundwater collection and treatment system, NAPL recovery and inspection and maintenance of the engineered sediment cap would be developed and implemented. The SMP would contain an excavation plan to manage MGP contamination and structures encountered during ground intrusive activities. The SMP would also require a soil vapor intrusion evaluation of the future buildings constructed on the site. Periodic certification of the institutional and engineering controls (IC/ECs) would be required.

Present Worth:..*$ 14,700,000*
Capital Cost:..*$ 4,736,000*
Annual Costs:..*$ 600,000*

Alternative 5: NAPL Barrier Wall, NAPL Recovery, Soil and Sediment Removal and Cover System

This alternative consists of constructing a NAPL barrier wall, installing NAPL recovery wells, a site cover for commercial use of the property, and excavating following areas:

- source material containing NAPL downgradient of the NAPL barrier wall
- surface soil outside of the fenced service center upgradient from NAPL barrier wall; and
- excavating shallow purifier waste located along the eastern boundary of the service center area.

This alternative includes the removal of MGP impacted sediments. Approximately 2,200 cubic yards of MGP impacted sediment would be removed and transported off-site for treatment. Backfill material meeting the Class A sediment guidance values and matching the grain size of the existing sediments would be imported to restore existing grades. This alternative also includes continuous operation of on-site storm and groundwater collection and treatment system.

An Environmental Easement would be placed on the site, restricting land use, prohibiting use of the site groundwater and requiring implementation of the Department approved Site Management Plan (SMP). As a part of the site management, monitoring program consisting of periodic monitoring of groundwater, storm and groundwater collection and treatment system, NAPL recovery and sediments would be developed and implemented. The SMP would contain an excavation plan to manage MGP contamination and structures encountered during ground invasive activities. The SMP would also require a soil vapor intrusion evaluation of the future buildings constructed on the site. Periodic certification of the institutional and engineering controls (IC/ECs) would be required.

Present Worth: .... *$ 18,150,000*
Capital Cost: .... *$ 8,110,000*
Annual Costs: *$617,000*

Alternative 6: Soil Excavation to Unrestricted Use SCOs and Sediment Removal to Background Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil clean objectives listed in Part 375-6.8 (a). This alternative includes excavation of all soil containing MGP-related contaminants at concentrations greater than the SCOs for unrestricted use. An estimated 180,000 cubic yards of soil would be excavated from the site. Additionally, Cayadutta Creek sediment containing site-related contaminants at concentrations greater than background levels would also be removed. An estimated 2,200 cubic of yards of sediment would be removed and replaced with backfill meeting the Class A sediment guidance values and matching the grain size of the existing sediments.

Capital Cost: .... *$ 67,900,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	0	0	0
No Further Action with continuation of the operation of onsite Groundwater and storm water collection and treatment system	0	$ 480,000	$ 8,300,000
Groundwater and Non-Aqueous Phase Liquid (NAPL) Monitoring, Monitored Natural Recovery (MNR) of the impacted sediment, and Site Management Plan (SMP)	$ 156,000	$ 573,000	$ 10,100,000
NAPL Barrier Wall, NAPL Recovery, Soil Removal, and Capping of the Sediments	$ 4,736,000	$ 600,000	$ 14,700,000
NAPL Barrier Wall, NAPL Recovery, Soil and Sediment Removal and Cover System	$ 8,110,000	$617,000	$ 18,150,000
Soil Excavation to Unrestricted Use SCOs and Sediment Removal to Background Conditions	$ 67,900,000	0	$ 67,900,000

Exhibit D

SUMMARY OF THE SELECTED REMEDY

The Department is selecting Alternative 5, NAPL Barrier Wall, NAPL Recovery, Targeted Soil Excavation, and Removal of MGP-Impacted Sediment as the remedy for this site. Alternative 5 would achieve the remediation goals for the site by intercepting NAPL flowing towards Cayadutta Creek, removing NAPL from the subsurface, removing MGP impacted sediments and purifier waste, and installing a cover system to prevent exposure to subsurface contamination. The elements of this remedy are described in Section 7. The selected remedy is depicted on Figure 7.

Basis for Selection

The selected remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The selected remedy, Alternative 5, would satisfy this criterion by installing a cover on the site and restricting the site use to prevent human exposure, intercepting and by recovering mobile NAPL, removing source material and contaminated soils and sediments to protect the environment. Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternative 2 does not eliminate exposures resulting from the NAPL present at the site which could migrate to Cayadutta Creek, or address the purifier waste, contaminated groundwater, soils or sediments. Alternatives 1 and 2 are not protective and will not be considered further. Alternative 6, by removing all soil contaminated above the unrestricted soil cleanup objective and removing contaminated sediments above background levels, meets the threshold criteria and does not require institutional controls. Alternative 3, also complies with this criterion but requires a longer time frame to achieve environmental protection since it relies on natural attenuation of groundwater and natural recovery of sediments and does not actively address the source area. Alternative 4 and 5 both prevent human exposures and actively address the source of the soil, groundwater and sediment impacts thereby providing both health and environmental protection. Alternatives 3, 4, and 5 require institutional controls and site management in order to be protective.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Alternative 3 does not include intrusive remedial construction activities and therefore, will not achieve chemical specific SCGs for soil, groundwater, or sediment. Alternatives 4 and 5 address potentially mobile NAPL at the site through installation of the NAPL barrier wall and NAPL recovery wells, and create the conditions necessary to restore the groundwater quality. Additionally, these alternatives would also address soil containing source material downgradient of the wall and shallow purifier waste along the eastern boundary of the service center area. Alternative 5 removes greater quantities of soil/sediment compared to Alternative 4. Alternatives 4 and 5 both address surface soil (to two feet below grade) located outside of the fenced service center that contains contamination at concentrations greater than the SCOs commercial use. Additionally, under these alternatives, a site cover will be installed to allow for the continued commercial use of the site. Alternatives 4 and 5 comply with SCGs to the extent practicable. Alternative 6 includes the removal and off-site treatment/disposal of all soils containing contaminants at concentrations greater than unrestricted use SCOs. Because Alternatives 4, 5, and 6 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Unlike Alternative 6 which removes the NAPL source and all contaminated soils and sediment, Alternatives 4 and 5 rely on NAPL containment and recovery and do not address NAPL source more directly, which will require long-term management. Alternative 6 is the most effective as it removes all source material and provides the greatest degree of permanence. Alternative 5, with the targeted removal, is more effective than Alternatives 3 and 4, which leave significantly more source material at the site. Alternatives 3, 4 and 5 require engineering and institutional controls (IC/EC) and developing and implementing Site Management Plan (SMP) to limit potential future exposures, which are all effective in managing long-term risk. Alternative 6 does not rely on IC/EC and SMP, and has the greatest degree of long term effectiveness and permanence.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 3 consists of continuing to collect impacted groundwater and NAPL, however, it does not address the source material and impacted sediments, hence it does not significantly reduce the toxicity, mobility or volume of remaining contamination. Alternatives 4 and 5, NAPL recovery, excavation of source material and off-site disposal, reduce the toxicity, mobility and volume of on-site waste to greater extent than Alternative 3 by transferring the material to an approved off-site treatment and/or disposal location. Alternatives 4 and 5 consist of removing approximately 6,150 cy and 16,100 cy of MGP impacted material, respectively. To the extent that this material is thermally treated, the volume and toxicity of the contamination would be permanently reduced. Alternative 4 includes capping impacted sediments which would limit the mobility but would not reduce toxicity or volume of the impacted sediments. Alternative 5 includes removal and off-site disposal of impacted sediment which will reduce the toxicity, mobility and volume of impacted sediments. Alternative 6 would reduce the toxicity, mobility and volume of contaminants to the greatest degree by removing approximately 182,000 cubic yard of soils exceeding unrestricted SCOs. Except for Alternatives 6, all other alternatives require a groundwater use restriction.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternative 3 does not include any intrusive activities, and as a result would pose minimal potential short term risks and potential disturbances to remedial workers and the surrounding community. Alternatives 4, 5 and 6 include ground intrusive activities e.g. excavation, installing barrier wall, and wells which would result in short term impacts. However, these impacts could be easily controlled though established technologies and practices. Among alternatives 4, 5 and 6, Alternative 4 will have least, and Alternative 6 will have greatest, short term impacts. The time needed to achieve the remediation goals is the shortest for Alternative 6 and longest for Alternative 3.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternative 3 is readily implementable because it does not require any additional construction. From a technical perspective Alternatives 4, 5 and 6 are implementable but require a detailed remedial design and proper equipment. Alternative 4 could be implemented more easily than alternative 5 because it needs less amount of material handling. However, Alternative 4 requires long term monitoring and maintenance of sediment cap which makes it less favorable to implement. Alternative 6 will disturb the most area of any of the remedies and significantly disrupt the surrounding community, making implementation much more difficult relative to Alternatives 4 and 5. Alternatives 4 and 5 require additional permits and approval to perform the remedial work in the creek and bank areas which will require coordination other agencies. Alternatives 3, 4, and 5 require long term groundwater/NAPL monitoring and MNR activities in off-site areas, which would require access agreements with owners of those properties.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The costs of the alternatives vary significantly. Alternative 3 has a low cost, but the source material, contaminated soil and sediment would not be addressed. Therefore, Alternative 3 is less cost effective. With its large volume of soil and sediment to be handled, Alternative 6 has significantly high capital cost and poses the greatest technical implementation difficulties and disruption to the surrounding community. Hence it is considered least cost effective alternative. The annual costs of Alternatives 4 and 5 are similar to each other, although the capital cost for Alternative 5 is higher than that of Alternative 4. Although the cost for implementing Alternative 5 is greater than Alternative 4, Alternative 5 addresses significantly more impacted site materials compared to Alternative 4 and removes impacted sediment instead of capping, which is in the long term is less effective remedy. Therefore, Alternative 4 is considered the most cost-effective alternative.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

The current and anticipated use of the site is industrial in the 8-acre fenced service center area and commercial in the 5-acre unfenced, wooded area. Alternative 3 would be less desirable because it does not address source material, MGP impacted soils and sediment and would remain on the property whereas Alternative 4, 5 and 6 would address that contamination. However, the remaining contamination under Alternatives 4 and 5 would be controllable with the placement of the cover, imposition of an environmental easement and implementation of a Site Management Plan. The service center is covered with building slabs, asphalt pavement and a gravel cover, which provides a cover that meets the requirements for both commercial and industrial land use. As a result, there is only a minor incremental effort required to achieve a commercial remedy for the portion of the site currently used for industrial purposes. With Alternative 6, removing all source material, impacted soils and sediment, restrictions on the site use would not be necessary.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

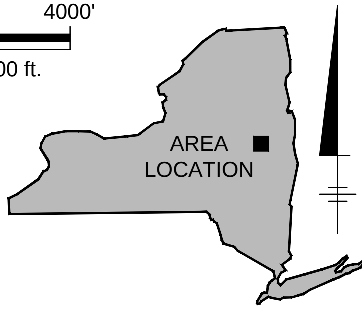
9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP were evaluated. A responsiveness summary was prepared that describes public comments received and the manner in which the Department will address the concerns raised.

Therefore, Alternative 5 (NAPL Barrier Wall, NAPL Recovery, Soil and Sediment Removal and Cover System) has been selected because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., GLOVERSVILLE, NEW YORK, 2013.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

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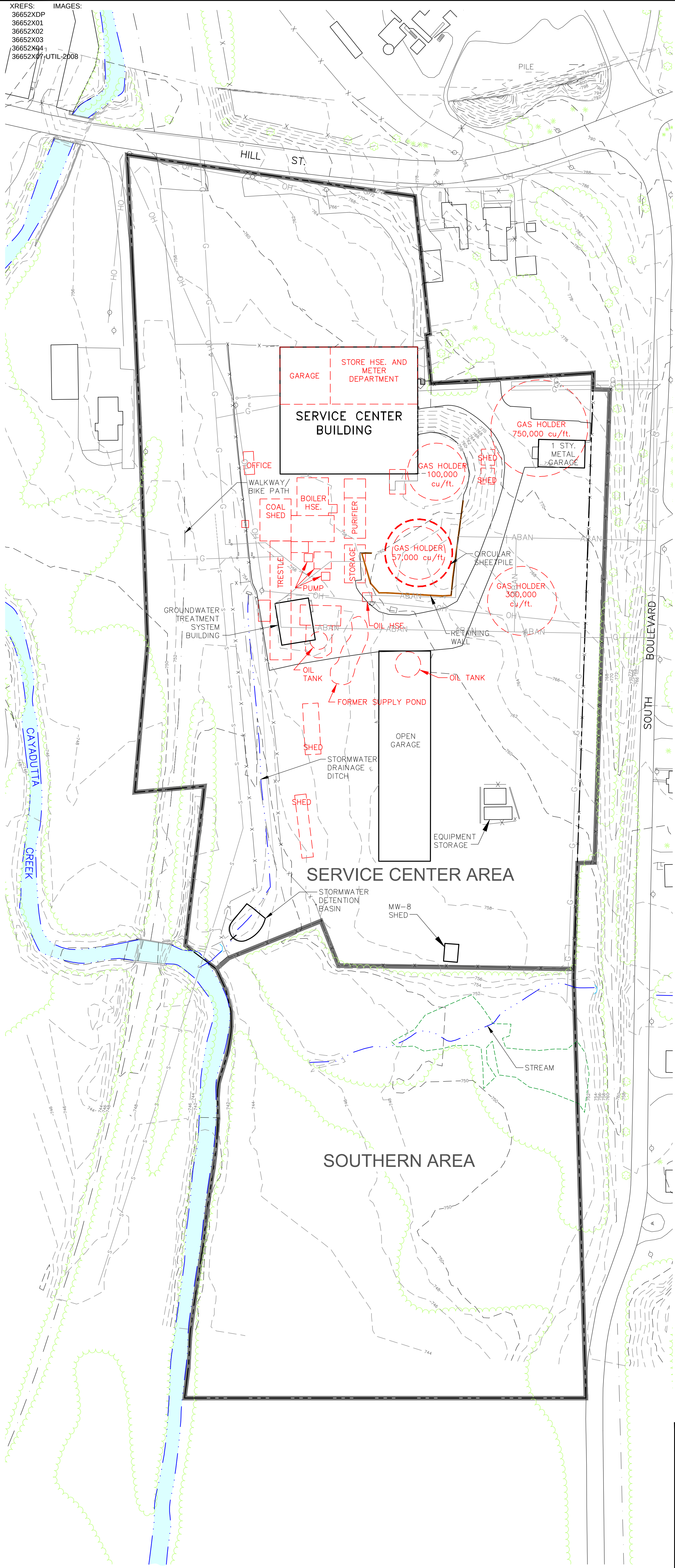

LEGEND:

- APPROXIMATE PROPERTY LINE
- HISTORICAL MGP STRUCTURE
- TOPOGRAPHIC ELEVATION CONTOUR
- WATER STREAM
- TREE LINE
- FENCE
- SANITARY LINE
- NATURAL GAS DISTRIBUTION LINE
- ELECTRICAL
- OVERHEAD
- ABANDONED
- UTILITY POLE
- IDENTIFIED WETLAND

NOTES:

1. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. THE NATIONAL GRID PROPERTY LINE SHOWN IS APPROXIMATE.
3. ALL LOCATIONS ARE APPROXIMATE.
4. BASEMAP PREPARED FROM ELECTRONIC SURVEY FILE PROVIDED BY NIAGARA MOHAWK ON 7/23/01. PRIMARY SURVEY CONTROL FOR PHOTOGRAMMETRIC MAPPING WAS ESTABLISHED FROM AN ON THE GROUND SURVEY, PERFORMED ON JULY 28, 1994 USING THE GLOBAL POSITIONING SYSTEM (GPS) AND CONFORMS TO ORDER 2 CLASS 2 FGCS ACCURACY SPECIFICATIONS. THE HORIZONTAL REFERENCE DATUM NORTH AMERICAN DATUM OF 1983 (NAD 83) ON REFERENCE ELLIPSOID ASSOCIATED WITH THE GEODETIC REFERENCE SYSTEM OF 1980 (GRS 80). THE COORDINATES ARE BASED ON THE NEW YORK STATE PLANE GEODETIC SYSTEM OF 1983 (EASTERN ZONE 3101).
5. EXISTING SITE FEATURES BASED ON "ASBUILT SURVEY" PROVIDED BY STANTEC ON 7/18/08.
6. FORMER LOCATIONS OF SITE FEATURES WERE DIGITIZED FROM PHOTOCOPIES OF FIGURES 2-4 & 2-5 FROM THE JUNE 1993 "GLOVERSVILLE MGP SITE IRM REPORT" BY ATLANTIC ENVIRONMENTAL SERVICES, INC., WHICH WERE BASED ON SANBORN INSURANCE MAPS, AND ARE APPROXIMATE ONLY.

0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER, E. KRAHMER PM/TM: J. BRIEN TR: S. POWLIN LYR: ON=*;OFF=REF, (FRZ)
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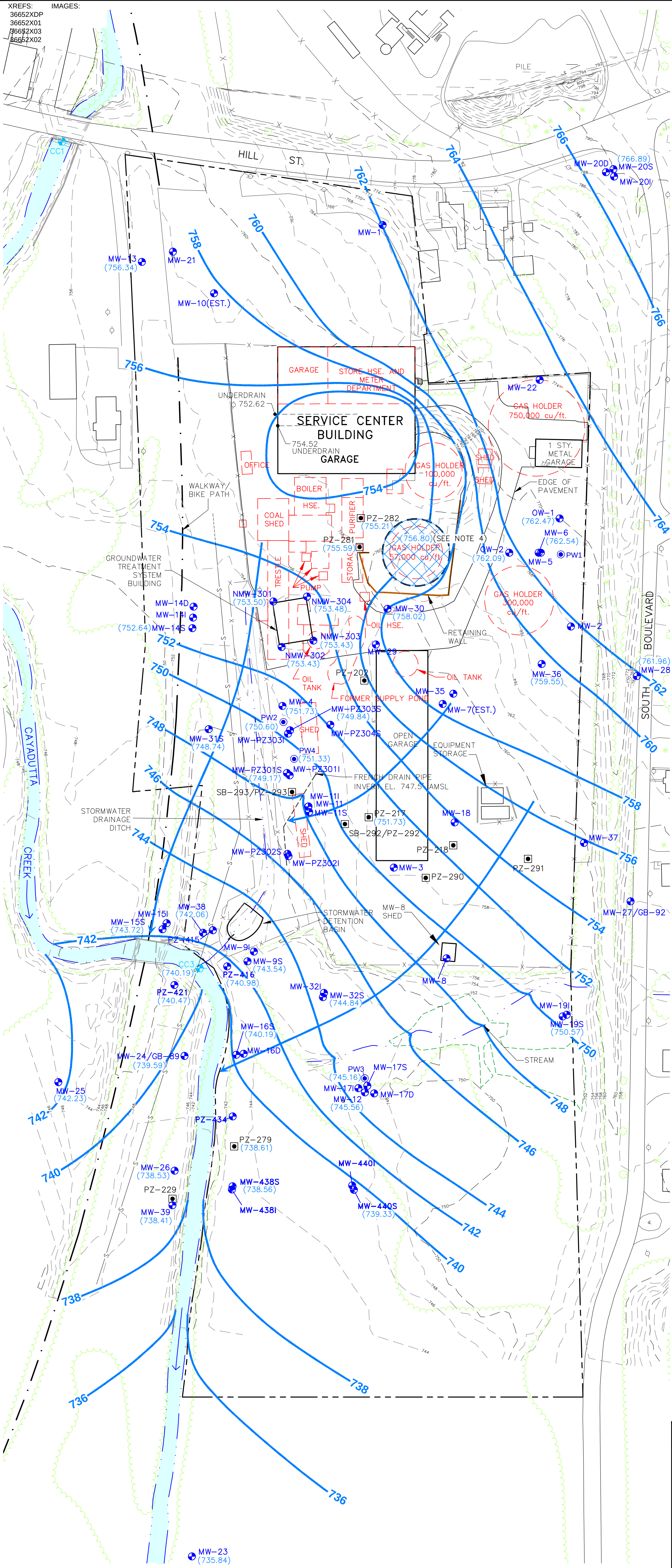

LEGEND:

MW-19I	MONITORING WELL
PZ-291	PIEZOMETER
PW-1	PUMPING WELL
CC1	STREAM GAUGE
	HISTORICAL MGP STRUCTURE
746	TOPOGRAPHIC ELEVATION CONTOUR
	PROPERTY LINE
	WATER
	TREE LINE
	FENCE
S	SANITARY SEWER
	UTILITY POLE
(762.09)	GROUNDWATER ELEVATION
754	INFERRED GROUNDWATER ELEVATION CONTOUR
	INFERRED GROUNDWATER FLOW DIRECTION

NOTES:

1. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. THE NATIONAL GRID PROPERTY LINE SHOWN IS APPROXIMATE.
3. ALL LOCATIONS ARE APPROXIMATE.
4. GROUNDWATER ELEVATION INSIDE FORMER RELIEF HOLDER BASED ON APPROXIMATE ELEVATION OF LOWEST POINT OF CIRCULAR SHEET PILING
5. BASEMAP PREPARED FROM ELECTRONIC SURVEY FILE PROVIDED BY NIAGARA MOHAWK ON 7/23/01. PRIMARY SURVEY CONTROL FOR PHOTOGRAMMETRIC MAPPING WAS ESTABLISHED FROM AN ON THE GROUND SURVEY, PERFORMED ON JULY 28, 1994 USING THE GLOBAL POSITIONING SYSTEM (GPS) AND CONFORMS TO ORDER 2 CLASS 2 FGCS ACCURACY SPECIFICATIONS. THE HORIZONTAL REFERENCE DATUM NORTH AMERICAN DATUM OF 1983 (NAD 83) ON REFERENCE ELLIPSOID ASSOCIATED WITH THE GEODETIC REFERENCE SYSTEM OF 1980 (GRS 80). THE COORDINATES ARE BASED ON THE NEW YORK STATE PLANE GEODETIC SYSTEM OF 1983 (EASTERN ZONE 3101).
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8. INVESTIGATION LOCATIONS COMPLETED AS PART OF THE FOLLOWING INVESTIGATIONS:
   - INITIAL SITE SURVEY (EBASCO, 1983)
   - SUPPLEMENTAL SITE SURVEY (EBASCO, 1985A)
   - PSA/IRM STUDY (ATLANTIC, 1993)
   - REMEDIAL INVESTIGATION (PARSONS, 1997)
   - SOIL AND SEDIMENT INVESTIGATION (STEARNS & WHELER, 2000)
   - ADDITIONAL INVESTIGATION (STEARNS & WHELER, 2002)
   - RI/FS PHASE I DNI (ARCADIS, 2008B)
   - RI/FS PHASE II DNI
   - FS DATA NEEDS INVESTIGATION (2015)

0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

WATER TABLE CONTOURS
MARCH 30, 2016

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

CITY: SYRACUSE, NY GROUP: ENV/IM-DV DB: P. LISTER, K.SARTORI, R. ALLEN PM/TM: J. BRIEN TR: D.RODRIGUEZ LYR: ON=*;OFF=REF, (FRZ)
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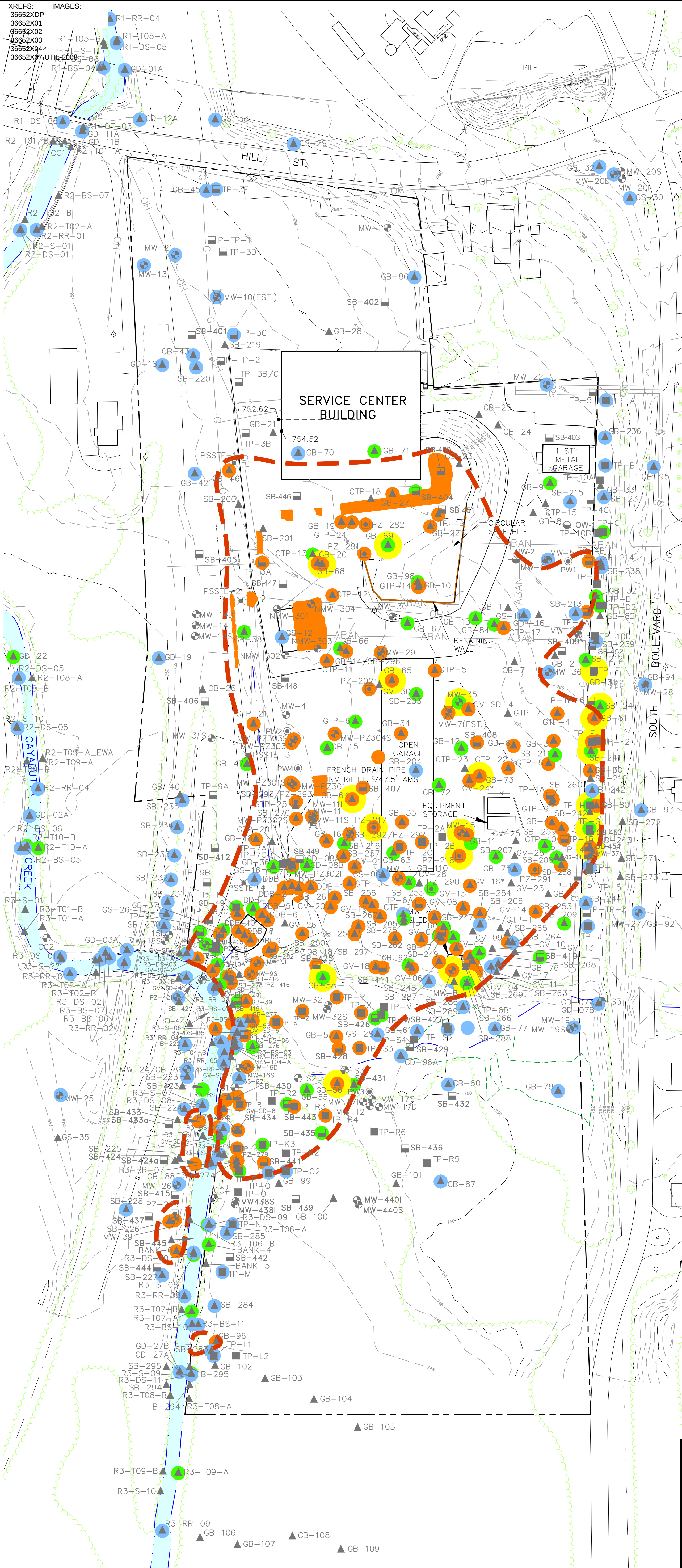

LEGEND:

- APPROXIMATE PROPERTY LINE
- TOPOGRAPHIC ELEVATION CONTOUR
- WATER STREAM
- TREE LINE
- FENCE
- SANITARY LINE
- NATURAL GAS DISTRIBUTION LINE
- ELECTRICAL
- OVERHEAD
- ABANDONED
- UTILITY POLE
- IDENTIFIED WETLAND
- OW-2 OBSERVATION WELL
- PW1 PUMPING WELL
- NMW-301 MONITORING WELL
- PZ-290 PIEXOMETER
- SB-445 ANGLED SOIL BORING, ARROW INDICATES DIRECTION OF ANGLE
- GB-61 SOIL BORING
- DDB-1 DRAINAGE DITCH SOIL BORING
- TARGOST PROBING LOCATION
- * CONFIRMATION BORING COMPLETED AT THIS LOCATION
- PSSTE-4 TEST EXCAVATION LOCATION
- TP-G, TP-1B, GTP-10 TEST PIT
- CC1 STREAM GAUGE
- MW-2 MONITORING WELL OR PIEZOMETER DESTROYED OR OTHERWISE INACCESSIBLE
- PROBABLE NAPL CONTAINING AREA
- NAPL (TRACE TO SATURATED AMOUNTS)
- SHEEN
- PAHs > 500 ppm AND BTEX > 10 ppm
- PAHs < 500 ppm, BTEX < 10 ppm, AND NO VISUAL IMPACTS

NOTES:

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7. NAPL AND SHEEN OBSERVATIONS AT ANGLE BORINGS SHOW APPROXIMATE HORIZONTAL LOCATION OF VISUAL IMPACTS.

0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

PROBABLE NAPL CONTAINING AREA

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

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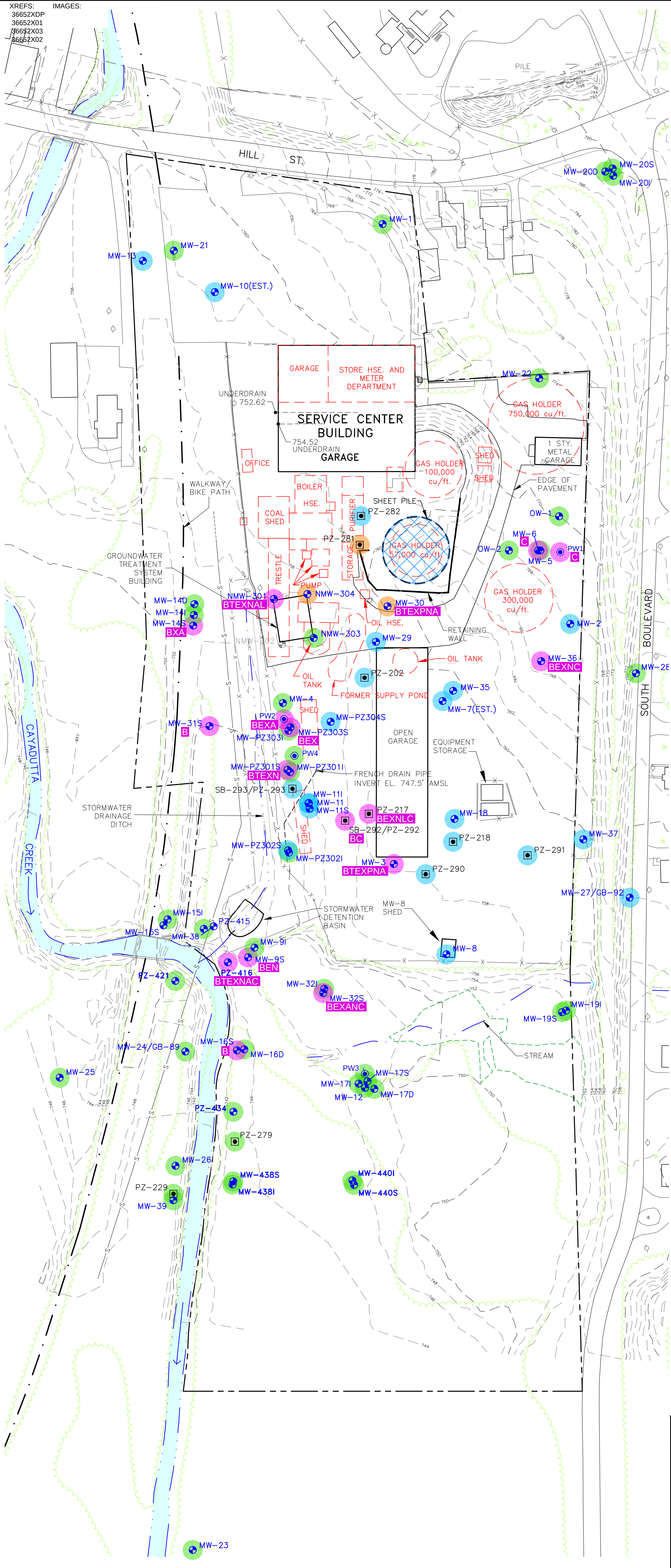

LEGEND:

MW-19I	MONITORING WELL
PZ-291	PIEZOMETER
PW-1	PUMPING WELL
	HISTORICAL MGP STRUCTURE
746	TOPOGRAPHIC ELEVATION CONTOUR
	PROPERTY LINE
	WATER
	TREE LINE
	FENCE
S	SANITARTY SEWER
	UTILITY POLE
	GROUNDWATER SAMPLE ANALYZED BUT NO EXCEEDANCE
BTEXPNALC	MOST RECENT GROUNDWATER SAMPLE CONTAINED ONE OR MORE CONSTITUENTS AT A CONCENTRATION GREATER THAN THE NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE (TOGS 1.1.1. JUNE 1996), THE LETTER GIVEN REPRESENTS THE COMPOUND(s) THAT EXCEED THEIR RESPECTIVE STANDARD, AS FOLLOWS: B = BENZENE T = TOLUENE E = ETHYLBENZENE X = XYLENES P = BENZO(a)PYRENE N = NAPHTHALENE A = ACENAPHTHENE L = PHENOL C = CYANIDE * EXCEEDANCES OF GUIDANCE VALUES ARE NOT PROVIDED
	NAPL OBSERVED IN WELL IN APRIL 2016
	DID NOT SAMPLE GROUNDWATER BECAUSE WELL WAS DESTROYED, COULD NOT BE LOCATED, OR CONTAINED NAPL

NOTES:

1. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. THE NATIONAL GRID PROPERTY LINE SHOWN IS APPROXIMATE.
3. ALL LOCATIONS ARE APPROXIMATE.
4. GROUNDWATER SAMPLES COLLECTED FROM APRIL 4 TO APRIL 18, 2016.

0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

GROUNDWATER SAMPLING RESULTS - APRIL 2016

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FIGURE
5

CITY: SYRACUSE, NY GROUP: ENV/IM-DV DB: P. LISTER, K.SARTORI, R. ALLEN PM/TM: J. BRIEN TR: D.RODRIGUEZ LYR: ON=*;OFF=REF, (FRZ)
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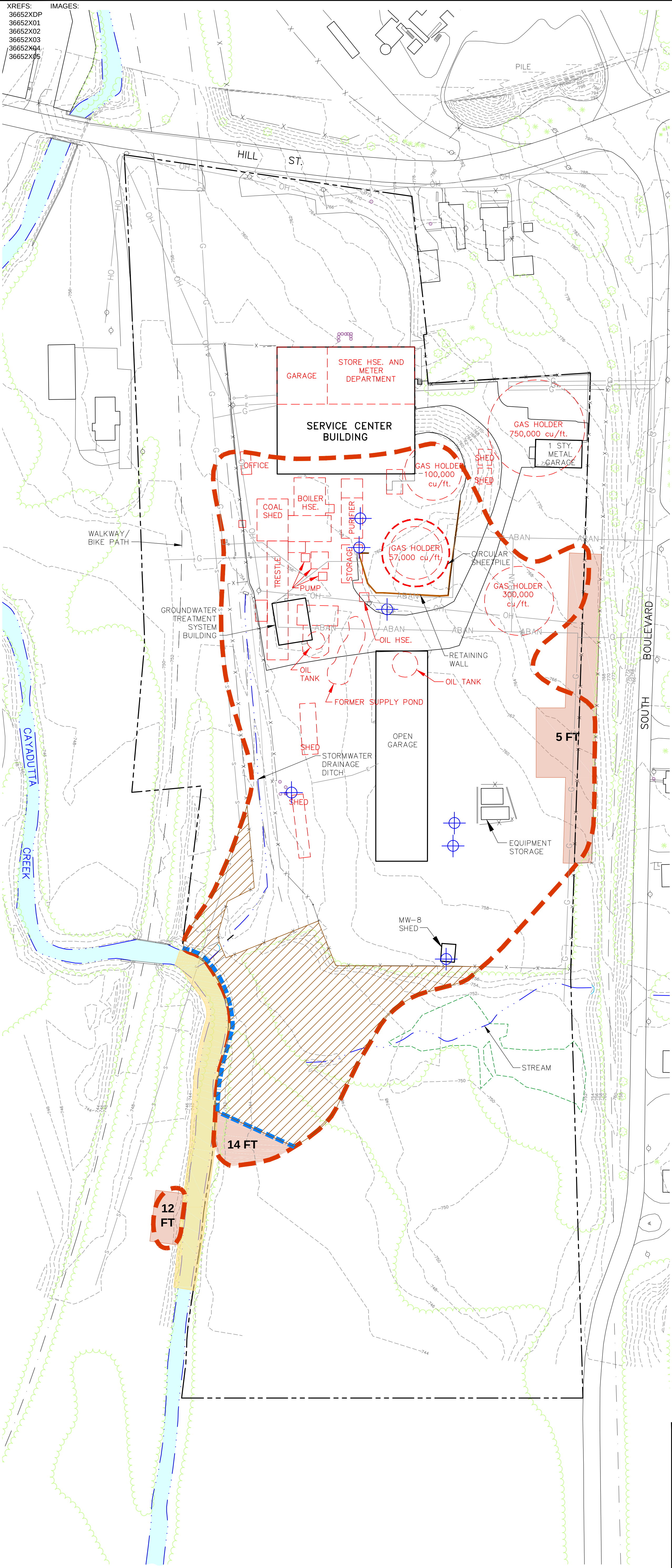

LEGEND:

- APPROXIMATE PROPERTY LINE
- HISTORICAL MGP STRUCTURE
- TOPOGRAPHIC ELEVATION CONTOUR
- WATER STREAM
- TREE LINE
- FENCE
- SANITARY LINE
- NATURAL GAS DISTRIBUTION LINE
- ELECTRICAL
- OVERHEAD
- ABANDONED
- UTILITY POLE
- IDENTIFIED WETLAND
- PROBABLE NAPL CONTAINING AREA
- 12 FT LIMITS AND DEPTH OF EXCAVATION AREA
- LIMITS OF SURFACE SOIL EXCAVATION AND SOIL COVER
- LIMITS OF SEDIMENT CAPPING AREA
- NAPL BARRIER WALL
- NAPL RECOVERY WELL

NOTES:

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0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

REMEDIAL ALTERNATIVE 4
NAPL Barrier Wall, NAPL Recovery, Soil Removal, and Capping of the Sediments

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FIGURE
6

CITY: SYRACUSE, NY GROUP: ENV/IM-DV DB: P. LISTER, K.SARTORI, R. ALLEN PM/TM: J. BRIEN TR: D.RODRIGUEZ LYR: ON=*;OFF=REF, (FRZ)
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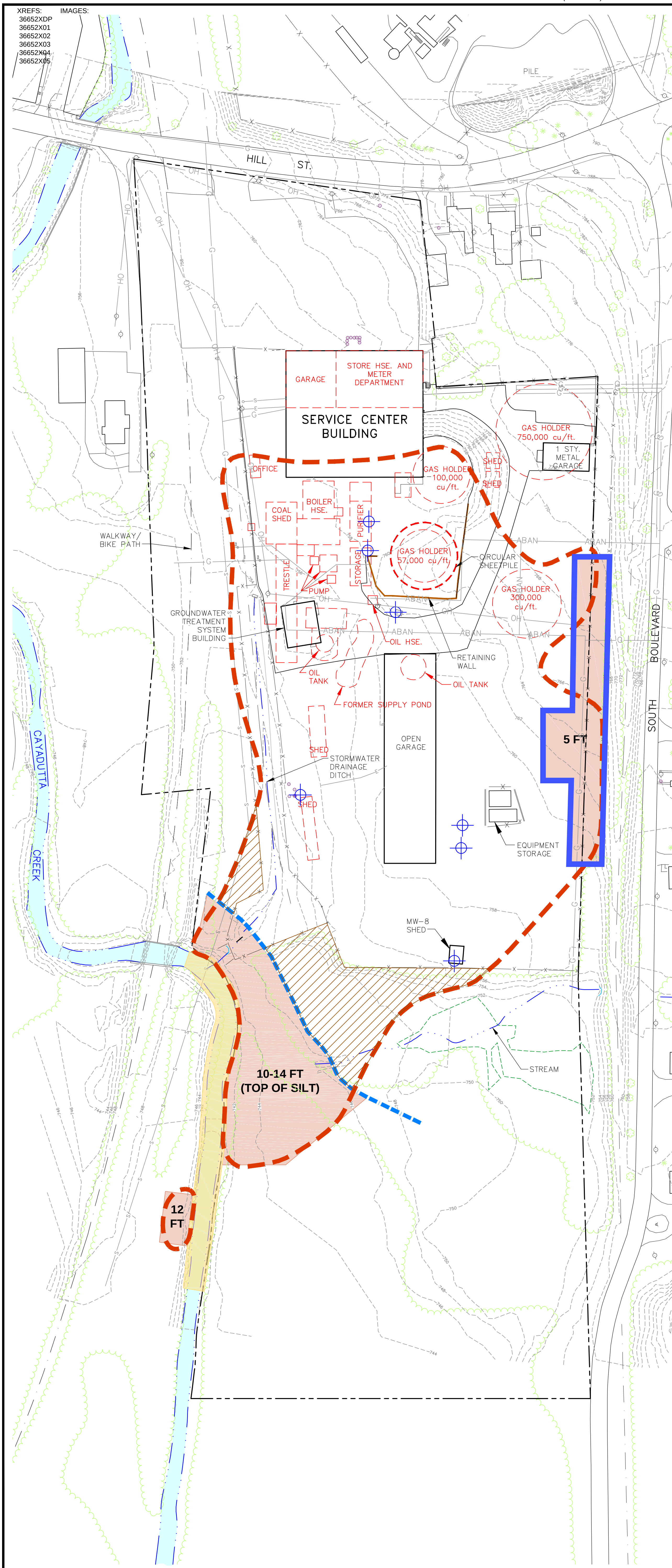


LEGEND:

- APPROXIMATE PROPERTY LINE
- HISTORICAL MGP STRUCTURE
- TOPOGRAPHIC ELEVATION CONTOUR
- WATER STREAM
- TREE LINE
- FENCE
- SANITARY LINE
- NATURAL GAS DISTRIBUTION LINE
- ELECTRICAL
- OVERHEAD
- ABANDONED
- UTILITY POLE
- IDENTIFIED WETLAND
- PROBABLE NAPL CONTAINING AREA
- 12 FT — LIMITS AND DEPTH OF EXCAVATION AREA
- LIMITS OF SURFACE SOIL EXCAVATION AND SOIL COVER
- LIMITS OF SEDIMENT REMOVAL AREA
- NAPL BARRIER WALL
- NAPL RECOVERY WELL

NOTE: ALL LIMITS OF EXCAVATION AREAS, SOIL COVER & SEDIMENT REMOVAL AREAS ARE APPROXIMATE.

APPROXIMATE MGP PURIFER WASTE DISPOSAL AREA POTENTIALLY CONTAINING POLY AROMATIC HYDROCARBONS (PAHs), CYANIDES AND OTHER MGP RELATED CONSTITUENTS OF CONCERNS.

NOTES:

1. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. THE NATIONAL GRID PROPERTY LINE SHOWN IS APPROXIMATE.
3. ALL LOCATIONS ARE APPROXIMATE.
4. BASEMAP PREPARED FROM ELECTRONIC SURVEY FILE PROVIDED BY NIAGARA MOHAWK ON 7/23/01. PRIMARY SURVEY CONTROL FOR PHOTOGRAMMETRIC MAPPING WAS ESTABLISHED FROM AN ON THE GROUND SURVEY, PERFORMED ON JULY 28, 1994 USING THE GLOBAL POSITIONING SYSTEM (GPS) AND CONFORMS TO ORDER 2 CLASS 2 FGCS ACCURACY SPECIFICATIONS. THE HORIZONTAL REFERENCE DATUM NORTH AMERICAN DATUM OF 1983 (NAD 83) ON REFERENCE ELLIPSOID ASSOCIATED WITH THE GEODETIC REFERENCE SYSTEM OF 1980 (GRS 80). THE COORDINATES ARE BASED ON THE NEW YORK STATE PLANE GEODETIC SYSTEM OF 1983 (EASTERN ZONE 3101).
5. EXISTING SITE FEATURES BASED ON "ASBUILT SURVEY" PROVIDED BY STANTEC ON 7/18/08.
6. FORMER LOCATIONS OF SITE FEATURES WERE DIGITIZED FROM PHOTOCOPIES OF FIGURES 2-4 & 2-5 FROM THE JUNE 1993 "GLOVERSVILLE MGP SITE IRM REPORT" BY ATLANTIC ENVIRONMENTAL SERVICES, INC., WHICH WERE BASED ON SANBORN INSURANCE MAPS, AND ARE APPROXIMATE ONLY.

NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

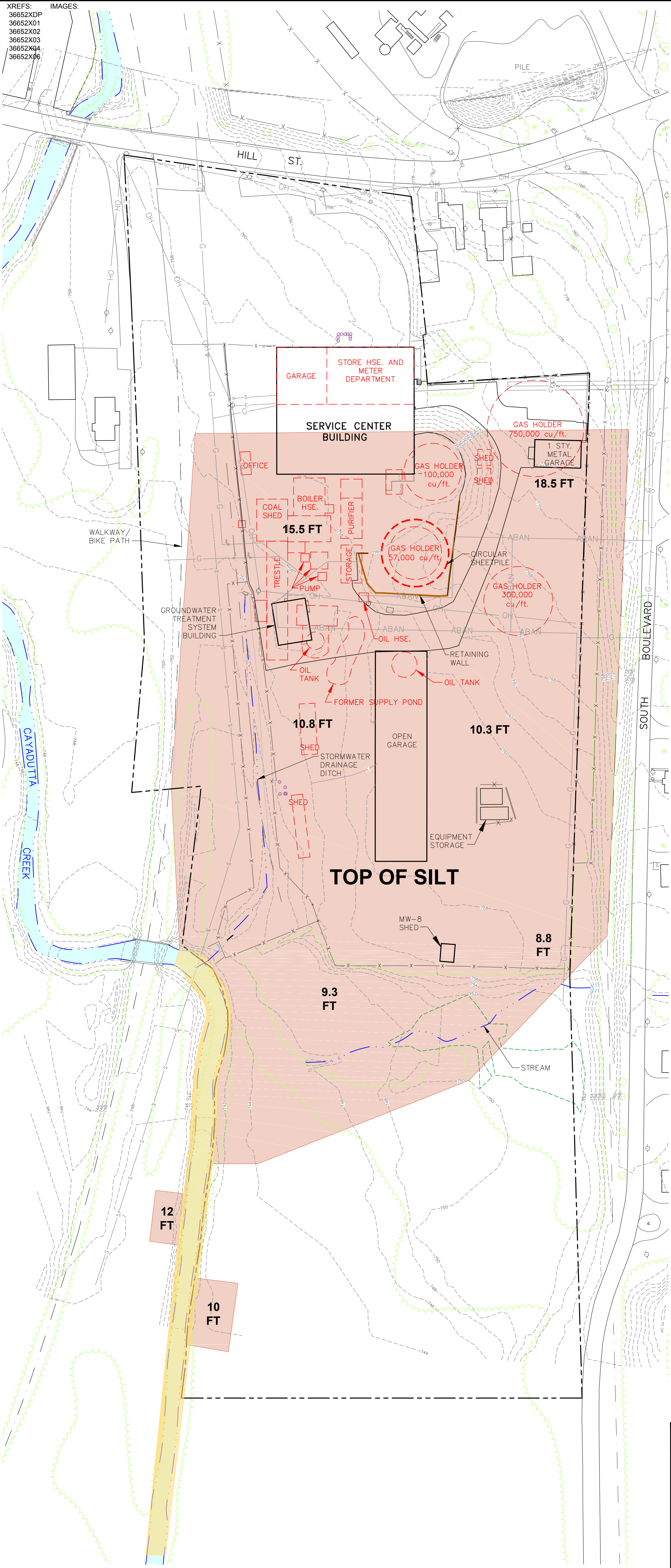
REMEDIAL ALTERNATIVE 5

NAPL Barrier Wall, NAPL Recovery, Soil and Sediment Removal and Cover System

ARCADIS Design & Consultancy for natural and built assets

FIGURE
7

XREFS: IMAGES:
36652XDP
36652X01
36652X02
36652X03
36652X04
36652X06



LEGEND:

- APPROXIMATE PROPERTY LINE
- HISTORICAL MGP STRUCTURE
- TOPOGRAPHIC ELEVATION CONTOUR
- WATER STREAM
- TREE LINE
- FENCE
- SANITARY LINE
- NATURAL GAS DISTRIBUTION LINE
- ELECTRICAL
- OVERHEAD
- ABANDONED
- UTILITY POLE
- IDENTIFIED WETLAND
- 12 FT LIMITS AND DEPTH OF EXCAVATION AREA
- LIMITS OF SEDIMENT REMOVAL AREA

NOTES:

1. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. THE NATIONAL GRID PROPERTY LINE SHOWN IS APPROXIMATE.
3. ALL LOCATIONS ARE APPROXIMATE.
4. BASEMAP PREPARED FROM ELECTRONIC SURVEY FILE PROVIDED BY NIAGARA MOHAWK ON 7/23/01. PRIMARY SURVEY CONTROL FOR PHOTOGRAMMETIC MAPPING WAS ESTABLISHED FROM AN ON THE GROUND SURVEY, PERFORMED ON JULY 28, 1994 USING THE GLOBAL POSITIONING SYSTEM (GPS) AND CONFORMS TO ORDER 2 CLASS 2 FGCS ACCURACY SPECIFICATIONS. THE HORIZONTAL REFERENCE DATUM NORTH AMERICAN DATUM OF 1983 (NAD 83) ON REFERENCE ELLIPSOID ASSOCIATED WITH THE GEODETIC REFERENCE SYSTEM OF 1980 (GRS 80). THE COORDINATES ARE BASED ON THE NEW YORK STATE PLANE GEODETIC SYSTEM OF 1983 (EASTERN ZONE 3101).
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NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK
FEASIBILITY STUDY REPORT

REMEDIAL ALTERNATIVE 6

Soil Excavation to Unrestricted Use SCOs and Sediment Removal to Background Conditions

ARCADIS Design & Consultancy for natural and built assets

FIGURE
8

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

NM-Hill St. – Gloversville MGP
State Superfund (SSF) Project
Gloversville, Fulton County New York
Site No. 518021

The Proposed Remedial Action Plan (PRAP) for the NM-Hill St. – Gloversville MGP site was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on January 30, 2019. The PRAP outlined the remedial measure proposed for the contaminated soil, sediment, surface water, and groundwater at the NM-Hill St. – Gloversville MGP site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on February 21, 2019, which included a presentation of the remedial investigation and feasibility study for SSF for the NM-Hill St. – Gloversville MGP site as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 1, 2019.

This responsiveness summary responds to all questions and comments raised during the public comment period.

Arcadis on behalf of National Grid submitted a letter (dated February 26, 2019) which included the following comments:

COMMENT 1: Section 3 – As a clarification, a portion of the southern portion of the Service Center Area has been covered with asphalt pavement in the past year. To support the paving efforts, groundwater monitoring wells were decommissioned in accordance with NYSDEC's CP-43 and pursuant to the June 28, 2017 NYSDEC-approved letter work plan. The paved area is approximately 50-feet-wide along the east, west and south sides of the existing pole barn structure located in the center of the property. Arcadis presented the paving plan in 12/13/18 and 12/19/18 emails to NYSDEC prior to the paving activities.

RESPONSE 1: The Department acknowledges the clarification. The relevant text will be revised to indicate that portion of the service center areas is paved.

COMMENT 2: Section 6.2 – Summary of Environmental Assessment – The PRAP indicates, "*Between 2000 and 2007, approximately 8,000 gallons of coal tar and contaminated water were removed from well MW-8 located along the southern boundary of service center area*." The coal tar and impacted water removal should be considered an IRM and be included in Section 6.2.

Stearns & Wheler, Inc. (Stearns & Wheler) constructed the MW-8 IRM during 2000 to recover NAPL from the monitoring well for offsite disposal. The MW-8 NAPL recovery IRM system consisted of an electric, well-mounted, Blackhawk piston pump controlled by a variable frequency drive (VFD). The MW-8 IRM removed a mixture of coal tar-NAPL and groundwater from existing MW-8 and piped the material to a 500-gallon steel storage tank equipped with a high-level switch. The well, pump and storage tank were housed in a wooden shed. The waste material was transported for offsite thermal treatment and disposal at the Norlite Corporation (Norlite) facility in Cohoes, New York. The waste material was characterized as a Resource Conservation and Recovery Act (RCRA) characteristically hazardous waste for both toxicity (due to benzene - D018) and ignitability (D001).

Over the course of the MW-8 IRM's operation, disposal records indicate that more than 8,000 gallons of the NAPL and water mixture were removed from the well with water making up an estimated 90% of the mixture.

Arcadis submitted to the NYSDEC a March 15, 2007 letter report presenting an MW-8 engineering evaluation and monitoring well MW-8 investigation. This report was also included as part of Attachment 2 to the Remedial Investigation Report, which is included in the public record. Based on the engineering evaluation and MW-8 investigation, National Grid proposed (and the NYSDEC approved) shutting down the MW-8 IRM and addressing the environmental concerns in this area of the site as part of the overall site remedy

RESPONSE 2: While the Department acknowledges the details of the NAPL recovery from well MW-8, the recovery effort was not tracked as an Interim Remedial Measure by the Department. As a result, that recovery effort is described in Section 6.3, Summary of Environmental Assessment instead of Section 6.2, Interim Remedial Measures.

COMMENT 3: Section 7 – Summary of the Proposed Remedy – Bullet 4 – Sediment and Bank Soils Removal - The PRAP indicates for the Sediment and Bank Soils Removal portion of the selected remedy:

Excavation and off-site disposal of Cayadutta Creek sediments and bank soils located adjacent to and downstream of the site including soil or sediment:

- *that is grossly contaminated, as defined in 6 NYCRR Part 375-1.2(u);*
- *that contains visual impacts of non-aqueous phase liquids, sheen or which produce a visible sheen when agitated in-situ;*
- *that are discolored and smell like coal tar;*
- *bank soils which exceed unrestricted use SCOs; and*
- *sediment impacted by the site contamination and which exceeds Class A freshwater sediment guidance values in the Department's Screening and Assessment of Contaminated Sediment.*

Gloversville has a rich history of industrial activity that has contributed contaminants to the Cayadutta Creek including PAHs. This is supported by the findings presented in Blasland, Bouck & Lee, Inc.'s January 2002 Cayadutta Creek investigation Summary Report.

The selected remedy indicates a cleanup objective of “site contamination and which exceeds Class A freshwater sediment guidance values in the Department’s Screening and Assessment of Contaminated Sediment”. The Class A total PAH guidance value presented in this document is 4 parts per million, which is less than typical background concentrations in the Cayadutta Creek.

NYSDEC has established precedence for allowing sediment cleanup objectives to be established based on a site-specific background study. National Grid requests that the last bullet of the selected remedy language presented above be modified to read:

“Addressing Cayadutta Creek sediments and bank soils located adjacent to and downstream of the site including soil or sediment:

that is grossly contaminated, as defined in 6 NYCRR Part 375-1.2(u);

- *that contains visual impacts of non-aqueous phase liquids, sheen or which produce a visible sheen when agitated in-situ;*
- *that are discolored and smell like coal tar;*
- *bank soils which exceed unrestricted use SCOs; and*
- *sediment impacted by site-related PAHs at concentrations greater than background levels.”*

National Grid will propose additional sediment and bank soil investigation activities as part of Pre-Design Investigation (PDI) activities in the Remedial Design Work Plan (RDWP) following submittal of the Record of Decision.

RESPONSE 3: The Department recognizes that industrial activity upstream of the site may have contributed to the sediment contamination including PAHs and should be considered in the determining the cleanup level. As a result, the Department agrees to revise the last bullet to “*sediment impacted by site-related PAHs at concentrations greater than background levels*.

COMMENT 4: Section 7 – Summary of the Proposed Remedy – Bullet 10 – Site Management Plan -

The PRAP indicates for the Site Management Plan portion of the selected remedy:
“*a provision for removal or treatment of the source area located south of the service center building (area known as probable NAPL source), if the coal tar NAPL recovery remedy described in paragraph 6 above is deemed ineffective*.”

As indicated in the Feasibility Study, a long-term NAPL monitoring and recovery program would be established following installation of the wells to remove NAPL from the NAPL collection sumps (within the NAPL barrier wall) and NAPL recovery wells to reduce the volume/mass of NAPL at the site and reduce the potential for future migration of NAPL to Cayadutta Creek. The objective of the barrier wall and NAPL recovery program is to prevent future migration of coal tar to Cayadutta Creek.

Significant improvements have already been made to reduce the flux of coal tar NAPL to Cayadutta Creek through the implementation of the Storm Sewer IRM and operation of the on-site groundwater treatment system. National Grid respectfully requests that the PRAP language is revised in the ROD to indicate*: "A monitoring program to periodically inspect the Cayadutta Creek bank will be conducted to confirm coal tar is no longer migrating to the creek."*

RESPONSE 4: NAPL present in the area south of the service center building is the source of the contamination. Addressing sources of contamination is a fundamental component of the Department's remedial program, and removal and/or treatment of sources is the highest priority in the hierarchy of source control measures (6NYCRR Part 375-1.8(c)). The monitoring of potential NAPL migration to the creek fails to address the source of contamination, hence it is not sufficient. National Grid will need to address the source of the contamination. Having recognized that excavating source material for off-site disposal may not be practical, the Department changes the text to "*a provision to address the source area located south of the service center building (area known as probable NAPL source), if the coal tar NAPL recovery remedy described in paragraph 6 above is deemed ineffective*." This will provide an opportunity to evaluate other alternatives based on the site conditions prevailing at that time.

APPENDIX B

Administrative Record

Administrative Record

NM-Hill St. – Gloversville MGP
State Superfund (SSF) Project
Gloversville, Fulton County New York
Site No. 518021

1. *Proposed Remedial Action Plan (PRAP) for the* NM-Hill St. – Gloversville MGP *site,* dated January 2019, prepared by the Department.

2. Order on Consent, Index No. A4-0473-0000, between the Department and Niagara Mohawk Power Corporation, executed on November 07, 2003 which superseded and replaced Consent Order D0-0001-9210 executed on December 7, 1992.

3. "Purifier Waste Removal Interim Remedial Measure (IRM) Closure report" dated March 1995, prepared by Atlantic Environmental Services, Inc.

4. "Former Holder No.3 Interim Remedial Measure (IRM) Summary Report" dated October 2001 and Addendum 1, dated July 2002, prepared by Foster Wheeler Environmental Corporation.

5. "Storm Sewer Interim Remedial Measure Engineering Certification Report" dated July 2011, prepared by Arcadis.

6. "Remedial Investigation Report," dated November 2013, prepared by Arcadis.

7. "Feasibility Study Report," dated February 2017 prepared by Arcadis.

8. "Citizen Participation Plan (CPP)," dated February 2019, prepared by Arcadis.

9. PRAP comment Letter, dated February 26, 2019, from Arcadis on behalf of National Grid.