PROPOSED REMEDIAL ACTION PLAN

OR - Fulton Ave. - Middletown MGP
Manufactured Gas Plant Program
Middletown, Orange County
Site No. 336030
February 2021

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

PROPOSED REMEDIAL ACTION PLAN

OR - Fulton Ave. - Middletown MGP
Middletown, Orange County
Site No. 336030
February 2021

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous substances associated with the former manufactured gas plant operations (MGP wastes) at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The contamination and media in which it is found at this site is more fully described in Section 6 of this document. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

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

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

MIDDLETOWN THRALL LIBRARY
12 Depot Street
Middletown, NY 10940
Phone: (845)-341-5454

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

Please note physical document repositories may be temporarily unavailable/limited hours due to COVID-19 precautions. Key project documents are also included on DEC Info Locator/On-line repository at:

https://www.dec.ny.gov/data/DecDocs/336030/

A public comment period has been set from:

February 24, 2021 to March 25th, 2021

A virtual public meeting will be held on March 11 at 7 pm via Webex (virtual platform). The public may participate in the virtual public meeting using the link and login information below:

https://meetny.webex.com/meetny/onstage/g.php?MTID=e874a957485716e6eaef2e97fee56029d

PH: 1-518-549-0500 Access Code: 185 718 6176 Password: Welcome1

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

Written comments may also be sent through **March 25th, 2021** to:

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

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

Receive Site Citizen Participation Information By Email

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

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The approximately 1.8-acre O&R Middletown Fulton Street Manufactured Gas Plant (MGP) site is located in a commercial area of Middletown in Orange County, NY. The former gas plant was located on the northeast corner of the intersection of Fulton and Canal Streets.

Site Features: One structure exists on the site, which currently houses both an auto body shop and a transmission shop. The site also includes the parking lot of the adjacent US Post Office, where a naphtha tank used during gas production was located. The site is predominantly covered by either pavement or structures except for some landscaped areas on the Post Office property.

Current Zoning and Land Use: The site is located in a recently rezoned area designated as Downtown Mixed Use (DMU-1). This zoning allows for various commercial purposes. It also allows for single and multi-use dwellings at the second floor or higher levels of a structure.

Past Use of the Site: From 1868 to 1952, the property was the site of a manufactured gas plant which made a combustible gas from coal. The site related contamination is coal tar, which was a condensate from the gas manufacturing process. Structures associated with the historic MGP operations include two gas holders, a tar cistern, a purifier, various oil tanks and a naphtha tank.

In 1985, before the site entered into a remedial program with the Department, MGP impacted soil was removed when it was encountered by a previous property owner during site redevelopment. NYSDEC provided oversight during these activities. The tar cistern and its contents were removed along with 750 tons of impacted soil. Concrete was used to stabilize the excavation and, backfill was placed on top.

Site Geology and Hydrogeology: The soils underlying the site vary significantly as a result of both human activity and geologic processes. Below the pavement or topsoil is a layer of fill material which is generally 5 to 10 feet thick, but which increases in the vicinity of MGP structures. Underlying the fill is a highly variable alluvium which contains layers of silt, clay and gravel. Underlying the alluvium is a glacial till. The upper portion of the till contains sand lenses and fractures. The lower portion of the till is highly compacted and of low permeability. Depth to the till unit varies across the site from approximately 13 feet to 32 feet.

Depth to groundwater varies across the site from approximately 3 to 11 feet below ground surface. The groundwater flow is generally toward, and then along, the historic location of the Monhagan Brook which flows west to east. As such, groundwater generally flows across the site to the southeast.

A site location map is attached as Figure 1, and a site boundary map is attached as Figure 2

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use

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

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

SECTION 5: ENFORCEMENT STATUS

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

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

Orange & Rockland Utilities

The NYSDEC and Orange and Rockland Utilities Inc. (O&R) entered into a series of Consent Orders including D3-0002-9412, dated February 8, 1996, and D3-001-98-03, dated September 29, 1998. Together these orders obligate O&R to investigate and, as necessary, remediate this site.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

The following general activities are conducted during an RI:

- research of historical information,
- geophysical survey to determine the lateral extent of wastes,
- test pits, soil borings, and monitoring well installations,
- sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- sampling of surface water and sediment,
- ecological and human health exposure assessments.

The analytical data collected on this site includes data for:

- groundwater
- 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
benzene, toluene, ethylbenzene and xylenes (BTEX)
chrysene
naphthalene
polycyclic aromatic hydrocarbons (PAHS), total
benzo(a)pyrene
benzo(b)fluoranthene
indeno(1,2,3-cd)pyrene
benzo(a)anthracene

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

- groundwater
- soil

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.

There were no IRMs performed at this site during the RI.

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.

Nature and Extent of Contamination: Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs) and pesticides. Soil vapor and indoor air were analyzed for VOCs. Based upon investigations conducted to date, the primary contaminants of concern are coal tar and its associated compounds as follows: VOCs, including, benzene, toluene, ethylbenzene and xylene (collectively known as BTEX) and various SVOCs, including but not limited to, the polycyclic aromatic compounds (PAHs) benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, indeno(1,2,3-cd) pyrene and naphthalene.

Soil: Coal tar impacts were observed in numerous soil borings across the site and on adjacent properties. Impacts range from tar odors to coal tar saturated soil. The greatest impacts on-site were observed in the vicinity of the tar cistern and southern gas holder at depths ranging from approximately 5 to 20 feet deep. The highest concentration of total BTEX on-site, 103 parts per million (ppm), was detected near the southern edge of the site, at a depth of 10-12 feet. Contamination has migrated off-site to the south/south-east beneath Fulton Street and has impacted soil beneath the post office and former Southwinds Empire State University property (currently a grocery store). Impacts were considerably deeper off-site than on-site and were observed at depths ranging from approximately 15 to 45 feet below grade. In general, the shallower off-site impacts consist of tar blebs and thin lenses of tar. Odor impacted soil was also observed on the post-office property. The most significant areas of off-site impacts were observed within depressions in the till unit that run parallel to Fulton Street, at depths of 20 feet or greater. Several feet of tar saturation have been observed within these depressions which are located beneath the post office and former Southwinds property. The till unit generally acts as a semi-confining layer and helps limit the migration of tar. The highest concentration of total BTEX off-site was detected beneath the post office property at a depth of 32-34 feet deep. Overall, the highest concentrations observed were benzene at 360 ppm compared to the protection of groundwater soil cleanup objective (PGWSCO) of 0.06 ppm, toluene at 840 ppm compared to the PGWSCO of 0.7 ppm, ethylbenzene at 260 ppm compared to the PGWSCO of 1 ppm, and xylene at 990 ppm compared to the PGWSCO of 1.6 ppm.

PAH contamination was detected in numerous soil samples collected both on-site and off-site. The most contaminated soil sample on-site was collected from a test pit located along Fulton Street. Total PAHs were detected at 22,590 ppm in a sample collected at a depth of 5.5 feet. Significant PAH contamination was observed in several borings off-site including SB-47 and SB-57. SB-47 is a boring located on the former SUNY Southwinds property and had total PAHs of 3,956 ppm at a depth interval of 23-24 feet deep. SB-57 is located in the landscaped area of the Post Office property and had total PAH concentration of 5,315 ppm in a sample collected at a depth interval of 35-38 feet. Overall, the highest individual concentrations of PAHs observed during the RI were benzo(a)anthracene at 160 ppm compared to PGWSCO of 1 ppm, benzo(b)fluoranthene at 79 ppm compared to RRSCO of 5.6 ppm, benzo(a)pyrene at 120 ppm compared to RRSCO of 1 ppm, chrysene at 160 ppm compared to PGWSCO of 1 ppm, indeno(1,2,3-cd) pyrene at 39 ppm compared to an RRSCO of 0.5 ppm, and naphthalene at 2,500 ppm compared to PGWSCO of 12 ppm.

Groundwater: Groundwater in the area has been impacted as a result of the former MGP operations. Groundwater contamination generally corresponds with the footprint of soil contamination and migrates off-site to the south/southeast. The most contaminated well on-site was MW-10 which is located downgradient of the holders and cistern areas. This well is screened into the till unit from approximately 20 to 30 feet below ground surface. BTEX (total) compounds were detected at 1,580 parts per billion (ppb) in the most recent sampling round. The highest concentrations were detected in off-site groundwater on the post office property (MW-8, MW-11, MW-19). Total BTEX was detected at a maximum concentration of 34,500 ppb in MW-19, which is screened from approximately 15 to 25 feet. Overall, the highest detections observed during the RI were benzene at 16,000 ppb, toluene at 9,100 ppb, ethylbenzene at 5,100 ppb and xylene at 5,400 ppb. This is compared to their groundwater standards of 1 ppb for benzene and 5 ppb for toluene, ethylbenzene and xylene.

SVOCs including naphthalene and acenaphthene were detected in on-site groundwater at 1,300 ppb and 66 ppb compared to their respective groundwater standards of 10 ppb and 20 ppb. The PAH naphthalene was detected off-site at a maximum concentration of 14,000 ppb in MW-8. This well, located in front of the post-office, is screened from 18 to 28 feet. Based on the review of this sampling data, soil vapor intrusion is not a concern for the post office building and therefore no further action is recommended.

Soil Vapor/Sub-slab Vapor and Indoor Air: Soil vapor intrusion samples were collected from three buildings. Sub-slab and indoor air samples were collected from off-site buildings including the post office and the former SUNY Southwinds building. On-site, only sub-slab vapor samples were collected from the autobody and transmission shops because of the potential for interference in indoor air due to existing site operations.

Sub-slab vapor samples collected from the on-site body and transmission shop building shows toluene, xylene and benzene in the sub-slab soil vapor at levels up to 290, 156 and 35 micrograms per cubic meter (ug/m^3), respectively. Based on the current use of the building and the fact that the body shop likely uses products containing these same contaminants, contribution to indoor air impacts if soil vapor intrusion occurs is not expected to be a current concern.

However, the potential for soil vapor intrusion may be a future concern if the building uses changes where products containing site related contaminants would no longer be used in the building. Therefore, if the use changes, a soil vapor intrusion evaluation is recommended.

Soil vapor intrusion sampling was conducted for the off-site former SUNY Southwinds building. Concentrations of potential MGP contaminants in the sub-slab soil vapor at the former SUNY Southwinds property were low. The potential MGP contaminants isopentane, toluene and xylene were detected in sub-slab soil vapor at maximum concentrations of 42, 52 and 38 ug/m^3, respectively. The maximum detections in indoor air for these contaminants were 7.8, 4 and 1 ug/m^3, respectively, comparable to ambient air concentrations. Based on a review of this sampling data, soil vapor intrusion is not a concern for the former SUNY Southwinds building. However, if new construction occurs on this parcel, a soil vapor intrusion evaluation is recommended.

Soil vapor intrusion sampling conducted at the off-site post office building showed several potential MGP contaminants were detected in the sub-slab soil vapor including isopentane, toluene and xylene at maximum concentrations of 50, 160 and 44 ug/m^3, respectively. Of these contaminants detected in the sub-slab vapor samples, toluene was the only contaminant detected at concentrations in indoor air at levels exceeding typical background concentrations. Toluene was detected in indoor air ranging from 50 to 270 micrograms per cubic meter (ug/m^3). Sub-slab soil gas concentrations for toluene ranged from 38 to 160 ug/m^3. Since the indoor air samples were much higher than the corresponding detections in the sub-slab vapor, an indoor source is likely. This is supported by the site questionnaire survey, which indicated toluene is present in many adhesives and inks which are commonly used to seal and identify mailed packages. Based on the review of this sampling data, soil vapor intrusion is not a concern for the post office building. However, if new construction occurs on this parcel, a soil vapor intrusion evaluation is recommended.

Special Resources Impacted/Threatened: Surface water resources near the site include the Monhagan Brook, which passes through the site in a box culvert. Based on the results of the investigation, the site related contamination passes below this box culvert, and does not impact the culvert or the stream within.

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.*

Direct contact with contaminants in the soil is unlikely because the majority of the site is covered with buildings and pavement. 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 the groundwater and/or soil 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. Based on sampling results from the

on-site building, soil vapor intrusion is not expected to be a current concern. However, there is a potential for future soil vapor intrusion concerns should the building uses change where products that contain site related contaminants are no longer used. Soil vapor intrusion sampling conducted for the off-site post office and former SUNY Southwinds buildings indicate that soil vapor intrusion is not a concern and no further actions are needed. However, it is recommended that soil vapor intrusion be evaluated if any new buildings are developed on either of the two on-site parcels, or for either the off-site post office or former SUNY Southwinds parcels.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

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 PROPOSED 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 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 proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as the Utility Corridor Soil Removal, Barrier Wall, Cover System, Coal Tar Recovery with Site Management remedy.

The estimated present worth cost to implement the remedy is $8,500,000. The cost to construct the remedy is estimated to be $6,000,000 and the estimated average annual cost is $164,000.

The elements of the proposed remedy are as follows and are shown on Figure 8:

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. 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;
- fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;

- use where possible and encouraging green and sustainable re-development; and
- additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation

Excavation and off-site disposal of source material from the utility corridor adjacent to the site along Fulton Street, including

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

Approximately 1,700 cubic yards of contaminated soil will be removed from the utility corridor adjacent to the site and transported for off-site thermal treatment. The excavation area is approximately 150 feet long and 30 feet wide. The depth of the excavation would be approximately 10 feet. However, the final extent of the excavation limits will be determined during remedial design.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site.

3. Barrier Wall

A barrier wall will be constructed along the edges of the excavation area to prevent recontamination of the utility corridor by migration of potentially mobile coal tar. The barrier along the upgradient side of the excavation will be installed to sufficiently prevent any further off-site migration of coal tar. The barrier wall type(s) will be determined during design but could consist of technologies such as sealed sheet piling, a slurry wall or a low permeability backfill.

4. Cover System

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

5. Coal Tar Recovery

Installation and operation of coal tar recovery wells on-site and off-site. Wells will be installed in areas of greatest impacts to remove potentially mobile 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 will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of coal tar over extended time periods, they will be converted to automated collection.

6. 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 restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

7. Site Management Plan

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

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

Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

Engineering Controls: The barrier wall discussed in Paragraph 3, the site cover discussed in Paragraph 4, and the recovery wells discussed in Paragraph 5.

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's 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 auto body/transmission shop and the car showroom and office area;

- 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 new buildings developed on or off-site (the post-office or former SUNY Southwinds parcels), 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 4 above will be placed in any areas where the upper two feet of exposed surface soil exceed 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.

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

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

- monitoring for vapor intrusion for any new buildings developed on or off-site (post-office or former SUNY Southwinds parcels), as may be required by the Institutional and Engineering Control Plan discussed above.

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

- monitoring and maintenance of the coal tar recovery wells referred to in Paragraph 5 above;

- 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 of concern at the site are coal tar comprised of PAHs and BTEX compounds (polycyclic aromatic hydrocarbons and benzene, toluene, ethylbenzene and xylene respectively). Coal tar is a non-aqueous phase liquid (NAPL). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Waste/Source Areas

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

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

The waste and source areas identified at the site were observed in areas corresponding with the footprint of the former MGP and in areas downgradient to those operations. Data collected during the remedial investigation (RI) indicates that the primary contaminants of concern include MGP related coal tar and its associated compounds (PAHs and BTEX). Soil saturated with coal tar was observed near and/or within historic structures including the former gas holders and tar cistern located on the auto body shop property. Coal tar has migrated to the southeast under Fulton Street and was also observed at depth beneath the Post Office property and the former SUNY Southwinds property (currently a grocery store). Lesser areas of contamination including tar blebs, sheens and odors were observed adjacent to the coal tar saturated source areas. Figure 3 shows the limits of the area where MGP related material was observed during the RI.

The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

During the RI, groundwater samples were collected from 18 monitoring wells to determine the nature and extent of contamination in the groundwater. Four additional wells (MW-25, MW-12, MW-20 and MW-34) were also installed, but were not sampled due to the presence of coal tar in the well. Six of the monitoring wells are located on the auto body repair property, ten are located on the post office property, and the remaining six wells were installed off-site to assess contaminant migration downgradient of the site. The wells are all screened in the overburden to depths ranging from approximately 13 to 50 feet below ground surface (bgs). Several wells were screened into the dense gray till unit, which is the deepest extent of where coal tar was observed at a depth of approximately 45 feet deep.

Figure 4 depicts the well locations and concentrations of BTEX and PAHs in the groundwater plume. Contaminated groundwater has migrated southeast from where the historic MGP related structures were located and was detected off-site at two adjacent properties.

As shown in Table 1, the Standards, Criteria and Guidance values (SCGs) for the contaminants of concern were exceeded in groundwater across the site. The contaminants of concern, BTEX compounds and PAHs, were detected in the monitoring wells located adjacent to and downgradient of the former MGP. In general, the most impacted wells have accumulated at least some coal tar (MW-25, MW-8, MW-11). High levels of contaminants were also observed in well MW-19, which is located further downgradient along the eastern edge of the post office property.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Benzene	ND – 16,000	1	7 of 18
Toluene	ND – 9,100	5	5 of 18
Ethylbenzene	ND – 5,100	5	5 of 18
Xylene	ND – 5,400	5	5 of 18
VOCs			
Acenaphthene	ND – 120	20	4 of 18

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Fluorene	ND – 88	50	3 of 18
Naphthalene	ND – 14,000	10	5 of 18
Phenanthrene	ND – 150	50	3 of 18
Benzo(a)anthracene	ND – 16	0.002	3 of 18
Chrysene	ND – 17	0.002	3 of 18

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).

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of 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 and napthalene.

Soil

There were no surface soil samples collected during the RI since the entire site is either paved or covered by structures. During the RI, a total of 111 soil samples were collected from 62 locations to evaluate subsurface soil conditions and determine the nature and extent of contamination. Samples were collected at various depths ranging from one foot to approximately sixty-five feet bgs. Borings were advanced using direct push and rotosonic drilling techniques. The cores were continuously logged for soil classification types and samples were collected where contamination was identified. If none was observed, then the sample was collected from the deepest interval of the boring.

Figure 5 shows the locations of soil borings and summarizes the sampling results at various depth intervals for the contaminants that were detected across the site. The results of the sampling indicated that MGP related contamination (PAHs, BTEX) are present in subsurface soil. MGP contamination is present in the southwestern corner of the auto body property and migrates to the south and southeast under Fulton Street onto the post office portion of the site. Coal tar saturated soils have been observed on the site at depths ranging from 5 feet to the top of the till layer, which is present at approximately 15 to 20 feet deep. Mobile tar was observed collected in depressions on the surface of the till layer at depths of 20 feet or greater on the off-

site properties. The till layer acts as a semi-confining layer that limits the migration of contamination. There are fractures in the till where tar has been observed at deeper intervals. The deepest coal tar impacts were observed off-site, within the till unit approximately 45 feet deep. The highest concentrations of contaminants were detected in soil borings located on the post office property (SB-8, SB-11, SB-13 and SB-57). These samples were all collected from a similar area and at depths ranging from approximately 18 to 35 feet deep. Significant contamination was also detected further downgradient in SB-47 at depths of 12 to 24 feet deep.

Table 2 summarizes the results for the subsurface soil samples that were collected during the RI.

Table 2- Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted
VOCs					
Benzene	ND – 360	0.06	16 of 111	44	4 of 111
Toluene	ND – 840	0.7	14 of 111	500	2 of 111
Ethylbenzene	ND – 260	1	15 of 111	390	0 of 111
Xylene	ND – 990	0.26	19 of 111	500	4 of 111
SVOCs					
Acenaphthylene	ND – 410	100	6 of 111	500	0 of 111
Anthracene	ND – 220	100	4 of 111	500	0 of 111
Fluoranthene	ND – 320	100	6 of 111	500	0 of 111
Fluorene	ND – 200	30	8 of 111	500	0 of 111
Naphthalene	ND – 2,500	12	16 of 111	500	6 of 111
Phenanthrene	ND – 820	100	9 of 111	500	2 of 111
Pyrene	ND – 480	100	8 of 111	500	0 of 111

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted
Benzo(a)anthracene	ND – 160	1	20 of 111	5.6	16 of 111
Benzo(a)pyrene	ND – 120	1	20 of 111	1	20 of 111
Benzo(b)fluoranthene	ND – 79	1	17 of 111	5.6	13 of 111
Benzo(k)fluoranthene	ND – 90	0.8	10 of 111	56	1 of 111
Chrysene	ND – 160	1	20 of 111	56	6 of 111
Indeno(1,2,3-cd)pyrene	ND – 39	0.5	13 of 111	5.6	8 of 111
Dibenz(a,h)anthracene	ND – 11	0.33	11 of 111	0.56	7 of 111

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.

c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.

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 and PAH compounds.

Surface Water

The site is situated near the historic channel of Monhagen Brook, which is a class D surface waterbody and a tributary of the Wallkill River. Stormwater sewers beneath Fulton Street discharge to the brook's box culvert. During the RI, a water sample was collected from an upgradient location (U-6) and downgradient (U-7) location within Monhagen Brook to assess for possible impacts attributed to the site. The sample locations are shown on Figure 6.

Sampling results from the surface water samples collected from Monhagen Brook indicated no SVOC detections in any of the samples. Acetone and chlorobenzene were the only VOCs detected in the surface water samples and are not related to past MGP activities. In addition, various inorganics were detected below Class D surface water standards. These VOCs and inorganics are typical of stormwater runoff from urban/developed areas.

No site-related surface water contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

A sediment sample was collected from Monhagen Brook at a location downgradient of the site. Figure 6 shows the location of where the sediment sample was collected (U-8). No VOCs were detected in the sample. The only inorganics detected in the sample were manganese and copper. Various SVOCs were detected in the sample which were potentially related to MGP contaminants. A further evaluation of the site's soil boring data concluded that MGP sources were present at depths below the invert of the Monhagen Brook culvert. As such, there was no migration pathway for MGP contaminants to impact the brook. An assessment of likely nearby sources has attributed that the SVOC detections were likely attributed to road surface runoff.

No site-related sediment contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for sediment.

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 sub-slab soil vapor from underneath on-site and off-site buildings and comparing the data to the indoor air sampled from inside the structures. Ambient air samples were also collected to compare to background concentrations. At this site, due to the presence of buildings in the impacted area, a full suite of VOCs samples were collected to evaluate whether soil vapor intrusion was occurring.

On-site, sub-slab soil vapor intrusion samples were collected from the Aamco Transmission and Maaco Auto Body Shops. However, indoor air samples were not collected from these businesses due to their usage of various products that contain the same chemicals that are site contaminants of concern. Off-site, a full suite of soil vapor intrusion samples were collected from the former SUNY Southwinds Building and the Middletown Post Office. Two concurrent sets of soil vapor intrusion samples were collected from the former SUNY Southwinds Building and three concurrent sets of samples were collected from the Middletown Post Office. All sampling was completed in accordance with the NYSDOH guidance document for soil vapor intrusion. Figure 7 shows the locations of the soil vapor intrusion samples that were collected.

The results of the sub-slab soil vapor samples from the Aamco Transmission and Maaco Auto Body shops indicate the presence of possible MGP related contaminants in the sub-slab air. Toluene and xylenes were detected in both samples. In the Aamco sample, toluene was detected at 290 micrograms per cubic meter (ug/m^3) and total xylene was 156 ug/m^3. In the Maaco sample, toluene was present at a concentration of 250 ug/m^3 and xylene was detected at 148 ug/m^3. These contaminants could be related to the site's past use as an MGP or the current site

operations. There is no soil vapor intrusion matrix for these compounds, however it is recommended that any future structures constructed at the site be evaluated for the potential for soil vapor intrusion.

Several possibly MGP related contaminants were detected in the sub-slab soil vapor samples collected at the former SUNY Southwinds Building, but most were detected at low levels. Isopentane, toluene and xylene were detected at maximum concentrations of 42, 52 and 38 ug/m^3, respectively. The maximum detections in indoor air for these contaminants were 7.8, 4 and 1 ug/m^3, respectively. As such, there were no significant detections of contaminants in the indoor air samples collected in this building. All of the possible MGP related contaminants were detected at concentrations consistent with background concentrations (i.e., the 75th percentile of the NYSDOH indoor air background values) and the ambient air samples that were collected. There is currently no soil vapor intrusion matrix for these compounds but, since the contaminants were present in indoor air at levels consistent with typical background concentrations, it was determined that soil vapor intrusion was not present.

At the post office building, several potential MGP contaminants were detected in the sub-slab soil vapor including isopentane, toluene and xylene at maximum concentrations of 50, 160 and 44 ug/m^3, respectively. In the indoor air samples collected in the post office, isopentane and xylene were detected at maximum concentrations of 19 and 6 ug/m^3, respectively. These levels are consistent with NYSDOH background values (i.e., 90th percentile of NYSDOH background levels) except for toluene. Toluene was detected in the indoor air samples at concentrations ranging from 50 to 270 ug/m^3. However, these levels are much higher than the corresponding detections of toluene in the sub-slab soil vapor which ranged from 38 to 160 ug/m^3. This suggested that the elevated levels of toluene were from an indoor source. The building survey found various chemicals containing toluene. Toluene is also present in many adhesives and inks which are commonly used to seal and identify mailed packages. As such, soil vapor intrusion has been demonstrated not to be a concern for this building.

There are currently no NYSDOH Soil Vapor Intrusion decision matrices available for MGP related contaminants. Since potential MGP contaminants were identified in the sub-slab soil vapor, it is recommended that soil vapor intrusion evaluations be completed for any new structures constructed at the site, the post office and former SUNY Southwinds parcels.

Exhibit B

Description of Remedial Alternatives

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: NAPL Recovery, Cover System, ICs and ECs

Alternative 2 requires the installation of coal tar recovery wells to facilitate the collection of mobile tar contamination both on-site and off-site. Recovery wells would be installed in areas where mobile coal tar has been observed and/or is likely to accumulate given the known subsurface conditions near the site. The number of recovery wells, their construction details and the means of coal tar collection (or NAPL recovery) would be determined during design. In addition, Alternative 2 requires that the existing site cover must be maintained as an engineering control.

Alternative 2 also includes the development of a Site Management Plan (SMP) to provide the procedures for coal tar recovery, cover system inspection and maintenance, and the site's groundwater monitoring activities. The SMP will also require institutional controls in the form of an environmental easement which would place restrictions on the site such as groundwater and land use restrictions.

Present Worth: *$3,400,000*
Capital Cost: *$900,000*
Annual Costs: *$164,000*

Alternative 3: Utility Corridor Soil Removal, Cover System, Barrier Wall, NAPL Recovery, ICs and ECs

Alternative 3 includes the same coal tar recovery, cover system and SMP components as Alternative 2. Alternative 3 also includes the removal of MGP impacted soil to a depth of approximately ten feet in the vicinity of the utility corridor that runs along the northern part of Fulton Street near the former MGP. Alternative 3 removes approximately 1,700 cubic yards of soil and all MGP impacted soil is transported off-site for thermal treatment. A low permeability

barrier will be installed along the boundary of the excavation to prevent recontamination of the utility corridor. The corridor will be demarcated to denote the clean limits and the area will be backfilled with soil meeting the required SCOs.

Present Worth: *$8,500,000*
Capital Cost: *$6,000,000*
Annual Costs: *$164,000*

Alternative 4: Shallow Soil Removal, Cover System, Barrier Wall, NAPL Recovery, ICs and ECs

Alternative 4 includes the same remedial components as Alternative 3. In addition to the utility corridor soil removal, Alternative 4 also includes the removal of shallow MGP impacted soil and structures on the former MGP property (autobody property). This Alternatives removes approximately 3,400 cubic yards of soil to a depth of approximately ten feet. All MGP impacted soil will then be sent to a disposal facility for thermal treatment. A demarcation layer will be placed in areas where deeper contamination remains, and the excavation will be backfilled with clean soil meeting the required SCOs. Contaminated soil beneath the autobody shop will not be removed under this alternative.

Present Worth: *$10,400,000*
Capital Cost: *$7,900,000*
Annual Costs: *$164,000*

Alternative 5: Deep Soil Removal, Cover System, Barrier Wall, NAPL Recovery, ICs and ECs

Alternative 5 includes the same remedial components as Alternatives 3 and 4, but this remedy expands the soil removal efforts to include accessible MGP impacted soil and structures to depths of up to twenty feet below grade, or until the top of the till layer, on the former MGP property. Alternative 5 removes approximately 6,700 cubic yards of accessible soil. All MGP impacted soil will then be sent to a disposal facility for thermal treatment. Contaminated soil beneath the autobody shop will not be removed under this alternative and the means of excavation support will be developed during design. Alternative 5 includes the same demarcation layer and backfill requirements.

Present Worth: *$12,100,000*

Capital Cost: *$9,600,000*

Annual Costs: *$164,000*

Alternative 6: Restoration to Pre-Disposal or Unrestricted Conditions

Alternative 6 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 would include excavation and removal of all MGP impacted soil and structures on the former MGP property and off-site properties. Excavation will be completed to the top of the till layer as needed where MGP impacted soil is encountered. All contaminated soil will be sent off-site for thermal treatment. Alternative 6 requires the demolition of part of the autobody shop building and a small portion of the post office to allow for the excavation activities. Portions of Fulton Street and South Street would also be shut down to accommodate the excavation needed in these areas. All properties would be restored following remediation activities.

Capital Cost:.....$90,000,000

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. No Action	$0	$0	$0
2. NAPL Recovery, Cover System, ICs and ECs	900,000	164,000	3,400,000
3. Utility Corridor Removal, Cover System, Barrier Wall, NAPL Recovery, ICs and ECs	6,000,000	164,000	8,500,000
4. Shallow Soil Removal, Cover System, Barrier Wall, NAPL Recovery, ICs and ECs	7,900,000	164,000	10,400,000
5. Deep Soil Removal, Cover System, Barrier Wall, NAPL Recovery, ICs and ECs	9,600,000	164,000	12,100,000
6. Restoration to Pre-Disposal or Unrestricted Conditions	90,000,000	0	90,000,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative #3, Utility Corridor Soil Removal, Cover System, Barrier Wall, NAPL Recovery, with Institutional Controls (ICs) and Engineering Controls (ECs) as the remedy for this site. Alternative #3 would achieve the remediation goals for the site by excavating soil in the utility corridor to address the greatest potential for exposure, using recovery wells both on-site and off-site to remove mobile coal tar, installing a barrier wall to eliminate further off-site contaminant migration, maintaining the site's existing cover system, and by implementing an SMP to manage the coal tar collection, ICs and ECs. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 8.

Basis for Selection

The proposed 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 proposed remedy, Alternative 3, would satisfy this criterion by removing the soil in the utility corridor that poses the greatest potential for exposure and by preventing mobile tar from leaving the site and entering the utility corridor once it has been cleaned up, as well as collecting mobile subsurface MGP tar from areas both on-site and off-site. Alternative 3 also includes maintaining the site's existing cover system, which will reduce the likelihood of exposure to contamination remaining on-site. Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternatives 2 provides less protection than Alternative 3 because it does not remove the contaminated soil in the utility corridor. Alternatives 4 and 5 provide additional protection for public health and the environment compared to Alternative 3, by removing a larger volume of impacted soil from the site. Alternative 6 provides the most protection for human health and the environment by removing all contaminated soil above the till unit.

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 complies with the SCGs by excavating contaminated soil in the utility corridor and by collecting mobile MGP source material on the former MGP property and in areas where mobile tar was observed off-site. Alternative 3 also maintains the site's current cover system, which is consistent with local zoning (restricted residential) and prevents exposure to contamination remaining in sub-surface soil. Alternative 2 also complies with this criterion but removes less contaminated soil than Alternative 3. Alternatives 4 and 5 comply with this criterion through the site cover and the removal of more contaminated soil than Alternative 3. Alternative 6 provides compliance with SCGs by removing all MGP impacted soil beneath the site and surrounding areas.

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.

Alternative 3 provides long-term effectiveness and permanence by excavating contaminated soil from the utility corridor, in the area with the greatest potential to encounter MGP waste, and placing an impermeable barrier to prevent any recontamination. Alternative 3 also removes mobile MGP contamination on-site and in the surrounding areas of impacts to prevent the further spread of contamination. Alternative 3 will require the use of long-term ICs and ECs, including a cover system, which provides long-term protection from exposure to remaining contamination. Alternative 2 provides less long-term effectiveness and permanence than Alternative 3 because it does not remove any impacted soil. Alternatives 4 and 5 satisfy this criterion to a greater degree than Alternative 3, because they include varying degrees of additional soil removal on-site. Similar to Alternative 3, Alternatives 2, 4 and 5 would each require some degree of long-term site management activities since each remedy leaves some degree of contamination at the site. Alternative 6 provides the most long-term effectiveness by removing all MGP contaminated soil from the site and surrounding areas and is expected to require few, if any, institutional controls and monitoring.

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 reduces mobility and volume on-site and off-site by physically removing MGP impacted soil from the utility corridor, collecting mobile coal tar from the subsurface by means of NAPL recovery and preventing further migration of contamination using a subsurface barrier wall. Alternative 2 satisfies this criterion to some extent, but to a lesser degree than Alternative 3. Alternatives 4 and 5 satisfy this criterion to a greater degree than Alternative 3, on-site, by

removing additional volumes of MGP impacted soil from the autobody property. However, their performance with regards to the post office property and the off-site areas would likely be similar to Alternative 3. Of all the remedial alternatives, Alternative 6 provides the most reduction of contaminant mobility and volume by removing all MGP impacted soil both on-site and off-site.

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 will have several short-term impacts to the community and site workers. These include rerouting traffic in the vicinity of the work area to accommodate the remedial activities along Fulton Street. Since Alternative 3 requires ground intrusive excavation, there will be the potential for site workers to be exposed to contamination during these efforts; however proper personal protective equipment will be used to prevent exposure. Alternatives 4, and 5 will have more significant short-term impacts than Alternative 3 because of the logistics associated with removing larger quantities of soil. These include an extended shutdown of the on-site businesses and nearby roads as well as disruptions to other nearby businesses. Alternative 2 would have less short-term impacts than Alternative 3 but would require a longer timeframe to meet the remedial objectives. Alternatives 4 and 5 would likely achieve remedial objectives quicker than Alternative 3 on-site, but the timeframe in off-site areas would be comparable. Alternative 6 has severe short-term impacts due to the large-scale nature of its ground intrusive work, including the demolition of nearby structures, disruption of services from the grocery store and post-office and prolonged road closures. However, this alternative achieves cleanup objectives the quickest.

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 requires the use of technologies and procedures that are readily implementable. Alternative 3 includes the completion of soil excavation, barrier wall and recovery well installation activities in an urban setting with nearby utilities. This work can be completed with careful planning and execution to ensure the safety of the public and the workers. Alternative 2 is easier to implement than Alternative 3 since it does not require excavation activities. Alternatives 4 and 5 both require significant planning and coordination with the on-site and off-site businesses and highway authority, but are also technically feasible. Alternatives 3 through 5 would each require the re-routing of subsurface and overhead utilities in order to be implemented. However, Alternatives 4 and 5 are more challenging to implement compared to Alternative 3 because they require excavation of significantly larger volumes of soil in a setting

where there is limited space available to work. Each of the alternatives will require property access agreements for on and off-site areas to implement the remedy, however Alternatives 4 and 5 are more likely to encounter on-site access issues than Alternative 3 because of their larger scale excavation activities. Alternative 6 is the most challenging remedy to implement and may not be feasible given the large-scale excavation, demolition and utility relocation activities that it requires.

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 2 requires only minimal remedial activities and as such is significantly cheaper than the other remedial alternatives. Alternatives 3, 4 and 5 each have moderate costs associated with their implementation with Alternative 3 being the least expensive. Each of these alternatives include some degree of excavation work in addition to requirements for long-term monitoring and maintenance activities. Alternative 6 requires large scale demolition, excavation and restoration work and would be by far the most expensive remedial option.

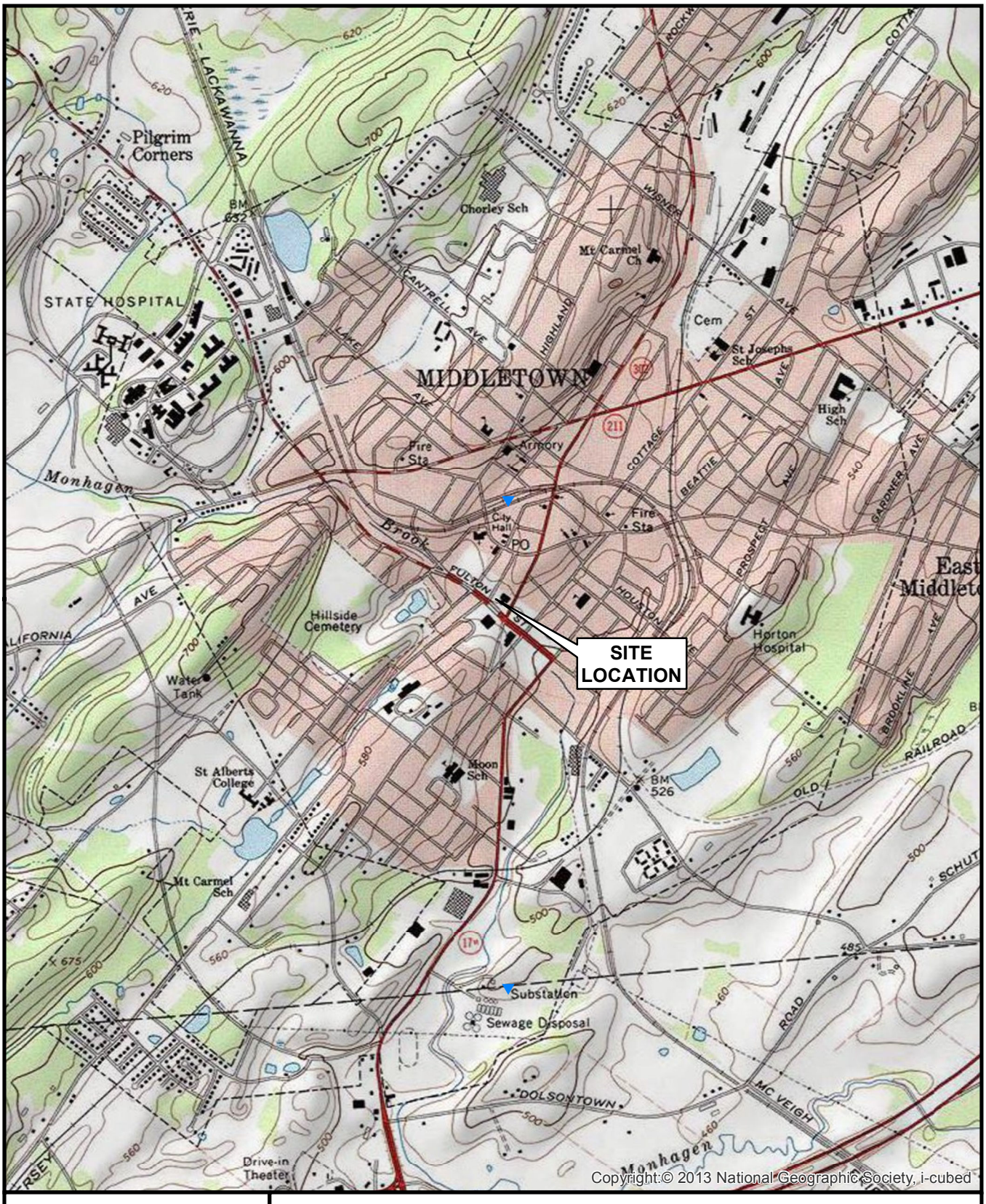
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

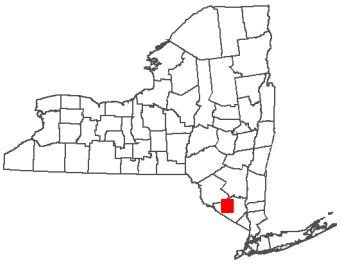
With the exception of Alternative 6, each remedial alternative is expected to leave contamination at the site which could impact the future use of the property. However, each of the remedies is expected to meet the requirements for the anticipated future use of the site. Alternatives 2 and 3 require more land use restrictions than Alternatives 4 and 5 because they do not remove soil contamination from the autobody shop property.

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 are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative 3 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.





N
W E
S

0 950 1,900
Feet

Figure 1

Site Location Map

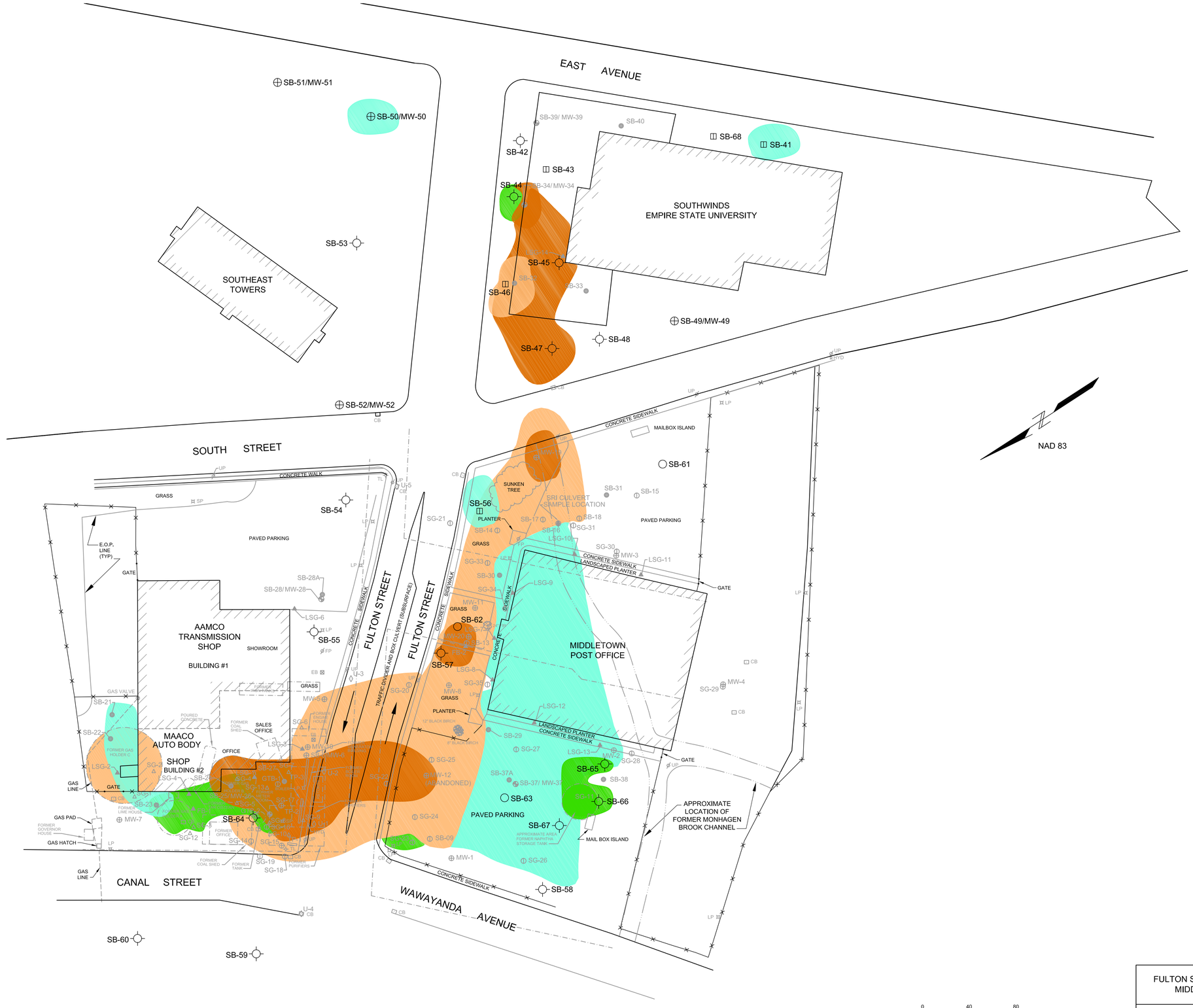
Fulton MGP Site
Town of Middletown, Orange County
Site No. 336030

DEPARTMENT OF ENVIRONMENTAL CONSERVATION • NEW YORK STATE •

Fulton Middletown MGP Site (336030)
Fulton and Canal Streets, Middletown, NY
Figure 2 - Site Boundary

0 0.0275 0.055 0.11 0.165 0.22
Miles

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation



LEGEND

- NAPHTHALENE OR TAR-LIKE ODORS
- SHEENS
- TAR BLEBS, TAR LENSES OR STAINING
- TAR SATURATED SOIL MATRIX
- SB-49/MW-49 — SOIL BORING/ MONITORING WELL LOCATION (2005)
- SB-41 — SHALLOW/DEEP BORING LOCATION (2005)
- SB-48 — DEEP BORING LOCATION (2005)
- SB-61 — SHALLOW BORING LOCATION (2005)
- SB-31 — SRI SOIL BORING LOCATION
- SB-31/ MW-28 — SRI SOIL BORING LOCATION COMPLETED AS MONITORING WELL.
- LSG-1 — SRI SOIL-GAS SURVEY LOCATION
- FB-1 — SRI SOIL-GAS FIELD BLANK LOCATION
- SB-31 — SRI CULVERT SAMPLE LOCATION
- MW-1 — MONITORING WELL INSTALLED PRIOR TO SRI
- SB-09/SG-26/GTB-1 — SOIL BORING INSTALLED PRIOR TO SRI
- SG-1 — SOIL GAS SURVEY LOCATION COMPLETED AS SOIL BORING PRIOR TO SRI
- U-5 — FORMER SEWER/SURFACE WATER SAMPLE LOCATION
- TP–1 — FORMER TEST PIT LOCATION
- EXISTING STRUCTURE
- FENCE
- FORMER STRUCTURES
- CB — CATCH BASIN
- LP — LIGHT POLE
- SP — SIGN POST
- UP — UTILITY POLE
- FP — FLAG POLE
- HYD — HYDRANT
- TL — TRAFFIC LIGHT POLE
- EB — ELECTRIC BOX
- 24" FIR — CONIFEROUS TREE/W 24" DIA.
- 8" BLACK BIRCH — DECIDUOUS TREE/W 8" DIA.

0 40 80
SCALE, FEET

FULTON STREET FORMER MGP SITE
MIDDLETOWN, NEW YORK

ORANGE AND ROCKLAND UTILITIES, INC.
SPRING VALLEY, NEW YORK

PROJECT 042310

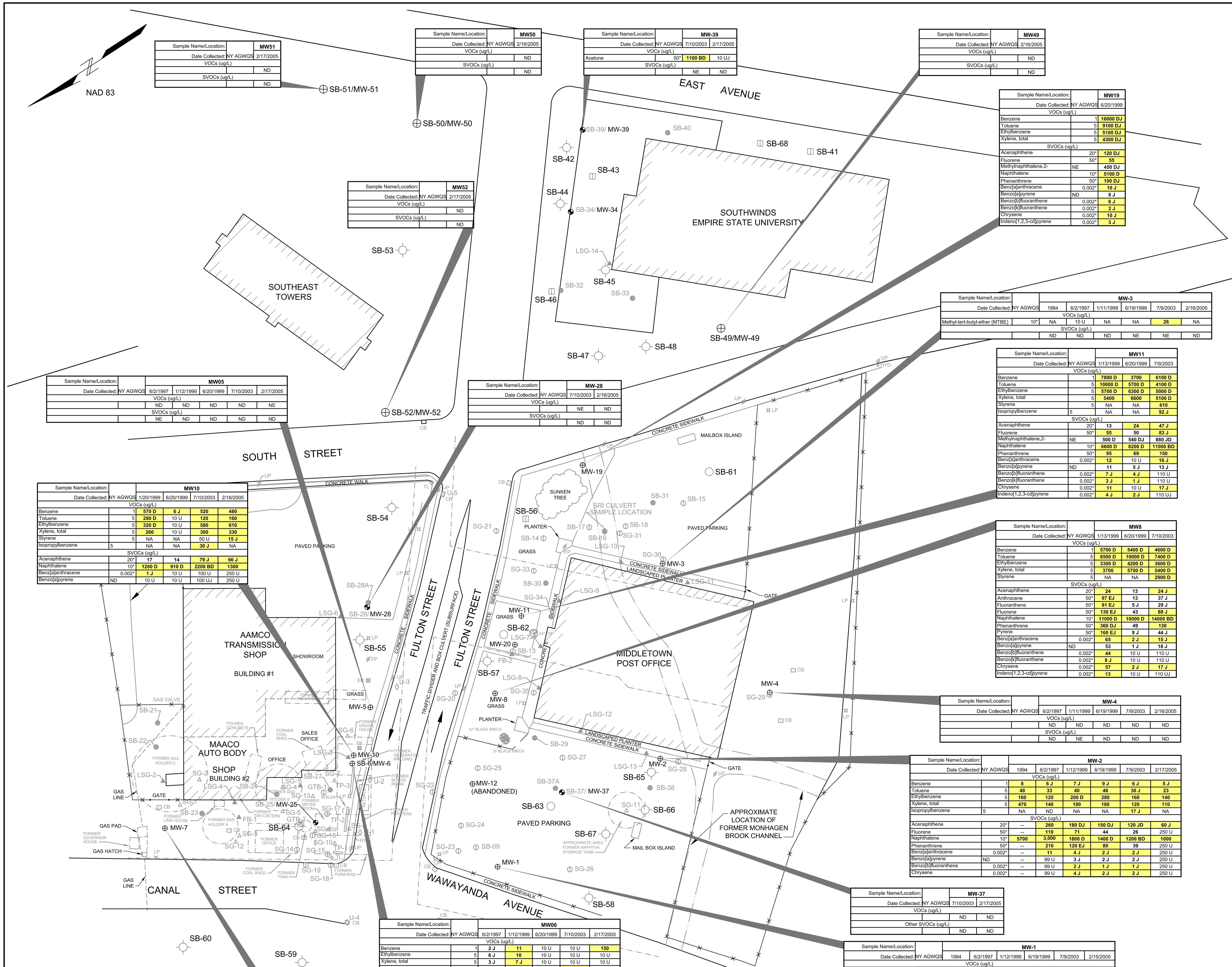
GEI Consultants
455 WINDING BROOK DRIVE
SUITE 201
GLASTONBURY, CONNECTICUT 06033

AREAL EXTENT OF OBSERVED MGP IMPACTS

March 2006

PRAP Figure 3

GEO\GIS\FULTON\042310\GRA\PLATES\FULTON-AREAL EXTENT.dwg



Sample Name/Location:		MW51
Date Collected:	NY AGWQS	2/17/2005
VOCs (ug/L)		
		ND
SVOCs (ug/L)		
		ND

Sample Name/Location:		MW50
Date Collected:	NY AGWQS	2/16/2005
VOCs (ug/L)		
		ND
SVOCs (ug/L)		
		ND

Sample Name/Location:		MW-39	
Date Collected:	NY AGWQS	7/10/2003	2/17/2005
VOCs (ug/L)			
Acetone	50*	**1100 BD**	10 UJ
SVOCs (ug/L)			
		NE	ND

Sample Name/Location:		MW52
Date Collected:	NY AGWQS	2/17/2005
VOCs (ug/L)		
		ND
SVOCs (ug/L)		
		ND

Sample Name/Location:		MW49
Date Collected:	NY AGWQS	2/16/2005
VOCs (ug/L)		
		ND
SVOCs (ug/L)		
		ND

Sample Name/Location:		MW19
Date Collected:	NY AGWQS	6/20/1999
VOCs (ug/L)		
Benzene	1	**16000 DJ**
Toluene	5	**9100 DJ**
Ethylbenzene	5	**5100 DJ**
Xylene, total	5	**4300 DJ**
SVOCs (ug/L)		
Acenaphthene	20*	**120 DJ**
Fluorene	50*	**55**
Methylnaphthalene,2-	NE	**450 DJ**
Naphthalene	10*	**5100 D**
Phenanthrene	50*	**100 DJ**
Benz[a]anthracene	0.002*	**10 J**
Benzo[a]pyrene	ND	**8 J**
Benzo[b]fluoranthene	0.002*	**6 J**
Benzo[k]fluoranthene	0.002*	**2 J**
Chrysene	0.002*	**10 J**
Indeno[1,2,3-cd]pyrene	0.002*	**3 J**

Sample Name/Location:		MW-3					
Date Collected:	NY AGWQS	1994	6/2/1997	1/11/1999	6/19/1999	7/9/2003	2/16/2005
VOCs (ug/L)							
Methyl-tert-butyl-ether (MTBE)	10*	NA	10 U	NA	NA	**26**	NA
SVOCs (ug/L)							
		ND	ND	ND	NE	NE	ND

Sample Name/Location:		MW11		
Date Collected:	NY AGWQS	1/13/1999	6/20/1999	7/9/2003
VOCs (ug/L)				
Benzene	1	**7800 D**	**3700**	**6100 D**
Toluene	5	**10000 D**	**5700 D**	**4100 D**
Ethylbenzene	5	**5700 D**	**6300 D**	**5000 D**
Xylene, total	5	**5400**	**6600**	**5100 D**
Styrene	5	NA	NA	**610**
Isopropylbenzene	5	NA	NA	**92 J**
SVOCs (ug/L)				
Acenaphthene	20*	**13**	**24**	**47 J**
Fluorene	50*	**55**	**50**	**83 J**
Methylnaphthalene,2-	NE	**500 D**	**540 DJ**	**880 JD**
Naphthalene	10*	**6600 D**	**8200 D**	**11000 BD**
Phenanthrene	50*	**95**	**69**	**150**
Benz[a]anthracene	0.002*	**12**	10 U	**16 J**
Benzo[a]pyrene	ND	**11**	**5 J**	**13 J**
Benzo[b]fluoranthene	0.002*	**7 J**	**4 J**	110 U
Benzo[k]fluoranthene	0.002*	**3 J**	**1 J**	110 U
Chrysene	0.002*	**11**	10 U	**17 J**
Indeno[1,2,3-cd]pyrene	0.002*	**4 J**	**2 J**	110 UJ

Sample Name/Location:		MW8		
Date Collected:	NY AGWQS	1/13/1999	6/20/1999	7/10/2003
VOCs (ug/L)				
Benzene	1	**5700 D**	**5400 D**	**4600 D**
Toluene	5	**8500 D**	**10000 D**	**7400 D**
Ethylbenzene	5	**3300 D**	**4200 D**	**3600 D**
Xylene, total	5	**3700**	**5700 D**	**5400 D**
Styrene	5	NA	NA	**2900 D**
SVOCs (ug/L)				
Acenaphthene	20*	**24**	**13**	**24 J**
Anthracene	50*	**97 EJ**	**13**	**37 J**
Fluoranthene	50*	**91 EJ**	**5 J**	**29 J**
Fluorene	50*	**130 EJ**	**43**	**88 J**
Naphthalene	10*	**11000 D**	**10000 D**	**14000 BD**
Phenanthrene	50*	**360 DJ**	**49**	**130**
Pyrene	50*	**160 EJ**	**9 J**	**44 J**
Benz[a]anthracene	0.002*	**65**	**2 J**	**15 J**
Benzo[a]pyrene	ND	**53**	**1 J**	**16 J**
Benzo[b]fluoranthene	0.002*	**44**	10 U	110 U
Benzo[k]fluoranthene	0.002*	**8 J**	10 U	110 U
Chrysene	0.002*	**57**	**2 J**	**17 J**
Indeno[1,2,3-cd]pyrene	0.002*	**13**	10 U	110 UJ

Sample Name/Location:		MW05				
Date Collected:	NY AGWQS	6/2/1997	1/12/1999	6/20/1999	7/10/2003	2/17/2005
VOCs (ug/L)						
		ND	ND	ND	ND	NE
SVOCs (ug/L)						
		NE	ND	ND	ND	ND

Sample Name/Location:		MW-28	
Date Collected:	NY AGWQS	7/10/2003	2/16/2005
VOCs (ug/L)			
		NE	ND
SVOCs (ug/L)			
		ND	ND

Sample Name/Location:		MW10			
Date Collected:	NY AGWQS	1/20/1999	6/20/1999	7/10/2003	2/18/2005
VOCs (ug/L)					
Benzene	1	**570 D**	**6 J**	**520**	**480**
Toluene	5	**290 D**	10 U	**120**	**160**
Ethylbenzene	5	**320 D**	10 U	**580**	**610**
Xylene, total	5	**260**	10 U	**300**	**330**
Styrene	5	NA	NA	50 U	**15 J**
Isopropylbenzene	5	NA	NA	**30 J**	NA
SVOCs (ug/L)					
Acenaphthene	20*	**17**	**14**	**79 J**	**66 J**
Naphthalene	10*	**1200 D**	**910 D**	**2200 BD**	**1300**
Benz[a]anthracene	0.002*	**1 J**	10 U	100 U	250 U
Benzo[a]pyrene	ND	10 U	10 U	100 UJ	250 U

Sample Name/Location:		MW-4				
Date Collected:	NY AGWQS	6/2/1997	1/11/1999	6/19/1999	7/9/2003	2/16/2005
VOCs (ug/L)						
		ND	ND	ND	ND	ND
SVOCs (ug/L)						
		ND	NE	ND	ND	ND

Sample Name/Location:		MW-2					
Date Collected:	NY AGWQS	1994	6/2/1997	1/12/1999	6/19/1999	7/9/2003	2/17/2005
VOCs (ug/L)							
Benzene	1	**8**	**6 J**	**7 J**	**9 J**	**6 J**	**5 J**
Toluene	5	**48**	**33**	**40**	**46**	**30 J**	**23**
Ethylbenzene	5	**160**	**120**	**200 D**	**280**	**160**	**140**
Xylene, total	5	**470**	**140**	**190**	**180**	**120**	**110**
Isopropylbenzene	5	NA	ND	NA	NA	**17 J**	NA
SVOCs (ug/L)							
Acenaphthene	20*	--	**260**	**180 DJ**	**150 DJ**	**120 JD**	**60 J**
Fluorene	50*	--	**110**	**71**	**44**	**26**	250 U
Naphthalene	10*	**5700**	**3,000**	**1800 D**	**1400 D**	**1200 BD**	**1000**
Phenanthrene	50*	--	**210**	**120 EJ**	**80**	**39**	250 U
Benz[a]anthracene	0.002*	--	**11**	**4 J**	**2 J**	**2 J**	250 U
Benzo[a]pyrene	ND	--	99 U	**3 J**	**2 J**	**2 J**	250 U
Benzo[b]fluoranthene	0.002*	--	99 U	**2 J**	**1 J**	**1 J**	250 U
Chrysene	0.002*	--	99 U	**4 J**	**2 J**	**2 J**	250 U

Sample Name/Location:		MW-37	
Date Collected:	NY AGWQS	7/10/2003	2/17/2005
VOCs (ug/L)			
		ND	ND
Other SVOCs (ug/L)			
		ND	ND

Sample Name/Location:		MW-1					
Date Collected:	NY AGWQS	1994	6/2/1997	1/12/1999	6/19/1999	7/9/2003	2/15/2005
VOCs (ug/L)							
Dichloroethene, cis-1,2-	5	ND	ND	ND	ND	**7 J**	NE
SVOCs (ug/L)							
		ND	ND	ND	ND	NE	ND

Sample Name/Location:		MW07				
Date Collected:	NY AGWQS	6/2/1997	1/12/1999	6/19/1999	7/10/2003	2/16/2005
VOCs (ug/L)						
Benzene	1	**14**	**65**	**11**	10 U	**2 J**
Acetone	50*	10 U	NA	NA	**53 BJ**	10 UJ
SVOCs (ug/L)						
		ND	ND	NE	NE	ND

Sample Name/Location:		MW06				
Date Collected:	NY AGWQS	6/2/1997	1/12/1999	6/20/1999	7/10/2003	2/17/2005
VOCs (ug/L)						
Benzene	1	**2 J**	**11**	10 U	10 U	**150**
Ethylbenzene	5	**6 J**	**10**	10 U	10 U	10 U
Xylene, total	5	**3 J**	**7 J**	10 U	10 U	10 U
Acetone	50*	11 U	NA	NA	**88 BJ**	10 UJ
SVOCs (ug/L)						
Naphthalene	10*	**20**	**2 J**	**37**	4 U	10 U
Benz[a]anthracene	0.002*	**9**	10 U	10 U	11 U	10 U
Benzo[a]pyrene	ND	**8**	10 U	10 U	11 UJ	10 U
Benzo[b]fluoranthene	0.002*	**6**	10 U	10 U	11 U	10 U
Benzo[k]fluoranthene	0.002*	**2**	10 U	10 U	11 U	10 U
Chrysene	0.002*	**9**	10 U	10 U	11 U	10 U
Indeno[1,2,3-cd]pyrene	0.002*	**3**	10 U	10 U	11 UJ	10 U
Phenol	1	NA	NA	NA	11 UJ	**21 J**

LEGEND

Symbol	Description
SB-49/MW-49	SOIL BORING/ MONITORING WELL LOCATION (2005)
SB-41	SHALLOW/DEEP BORING LOCATION (2005)
SB-48	DEEP BORING LOCATION (2005)
SB-61	SHALLOW BORING LOCATION (2005)
SB-31	SRI SOIL BORING LOCATION
SB-31/ MW-28	SRI SOIL BORING LOCATION COMPLETED AS MONITORING WELL.
LSG-1	SRI SOIL-GAS SURVEY LOCATION
FB-1	SRI SOIL-GAS FIELD BLANK LOCATION
SB-31	SRI CULVERT SAMPLE LOCATION
MW-1	MONITORING WELL INSTALLED PRIOR TO SRI
SB-09/SG-26/GTB-1	SOIL BORING INSTALLED PRIOR TO SRI
SG-1	SOIL GAS SURVEY LOCATION COMPLETED AS SOIL BORING PRIOR TO SRI
U-5	FORMER SEWER/SURFACE WATER SAMPLE LOCATION
TP-1	FORMER TEST PIT LOCATION
	EXISTING STRUCTURE
	FENCE
	FORMER STRUCTURES
CB	CATCH BASIN
LP	LIGHT POLE
SP	SIGN POST
UP	UTILITY POLE
FP	FLAG POLE
HYD	HYDRANT
TL	TRAFFIC LIGHT POLE
EB	ELECTRIC BOX
24" FIR	CONIFEROUS TREE/W 24" DIA.
8" BLACK BIRCH	DECIDUOUS TREE/W 8" DIA.
ND	NOT DETECTED
NA	NOT ANALYZED
NE	NOT EXCEEDANCE
PPM	PARTS PER MILLION
ug/L	MICROGRAMS PER LITER
VOCs	VOLATILE ORGANIC COMPOUNDS
SVOCs	SEMI-VOLATILE ORGANIC COMPOUNDS

0 40 80
SCALE, FEET

FULTON STREET FORMER MGP SITE
MIDDLETOWN, NEW YORK

ORANGE AND ROCKLAND UTILITIES, INC.
SPRING VALLEY, NEW YORK

PROJECT 042310

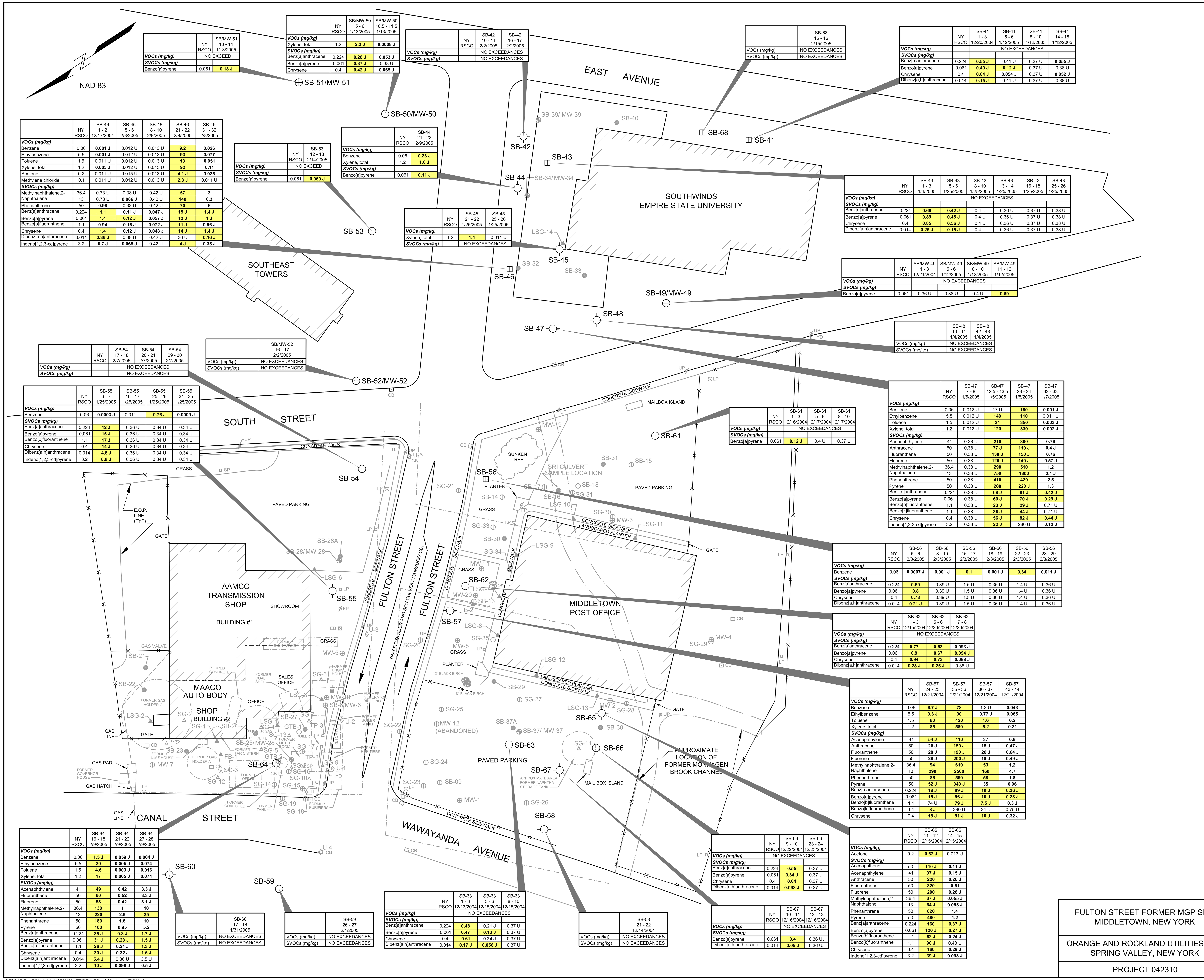
GEI Consultants
455 WINDING BROOK DRIVE
SUITE 201
GLASTONBURY, CONNECTICUT 06033

GROUNDWATER ANALYTICAL RESULTS SUMMARY

March 2006

PRAP Figure 4

GEI\O&R\FULTON\042310\SRIA\PLATES\FULTON-GW ANALYTICAL.dwg



NAD 83
SB-51/MW-51
SB-50/MW-50
EAST AVENUE
SB-39/ MW-39
SB-40
SB-42
SB-43
SB-44
SB-34/ MW-34
SB-68
SB-41
SB-53
LSG-14
SB-45
SB-32
SB-33
SB-46
SOUTHEAST TOWERS
SOUTHWINDS EMPIRE STATE UNIVERSITY
SB-49/MW-49
SB-48
SB-47
SB-52/MW-52
SOUTH STREET
CONCRETE WALK
CONCRETE SIDEWALK
MAILBOX ISLAND
SB-61
GRASS
SB-54
E.O.P. LINE (TYP)
GATE
PAVED PARKING
SUNKEN TREE
SRI CULVERT SAMPLE LOCATION
SB-31
SB-15
SB-56
PLANTER
SB-28A
SB-28/MW-28
LSG-6
SB-55
AAMCO TRANSMISSION SHOP
SHOWROOM
BUILDING #1
FULTON STREET
TRAFFIC DIVIDER AND BOX CULVERT (SUBSURFACE)
SB-62
SB-57
LANDSCAPED PLANTER
MIDDLETOWN POST OFFICE
SB-29
MW-4
MAACO AUTO BODY SHOP
BUILDING #2
SALES OFFICE
OFFICE
SB-25/MW-25
SB-64
GAS PAD
GAS HATCH
GAS LINE
SB-27
SB-23
SB-37/ MW-37
SB-65
SB-66
SB-63
SB-67
APPROXIMATE LOCATION OF FORMER MONHAGEN BROOK CHANNEL
MAIL BOX ISLAND
SB-58
SB-26
MW-1
SB-24
SB-09
MW-12 (ABANDONED)
CANAL STREET
WAWAYANDA AVENUE
SB-60
SB-59
U-4

	NY RSCO	SB/MW-51 13 - 14 1/13/2005
VOCs (mg/kg)	NO EXCEED	
SVOCs (mg/kg)		
Benzo[a]pyrene	0.061	**0.18 J**

	NY RSCO	SB/MW-50 5 - 6 1/13/2005	SB/MW-50 10.5 - 11.5 1/13/2005
VOCs (mg/kg)			
Xylene, total	1.2	**2.3 J**	**0.0008 J**
SVOCs (mg/kg)			
Benz[a]anthracene	0.224	**0.28 J**	**0.053 J**
Benzo[a]pyrene	0.061	**0.37 J**	0.38 U
Chrysene	0.4	**0.42 J**	**0.065 J**

	NY RSCO	SB-42 10 - 11 2/2/2005	SB-42 16 - 17 2/2/2005
VOCs (mg/kg)		NO EXCEEDANCES	
SVOCs (mg/kg)		NO EXCEEDANCES	

	SB-68 15 - 16 2/15/2005
VOCs (mg/kg)	NO EXCEEDANCES
SVOCs (mg/kg)	NO EXCEEDANCES

	NY RSCO	SB-41 1 - 3 12/20/2004	SB-41 5 - 6 1/12/2005	SB-41 8 - 10 1/12/2005	SB-41 14 - 15 1/12/2005
VOCs (mg/kg)		NO EXCEEDANCES			
SVOCs (mg/kg)					
Benz[a]anthracene	0.224	**0.55 J**	0.41 U	0.37 U	**0.055 J**
Benzo[a]pyrene	0.061	**0.49 J**	**0.12 J**	0.37 U	0.38 U
Chrysene	0.4	**0.64 J**	**0.054 J**	0.37 U	**0.052 J**
Dibenz[a,h]anthracene	0.014	**0.15 J**	0.41 U	0.37 U	0.38 U

	NY RSCO	SB-46 1 - 2 12/17/2004	SB-46 5 - 6 2/8/2005	SB-46 8 - 10 2/8/2005	SB-46 21 - 22 2/8/2005	SB-46 31 - 32 2/8/2005
VOCs (mg/kg)						
Benzene	0.06	**0.001 J**	0.012 U	0.013 U	**9.2**	**0.026**
Ethylbenzene	5.5	**0.001 J**	0.012 U	0.013 U	**93**	**0.077**
Toluene	1.5	0.011 U	0.012 U	0.013 U	**13**	**0.051**
Xylene, total	1.2	**0.003 J**	0.012 U	0.013 U	**92**	**0.11**
Acetone	0.2	0.011 U	0.015 U	0.013 U	**4.1 J**	**0.025**
Methylene chloride	0.1	0.011 U	0.012 U	0.013 U	**2.3 J**	0.011 U
SVOCs (mg/kg)						
Methylnaphthalene,2-	36.4	0.73 U	0.38 U	0.42 U	**57**	**3**
Naphthalene	13	0.73 U	**0.086 J**	0.42 U	**140**	**6.3**
Phenanthrene	50	**0.98**	0.38 U	0.42 U	**70**	**6**
Benz[a]anthracene	0.224	**1.1**	**0.11 J**	**0.047 J**	**15 J**	**1.4 J**
Benzo[a]pyrene	0.061	**1.4**	**0.12 J**	**0.057 J**	**12 J**	**1 J**
Benzo[b]fluoranthene	1.1	**0.94**	**0.16 J**	**0.072 J**	**11 J**	**0.96 J**
Chrysene	0.4	**1.4**	**0.12 J**	**0.048 J**	**14 J**	**1.4 J**
Dibenz[a,h]anthracene	0.014	**0.36 J**	0.38 U	0.42 U	36 U	**0.16 J**
Indeno[1,2,3-cd]pyrene	3.2	**0.7 J**	**0.065 J**	0.42 U	**4 J**	**0.35 J**

	NY RSCO	SB-53 12 - 13 2/14/2005
VOCs (mg/kg)	NO EXCEED	
SVOCs (mg/kg)		
Benzo[a]pyrene	0.061	**0.069 J**

	NY RSCO	SB-44 21 - 22 2/9/2005
VOCs (mg/kg)		
Benzene	0.06	**0.23 J**
Xylene, total	1.2	**1.6 J**
SVOCs (mg/kg)		
Benzo[a]pyrene	0.061	**0.11 J**

	NY RSCO	SB-45 21 - 22 1/25/2005	SB-45 25 - 26 1/25/2005
VOCs (mg/kg)			
Xylene, total	1.2	**1.4**	0.011 U
SVOCs (mg/kg)		NO EXCEEDANCES	

	NY RSCO	SB-43 1 - 3 1/4/2005	SB-43 5 - 6 1/25/2005	SB-43 8 - 10 1/25/2005	SB-43 13 - 14 1/25/2005	SB-43 16 - 18 1/25/2005	SB-43 25 - 26 1/25/2005
VOCs (mg/kg)		NO EXCEEDANCES					
SVOCs (mg/kg)							
Benz[a]anthracene	0.224	**0.68**	**0.42 J**	0.4 U	0.36 U	0.37 U	0.38 U
Benzo[a]pyrene	0.061	**0.89**	**0.45 J**	0.4 U	0.36 U	0.37 U	0.38 U
Chrysene	0.4	**0.85**	**0.56 J**	0.4 U	0.36 U	0.37 U	0.38 U
Dibenz[a,h]anthracene	0.014	**0.25 J**	**0.15 J**	0.4 U	0.36 U	0.37 U	0.38 U

	NY RSCO	SB/MW-49 1 - 3 12/21/2004	SB/MW-49 5 - 6 1/12/2005	SB/MW-49 8 - 10 1/12/2005	SB/MW-49 11 - 12 1/12/2005
VOCs (mg/kg)		NO EXCEEDANCES			
SVOCs (mg/kg)					
Benzo[a]pyrene	0.061	0.36 U	0.38 U	0.4 U	**0.89**

	SB-48 10 - 11 1/4/2005	SB-48 42 - 43 1/4/2005
VOCs (mg/kg)	NO EXCEEDANCES	
SVOCs (mg/kg)	NO EXCEEDANCES	

	NY RSCO	SB-54 17 - 18 2/7/2005	SB-54 20 - 21 2/7/2005	SB-54 29 - 30 2/7/2005
VOCs (mg/kg)		NO EXCEEDANCES		
SVOCs (mg/kg)		NO EXCEEDANCES		

	SB/MW-52 16 - 17 2/2/2005
VOCs (mg/kg)	NO EXCEEDANCES
SVOCs (mg/kg)	NO EXCEEDANCES

	NY RSCO	SB-55 6 - 7 1/25/2005	SB-55 16 - 17 1/25/2005	SB-55 25 - 26 1/25/2005	SB-55 34 - 35 1/25/2005
VOCs (mg/kg)					
Benzene	0.06	**0.0003 J**	0.011 U	**0.76 J**	**0.0009 J**
SVOCs (mg/kg)					
Benz[a]anthracene	0.224	**12 J**	0.36 U	0.34 U	0.34 U
Benzo[a]pyrene	0.061	**15 J**	0.36 U	0.34 U	0.34 U
Benzo[b]fluoranthene	1.1	**17 J**	0.36 U	0.34 U	0.34 U
Chrysene	0.4	**14 J**	0.36 U	0.34 U	0.34 U
Dibenz[a,h]anthracene	0.014	**4.8 J**	0.36 U	0.34 U	0.34 U
Indeno[1,2,3-cd]pyrene	3.2	**8.8 J**	0.36 U	0.34 U	0.34 U

	NY RSCO	SB-61 1 - 3 12/16/2004	SB-61 5 - 6 12/17/2004	SB-61 8 - 10 12/17/2004
VOCs (mg/kg)		NO EXCEEDANCES		
SVOCs (mg/kg)				
Benzo[a]pyrene	0.061	**0.12 J**	0.4 U	0.37 U

	NY RSCO	SB-47 7 - 8 1/5/2005	SB-47 12.5 - 13.5 1/5/2005	SB-47 23 - 24 1/5/2005	SB-47 32 - 33 1/7/2005
VOCs (mg/kg)					
Benzene	0.06	0.012 U	17 U	**150**	**0.001 J**
Ethylbenzene	5.5	0.012 U	**140**	**110**	0.011 U
Toluene	1.5	0.012 U	**24**	**350**	**0.003 J**
Xylene, total	1.2	0.012 U	**120**	**330**	**0.002 J**
SVOCs (mg/kg)					
Acenaphthylene	41	0.38 U	**210**	**300**	**0.76**
Anthracene	50	0.38 U	**77 J**	**110 J**	**0.4 J**
Fluoranthene	50	0.38 U	**130 J**	**150 J**	**0.76**
Fluorene	50	0.38 U	**120 J**	**140 J**	**0.57 J**
Methylnaphthalene,2-	36.4	0.38 U	**290**	**510**	**1.2**
Naphthalene	13	0.38 U	**750**	**1800**	**3.1 J**
Phenanthrene	50	0.38 U	**410**	**420**	**2.5**
Pyrene	50	0.38 U	**200**	**220 J**	**1.3**
Benz[a]anthracene	0.224	0.38 U	**68 J**	**81 J**	**0.42 J**
Benzo[a]pyrene	0.061	0.38 U	**60 J**	**70 J**	**0.29 J**
Benzo[b]fluoranthene	1.1	0.38 U	**23 J**	**29 J**	0.71 U
Benzo[k]fluoranthene	1.1	0.38 U	**36 J**	**44 J**	0.71 U
Chrysene	0.4	0.38 U	**56 J**	**82 J**	**0.44 J**
Indeno[1,2,3-cd]pyrene	3.2	0.38 U	**22 J**	280 U	**0.12 J**

	NY RSCO	SB-56 5 - 6 2/3/2005	SB-56 8 - 10 2/3/2005	SB-56 16 - 17 2/3/2005	SB-56 18 - 19 2/3/2005	SB-56 22 - 23 2/3/2005	SB-56 28 - 29 2/3/2005
VOCs (mg/kg)							
Benzene	0.06	**0.0007 J**	**0.001 J**	**0.1**	**0.001 J**	**0.34**	**0.011 J**
SVOCs (mg/kg)							
Benz[a]anthracene	0.224	**0.69**	0.39 U	1.5 U	0.36 U	1.4 U	0.36 U
Benzo[a]pyrene	0.061	**0.8**	0.39 U	1.5 U	0.36 U	1.4 U	0.36 U
Chrysene	0.4	**0.78**	0.39 U	1.5 U	0.36 U	1.4 U	0.36 U
Dibenz[a,h]anthracene	0.014	**0.21 J**	0.39 U	1.5 U	0.36 U	1.4 U	0.36 U

	NY RSCO	SB-62 1 - 3 12/15/2004	SB-62 5 - 6 12/20/2004	SB-62 7 - 8 12/20/2004
VOCs (mg/kg)		NO EXCEEDANCES		
SVOCs (mg/kg)				
Benz[a]anthracene	0.224	**0.77**	**0.63**	**0.093 J**
Benzo[a]pyrene	0.061	**0.9**	**0.67**	**0.094 J**
Chrysene	0.4	**0.94**	**0.73**	**0.088 J**
Dibenz[a,h]anthracene	0.014	**0.28 J**	**0.25 J**	0.38 U

	NY RSCO	SB-57 24 - 25 12/21/2004	SB-57 35 - 36 12/21/2004	SB-57 36 - 37 12/21/2004	SB-57 43 - 44 12/21/2004
VOCs (mg/kg)					
Benzene	0.06	**6.7 J**	**78**	1.3 U	**0.043**
Ethylbenzene	5.5	**9.3 J**	**90**	**0.77 J**	**0.065**
Toluene	1.5	**80**	**420**	**1.6**	**0.2**
Xylene, total	1.2	**85**	**580**	**5.2**	**0.21**
SVOCs (mg/kg)					
Acenaphthylene	41	**54 J**	**410**	**37**	**0.8**
Anthracene	50	**26 J**	**150 J**	**15 J**	**0.47 J**
Fluoranthene	50	**28 J**	**190 J**	**20 J**	**0.64 J**
Fluorene	50	**28 J**	**200 J**	**19 J**	**0.49 J**
Methylnaphthalene,2-	36.4	**94**	**610**	**53**	**1.2**
Naphthalene	13	**290**	**2500**	**160**	**4.7**
Phenanthrene	50	**86**	**550**	**58**	**1.8**
Pyrene	50	**52 J**	**340 J**	**35**	**0.96**
Benz[a]anthracene	0.224	**18 J**	**99 J**	**10 J**	**0.36 J**
Benzo[a]pyrene	0.061	**15 J**	**96 J**	**10 J**	**0.28 J**
Benzo[b]fluoranthene	1.1	74 U	**79 J**	**7.5 J**	**0.3 J**
Benzo[k]fluoranthene	1.1	**8 J**	390 U	34 U	0.75 U
Chrysene	0.4	**18 J**	**91 J**	**10 J**	**0.32 J**

	NY RSCO	SB-66 9 - 10 12/22/2004	SB-66 23 - 24 12/23/2004
VOCs (mg/kg)		NO EXCEEDANCES	
SVOCs (mg/kg)			
Benz[a]anthracene	0.224	**0.55**	0.37 U
Benzo[a]pyrene	0.061	**0.34 J**	0.37 U
Chrysene	0.4	**0.64**	0.37 U
Dibenz[a,h]anthracene	0.014	**0.098 J**	0.37 U

	NY RSCO	SB-67 10 - 11 12/16/2004	SB-67 12 - 13 12/16/2004
VOCs (mg/kg)		NO EXCEEDANCES	
SVOCs (mg/kg)			
Benzo[a]pyrene	0.061	**0.4**	0.36 UJ
Dibenz[a,h]anthracene	0.014	**0.05 J**	0.36 UJ

	NY RSCO	SB-65 11 - 12 12/15/2004	SB-65 14 - 15 12/15/2004
VOCs (mg/kg)			
Acetone	0.2	**0.62 J**	0.013 U
SVOCs (mg/kg)			
Acenaphthene	50	**110 J**	**0.11 J**
Acenaphthylene	41	**97 J**	**0.15 J**
Anthracene	50	**220**	**0.26 J**
Fluoranthene	50	**320**	**0.61**
Fluorene	50	**200**	**0.28 J**
Methylnaphthalene,2-	36.4	**37 J**	**0.055 J**
Naphthalene	13	**64 J**	**0.055 J**
Phenanthrene	50	**820**	**1.4**
Pyrene	50	**480**	**1.2**
Benz[a]anthracene	0.224	**160**	**0.37 J**
Benzo[a]pyrene	0.061	**120 J**	**0.27 J**
Benzo[b]fluoranthene	1.1	**62 J**	**0.24 J**
Benzo[k]fluoranthene	1.1	**90 J**	0.43 U
Chrysene	0.4	**160**	**0.29 J**
Indeno[1,2,3-cd]pyrene	3.2	**39 J**	**0.093 J**

	NY RSCO	SB-64 16 - 18 2/9/2005	SB-64 21 - 22 2/9/2005	SB-64 27 - 28 2/9/2005
VOCs (mg/kg)				
Benzene	0.06	**1.5 J**	**0.059 J**	**0.004 J**
Ethylbenzene	5.5	**20**	**0.005 J**	**0.074**
Toluene	1.5	**4.6**	**0.003 J**	**0.016**
Xylene, total	1.2	**17**	**0.005 J**	**0.074**
SVOCs (mg/kg)				
Acenaphthylene	41	**49**	**0.42**	**3.3 J**
Fluoranthene	50	**60**	**0.52**	**3.3 J**
Fluorene	50	**58**	**0.42**	**3.1 J**
Methylnaphthalene,2-	36.4	**130**	**1**	**10**
Naphthalene	13	**220**	**2.9**	**25**
Phenanthrene	50	**180**	**1.6**	**10**
Pyrene	50	**100**	**0.95**	**5.2**
Benz[a]anthracene	0.224	**35 J**	**0.3 J**	**1.7 J**
Benzo[a]pyrene	0.061	**31 J**	**0.28 J**	**1.5 J**
Benzo[b]fluoranthene	1.1	**26 J**	**0.21 J**	**1.3 J**
Chrysene	0.4	**30 J**	**0.32 J**	**1.6 J**
Dibenz[a,h]anthracene	0.014	**5.4 J**	0.36 U	3.5 U
Indeno[1,2,3-cd]pyrene	3.2	**10 J**	**0.096 J**	**0.5 J**

	SB-60 17 - 18 1/31/2005
VOCs (mg/kg)	NO EXCEEDANCES
SVOCs (mg/kg)	NO EXCEEDANCES

	SB-59 26 - 27 2/1/2005
VOCs (mg/kg)	NO EXCEEDANCES
SVOCs (mg/kg)	NO EXCEEDANCES

	NY RSCO	SB-63 1 - 3 12/13/2004	SB-63 5 - 6 12/15/2004	SB-63 8 - 10 12/15/2004
VOCs (mg/kg)		NO EXCEEDANCES		
SVOCs (mg/kg)				
Benz[a]anthracene	0.224	**0.48**	**0.21 J**	0.37 U
Benzo[a]pyrene	0.061	**0.47**	**0.13 J**	0.37 U
Chrysene	0.4	**0.61**	**0.24 J**	0.37 U
Dibenz[a,h]anthracene	0.014	**0.17 J**	**0.056 J**	0.37 U

	SB-58 21 - 22 12/14/2004
VOCs (mg/kg)	NO EXCEEDANCES
SVOCs (mg/kg)	NO EXCEEDANCES

LEGEND

SB-49/MW-49	SOIL BORING/ MONITORING WELL LOCATION (2005)
SB-41	SHALLOW/DEEP BORING LOCATION (2005)
SB-48	DEEP BORING LOCATION (2005)
SB-61	SHALLOW BORING LOCATION (2005)
SB-31	SRI SOIL BORING LOCATION
SB-31/ MW-28	SRI SOIL BORING LOCATION COMPLETED AS MONITORING WELL.
LSG-1	SRI SOIL-GAS SURVEY LOCATION
FB-1	SRI SOIL-GAS FIELD BLANK LOCATION
SB-31	SRI CULVERT SAMPLE LOCATION
MW-1	MONITORING WELL INSTALLED PRIOR TO SRI
SB-09/SG-26/GTB-1	SOIL BORING INSTALLED PRIOR TO SRI
SG-1	SOIL GAS SURVEY LOCATION COMPLETED AS SOIL BORING PRIOR TO SRI
U-5	FORMER SEWER/SURFACE WATER SAMPLE LOCATION
TP-1	FORMER TEST PIT LOCATION
	EXISTING STRUCTURE
	FENCE
	FORMER STRUCTURES
CB	CATCH BASIN
LP	LIGHT POLE
SP	SIGN POST
UP	UTILITY POLE
FP	FLAG POLE
HYD	HYDRANT
TL	TRAFFIC LIGHT POLE
EB	ELECTRIC BOX
24" FIR	CONIFEROUS TREE/W 24" DIA.
8" BLACK BIRCH	DECIDUOUS TREE/W 8" DIA.
mg/kg	MILLIGRAM PER KILOGRAM
VOCs	VOLATILE ORGANIC COMPOUNDS
SVOCs	SEMI-VOLATILE ORGANIC COMPOUNDS

0 40 80
SCALE, FEET

FULTON STREET FORMER MGP SITE
MIDDLETOWN, NEW YORK

ORANGE AND ROCKLAND UTILITIES, INC.
SPRING VALLEY, NEW YORK

PROJECT 042310

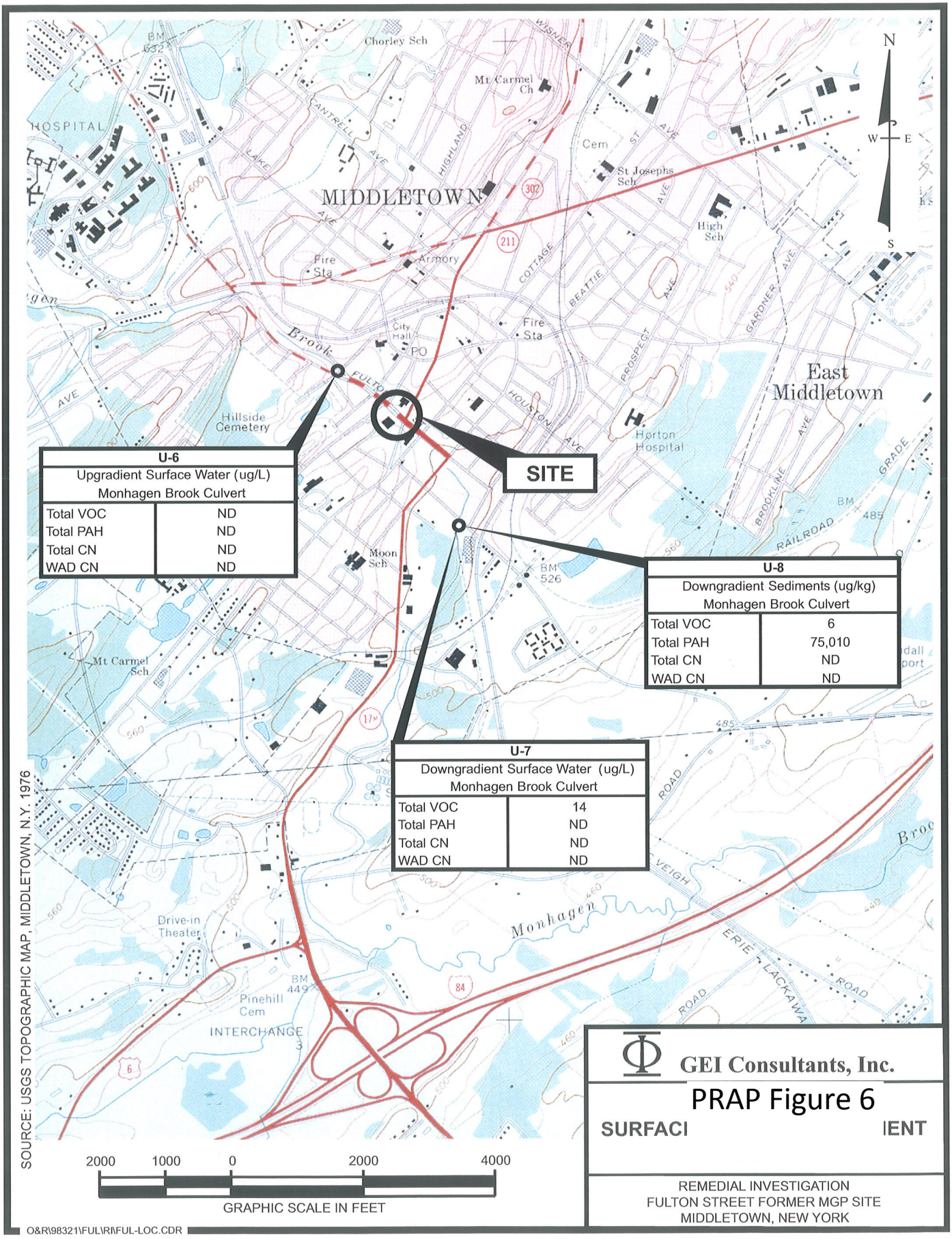
GEI Consultants
455 WINDING BROOK DRIVE
SUITE 201
GLASTONBURY, CONNECTICUT 06033

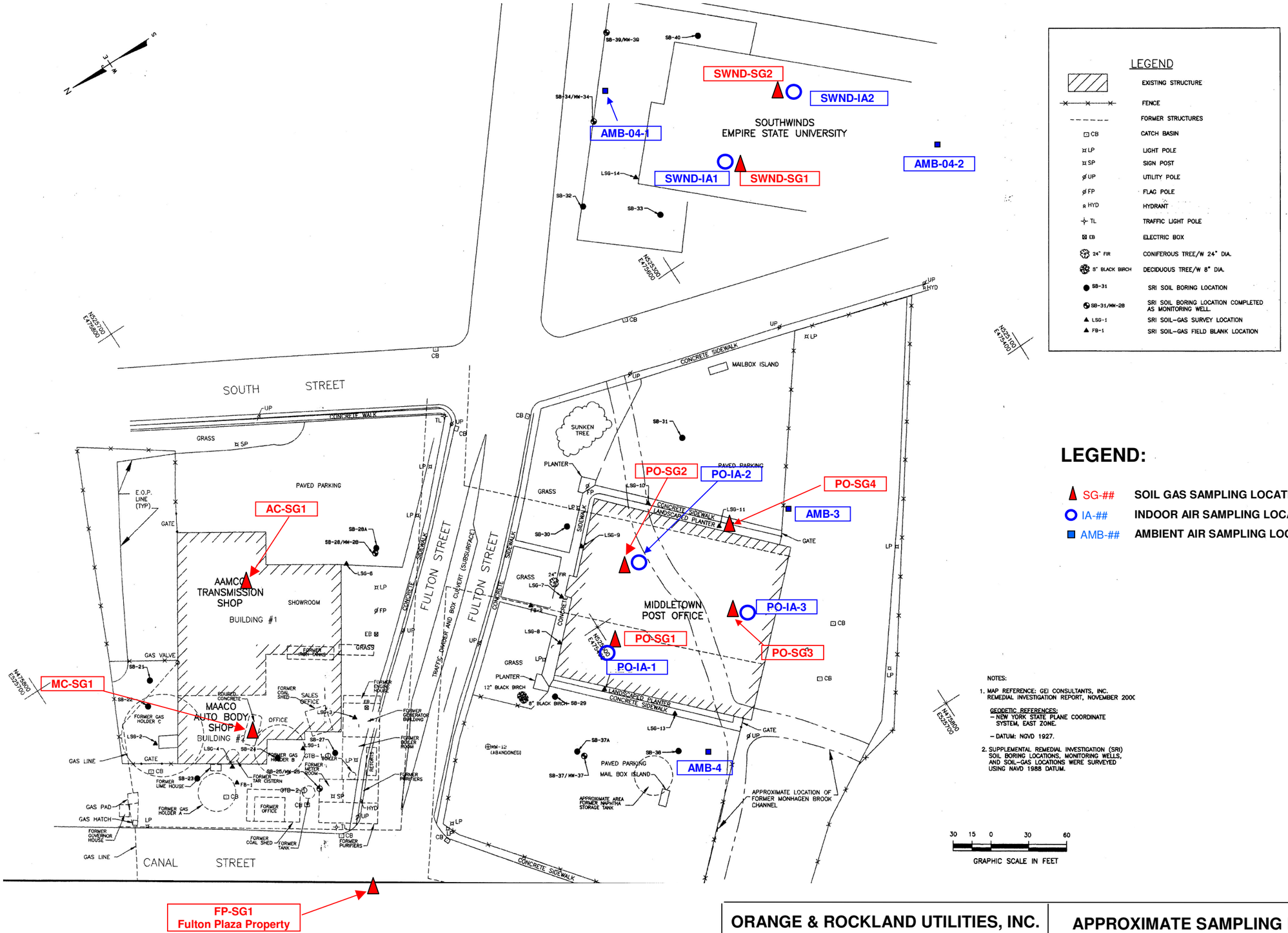
SOIL ANALYTICAL RESULTS SUMMARY

March 2006

PRAP Figure 5

GEI\O&R\FULTON\042310\SRIA\PLATES\FULTON-SOIL ANALYTICAL.dwg


U-6
Upgradient Surface Water (ug/L)
Monhagen Brook Culvert
Total VOC ND
Total PAH ND
Total CN ND
WAD CN ND
SITE
U-8
Downgradient Sediments (ug/kg)
Monhagen Brook Culvert
Total VOC 6
Total PAH 75,010
Total CN ND
WAD CN ND
U-7
Downgradient Surface Water (ug/L)
Monhagen Brook Culvert
Total VOC 14
Total PAH ND
Total CN ND
WAD CN ND
MIDDLETOWN
East Middletown
Hillside Cemetery
Horton Hospital
Mt Carmel Sch
Moon Sch
Pinehill Cem
Drive-in Theater
INTERCHANGE 3
Monhagen Brook
N
S
W
E
SOURCE: USGS TOPOGRAPHIC MAP, MIDDLETOWN, N.Y. 1976
2000 1000 0 2000 4000
GRAPHIC SCALE IN FEET
GEI Consultants, Inc.
PRAP Figure 6
SURFACI IENT
REMEDIAL INVESTIGATION
FULTON STREET FORMER MGP SITE
MIDDLETOWN, NEW YORK
O&R\98321\FUL\R\FUL-LOC.CDR



LEGEND:

- SG-## SOIL GAS SAMPLING LOCATION
- IA-## INDOOR AIR SAMPLING LOCATION
- AMB-## AMBIENT AIR SAMPLING LOCATION

RETEC

ORANGE & ROCKLAND UTILITIES, INC. MIDDLETOWN, NEW YORK ORAN3-18427-001	APPROXIMATE SAMPLING LOCATIONS O&R FULTON STREET SITE
DATE: 9/3/04 | DRWN: MLR	PRAP Figure 7

LEGEND:

- Approximate Limits of Excavation/Barrier Wall
- 10' — Depth in Feet of Proposed Soil Removal
- Approximate Extent of Visually Impacted Soil
- 15' — Depth in Feet to Top of Visual Impacts
- Proposed NAPL Collection Well
- Proposed Groundwater Monitoring Well
- Property Line
- Existing Structure
- Fence
- Former Structure
- Former Monhagen Brook Channel

CB	Catch Basin	FP	Flag Pole
LP	Light Pole	HYD	Hydrant
SP	Sign Post	TL	Traffic Light Pole
UP	Utility Pole	EB	Electric Box

NAPL NOTES:

1. LOCATIONS OF PROPOSED NAPL COLLECTION WELLS AND GROUNDWATER MONITORING WELLS ARE APPROXIMATE. ACTUAL NUMBER AND LOCATIONS OF THESE WELLS WILL BE DETERMINED DURING THE REMEDIAL DESIGN PHASE.
2. IMPACTS OBSERVED NORTHWEST OF POST OFFICE ARE NOT CONSIDERED MGP-RELATED SOURCE MATERIAL.

SOURCE: Based on "Feasibility Study" report figures by ARCADIS US, Inc., 2010 and 2016. See notes for additional references.
HORIZONTAL DATUM: New York East, HARN, U.S. Feet.
VERTICAL DATUM: NAVD88 (presumed)

NOTES:
1. Additional base map references:
1.1. Survey by Paul James Olszewski, P.L.S., PLLC, Camillus NY on August 31, 2016.
1.2. GEI Consultants, Inc. Remedial Investigation Report, November 2000.
2. Many locations are approximate. Refer to note 1, item 1.1 above for surveyed locations.
3. Location of former Monhagen Brook inferred based on voids encountered in soil borings SB-16, SB-69, SB-79 and SB-74.

0 100 Feet

Publish Date: 2019/04/15 1:01 PM | User: rpetrie
Filepath: K:\Projects\0921-Con_Edison\Fulton Street FS\0921-R-007-Fulton St FS-Alternative 3.dwg 5-3

PRAP Figure 8

ANCHOR QEA

Figure 5-3
Alternative 3
Feasibility Study
Fulton Street Former MGP Site, Middletown, New York
Orange and Rockland Utilities