DRAFT

PRELIMINARY SITE ASSESSMENT REPORT
PORT JERVIS FORMER MGP SITE
NYSDEC CONSENT ORDER # D03-0002-9412
PORT JERVIS, NEW YORK

Submitted to:

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Pearl River, New York

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September 10, 1998
Project No. 97679-1004

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EXECUTIVE SUMMARY

GEI Consultants, Inc., Atlantic Environmental Division (GEI/Atlantic), was retained by Orange & Rockland Utilities, Inc. (O&R) to perform a preliminary site assessment (PSA) at the Port Jervis former manufactured gas plant (MGP) site. This former MGP site is wholly owned by O&R and is managed under a Consent Order with the New York State Department of Environmental Conservation (NYSDEC) [Index # D3-0002-9412, January 8, 1996].

O&R's objectives for the PSA were to determine the following:

- whether contamination from previous MGP operations exists;
- the nature and extent of contamination;
- the associated risk to public health and the environment; and
- possible options for remediation, if necessary.

The Port Jervis former MGP site is located in an urbanized area in the western portion of the city of Port Jervis, New York. The site is approximately 160 feet northeast of the Delaware River, which is a Class A river. The property consists of a 1.2-acre commercial/industrial parcel. The Port Jervis MGP site was initially a coal gas plant sometime before 1880, and had a long service life. A change in manufacturing technology occurred in 1880 when the Lowe water gas process was adopted. The site continued in gas production as a water gas plant until sometime between 1946 and 1961. The site is currently occupied by an O&R operating center.

A field investigation was conducted at the Port Jervis former MGP site from April to May 1998. During the field investigation, 10 test pits, six shallow subsurface-soil borings, and one deep subsurface-soil boring were completed to locate former MGP structures, to characterize the subsurface material, and to determine the presence and, if found, the extent of contamination. Four of the shallow borings and the one deep boring were completed as monitoring wells to determine the groundwater flow direction and to characterize the groundwater quality at the site. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, cyanide, and polychlorinated biphenyls (PCBs) were identified as potential compounds of concern; therefore, samples collected at the site were analyzed for these constituents. Ten subsurface-soil samples, one sediment sample, and five groundwater samples were collected at the site.

Four geologic units were identified during the subsurface investigation. The uppermost unit was identified as fill material and ranged in thickness from 7 to 13 feet. The second unit was identified as a fine-grained alluvium deposit and ranged in thickness from 2 to 9 feet. The third unit encountered was a coarse-grained alluvium and was approximately 13 feet thick. Glacial outwash underlies the coarse-grained alluvium. A confining layer was not encountered during the subsurface boring investigation.

The shallow aquifer is unconfined and present within the fine-grained alluvium, coarse-grained alluvium, and glacial outwash units. The water table was approximately 15 feet below ground surface (bgs) during April 1998. The shallow groundwater flow direction is southwest, toward the Delaware River. The average hydraulic gradient across the site is 0.004 foot/foot. Groundwater elevation measurements indicate a downward vertical gradient in the vicinity of the former canal which traverses the site.

Three concrete pads for former gas holders were located at the site. No visual or olfactory evidence of contamination was observed from soils excavated along the side of these concrete pads. A subsurface holder located at the center of the site was located below one of the concrete pads. Based on a soil boring placed in the center of this subsurface holder, the holder contains fill material consisting of brick, ash, rubble, and approximately 6 feet of tar. The bottom and side walls of this holder appear to be intact. Soil borings were completed through the center of the two other concrete pads. Tar was observed in soil from both of these borings. Benzene, toluene, ethylbenzene, and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs) were detected in soil samples collected from these borings at concentrations exceeding the NYSDEC soil cleanup criteria. The highest total BTEX and PAH concentrations were detected in the sample collected from the subsurface holder.

Fuel oil odors were observed in soil excavated in the area of former subsurface naphtha tanks. Two soil samples collected in this location contained PAHs in excess of the NYSDEC soil cleanup criteria.

Three test pits were excavated in the area of the former canal which traverses the site. Material excavated from these test pits consisted of ash, cinders, and brick. No visual or olfactory evidence of contamination was observed. Three wells were placed adjacent to the former canal. Tar and/or tar impacts were observed in soil collected in shallow and deep borings between the canal and a subsurface gas holder pit. Approximately 3 feet of tar was observed between 40.7 and 44 feet bgs. Another boring within the canal showed no evidence of tar. BTEX and PAHs were detected in soil samples collected from each boring at concentrations exceeding the NYSDEC soil cleanup criteria.

A hand-auger boring was placed in the vicinity of a former tar well on the northeastern portion of the site. No visual or olfactory evidence of contamination was observed while completing this boring.

The basement of the dwelling located adjacent to the southern boundary of the site was inspected for evidence of contamination from former MGP operations. No visual or olfactory signs of contamination were observed in the basement.

A sediment sample was collected adjacent to the Delaware River, aligned with the discharge of the former canal which traversed the site and downgradient of a major city stormwater discharge. The sediment sample contained PAHs and metals exceeding the NYSDEC guidance values.

Five groundwater samples were collected to characterize the groundwater quality at the site. BTEX, PAHs, and dibenzofuran were detected at concentrations exceeding the NYSDEC groundwater standard. The highest total BTEX concentration (1,772 μg/L) was detected at MW-1D screened from 37 to 47 feet bgs. The highest total PAH concentration (7,617 μg/L) was detected at MW-1S (screened between 15 and 25 feet bgs). MW-1S and MW-1D are located between the former canal which traverses the site and the subsurface gas holder pit that contained 6 feet of tar. The lowest total BTEX and PAH concentrations in groundwater were detected at MW-2, which is located in the former canal, downgradient of MW-1S and MW-1D. Light nonaqueous phase liquid (LNAPL) and dense nonaqueous phase liquid (DNAPL) were not detected in the monitoring wells.

Based on the analytical results, a preliminary evaluation of the potential for human and/or environmental hazards was performed. The evaluation concluded that BTEX, PAHs, and metals in subsurface soil do not pose a significant potential for exposure or risk to on-site workers or construction workers at the site. Typical trespassers or visitors to the site would not be exposed to a significant risk. Because no supply wells are located in the vicinity of the site, no exposure pathway exists for ingestion of BTEX or PAHs via drinking water from groundwater.

1.0 INTRODUCTION

GEI Consultants, Inc., Atlantic Environmental Division (GEI/Atlantic), was retained by Orange and Rockland Utilities, Inc. (O&R) to perform a preliminary site assessment (PSA) at the Port Jervis former manufactured gas plant (MGP) site. This former MGP site is wholly owned by O&R and is managed under a Consent Order with the New York State Department of Environmental Conservation (NYSDEC) [Index # D3-0002-9412, January 8, 1996]. This introductory section presents GEI/Atlantic's understanding and objectives of the project.

In view of the New York state regulatory program to investigate and remediate MGP sites throughout the state, and O&R's interest in determining whether contamination exists on sites owned by predecessor companies, O&R is actively addressing potential environmental issues at the Port Jervis former MGP site. The site is currently used on a small scale as an O&R service center.

O&R's objectives for the PSA were to determine the following:

- whether contamination from previous MGP operations exists;
- the nature and extent of contamination;
- the associated risk to public health and the environment; and
- possible options for remediation, if necessary.

The PSA was the first element in a series of activities necessary for regulatory compliance and site closure. O&R's goal was to characterize the site and minimize the need for additional characterization. The field program was designed to achieve this goal while complying with the regulations.

This report presents the methods and the results of the PSA. Section 2.0 presents the site background. Section 3.0 presents the field investigation activities. The findings from the field investigation are presented in Section 4.0. An evaluation of risks to potential receptors was completed and is provided in Section 5.0. Section 6.0 describes applicable site remedial strategies based on PSA findings. Section 7.0 presents a summary of the PSA findings and recommendations for future actions.

2.0 SITE BACKGROUND

The following subsections provide detailed historic and environmental information relevant to the field investigation. Subsection 2.1 presents the physical setting and site description. Subsection 2.2 describes the surrounding land use and regional demographics. Subsection 2.3 presents the site operational history, and subsection 2.4 lists previous site investigations. Subsection 2.5 summarizes the findings of an environmental records review. Subsection 2.6 reports the regional climatology and regional geology. Subsection 2.7 presents the regional hydrogeology.

2.1 Physical Setting and Site Description

The Port Jervis former MGP site is located in the western portion of the city of Port Jervis, New York, 160 feet northeast of the Delaware River. The site consists of a 1.2±-acre commercial/industrial parcel. The property is currently occupied by an O&R service center. A site location map is provided as Figure 1. Current site conditions are depicted in Figure 2.

2.2 Surrounding Land Use/Regional Demographics

The Port Jervis former MGP site is located in an urbanized area. Features of note include the nearby Delaware River (160 feet southwest of the site), a large railyard facility (less than 1,000 feet northwest of the site), and nearby railroad tracks (less than 1,000 feet northeast of the site, running in a southeast/northwesterly direction).

Port Jervis Demographics. The total population of Port Jervis is 15,181 persons and 5,515 households. Forty-nine percent of the population is male, while 51 percent is female. The ethnic breakdown is as follows.

White: 95 percent
Black: 2.5 percent
Other: 2.5 percent

2.3 Site Operational History

The development of the manufactured gas industry in this country typically started with small, local enterprises that joined/evolved into larger network operations involved with the manufacture and distribution of gas from hub facilities, as occurred in Orange and Rockland

counties. Site uses were variable following the decline of gas manufacturing and the increase in use of natural gas.
The operational history for the Port Jervis MGP site was generated using the following resources.

- Production records from *Brown's Directory of American Gas Companies (Brown's Directory).* Site-specific records were available from 1887 to 1917; thereafter, the annual data were combined with records for production at the Middletown MGP site. Table 1 summarizes these records.

- Sanborn Fire Insurance (Sanborn) Maps from 1888, 1900, 1912, 1921, 1931, 1945, and 1961

- New York State Public Service Commission (NYSPSC) Case 94-M-1016 file information

- Current and Historic Topographic Maps from 1906, 1936, 1969 photorevised 1983, and 1992

- 1995 Site Map

The Port Jervis MGP site was initially a coal gas plant sometime before 1880, and had a long service life. A change in manufacturing technology occurred in 1880, when the Lowe water gas process, Granger variation, was adopted (*Water Gas Journal,* 1883). It should be noted that records were not available from *Brown's Directory* until 1887. The site continued in gas production as a water gas plant until sometime between 1946 and 1961. A brief summary of the site history follows.

- **Prior to 1880.** The site was an active coal gas manufacturing plant.

- **1880.** Production at the site shifted to the Lowe water gas process.

- **1887.** *Brown's Directory* indicates that gas production continued with the use of the Lowe water gas process, Granger variation. This variation placed the generator in a pit and utilized naphtha. Sanborn maps show that the site was split by a canal raceway perpendicular to the Delaware River. The canal extended into the adjacent block to the northeast. Naphtha feedstock was piped underground to storage tanks on the northern side of the site from the railroad a block away. From storage, naphtha was piped across the canal raceway to the generator room. Lime purifiers were on the northern side of the site. Two gas holders were present, an 8,000-cubic foot (cf) holder to the south of the canal, and a 37,000-cf holder to the north of the canal. A tar well was adjacent to the canal to the south. Coal was stored east of the generator room. (Site features depicted on the 1888 Sanborn map are shown in Figure 3.)

- **1892.** *Brown's Directory* indicates that the gasification method used was modified to the Granger-Collins method.

- **1900.** *Brown's Directory* indicates that the Lowe water gas process continued. The specific gasification method used was not included in *Brown's Directory*. Sanborn maps show that the canal was partially filled under Water Street, in the vicinity of the river, and identified as a brook. An additional naphtha tank was located in the generator room. Gas purifying was accomplished in the same location with a combination of sawdust and bog iron. A slight increase in gas holder capacities was noted, 9,000 cf and 39,000 cf. (Site features depicted on the 1900 Sanborn map are shown in Figure 4.)

- **1906.** A historic topographic map shows that the brook was completely filled.

- **1912.** The Sanborn map shows that the small gas holder was removed. One naphtha tank on the northern side of the site was relocated in the same vicinity, as was piping to the generator room. The tar well south of the former canal/brook was relocated near the eastern site boundary, still south of the former water course. Added structures included a large (75,000 cf) gas holder in the northeastern corner of the site, a tar extractor next to the purifier room, and additional generator and purifier buildings. (Site features depicted on the 1912 Sanborn map are shown in Figure 5.)

- **1921.** The Sanborn map shows that one naphtha tank near the northern site boundary was removed and the capacity of the 39,000 cf gas holder was reduced to 25,000 cf. The underground naphtha pipe from the railroad was not identified. Coal storage was shifted to the northern side of the original generator room which was converted to storage. Added structures included gas oil tanks near the northwestern corner and in a pit in the vicinity of the former 8,000 cf gas holder. (Site features depicted on the 1921 Sanborn map are shown in Figure 6.)

- **1931.** The Sanborn map shows that the site property extended westward to Water Street. A larger gas holder of unknown capacity was located in the northwestern corner. The original purifier house was relocated to the west. (Site features depicted on the 1931 Sanborn map are shown in Figure 7.)

- **1945.** No changes were evident. (Site features depicted on the 1945 Sanborn map are shown in Figure 8.)

- **1961.** The Sanborn map shows that the largest gas holder and governor room remained, but the rest of the site was modified to function as an office and service center. No gas production structures were evident. The largest gas holder was removed sometime before 1970. (Site features depicted on the 1961 Sanborn map are shown in Figure 9.)

Figure 10 reflects the substantial modifications made to the MGP operations at the site over the years. One notable feature at this site is the former canal that traversed the site and discharged to the Delaware River. It was a component for operation of the Delaware-Hudson Canal, which was located north of the site. The canal on site was filled in between 1900 and 1906. The only visible remaining MGP structure on site is a small brick building that was formerly the governor house. A composite map of historical site structures is shown in Figure 10.

2.4 Previous Investigations

No previous investigations have been conducted at this site.

2.5 Environmental Records Review

Federal and state environmental lists were reviewed for potential impacts to the site. Table 2 summarizes the lists reviewed and the number of environmentally significant locations in the vicinity of the site.

A brief summary of each location is provided below.

Orange & Rockland Utilities, Inc.; 16 Pike Street (the subject site). This site is currently a Hazardous Substance Waste Disposal site and a bulk petroleum storage facility. The site has been delisted from the CERCLIS database. A 1,000-gallon gasoline underground storage tank (UST) was removed from the eastern side of the site during late 1997. An 8,000-gallon diesel tank was removed in 1996 due to a failed tank test. The ERNS database indicates that 20 gallons of transformer oil were spilled at the site in February 1987 (Spill Number 1943). According to this database, 10 gallons of transformer oil was released to water.

Calligo Residence; 43 King Street (413 feet east/southeast of the site). On May 29, 1992 NYSDEC was informed of deliberate oil dumping. This case was found to be a neighbor dispute. This case was closed.

Mile Post 87; Pike Street (distance from site is unknown). Ten gallons of sulfuric acid was spilled at this location.

Conrail; 75 Pike Street/1 Bell Crossing Road (867 feet northeast of the site). This location is a listed hazardous waste generator/transporter. The status is unknown.

US Post Office; 20 Sussex Street (1,306 feet east/northeast of the site). On August 14, 1989, a tank containing No. 2 fuel oil failed tank tightness testing. A noticeable leak was identified in the manway. A 3,000-gallon fuel tank was removed from this property in 1990. This site is also listed as an air discharge facility (potential uncontrolled emissions, less than 100 tons per year).

Port Jervis Solid Waste Landfill; 1 Franklin Street (1,740 feet to the east/northeast). This is a mixed solid waste landfill.

Monroe Residence; 15 Franklin Street (1,894 feet east of the site). On August 29, 1984, an odor was detected in well water at this residence. The site is in close proximity to an earlier spill. The site water was tested.

Williams Candle Shop; 17 Delaware Street (2,122 feet northeast of the site). On September 15, 1993, a 275-gallon outdoor oil tank was overfilled. Oil leaked into the basement. The quantity of oil was estimated to be 1 gallon.

Tank Site; Pike and East Main Street (2,567 feet northeast of the site)). On April 4, 1997, three 2,000-gallon gasoline tanks failed tank tightness testing.

Barrier Industries; 200 East Main Street (4,532 feet southeast of the site). This site is listed as a CERCLA site and a Hazardous Substance Waste Disposal Site. This is an industrial site. Contamination sources include leaking tanks, drums, lagoons, and other containers.

2.6 Regional Climatology

Climatological data recorded at West Point, New York are a good representation of the climatology of Orange County. Data collected from 1951 to 1971 are summarized in Table 3. The data are typical of the northeastern United States.

2.7 Regional Geology

According to the Soil Survey of Orange County, New York, United States Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station (1981), the Port Jervis site is underlain by soil classified as Tioga silt loam. These soils are generally deep (greater than 60 inches) and consist of well-drained, nearly level soils. These soils formed in alluvial deposits on floodplains and low terraces along streams and rivers. Tioga soils are characterized by three soil horizons. The first horizon is a silt loam and ranges in depth from 0 to 3 inches below grade. The second horizon is classified as a silt loam, loam, gravelly fine sandy loam and ranges in depth from 3 to 40 inches below grade. The third horizon is from 40 to 60 inches below grade and is classified as a silt loam, gravelly loam, very gravelly loamy sand.

2.8 Hydrogeology

The physical and chemical properties of the three Tioga soil horizons are summarized in Table 4. Brief flooding from November through May is common in areas underlain by Tioga soils. The high water table is generally 3 to 6 feet below ground surface (bgs), and occurs from February to April. Little information is available regarding aquifers in the site vicinity. Depth to bedrock is unknown.

3.0 FIELD INVESTIGATION ACTIVITIES

A field investigation was conducted at the Port Jervis site from April to May 1998. The nature and extent of contamination was characterized through subsurface exploration (installation of soil borings and test pits), groundwater monitoring well installation, and the collection of subsurface-soil, groundwater, and sediment samples for chemical analyses. Field activities were conducted as detailed in the *Final Work Plan, Port Jervis Former MGP Site,* by GEI/Atlantic, dated March 9, 1998. Standard Operating Procedures (SOPs) followed during field work activities were provided in the work plan. The Quality Assurance Project Plan (QAPP), intended to maintain and document the quality of developed data, was also provided in the work plan and was followed during the field investigation. The field investigation tasks were targeted to obtain sufficient data to characterize both the nature and potential risks of contaminants at the site. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, cyanide, and polychlorinated biphenyls (PCBs) were identified as potential compounds of concern based on the previous and current site uses. The following analytical methods were performed.

- VOCs by SW-846 Method 8260
- SVOCs by SW-846 Method 8270
- PCBs by SW-846 Method 8081
- Target Analyte List (TAL) Metals by 6000/7000 Series
- Total Cyanide by United States Environmental Protection Agency (EPA) Method 9012

Analytical procedures were conducted in accordance with New York State Analytical Services Protocols (NYSASP). Category B deliverables were provided by the laboratory. Quality assurance/quality control samples were collected to assess the sampling and analytical protocols. QA/QC samples included duplicates, field blanks, rinsate blanks, trip blanks, matrix spikes, and matrix spike duplicates.

Investigation-derived waste (IDW) generated during the field program included drill cuttings which were containerized, labeled, and staged on site for disposal by O&R. Personal protective equipment (PPE) and other solid IDWs were segregated in trash bags and containerized to facilitate disposal by O&R. Well development water, purge-water, and decontamination liquid were contained in 55-gallon drums, labeled, and staged on site for disposal by O&R. Based on TCLP analysis, material in the worst-case drum was characterized as nonhazardous.

3.1 Surface-Soil Sampling

Surface-soil samples were not collected because the site is paved.

3.2 Test Pit Excavation

Ten test pits were excavated at the Port Jervis site. Test pits were excavated to approximately 13 feet bgs. The objective was to locate former MGP structures and other relevant features, such as the former canal that traversed the site before 1906. Test pit locations were selected based on historic site information, including the review of Sanborn maps, topographic maps, and available site plans, and are presented in Figure 11.

Test pits were logged to include dimensions, soil lithology, structures, and visual and olfactory evidence of contamination. Soil excavated from each test pit was screened in the field for organic vapors, using a photoionization detector (PID). Details on the excavation and logging practices were included in the work plan. Test pit logs are provided in Appendix A.

Analytical samples were collected during test pit excavation if contamination was evident. Soil excavated from two test pits (TP-4 and TP-10, located near former naphtha tanks and north of two former gas holders) showed evidence of contamination based on visual, olfactory, and PID observations. Samples were collected from these two test pits and analyzed for VOCs, SVOCs, PCBs, metals, and cyanide. Results of the test pit investigation are provided in Section 4.0.

3.3 Subsurface-Soil Borings/Well Installation

Subsurface-Soil Borings. Six shallow subsurface-soil borings were installed; four of these were completed as shallow monitoring wells. The shallow borings were advanced to a depth between 10 and 32 feet bgs. The objectives of these borings were to characterize shallow subsurface soils (those soils encountered from the ground surface to the uppermost portion of the underlying aquifer). The shallow wells were utilized to determine the groundwater flow direction. The wells were screened through the water table in an effort to assess the presence of light nonaqueous phase liquid (LNAPL) impacts.

An additional boring was installed and extended to 62 feet bgs. The objective of this deep boring was to attempt to evaluate the presence of dense nonaqueous phase liquid (DNAPL). Tar and tar-impacted soil (stain, sheen) were observed intermittently in this boring from 15 to 38.5 feet bgs; DNAPL was collected at 40.8 to 41.3 feet bgs. A confining layer was not encountered; however, evidence of contamination was not observed within the bottom 10 feet of the deep boring. A deep monitoring well was installed and screened within the interval of tar contamination.

A hollow-stem auger (HSA) drill rig with a 4.25-inch auger was used to install the borings. Continuous split-spoon samples were collected from the ground surface to the end of each boring. Samples were collected in advance of the auger using a 2-inch split spoon, 2 feet in length.

The lithology, moisture content, visual and olfactory evidence of contamination, PID readings, blow counts, and percent recovery of each subsurface sample were logged. Specific soil boring procedures are described in the work plan. Boring logs are provided in Appendix B. Each sample was screened with a PID for organic vapors. One soil sample per shallow boring was collected for laboratory analysis from the most contaminated interval (based on field observations). When no contamination was evident, the sample was taken from the groundwater interface. As previously mentioned, one soil sample was also collected for laboratory analyses from the interval of tar contamination in the deep boring.

Seven analytical samples were collected from subsurface-soil borings. These samples were analyzed for VOCs, SVOCs, PCBs, metals, and cyanide. Results of the boring investigation are provided in Section 4.0.

Monitoring Well Installation. Four shallow subsurface borings, and one deep subsurface boring, were completed as monitoring wells. The monitoring wells were constructed of 2-inch inside diameter, flush-threaded polyvinyl chloride (PVC) screen and solid casing. The annular space between the well screen and the borehole wall was backfilled with chemically inert sand to promote sufficient groundwater flow to the well and to minimize the passage of any fine-grained formational material into the well. A 1-foot layer of fine sand and a bentonite clay seal were placed above the sand pack. The remaining annular space was filled to grade with cement/bentonite grout. The bentonite seal prevents the migration of contaminants to the sampling zone (i.e., screened interval) from the surface and overlying material and prevents cross-contamination between strata. A concrete pad surrounds each well at the ground surface. Each monitoring well was fitted with a flush-mounted curb box, secured with concrete. The shallow monitoring wells were screened at the uppermost portion of the water table with a screen length of 10 feet. The deep monitoring well also has a screened interval of 10 feet. Well construction diagrams are provided with the boring logs in Appendix B.

Well Development. Subsequent to drilling operations, all monitoring wells were developed to restore the natural permeability of the formation in the vicinity of the well and to remove silt and clay. Development was performed by alternately surging and pumping, utilizing a centrifugal or piston pump for a minimum of 30 minutes. Pumping continued until the turbidity of the development water was less than 50 nephelometric turbidity units (NTUs). A field turbidity meter was used to monitor these levels. Several wells did not develop to a turbidity less than 50 NTUs. In these cases, pH, conductivity, and temperature of the development water were monitored and recorded. Well development continued until pH, conductivity, and temperature readings were within 10 percent over three consecutive readings. Wells were not developed until 24 hours after construction, or their recovery was completed (whichever was later). Development water was contained, labeled, and staged for appropriate disposal.

3.4 Surveying

A site survey was performed by a licensed-surveyor. Information was obtained for production of a composite map that accurately illustrates the locations and elevations of test pits, soil borings, monitoring wells, and other pertinent features. This composite map was used to develop the figures in this report. Monitoring well reference elevations were determined with a vertical accuracy of ±0.01 foot. Locations and elevations were referenced to a known benchmark.

3.5 Groundwater Sampling

The newly installed monitoring wells were sampled for MGP constituents. These wells were sampled a minimum of 14 days after development was completed. The groundwater sampling procedures provided in the work plan were followed during the field investigation.

Water Level Measurements. Prior to groundwater sampling, depth to groundwater was measured and recorded. The surveyed monitoring well reference elevation and the depth to groundwater measurement were used to calculate the groundwater elevation at each monitoring well. This information was used to determine the hydraulic gradient and the groundwater flow direction at the site.

Purging. Prior to groundwater sampling, three to five well volumes were purged from each well to ensure that all stagnant water was replaced by representative formation water. A peristaltic pump with dedicated disposable nalgene and silicone tubing was used to purge each well at a pumping rate of approximately 1,000 milliliters/minute (ml/min). While the monitoring well was being purged, pH, temperature, dissolved oxygen, Eh, and conductivity were monitored and recorded. After a minimum of three well volumes were purged, and the pH, temperature, and conductivity values were within 10 percent over several consecutive readings, the monitoring well was sampled. At a maximum, five well volumes were purged prior to sampling. Purge water was contained, labeled, and staged for appropriate disposal.

Sampling. After each well was purged, groundwater samples were collected and contained in glassware provided by the laboratory. Samples were collected using dedicated disposable polyethylene bailers and a peristaltic pump at a pumping rate of 100 milliliters per minute. Samples were collected for analysis in the following order: VOCs, SVOCs, PCBs, cyanide, and TAL metals. An in-line 0.4 micron disposable filter was used when collecting the TAL metals sample. An unfiltered sample was also collected for TAL metals analyses. All samples were kept on ice before and during shipment to the laboratory.

Five groundwater samples were collected from the monitoring wells installed at the site (one from each well). Results of groundwater sampling are presented in Section 4.0.

3.6 Delaware Riverbank Inspection

GEI/Atlantic performed an inspection of the Delaware River near the entrance of the former canal and collected a sediment sample from this area. The riverbank inspection consisted of walking the riverbank, probing the sediments to determine if a sheen was present, and making visual observations.

4.0 FINDINGS

During the field investigation, 10 test pits, six shallow subsurface borings, and one deep subsurface boring were completed to characterize the subsurface material, to locate former MGP structures, and to define the extent of contamination. The figure below and Figure 11 illustrate these sampling locations. Four of the shallow borings and one deep boring were completed as monitoring wells to determine the groundwater flow direction and to determine the presence of groundwater contamination. Results of the field investigation are discussed in this section.

4.1 Site Hydrogeology

Four geologic units were identified during the subsurface field investigation. The geologic units are depicted in cross-section A-A′ (Figure 12). The uppermost unit was identified as fill material consisting of demolition debris, bottom ash, cinders, sand, silt, and gravel. The fill unit ranged in thickness from 7 to 13 feet throughout the site. The fill was typically dry to moist. The second unit was identified as a fine-grained alluvium deposit consisting of moderately- to well-sorted fine sand and silt. This unit was consistently encountered below the fill and ranged in thickness from 2 to 9 feet. The fine-grained alluvium was typically very moist to wet. The third unit encountered at the site was a coarse-grained alluvium consisting of rock fragments, cobbles, and sand. This unit was transitional from the overlying fine-grained alluvium and also was water-bearing. The coarse-grained alluvium was typically encountered approximately 17 feet bgs. Two borings (MW-1D and MW-2) extended through the entire coarse-grained alluvium. In both of these borings the coarse-grained alluvium was 13 feet thick. The coarse-grained alluvium is underlain by glacial outwash consisting of poorly-sorted silt, sand, and gravel. This unit is also water bearing. The thickness of the glacial outwash unit is unknown, but results from the deep boring completed on site indicated that this unit extends to at least 62 feet bgs. A confining layer was not encountered during the subsurface boring investigation.

The shallow aquifer is unconfined and is present within the fine-grained alluvium, coarse-grained alluvium, and glacial outwash units. The depth to groundwater ranged from 14.3 to 16.5 feet. Figure 13 illustrates the shallow groundwater elevation and flow direction. The groundwater flow direction is to the southwest, toward the Delaware River. The average hydraulic gradient across the site is 0.004 foot/foot. Groundwater level measurements at MW-1S and MW-1D differ by approximately 0.5 foot, resulting in a downward vertical gradient of 0.025 foot/foot.

4.2 Nature and Extent of Chemical Constituents

4.2.1 Subsurface Investigation

Test pits and soil borings were completed to locate former MGP structures and to identify residual wastes associated with former MGP activities. Figure 14 illustrates these sampling locations. Samples were collected from test pit excavations if visual or olfactory evidence of contamination were observed. Based on observations during test pit excavations, two analytical samples were collected (from TP-4 and TP-10). Eight subsurface-soil samples were collected from soil borings completed at the site. One sample was collected from each boring except MW-3 where two samples were collected at different depths. Subsurface-soil samples were analyzed for VOCs, SVOCs, PCBs, metals, and cyanide.

Table 5 presents the analytical results of subsurface-soil samples and includes only analytes detected in at least one soil sample. NYSDEC soil cleanup criteria (Technical and Administrative Guidance Memorandum [TAGM] 4046) for each detected analyte and state background levels of metals are provided in Table 5. The detected concentrations that exceed the NYSDEC soil cleanup criteria are highlighted in Table 5. VOCs, SVOCs, metals, and cyanide were detected in subsurface-soil samples. Benzene, toluene, ethylbenzene, and xylenes (BTEX), PAHs, and dibenzofuran (a heterocyclic compound containing oxygen, typically detected in tar) were detected at concentrations exceeding NYSDEC soil cleanup criteria. The detected concentrations of metals were less than either the cleanup criteria or state background levels. Figure 14 includes the total BTEX and total PAH concentrations detected in subsurface-soil samples.

Three concrete pads for former gas holders were located at the site (Figure 14). No visual or olfactory evidence of contamination was observed from soils excavated along the side of these concrete pads. Soil borings were completed through the center of each concrete pad (MW-3, SB-4, and MW-5). At the center gas holder, a concrete pad was placed over a subsurface gas holder. SB-4 was installed at this location to verify the presence of the bottom of the holder. Based on this soil boring, the holder contains fill material consisting of brick, ash, rubble, and tar. While drilling SB-4, an obstruction was encountered at 10 feet bgs which was assumed to be the bottom of the former gas holder. MW-3 was installed near the gas holder located in the southern portion of the site. Tar was observed in soil samples collected from this boring at the groundwater interface. Tar blebs, which are defined as isolated amorphous occurrence of NAPL on the scale of a few millimeters, were observed in soil collected from MW-3 from 17 to 30 feet bgs. MW-5 was installed near the gas holder located in the northern portion of the site. Black oil blebs were observed on the water surface from soil samples collected from this boring approximately 2 to 7 feet below the water table (17 to 22 feet bgs). Tar blebs were observed from 22 to 24 feet bgs. High BTEX and PAH concentrations were detected in subsurface-soil samples collected at MW-3 (15.1 to 16.8 feet bgs), MW-3 (17.0 to 18.0 feet bgs), SB-4 (8.0 to 8.6 feet bgs), and MW-5 (15.0-15.7 feet bgs). The highest total BTEX and PAH concentrations were detected at SB-4, which is located within a former gas holder.

The former subsurface gas holder adjacent to Pike Street was also located (Figure 14). No visual or olfactory evidence of contamination was observed from soils excavated inside or outside of the former gas holder. Water was encountered inside of the holder at approximately 9 feet bgs, while soil excavated outside to a depth of 10 feet bgs was dry. Based on these observations, the bottom of the holder is likely intact.

Two test pits (TP-4 and TP-10) were excavated in the area of former subsurface naphtha tanks located along Brown Street (Figure 14). Fuel oil odors were observed in soil excavated from both of these test pits. Two soil samples were collected from these locations. These samples contained only PAHs in excess of NYSDEC criteria.

Three test pits (TP-5, TP-6, and TP-9) were excavated in the area of the former canal which traverses the site (Figure 14). These test pits were excavated to approximately 10 to 13 feet bgs. Material excavated from these test pits consisted of ash, cinders, and brick. No visual or olfactory evidence of contamination was observed. TP-5 and TP-6 were excavated to 13 feet; groundwater was not encountered. A clay pipe was encountered at approximately 7 feet bgs in TP-9 and groundwater was encountered at 10 feet bgs. Three wells (MW-1S, MW-1D, and MW-2) were placed adjacent to the former canal. Groundwater was encountered at approximately 15 feet bgs. Tar impacted soil (sheen, stain, tar blebs) was observed in samples collected at MW-1S and MW-1D from 15 to 39 feet bgs. DNAPL was present from 40.7 to 44 feet bgs in fine to medium sand. A lense of very fine sand (40 to 40.4 feet bgs) contained no tar. Sheen and staining was evident from 40.4 to 50 feet bgs. The subsurface-soil samples collected from these borings contained BTEX and PAHs in excess of NYSDEC criteria. At MW-2 visible tar was not observed, but a sheen was present. The subsurface-soil sample collected from MW-2 contained only PAHs in excess of NYSDEC criteria.

The hand-augered boring, HA-1, which was placed in the vicinity of a former tar well on the northeastern portion of the site, did not contain any analytes at concentrations in excess of NYSDEC criteria. No visual or olfactory impacts were observed while augering this boring.

The basement of the dwelling located adjacent to the southern boundary of the site was inspected for evidence of contamination from former MGP operations. The inspection consisted of entering the basement, examining the foundation walls and floor, taking PID readings, and making visual observations. No visual or olfactory signs of contamination were observed in the basement of this dwelling.

4.2.2 Sediment Sample Analytical Results

One sediment sample (SED-01) was collected from the Delaware River immediately downgradient of the former canal discharge to characterize historic/current discharge. The sediment sample was analyzed for VOCs, SVOCs, PCBs, metals, and cyanide. Table 6 presents the analytical results of the sediment sample. The table excludes the parameters which were not detected. The SVOCs detected included all 17 PAHs and several other SVOCs. Six of the 8 RCRA metals were detected.

4.2.3 Groundwater Investigation

Five monitoring wells were installed to determine the groundwater flow direction and evaluate groundwater quality. Groundwater samples were collected from the newly installed wells and analyzed for VOCs, SVOCs, PCBs, metals, and cyanide.

During drilling operations, visual evidence of contamination was observed within the saturated zone in all of the borings. The four shallow wells are screened within the uppermost portion of the aquifer. One deep well is screened approximately 20 to 30 feet below the water table (37 to 47 feet bgs). During groundwater sampling, the purge water from all the wells except MW-2 had a slight to moderate odor and a slight sheen. No LNAPL or DNAPL were detected in the monitoring wells. As mentioned earlier, groundwater at the site flows southwest, toward the Delaware River.

Table 7 presents the analytical results of groundwater samples and includes only analytes detected in at least one groundwater sample. The NYSDEC groundwater standard for each detected analyte is provided in Table 7. The detected concentrations that exceed the NYSDEC groundwater standard are highlighted in Table 7. SVOCs and metals were detected in all of the groundwater samples. VOCs were detected in four of the samples. Cyanide was detected in one sample (MW-1S). The following analytes were detected at concentrations exceeding the NYSDEC groundwater standard:

- BTEX;
- PAHs: naphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, fluorene, anthracene, fluoranthene, phenanthrene, pyrene, benzo(g,h,i) perylene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene; and
- other SVOCs: dibenzofuran.

The location, screened interval, and total BTEX and total PAH concentrations of each groundwater sample collected are provided on Figure 15. The highest total BTEX concentration was detected at MW-1D. The highest total PAH concentration was detected at MW-1S. MW-1S and MW-1D are located adjacent to the former canal which traverses the site. The lowest total BTEX and PAH concentrations were detected in MW-2 which is located in the former canal, downgradient of MW-1S and MW-1D.

4.3 Ecological Setting

Records on the occurrence of wetlands and rare species in the vicinity of the site, literature and field observations are the bases for information in this section.

4.3.1 Delaware River

The Port Jervis site is in an old urban setting, surrounded by residential and commercial properties (Figure 16). However, the Delaware River is approximately 160 feet to the southwest; in the vicinity of the site it constitutes the boundary between New York and Pennsylvania. There the river features mid-reach characteristics; a shallow quiet run, parallel to the site upgradient of the Pike Street bridge, transitions to a riffle area downgradient of the bridge. Downgradient of the riffles, the Neversink River joins the Delaware River where the Delaware makes a 90 degree bend at the edge of Port Jervis. A small island near the New York bank is a feature of the bend approximately 4,200 feet downgradient of the bridge.

The river is controlled by releases from the Cannonsville reservoir approximately 65 miles upstream. In the reach of river near the site, the Delaware is designated as Class A by the NYSDEC (6CRR815). Dace (*Rhinicthys*), white sucker (*Cataostomus commersoni*), and largemouth bass (*Micropterus salmoides*) have been observed in the Port Jervis region of the Delaware (Smith, 1985).

4.3.2 Covertype

The following description is with reference to the New York side of the river. The site is separated from the Delaware River by Water Street and a restaurant on the riverbank. For approximately 500 feet upgradient from the Pike Street bridge, the bank slopes steeply from street level to river level due to an approximate 20-foot drop in surface elevation within 40-50 feet of the river. The riverbank section that parallels the southern site boundary is grass covered where structural features of the restaurant are absent. The storm sewer drain that traverses the site passes under the restaurant and empties into the river near water level. Discharge from the sewer maintains a small cut (10 feet wide, a few inches deep) in the riverbank.

On the streetlevel of the riverbank, across from the adjacent upgradient block, a cluster of successional trees, such as maple and oak and ornamental evergreens, exists among two houses, one of which is a store. Two blocks upstream of the site, on the bank, is a riverside park where the bank is grass-covered and landscaped, and not as steep as near the restaurant. Upstream of and adjacent to the park, successional tree growth is established on the more gradual bank. At river level, a step-like feature (riverside ice meadow), approximately 50 feet wide, provides access to the river for pedestrians at the restaurant and upgradient locations. Grasses, herbs, and some shrubs grow in the flat area.

Downstream of the site, the riverbank has been subject to much alteration. A footing for the Pike Street bridge and protection for it are followed by a concrete wall from street-level to river-level which extends downstream approximately 1,000 feet from the bridge. From the wall to the sharp turn in the river approximately 3,500 feet farther downgradient, the grassy riverbank is low at water's edge, but slopes upward gradually to the Conrail ROW approximately 300 feet to the north of the river. From the turn to the juncture with the Neversink River, approximately 2,800 feet, is the Laurel Grove Cemetery. In summary, three principal characteristics are evident along the riverbank from the site to 1.4 miles downgradient: urban paving, native grass and herbs, and lawn/landscaping. Part of a Class II mapped wetland (PN-30) is located within 2 miles of the site, along Gold Creek, a tributary of the Neversink River.

Urban characteristics dominate within 0.5 mile of the site and north of the Delaware River. Small lawns and successional trees are associated with some residential parcels. However, many of the houses and the commercial structures are densely spaced, without any vegetation. Rail yards are located to the northwest, north, and northeast of the site. Commercial uses such as a bulk storage area, trucking depot and warehouse operations occur northwest of the site. Cliffs at the northern edge of Port Jervis fall within the 0.5-mile radius.

4.3.3 Pennsylvania Characteristics

On the Pennsylvania side of the Delaware, urban features associated with the town of Matamoras characterize the area across the river from the site and about 3,000 feet upgradient and 1,800 feet downgradient. Near the right-angle bend in the river is a small airport and open land.

4.3.4 Rare Species

The New York State Natural Heritage Program was queried with reference to the area within 2 miles of the site. Several rare species are documented. The sightings include historic records going back to the 19th century. The occurrences are shown in Figure 17. One of them is with reference to an endangered plant noted in the cliff setting north of Port Jervis; an endangered peregrine falcon was noted at the same location. Four records involve unprotected dragonflies observed in the vicinity of the Neversink River or downgradient of the site along the Delaware River. The bald eagle has been observed along the Neversink and Delaware River corridors. No species of concern are documented in the immediate vicinity of the site.

5.0 RISK EVALUATION

One of the requirements of a PSA is an evaluation of the analytical findings relative to the potential for human and/or environmental exposure to chemical contaminants or other potential hazards or stressors, and a qualitative evaluation as to whether the potential exposure may be sufficiently significant to warrant concern. The evaluation is performed as a series of steps:

- problem formulation;
- identification of thresholds of concern (TOCs);
- evaluation of potential health hazards; and
- evaluation of potential fish and wildlife impacts.

This section of the report provides this evaluation for the Port Jervis site.

5.1 Problem Formulation

Problem formulation is the process of identifying and defining potential sources of contaminants, and how those contaminants might be transported in the environment and result in exposure to either humans or environmental receptors (such as fish, birds, animals, plants, or their habitat). The process results in the development of a conceptual risk system model. This model describes the site and presents theories regarding the transport and fate of, and exposure to, the contaminants. The model serves as the basis of the evaluation of potential risk. The model for the Port Jervis site is shown in Figure 18.

5.2 Thresholds of Concern

TOCs are numerical concentration values for hazardous substances in specific environmental media. These values are based on:

- background concentrations that one might expect to observe in media at the site;
- regulatory requirements (such as drinking water or air standards);
- generic health thresholds based on broad, general, and conservative (health-protective) assumptions about exposure; and
- specific target thresholds based on site-specific and health-protective assumptions.

The basis or development of these values for the Port Jervis site follows.

Background Concentrations. For the purposes of this evaluation, it was necessary to define what the background concentrations of chemicals were in order to distinguish between site-related contamination from naturally occurring or other non-site-related levels of chemicals. Two different types of background levels of chemicals are generally recognized:

- naturally occurring levels, which are ambient concentrations of chemicals present in the environment that have not been influenced by humans (e.g., aluminum, manganese); and

- anthropogenic levels, which are concentrations of chemicals that are present in the environment due to human-made, non-site sources (e.g., industry, automobiles).

Background can range from localized to ubiquitous. For example, pesticides (most of which are anthropogenic) may be found throughout certain areas (such as agricultural areas), and salt runoff from roads during periods of snow may contribute high levels of chemicals such as sodium, calcium, and magnesium around roadways. PAHs and lead are other examples of human-produced and generally present chemicals, although lead can be a natural component of some soils, and PAHs can be formed in fires. Some typically benign substances, such as sodium, magnesium, and potassium may be present naturally at high levels.

When evaluating data with regards to potential risk assessment, it is necessary to distinguish naturally-occurring concentrations from those that may be due to contamination, and those due to on-site sources from those attributable to off-site sources. It is difficult to define background for a site when it is located in a large urban area with a substantially long history. The proximity of the site location to major traffic arterials may affect the content of some of the samples, resulting in contaminants typically associated with automobile usage (e.g., asbestos, lead, PAHs, and other compounds). While background contamination may occur in some samples, it is nevertheless representative of the urban location and the commercial/ industrial nature of the general site area.
As a result, some substances on the Target Analyte List (TAL) are not considered for this evaluation because they are natural constituents of soils and were detected at concentrations that were within or below typically occurring concentration ranges in New York (see Table 5).

Regulatory Requirements. Relevant requirements include state ambient water quality levels (NYSDEC, 1993, guidance values) for class GA groundwater, soil clean-up objectives and EPA established maximum contaminant level (MCL) concentrations for drinking water. Comparisons of the observed analyte concentrations in groundwater are compared to these levels in Tables 8 and 9.

Generic Health Thresholds. New York State's TAGM 4046 (NYSDEC, 1994) documents a set of recommended values for the cleanup of soil at inactive hazardous waste sites. These values arise out of considering generic, conservative exposure conditions designed to ensure significant safety; concentrations which are protective of groundwater and drinking water quality; background concentrations; and analytical detection limits. From these different values, a recommended clean-up value is selected that is the most stringent and above the analytical method detection limit. Under certain, compound-specific circumstances, the value is set at the detection limit itself. These criteria are provided for the measured analytes in Table 10.

Region III of the EPA has developed a set of screening concentrations based on risk assessment methods (EPA, 1998, Spring 1998 Risk-based Concentration Table). These risk-based concentration (RBCs), are useful threshold values for determining the general likelihood of concern for a particular analyte. The RBCs do not necessarily of and by themselves indicate safety nor that a hazard should not be anticipated, only that there is less concern that there might be a hazard. RBCs are provided for the measured analytes in Table 10.

5.3 Evaluation of Potential for Health Hazards

In comparing the subsurface-soil analytical results to background levels, NYSDEC TAGM values and EPA R-III RBCs the following general observations can be made.

- The average concentrations of BTEX and PAHs exceed the TAGM criteria; for heavier weight PAHs (possible carcinogens) the RBCs were exceeded.

- Several inorganic constituents (antimony, lead, and zinc) exceed background levels and TAGMs, but not RBC values.

Based on these simple comparisons, GEI/Atlantic concludes that the inorganic constituents do not pose a significant potential for exposure or risk considering the general conditions at the site. However, the carcinogenic PAHs at the site may pose a potential for significant exposure and risk. The PAHs were evaluated further.

GEI/Atlantic performed a simple screening evaluation following traditional risk assessment techniques consistent with good practice as described by EPA (1989, Risk Assessment Guidelines). The exposure scenario considered was for adult workers and construction workers exposed via dermal contact and incidental ingestion of soil-borne contaminants.

The potential exposure conditions considered involve two worker scenarios: dermal contact and ingestion of soil-borne contaminants by a construction worker exposed to contaminants in subsurface soil, and dermal contact and ingestion of soil-borne contaminants by an Orange and Rockland employee using the site on a routine basis. This employee scenario follows a routine that involves the individuals' presence on the site in the morning at the start of work and at the end of the day for stowing vehicles and equipment and personal clean-up. Workers may or may not return to the site for lunch.

Two exposure cases were evaluated: a central tendency case using average exposure factors and concentrations and a reasonable maximum exposure using average concentrations and upper confidence level exposure factors. Inhalation exposures (to either volatiles or soil particulate) were not considered due to the general lack of VOCs and the surface conditions of the site, and because such exposures generally do not contribute significantly to the cumulative risk.

The toxicological factors, absorption factors, and exposure factors used in the analysis are presented in Appendix C. The estimated potential risks are shown in Table 11. The results lead GEI/Atlantic to conclude that the PAHs at the site will not result in a significant exposure or risk to either workers or construction workers at the site. Because no risk is evident for these on-site workers, we conclude that typical trespassers or visitors of the site would not be exposed to risk.

Conditions at the site and downgradient property indicate that nearby residents are not exposed to risk from MGP residues. The site is paved and observations in the basement of an adjacent dwelling did not reveal any visual or olfactory signs of contamination. According to the City of Port Jervis and the County Health Department, there are no private wells in the vicinity of the site, and city residents are on public water supplied from three reservoirs. Therefore, exposure via ingestion pathways does not occur.

5.4 Evaluation of Potential for Environmental Impacts

The sediment sample collected adjacent to the Delaware River, from a small pocket in the riverbank, contained inorganic and organic analytes at concentrations greater than NYSDEC guidance values for screening sediments (Table 6). The sampled sediments were from an area impacted by discharge from an outfall for a city wide storm drain. Therefore, although the sampled location is aligned with the former canal that crossed the site and the storm drain traverses the site, the source of detected contaminants is unknown. Lead, copper, zinc, and mercury concentrations were greater than the screening values. The lead concentration was an order of magnitude greater than the guidance level. For detected organics, methylphenol and PAHs exceeded the guidance values. The represented PAHs tended to be the heavier molecular weight compounds that tend to sorb. For nine PAHs with guidance values, the measured concentrations far exceeded the guidance value. The concentration for acenaphthalene was slightly more (30 μg/kg) than the guidance value; naphthalene was detected at less than the guidance value.

Based on the level of exceedance by the PAHs and metals, the sampled sediments are contaminated per New York State guidance. However, the impact on the Delaware River and organisms within it cannot be evaluated from this one sample. The semi-confined location that was sampled is not representative of the river channel. The riverbank pocket is likely the result from erosion caused by the discharge from the storm drain. The sample represents a worst-case condition characterized by relatively small-grained sediment, compared to the main channel; limited flow; and intermittent concentrated loading from storm drainage. Analytical analyses by gas chromatography could be utilized in an attempt to determine the source of hydrocarbon contamination, but definitive attribution would likely be difficult due to multiple sources contributing to the storm drainage, including runoff from roadways and train yards in Port Jervis.

6.0 POTENTIAL REMEDIATION STRATEGIES

The results of the Port Jervis former MGP site PSA indicated several areas that have been impacted by MGP residuals. The residuals are primarily associated with tar and dissolved phase groundwater contaminants. No LNAPL impacts were observed. The following observations regarding the impacts and site conditions have been made.

- The subsurface holder near the center of the site contains approximately 6 feet of tar. The bottom and side walls of this holder appear to be intact.

- Tar was found in three locations other than in the subsurface holder. Tar and tar-impacted soil were encountered at one of these borings from 15 to 50 feet bgs. The vertical extent of the tar impacts was only determined in one of these three locations (MW-1D). The lateral extent of the tar has not been determined.

- The tar impacts were typically found in the coarse-grained alluvium that appears to be continuous throughout the site.

- No confining unit was identified in any of the borings and the depth to bedrock is unknown.

- The site is paved, fenced, and in an urban area. The site is approximately 160 feet from the Delaware River which is a Class A river.

- The preliminary human health risk evaluation indicates no significant risk to on-site workers or construction works.

Although the preliminary human health risk assessment indicates that there is likely no significant risk associated with the site, the presence of tar in the subsurface creates a long-term source of groundwater contamination. The focus of the remedial strategy is to prevent additional migration of tar and to mitigate the continued source of contaminants to groundwater. There is insufficient data to fully evaluate the remedial options for the site; however, a preliminary review of potentially applicable remedial options was performed.

The following remedial options may be applicable to the site.

- Containment
- DNAPL recovery
- Excavation

Containment technologies may consist of a permeable barrier that would act as a DNAPL collection system; an impermeable wall such as a slurry wall that would prevent continued migration, or a combination of impermeable and permeable barrier technologies. Key factors influencing the feasibility of containment technologies include the depth to bedrock and the depth of the DNAPL which are presently unknown.

There are several DNAPL recovery systems that have been implemented at MGP sites. Factors affecting DNAPL recovery include the rate of DNAPL migration and the depth of the DNAPL. Technical impracticability should be considered if the site conditions or depth of the DNAPL create a situation in which removal or mitigation is not technically feasible. Technical impracticability arguments would require additional information, including the vertical extent of DNAPL and the depth to bedrock or other confining unit. Possible innovative DNAPL-recovery technologies include an extraction process that requires heating the DNAPL prior to extraction through pumping, or extracting DNAPL from wells using a synthetic hydrophobic belt system.

Excavation of tar-impacted soils is relatively straightforward. Off-site disposal or thermal treatment would be required. Factors affecting excavation and disposal or treatment technologies include the depth of impacts, the volume of material, the volume of hazardous material, and the available disposal facilities. Compliance with the recently promulgated land disposal restrictions would need to be considered. The volume of material and the percent of the material that would be considered hazardous are presently unknown.

The tar in the subsurface holder near the center of the site should be removed or otherwise remediated to eliminate the potential for future releases of this material. This remediation could be treated either as an interim remedial measure (IRM) or as part of the site remediation. The primary feasible remedial alternative for this holder would be excavation of the tar and fill and off-site disposal or thermal treatment. Treatment and disposal options would be governed by the volume of material and percentage of that volume that would be considered hazardous. For land disposal options, compliance with the recently promulgated land disposal restrictions would be required.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The PSA investigation at the Port Jervis former MGP site was conducted from April through May 1998. This investigation was designed to characterize the nature and extent of contamination from previous MGP operations through subsurface exploration and collection of subsurface-soil, groundwater, and sediment samples. VOCs, SVOCs, PCBs, metals, and cyanide were identified as potential compounds of concern; therefore, samples collected at the site were analyzed for these constituents. The following conclusions were made based on the results of this investigation.

- Four geologic units were identified at the site. These units include fill, fine-grained alluvium deposits, coarse-grained alluvium, and glacial outwash. These units appear to be continuous throughout the site. A confining layer was not encountered in any of the borings.

- Shallow aquifer is unconfined and is present within the alluvium and glacial outwash. Depth to groundwater is approximately 15 feet. The groundwater flow direction is to the southwest toward the Delaware River.

- The subsurface holder located at the center of the site contains approximately 6 feet of tar. The bottom and side walls of this holder appear to be intact.

- Tar and tar-impacted soil were found in three locations. The vertical extent of tar impacts was only determined in one of these three locations (MW-1D), where stain, sheen and tar blebs were observed between 15 and 50 feet bgs and DNAPL was present from approximately 41 to 44 feet bgs. The lateral extent of the tar has not been determined. The tar was found within the coarse-grained alluvium unit at these locations.

- Fuel-oil contamination was observed in soil in the vicinity of the former subsurface naphtha tanks.

- No LNAPL was observed in borings or on groundwater.

- VOCs, SVOCs, metals, and cyanide were detected in subsurface-soil samples. BTEX, PAHs, and dibenzofuran concentrations exceeded NYSDEC soil cleanup criteria.

- SVOCs and metals were detected in the sediment sample at concentrations exceeding the Lowest Effect Level.

- BTEX, PAHs, and dibenzofuran concentrations in groundwater exceeded the NYSDEC groundwater standards. DNAPL was not detected in the monitoring wells.

- The site is paved, fenced, and in an urban area. The site is approximately 160 feet from the Delaware River which is a Class A river.

- The preliminary human health risk evaluation indicates no significant risk to on-site workers or construction workers.

- Presence of tar in the subsurface creates a long-term source of groundwater contamination. Possible remedial options which may be applied to the site include containment, DNAPL recovery, and excavation.

Several areas of the site appear to have been impacted by previous MGP operations. These impacts are associated with tar in the saturated zone, resulting in dissolved phase groundwater contamination. Since the vertical and lateral extent of tar contamination has not been fully delineated and the potential for off-site migration of tar exists, further subsurface investigation is recommended. To evaluate the vertical extent of DNAPL, it will be necessary to determine the depth of bedrock or confining layer. Since groundwater at the site flows toward the Delaware River, additional investigation of groundwater quality is also recommended. This additional information will assist in the selection and design of an effective remedial alternative for the site.

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TABLES

Table 1
Gas Production at Port Jervis, New York[a]

Year	Process	Annual Output (cf)
1887	Lowe by Granger	Not reported
1892	Granger-Collins	6 million
1893	Granger-Collins	6 million
1900	Lowe	8 million
1904	Lowe	12 million
1905	Lowe	10 million
1906	Lowe	10 million
1907	Lowe	10 million
1908	Lowe	10 million
1909	Lowe	10 (1907)
1910	Lowe	10 (1907)
1911	Lowe	10 million
1912	Lowe	10 million
1913	Lowe	10 million
1914	Lowe	10 million
1915	Lowe	19.7 million
1916	Lowe	23.7 million
1917	Lowe	23.7 million
1918-1921	Production information for the Port Jervis site was combined with production information for the Middletown site. The work plan for the Middletown site is provided under separate cover.	

[a] *Brown's Directory of American Gas Companies*

Table 2
Potential Contaminant Sources Within One Mile

Environmental List	Port Jervis Site	Beyond the Site Boundary 0.125 mile	From 0.125 to 0.25 Mile From the Site Boundary	From 0.25 to 0.5 Mile From the Site Boundary	From 0.5 to 1.0 Mile From the Site Boundary
NYS Inactive Hazardous Waste Disposal Sites	0	0	0	0	0
CERCLIS Sites	Delisted from database	0	0	0	1
National Priority List	0	0	0	0	0
Hazardous Substance Waste Disposal	1	0	0	0	1
NYS Solid Waste Facilities	0	0	0	1	0
NYS Major Oil Storage Facilities	0	0	0	0	0
RCRA Hazardous Waste Treatment, Storage, Disposal Sites	0	0	1	0	0
NYS Toxic Spills (including Leaking Underground Storage Tanks)	0	1	1	4	Not searched
Local & State Petroleum Bulk Storage Sites	1	0	1	Not searched	Not searched
RCRA Hazardous Waste Generators & Transporters	0	0	0	Not searched	Not searched
NYS Chemical Bulk Storage Sites	0	0	0	Not searched	Not searched
Toxic Release Inventory	0	0	0	Not searched	Not searched
Permit Compliance System Toxic Wastewater Discharges	0	0	0	Not searched	Not searched
NYS Air Discharges	0	0	1	Not searched	Not searched
Civil Enforcement Docket Facilities	0	0	0	Not searched	Not searched
ERNS	Transformer oil spill	Not searched	Not searched	Not searched	Not searched

Table 3
Climatological Data Collected at West Point, New York

Temperature	
Average daily temperature, winter	29 degrees F
Average minimum daily temperature, winter	21 degrees F
Lowest recorded temperature	-11 degrees F, 2/8/1963
Average daily temperature, summer	73 degrees F
Average maximum daily temperature, summer	84 degrees F
Highest recorded temperature	105 degrees F, 9/2/1953
Precipitation	
Total annual precipitation	48 inches
Average presently falling between April and September	50%; 24 inches
Heaviest 1-day rainfall	4.76 inches, 9/12/1960
Mean annual lake evaporation	31 inches
Mean net precipitation	17 inches
One year 24-hour rainfall	2.9 inches

Source: *Soil Survey of Orange County, New York*, US Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station, 1981

Table 4
Physical and Chemical Properties of the Three Soil Horizons of the Tioga Soils

	Soil Horizon 1 (0-3 inches BG)	Soil Horizon 2 (3-40 inches BG)	Soil Horizon 3 (40-60 inches BG)
Permeability Inches/Hour	0.6 to 6.0	0.6 to 6.0	0.6 to 20
Available water capacity Inch/Inch	0.15 to 0.21	0.07 to 0.20	0.02 to 0.20
Soil reaction pH	5.1 to 7.3	5.1 to 7.3	5.6 to 7.8
Shrink-swell potential	Low	Low	Low
Erosion Factor K	0.49	0.37	0.37
Erosion Factor T	4	4	4

Source: *Soil Survey of Orange County, New York,* US Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station, 1981

Table 5
Subsurface-Soil Sample Results
Port Jervis Former MGP Site

Analyte	NYSDEC Soil Cleanup Criteria	Sample ID/Depth (feet bgs)					
		HA-1 5.1	MW-1D 41.05	MW-1S 18.7	MW-2 15.6	MW-3 15.95	MW-3 17.5
BTEX (ug/kg)							
Benzene	60	6 U	7,900 U	7,000 U	6 U	760 U	1,400 U
Toluene	1,500	6 U	**5,000 J**	7,000 U	6 U	760 U	1,400 U
Ethylbenzene	5,500	6 U	**150,000**	**13,000**	6 U	2,000	**13,000**
Xylene (total)	1,200	6 U	**160,000**	**14,000**	6 U	**2,200**	**15,000**
Other VOCs (ug/kg)							
2-Butanone	NA	12 U	15,000 U	14,000 U	12 U	1,500 U	2,800 U
PAHs (ug/kg)							
Naphthalene	13,000	44 JB	**1,400,000 B**	**240,000**	1,600 U	**440,000 B**	**250,000 B**
2-Methylnaphthalene	36,400	390 U	**730,000**	**130,000**	1,600 U	**260,000**	**180,000**
Acenaphthene	50,000	390 U	**320,000**	**62,000 J**	48 J	**130,000**	**80,000**
Acenaphthylene	41,000	390 U	**56,000 J**	5,800 J	1,400 J	14,000 J	9,800 J
Fluorene	50,000	390 U	**93,000 J**	71,000 U	1,600 U	21,000 J	23,000 J
Anthracene	50,000	390 U	**160,000 J**	27,000 J	310 J	**56,000 J**	37,000
Fluoranthene	50,000	390 U	**93,000 J**	71,000 U	1,600 U	80,000 U	5,000 J
Phenanthrene	50,000	390 U	**480,000**	**80,000**	49 J	**160,000**	**100,000**
Pyrene	50,000	17 J	**280,000**	36,000 J	890 J	**66,000 J**	48,000
Chrysene	400	12 J	**96,000 J**	**12,000 J**	**460 J**	**25,000 J**	**16,000 J**
Benz(a)anthracene	224[1]	12 J	**81,000 J**	**12,000 J**	170 J	**24,000 J**	**16,000 J**
Benzo(b)fluoranthene	1,100	10 J	**35,000 J**	**4,500 J**	530 J	**7,700 J**	**4,700 J**
Benzo(k)fluoranthene	1,100	390 U	180,000 U	71,000 U	1,600 U	80,000 U	36,000 U
Benzo(g,h,i)perylene	50,000	390 U	34,000 J	3,600 J	5,500	5,800 J	5,000 J
Benzo(a)pyrene	61[1]	11 J	**84,000 J**	**9,200 J**	**1,600**	**18,000 J**	**12,000 J**
Dibenz(a,h)anthracene	14[1]	390 U	**8,500 J**	71,000 U	**660 J**	80,000 U	**1,400 J**
Indeno(1,2,3-cd)pyrene	3,200	390 U	**28,000 J**	3,100 J	2,500	**5,100 J**	**4,200 J**

Notes:

U - Value below detection limit.
J - Estimated value (less than detection limit).
B - (Organics) - analyte detected in blank.
B - (Inorganics) - Value between instrument detection limit and contract required detection limit.
BK - Background level; background levels are provided.
E - Estimated value (due to interference).
N - Spiked sample recovery not within control limits.
[1] - Or method detection limit (MDL).
[2] - Or background level; background levels are provided.
[3] - Fume or dust.

Table 6
Sediment Sample (SED-01) Results
Port Jervis Former MGP Site

Analyte	Concentration	Lowest Effect Level[a]
PAHs (ug/kg)		
Naphthalene	170 J	340
2-Methylnaphthalene	**140 J**	65
Acenaphthene	**180 J**	150
Acenaphthylene	570 J	---
Fluorene	**320 J**	35
Anthracene	**1,100**	85
Fluoranthene	**5,200**	600
Phenanthrene	**3,400**	225
Pyrene	**4,700**	350
Chrysene	**3,500**	400
Benz(a)anthracene	**2,700**	230
Benzo(b)fluoranthene	2,400	---
Benzo(k)fluoranthene	1,900	---
Benzo(g,h,i)perylene	1,600	---
Benzo(a)pyrene	**2,600**	400
Dibenz(a,h)anthracene	**480 J**	60
Indeno(1,2,3-cd)pyrene	1,300	---
Other SVOCs (ug/kg)		
4-Methylphenol	**58 J**	0.5
Benzoic acid	150 J	---
Dibenzofuran	160 J	---
Butylbenzylphthalate	90 J	---
bis(2-Ethylhexyl)phthalate	120 J	---
Di-n-octylphthalate	97 J	---

Analyte	Concentration	Lowest Effect Level[a]
RCRA Metals (mg/kg)		
Arsenic	5.8	6
Chromium	13.5	26
Lead	**114**	31
Mercury	**0.22**	0.15
Selenium	1.2 B	---
Other Metals (mg/kg)		
Aluminum	4050	---
Antimony	**2.9 B**	2
Beryllium	0.35 B	---
Calcium	2860	---
Cobalt	4.7 B	---
Copper	**60.1**	16
Iron	**12700**	2
Magnesium	2170	---
Manganese	134	460
Nickel	12	16
Potassium	357 B	---
Sodium	133 B	---
Vanadium	8.5 B	---
Zinc	**154 J**	120

Notes:

[a] Long, E.R and L.G. Morgan, 1990. "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National States and Trends Program," National Oceanic Atmospheric Administration (NOAA) Technical Memorandum No. 5. OMA52, NOAA National Ocean Service, Seattle, WA.

U - Value below detection limit.

J - Estimated value (less than detection limit).

B - Value between instrument detection limit and contract required detection limit.

Table 7
Groundwater Sample Results
Port Jervis Former MGP Site

Analyte	NYSDEC Groundwater Standard	Sample ID/Screen Interval (feet bgs) MW-1D (37-47)	MW-1S (15-25)	MW-2 (13-23)	MW-3 (13-23)	MW-5 (12-22)
BTEX (ug/L)						
Benzene	0.7	**130**	**52**	5 U	5 U	**75**
Toluene	5	**52 J**	**11 J**	5 U	5 U	**15**
Ethylbenzene	5	**830 J**	**410**	5 U	2 J	**100 J**
Xylene (total)	5	**760 J**	**520**	5 U	**14**	**400**
Other VOCs (ug/L)						
Methylene Chloride	NA	28 J	25 U	5 U	5 U	10 U
PAHs (ug/L)						
Naphthalene	10	**270**	**3,100**	11 U	**1,200**	**1,200**
2-Methylnaphthalene	50	**290**	**1000**	11 U	**230 J**	**210 J**
Acenaphthene	20	**140**	**370 J**	11 U	**170 J**	**110 J**
Acenaphthylene	20	**21 J**	600 U	11 U	**24 J**	14 J
Fluorene	50	42 J	**140 J**	11 U	**58 J**	40 J
Anthracene	50	12 J	**94 J**	11 U	38 J	26 J
Fluoranthene	50	4 J	**83 J**	11 U	28 J	16 J
Phenanthrene	50	38 J	**320 J**	11 U	**110 J**	**92 J**
Pyrene	50	5 J	**110 J**	11 U	36 J	19 J
Benzo(g,h,i)perylene	5	54 U	600 U	**8 J**	270 U	250 U
Benzo(a)pyrene	0.002	54 U	600 U	**1 J**	270 U	250 U
Indeno(1,2,3-cd)pyrene	0.002	54 U	600 U	**7 J**	270 U	250 U
Other SVOCs (ug/L)						
Dibenzofuran	5	**6 J**	600 U	11 U	270 U	250 U
Carbazole	NA	12 J	600 U	11 U	270 U	250 U
Di-n-butylphthalate	50	54 U	600 U	0.6 J	270 U	250 U
RCRA Metals - Total (ug/L)						
Arsenic	25	21.8 R	10.4	3.6 B	8.9 B	7.4 B
Barium	1,000	292 J	235 J	68.6 J	347 J	765 J
Chromium	50	3.8 J	5.7 J	3.2 J	4.6 J	3.4 J
Lead	25	5 J	5.2 J	7.3 J	7.2 J	3 J
Selenium	10	2 UN	3.1 U	8 U	2 UN	3.2 U
Silver	50	2 B	1 U	1 U	1.1 B	1.1 B
RCRA Metals - Dissolved (ug/L)						
Arsenic	25	36.3 R	5.9 B	2.3 B	7 B	5.5 B
Barium	1,000	386 J	216	45.6 B	414 J	642
Cadmium	10	1 U	1 U	1.2 B	1 U	1 U
Chromium	50	3.6 B	1.4 B	1 U	2.4 B	1.9 B
Lead	25	2.4 U	8.4 U	1 U	2.6 U	2.1 U
Selenium	10	2 UN	2.4 U	9.8 U	4.5 U	3.5 U
Silver	50	2.3 B	1 U	1 U	1.2 B	1 U
Other Metals (mg/L)						
Cyanide, Total	0.100[1]	0.01 U	0.0198	0.01 U	0.01 U	0.01 U

Notes
- U - Value below detection limit.
- J - Estimated value (less than detection limit).
- B - Value between instrument detection limit and contract required detection limit.
- E - Estimated value (due to interference).
- N - Spiked sample recovery not within control limits.
- R - Rejected value.
- NA - Not available.
- [1] - Free cyanide.

Table 8
Groundwater Analytical Results for Risk Assessment
Port Jervis Former MGP Site

Analyte	NYSDEC Groundwater Standards Guidance[1]	Sample ID/Date MW-1D 5/20/98	MW-1S 5/20/98	MW-2 5/20/98	MW-3 5/20/98	MW-5 5/22/98	MW-5 (DUP) 5/22/98
SVOCs (mg/L)							
Naphthalene	0.010	0.27	3.1	***0.0055***	1.2	1.2	1.4
2-Methylnaphthalene	0.050	0.29	1	***0.0055***	0.23	0.21	0.29
Acenaphthene	0.020	0.14	0.37	***0.0055***	0.17	0.11	0.14
BTEX (mg/L)							
Benzene	0.0007	0.13	0.052	***0.0025***	***0.0025***	0.075	0.08
Toluene	0.005	0.052	0.011	***0.0025***	***0.0025***	0.015	0.018
Ethylbenzene	0.005	0.83	0.41	***0.0025***	0.002	0.1	0.29
Xylene (total)	0.005	0.76	0.52	***0.0025***	0.014	0.4	0.45
Total Inorganic (mg/L)							
Arsenic	0.025	NA	0.0104	0.0036	0.0089	0.0074	0.0069
Barium	1.0	0.292	0.235	0.0686	0.347	0.765	0.768
Chromium	0.050	0.0038	0.0057	0.0032	0.0046	0.0034	0.0044
Lead	0.025	0.005	0.0052	0.0073	0.0072	0.003	0.0043
Mercury	0.002	ND	ND	ND	ND	ND	ND
Selenium	0.010	***0.001***	*0.00155*	***0.004***	***0.001***	***0.0016***	0.0031
Silver	0.050	0.002	*0.0005*	***0.0005***	***0.0011***	0.00055	0.0012
Dissolved Inorganic (mg/L)							
Arsenic	0.025	NA	0.0059	2.3	0.007	0.00275	0.0049
Barium	1.0	0.386	0.216	0.0456	0.414	0.642	0.659
Cadmium	0.010	***0.0005***	***0.0005***	1.2	***0.0005***	0.001	0.001
Chromium	0.050	0.0036	0.0014	***0.0005***	0.0024	0.0019	0.0018
Lead	0.025	***0.0012***	***0.0042***	***0.0005***	***0.0013***	0.0021	0.0021
Selenium	0.010	***0.001***	***0.0012***	***0.0049***	***0.00225***	0.0035	0.0031
Silver	0.050	0.0023	***0.0005***	***0.0005***	0.0012	0.001	0.001
Cyanide, Total	0.100	***0.005***	0.0198	***0.005***	***0.005***	***0.005***	***0.005***
PCBs	0.0001	ND	ND	ND	ND	ND	ND

Notes:

[1] - Class GA, Division of Water Technical and Operational Guidance, Series (1.1.1) Ambient Water Quality Standards and Guidance Values, 1993.

Bold Italicized numbers indicate one-half detection limit.

NA - unusable samples.

ND - not detected in any samples.

Table 9
Groundwater Analytical Results Statistics
Port Jervis Former MGP Site

Analyte	NYSDEC Groundwater Standards Guidance[1]	Average Concentration mg/L	Minimum Detected Value	Maximum	Number of Samples	Number of Detects	Exceedance
SVOCs (mg/L)							
Naphthalene	0.010	1.196	0.27	3.1	6	5	Yes
2-Methylnaphthalene	0.050	0.338	0.21	1	6	5	Yes
Acenaphthene	0.020	0.156	0.11	0.37	6	5	Yes
BTEX (mg/L)							
Benzene	0.0007	0.057	0.08	0.13	6	4	Yes
Toluene	0.005	0.017	0.011	0.052	6	4	Yes
Ethylbenzene	0.005	0.272	0.1	0.83	6	5	Yes
Xylene (total)	0.005	0.358	0.014	0.76	6	5	Yes
Total Inorganic (mg/L)							
Arsenic	0.025	0.006	0.0036	0.0104	5	5	No
Barium	1.0	0.413	0.0686	0.768	6	6	No
Chromium	0.050	0.004	0.0032	0.0057	6	6	No
Lead	0.025	0.005	0.003	0.0073	6	6	No
Mercury	0.002		ND	ND	6	0	No
Selenium	0.010	0.002	0.001	0.004	6	2	No
Silver	0.050	0.001	0.0005	0.002	6	4	No
Dissolved Inorganic (mg/L)							
Arsenic	0.025	0.387	0.00275	2.3	5	5	Yes
Barium	1.0	0.394	0.216	0.659	6	6	Yes
Cadmium	0.010	0.201	0.001	1.2	6	3	Yes
Chromium	0.050	0.002	0.0018	0.0036	6	5	No
Lead	0.025	0.002	0.0021	0.0042	6	2	No
Selenium	0.010	0.003	0.0031	0.0049	6	2	No
Silver	0.050	0.001	0.001	0.0023	6	4	No
Cyanide, Total	0.100	0.007	0.0198	0.0198	6	1	No
PCBs	0.0001		ND	ND	6	0	No

Notes:

[1] - Class GA, Division of Water Technical and Operational Guidance, Series (1.1.1) Ambient Water Quality Standards and Guidance Values, 1993.

NA - unusable samples.

ND - not detected in any samples.

Table 10
Soil Analytical Results for Risk Assessment (mg/kg)
Port Jervis Former MGP Site

	Average Concentration mg/kg	Maximum Detected Concentration	Background Concentrations	TAGM 4046	RBCs Industrial	RBCs Residential
PAHs						
Naphthalene	1,125	9,000	NA	13.00	82,000	3,100
2-Methylnaphthalene	803	6,400	NA	36.40	82,000	3,100
Acenaphthene	176	1,400	NA	50.00	120,000	4,700
Acenaphthylene	151	1,200	NA	41.00	NA	NA
Fluorene	47	310	NA	50.00	82,000	3,100
Anthracene	127	1,000	NA	50.00	610,000	23,000
Fluoranthene	1.5	5	NA	50.00	82,000	3,100
Phenanthrene	378	3,000	NA	50.00	NA	NA
Pyrene	177	1,400	NA	50.00	61,000	2,300
Chrysene	65	500	NA	0.40	780	87
Benz(a)anthracene	63	500	NA	0.22	8	0.87
Benzo (b) fluoranthene	18	140	NA	1.10	8	0.87
Benzo (k) fluoranthene	107	850	NA	1.10	78	9
Benzo (g,h,i) perylene	17	130	NA	50.00	NA	NA
Benzo (a) pyrene	47	370	NA	0.06	0.78	0.09
Indeno(1,2,3-cd)pyrene	14	110	NA	3.20	8	0.87
BTEX						
Benzene	150	1,200	NA	0.06	200	22
Toluene	213	1,700	NA	1.50	410,000	16,000
Ethylbenzene	175	1,400	NA	5.50	200,000	7,800
Xylene (total)	238	1,900	NA	1.20	4,100,000	160,000
VOCs						
Acetone	0.07	0.19	NA	0.20	200,000	7,800
Inorganic						
Aluminum	6,537	8,300	66,000	SB	2,000,000	78,000
Antimony	9	49	0.67	SB	820	31
Arsenic	5	12	7.20	7.5 or SB	4	0.43
Barium	57	73	580	300 or SB	140,000	5,500
Beryllium	0.38	0.58	0.92	0.16 or SB	4,100	160
Cadmium	0.23	0.29	0.06	1 or SB	2,000	78
Calcium	2,502	9,060	24,000	SB	NA	NA
Chromium	8	14	54	10 or SB	10,000	390
Cobalt	6	7	10	30 or SB	120,000	4,700
Copper	25	60	25	25 or SB	82,000	3,100
Iron	14,833	18,400	25,000	2,000 or SB	610,000	23,000
Lead	50	117	19	SB	NA	NA
Magnesium	2,082	2,620		SB	NA	NA
Manganese	262	500	560	SB	41,000	1,600
Mercury	0.08	0.22	NA	0.10	NA	NA
Nickel	13	15	19	13 or SB	41,000	1,600
Potassium	614	926	23,000	SB	NA	NA
Selenium	1.5	2.4	0.39	2 or SB	10,000	390
Silver	ND	ND		SB	10,000	390
Sodium	139	254	12,000	SB	NA	NA
Thallium	0.9	1.7		SB	140	6
Vanadium	8	9	76	150 or SB	14,000	550
Zinc	84	154	60	20 or SB	610,000	23,000

Notes:

NA - not available

SB - site background level

*** - cleanup objective should be based on the type of cyanide present

Table 11
Risk Evaluation Results
Port Jervis Former MGP Site

Scenario	Case	Pathway	CAS	Analyte	Hazard Index	Risk
Const. Worker	Average	Dermal Contact with Soil	83-32-9	Acenaphthene	5.6E-05	
			208-96-8	Acenaphthylene	4.8E-05	
			120-12-7	Anthracene	8.1E-06	
			56-55-3	Benz(a)anthracene	3.0E-04	5.8E-08
			50-32-8	Benzo(a)pyrene	2.2E-04	4.3E-07
			205-99-2	Benzo(b)fluoranthene	8.6E-05	1.6E-08
			191-24-2	Benzo(g,h,i)perylene	8.1E-05	
			207-08-9	Benzo(k)fluoranthene	5.1E-04	9.8E-09
			218-01-9	Chrysene	3.1E-04	5.9E-10
			206-44-0	Fluoranthene	7.1E-07	
			86-73-7	Fluorene	2.2E-05	
			193-39-5	Indeno(1,2,3-cd)pyrene	6.7E-05	1.3E-08
			91-57-6	Methyl Naphthalene, 2-	3.8E-03	
			91-20-3	Naphthalene	5.4E-03	
			85-01-8	Phenanthrene	2.4E-03	
			129-00-0	Pyrene	1.1E-04	
				Pathway Total	0.01	5.3E-07
Const. Worker	Average	Ingestion of Soil	83-32-9	Acenaphthene	8.1E-05	
			208-96-8	Acenaphthylene	7.0E-05	
			120-12-7	Anthracene	1.2E-05	
			56-55-3	Benz(a)anthracene	4.3E-04	8.4E-08
			50-32-8	Benzo(a)pyrene	3.2E-04	6.2E-07
			205-99-2	Benzo(b)fluoranthene	1.2E-04	2.4E-08
			191-24-2	Benzo(g,h,i)perylene	1.2E-04	
			207-08-9	Benzo(k)fluoranthene	7.4E-04	1.4E-08
			218-01-9	Chrysene	4.5E-04	8.6E-10
			206-44-0	Fluoranthene	1.0E-06	
			86-73-7	Fluorene	3.2E-05	
			193-39-5	Indeno(1,2,3-cd)pyrene	9.7E-05	1.9E-08
			91-57-6	Methyl Naphthalene, 2-	5.5E-03	
			91-20-3	Naphthalene	7.8E-03	
			85-01-8	Phenanthrene	3.5E-03	
			129-00-0	Pyrene	1.6E-04	
				Pathway Total	0.02	7.6E-07
				Case Cumulative Risk	0.03	1.3E-06

Table 11 (continued)
Risk Evaluation Results
Port Jervis Former MGP Site

Scenario	Case	Pathway	CAS	Analyte	Hazard Index	Risk
Const. Worker	RME	Dermal Contact with Soil	83-32-9	Acenaphthene	3.33E-04	
			208-96-8	Acenaphthylene	2.86E-04	
			120-12-7	Anthracene	4.80E-05	
			56-55-3	Benz(a)anthracene	1.79E-03	6.96E-07
			50-32-8	Benzo(a)pyrene	1.33E-03	5.19E-06
			205-99-2	Benzo(b)fluoranthene	5.11E-04	1.99E-07
			191-24-2	Benzo(g,h,i)perylene	4.82E-04	
			207-08-9	Benzo(k)fluoranthene	3.04E-03	1.18E-07
			218-01-9	Chrysene	1.84E-03	7.18E-09
			206-44-0	Fluoranthene	4.26E-06	
			86-73-7	Fluorene	1.33E-04	
			193-39-5	Indeno(1,2,3-cd)pyrene	3.97E-04	1.55E-07
			91-57-6	Methyl Naphthalene, 2-	2.28E-02	
			91-20-3	Naphthalene	3.19E-02	
			85-01-8	Phenanthrene	1.43E-02	
			129-00-0	Pyrene	6.70E-04	
				Pathway Total	0.08	6.4E-06
Const. Worker	RME	Ingestion of Soil	83-32-9	Acenaphthene	4.2E-04	
			208-96-8	Acenaphthylene	3.6E-04	
			120-12-7	Anthracene	6.0E-05	
			56-55-3	Benz(a)anthracene	2.2E-03	8.7E-07
			50-32-8	Benzo(a)pyrene	1.7E-03	6.5E-06
			205-99-2	Benzo(b)fluoranthene	6.4E-04	2.5E-07
			191-24-2	Benzo(g,h,i)perylene	6.0E-04	
			207-08-9	Benzo(k)fluoranthene	3.8E-03	1.5E-07
			218-01-9	Chrysene	2.3E-03	9.0E-09
			206-44-0	Fluoranthene	5.3E-06	
			86-73-7	Fluorene	1.7E-04	
			193-39-5	Indeno(1,2,3-cd)pyrene	5.0E-04	1.9E-07
			91-57-6	Methyl Naphthalene, 2-	2.8E-02	
			91-20-3	Naphthalene	4.0E-02	
			85-01-8	Phenanthrene	1.8E-02	
			129-00-0	Pyrene	8.4E-04	
				Pathway Total	0.10	8.0E-06
				Case Cumulative Risk	0.18	1.4E-05

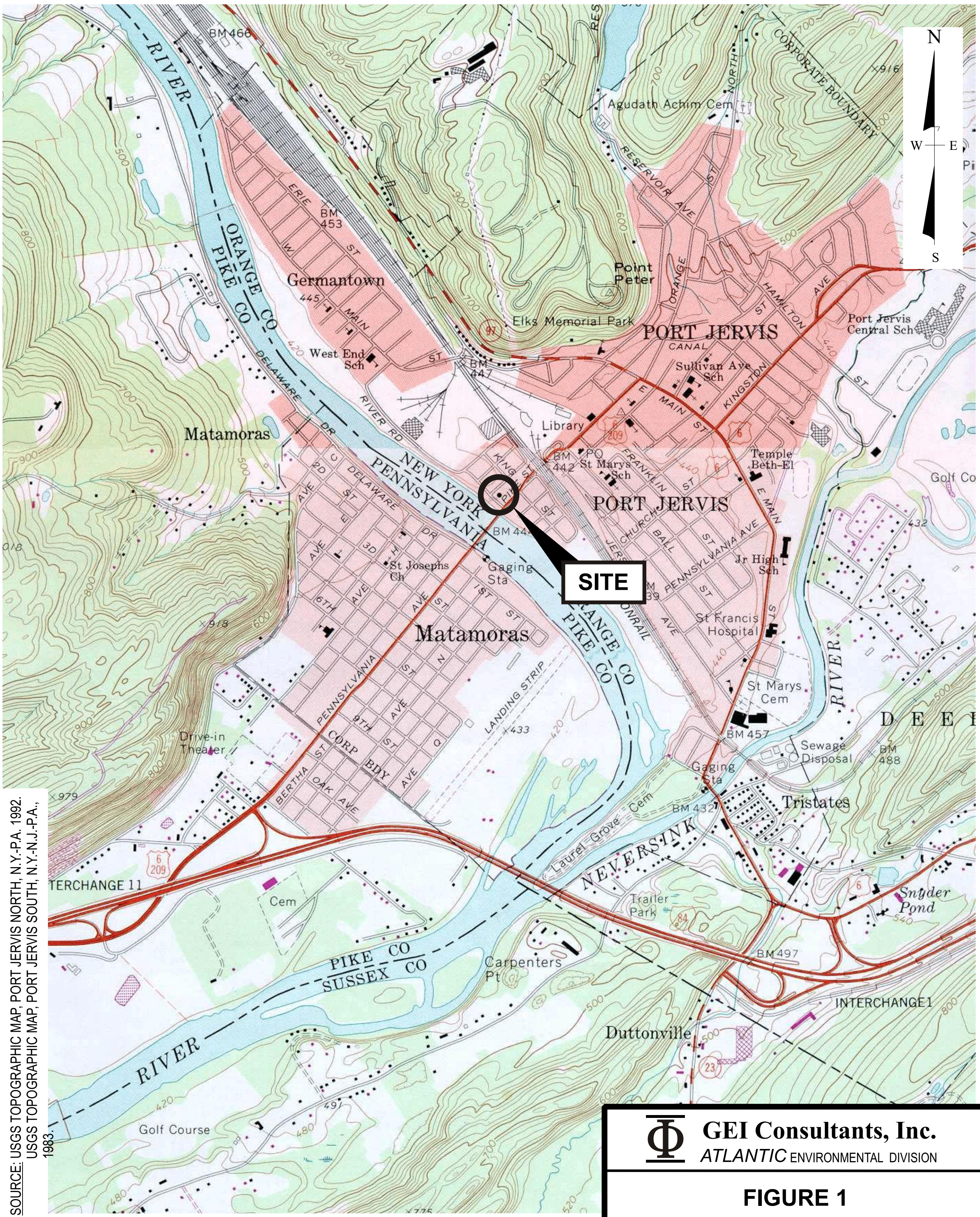
Table 11 (continued)
Risk Evaluation Results
Port Jervis Former MGP Site

Scenario	Case	Pathway	CAS	Analyte	Hazard Index	Risk
INDUSTRIAL	RME	Dermal Contact with Soil	83-32-9	Acenaphthene	4.6E-04	
			208-96-8	Acenaphthylene	3.9E-04	
			120-12-7	Anthracene	6.6E-05	
			56-55-3	Benz(a)anthracene	2.4E-04	2.4E-06
			50-32-8	Benzo(a)pyrene	1.8E-04	1.8E-05
			205-99-2	Benzo(b)fluoranthene	7.0E-05	6.8E-07
			191-24-2	Benzo(g,h,i)perylene	6.6E-05	0.0E+00
			207-08-9	Benzo(k)fluoranthene	4.2E-04	4.0E-07
			218-01-9	Chrysene	2.5E-04	2.5E-08
			206-44-0	Fluoranthene	5.8E-06	
			86-73-7	Fluorene	1.8E-04	
			193-39-5	Indeno(1,2,3-cd)pyrene	5.4E-05	5.3E-07
			91-57-6	Methyl Naphthalene, 2-	3.1E-03	
			91-20-3	Naphthalene	4.4E-03	
			85-01-8	Phenanthrene	2.0E-03	
			129-00-0	Pyrene	9.2E-04	
				Pathway Total	0.013	2.2E-05
INDUSTRIAL	RME	Ingestion of Soil	83-32-9	Acenaphthene	2.1E-04	
			208-96-8	Acenaphthylene	1.8E-04	
			120-12-7	Anthracene	3.0E-05	
			56-55-3	Benz(a)anthracene	1.1E-04	1.1E-06
			50-32-8	Benzo(a)pyrene	8.3E-05	8.0E-06
			205-99-2	Benzo(b)fluoranthene	3.2E-05	3.1E-07
			191-24-2	Benzo(g,h,i)perylene	3.0E-05	
			207-08-9	Benzo(k)fluoranthene	1.9E-04	1.8E-07
			218-01-9	Chrysene	1.1E-04	1.1E-08
			206-44-0	Fluoranthene	2.6E-06	
			86-73-7	Fluorene	8.3E-05	
			193-39-5	Indeno(1,2,3-cd)pyrene	2.5E-05	2.4E-07
			91-57-6	Methyl Naphthalene, 2-	1.4E-03	
			91-20-3	Naphthalene	2.0E-03	
			85-01-8	Phenanthrene	8.9E-04	
			129-00-0	Pyrene	4.2E-04	
				Pathway Total	0.006	9.9E-06
				Case Cumulative Risk	0.019	3.2E-05

Table 11 (continued)
Risk Evaluation Results
Port Jervis Former MGP Site

Scenario	Case	Pathway	CAS	Analyte	Hazard Index	Risk
INDUSTRIAL	Average	Dermal Contact with Soil	83-32-9	Acenaphthene	4.8E-05	
			208-96-8	Acenaphthylene	4.1E-05	
			120-12-7	Anthracene	6.9E-06	
			56-55-3	Benz(a)anthracene	2.6E-05	1.0E-07
			50-32-8	Benzo(a)pyrene	1.9E-05	7.4E-07
			205-99-2	Benzo(b)fluoranthene	7.3E-06	2.9E-08
			191-24-2	Benzo(g,h,i)perylene	6.9E-06	
			207-08-9	Benzo(k)fluoranthene	4.4E-05	1.7E-08
			218-01-9	Chrysene	2.6E-05	1.0E-09
			206-44-0	Fluoranthene	6.1E-07	
			86-73-7	Fluorene	1.9E-05	
			193-39-5	Indeno(1,2,3-cd)pyrene	5.7E-06	2.2E-08
			91-57-6	Methyl Naphthalene, 2-	3.3E-04	
			91-20-3	Naphthalene	4.6E-04	
			85-01-8	Phenanthrene	2.1E-04	
			129-00-0	Pyrene	9.6E-05	
				Pathway Total	0.0013	9.1E-07
INDUSTRIAL	Average	Ingestion of Soil	83-32-9	Acenaphthene	8.7E-05	
			208-96-8	Acenaphthylene	7.4E-05	
			120-12-7	Anthracene	1.2E-05	
			56-55-3	Benz(a)anthracene	4.6E-05	1.8E-07
			50-32-8	Benzo(a)pyrene	3.5E-05	1.4E-06
			205-99-2	Benzo(b)fluoranthene	1.3E-05	5.2E-08
			191-24-2	Benzo(g,h,i)perylene	1.3E-05	
			207-08-9	Benzo(k)fluoranthene	7.9E-05	3.1E-08
			218-01-9	Chrysene	4.8E-05	1.9E-09
			206-44-0	Fluoranthene	1.1E-06	
			86-73-7	Fluorene	3.5E-05	
			193-39-5	Indeno(1,2,3-cd)pyrene	1.0E-05	4.0E-08
			91-57-6	Methyl Naphthalene, 2-	5.9E-04	
			91-20-3	Naphthalene	8.3E-04	
			85-01-8	Phenanthrene	3.7E-04	
			129-00-0	Pyrene	1.7E-04	
				Pathway Total	0.002	1.7E-06
				Case Cumulative Risk	0.004	2.6E-06

FIGURES



SOURCE: USGS TOPOGRAPHIC MAP, PORT JERVIS NORTH, N.Y.-P.A. 1992.
USGS TOPOGRAPHIC MAP, PORT JERVIS SOUTH, N.Y.-N.J.-P.A., 1983.

2000 1000 0 2000 4000

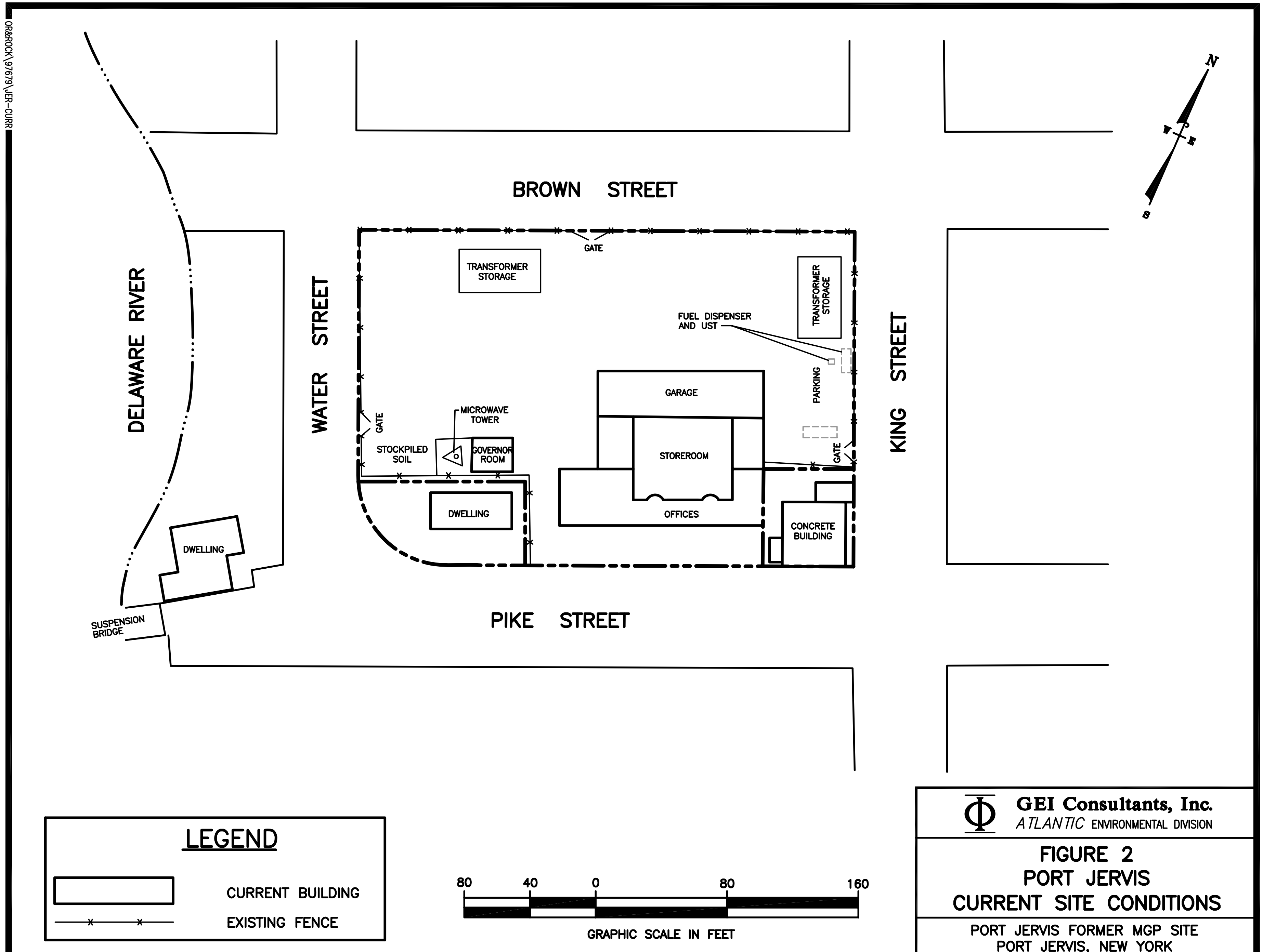
GRAPHIC SCALE IN FEET

GEI Consultants, Inc.
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 1
SITE LOCATION MAP

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

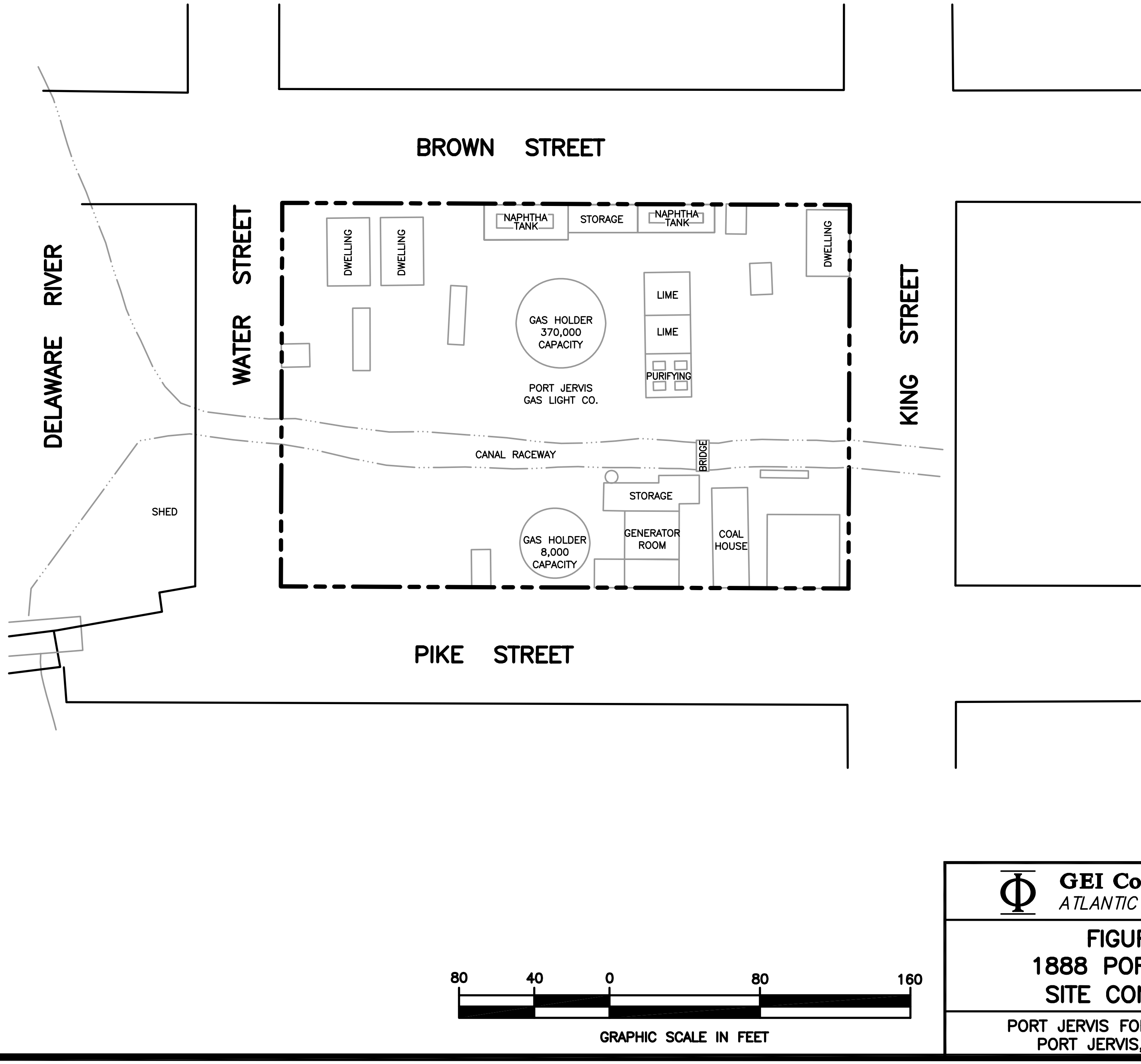
OR&ROCK\97679\JERVIS\JRV-LOC.CDR



GEI Consultants, Inc.
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 2
PORT JERVIS
CURRENT SITE CONDITIONS

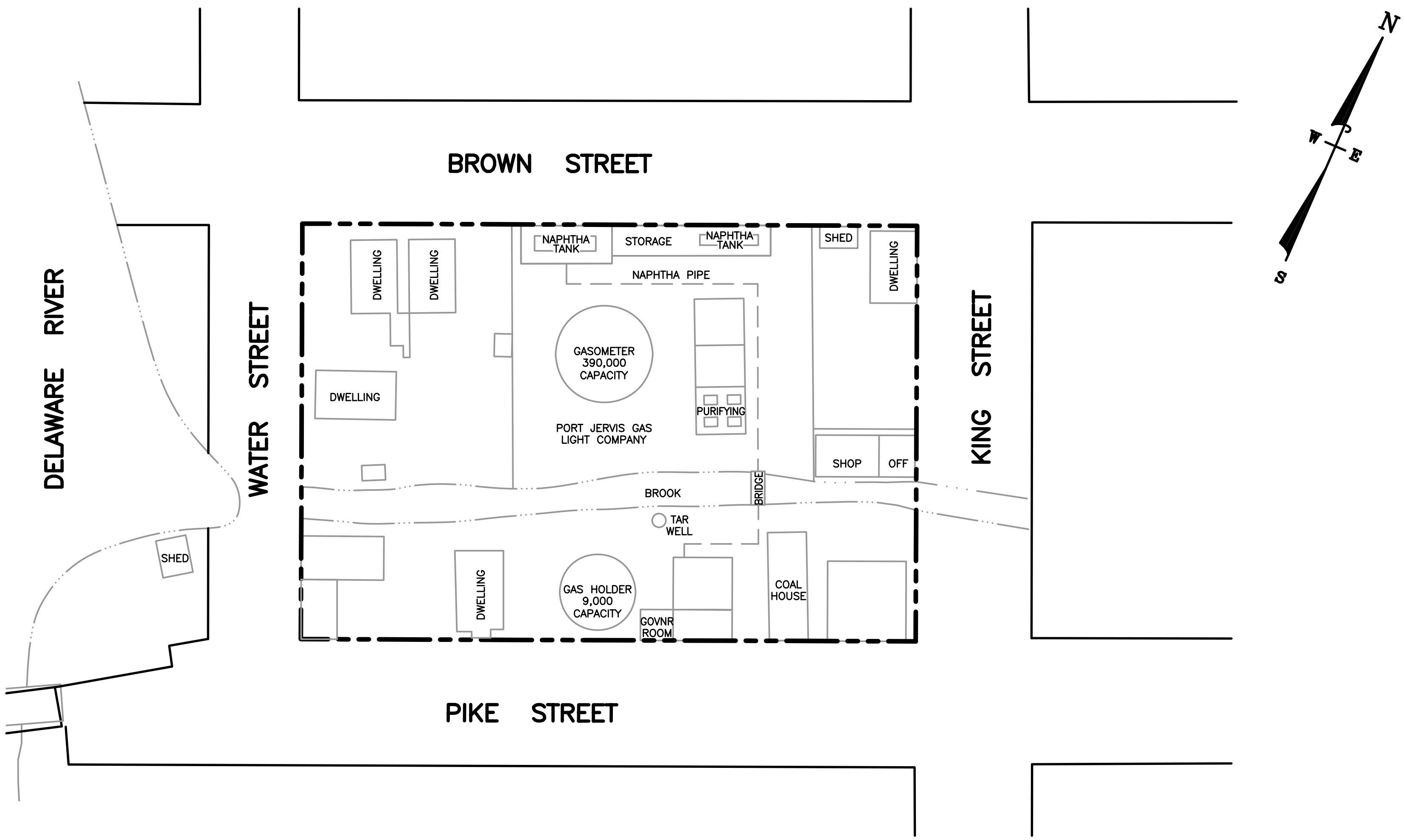
PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

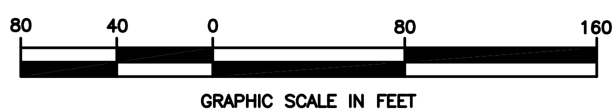


GEI Consultants, Inc.
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 3
1888 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK





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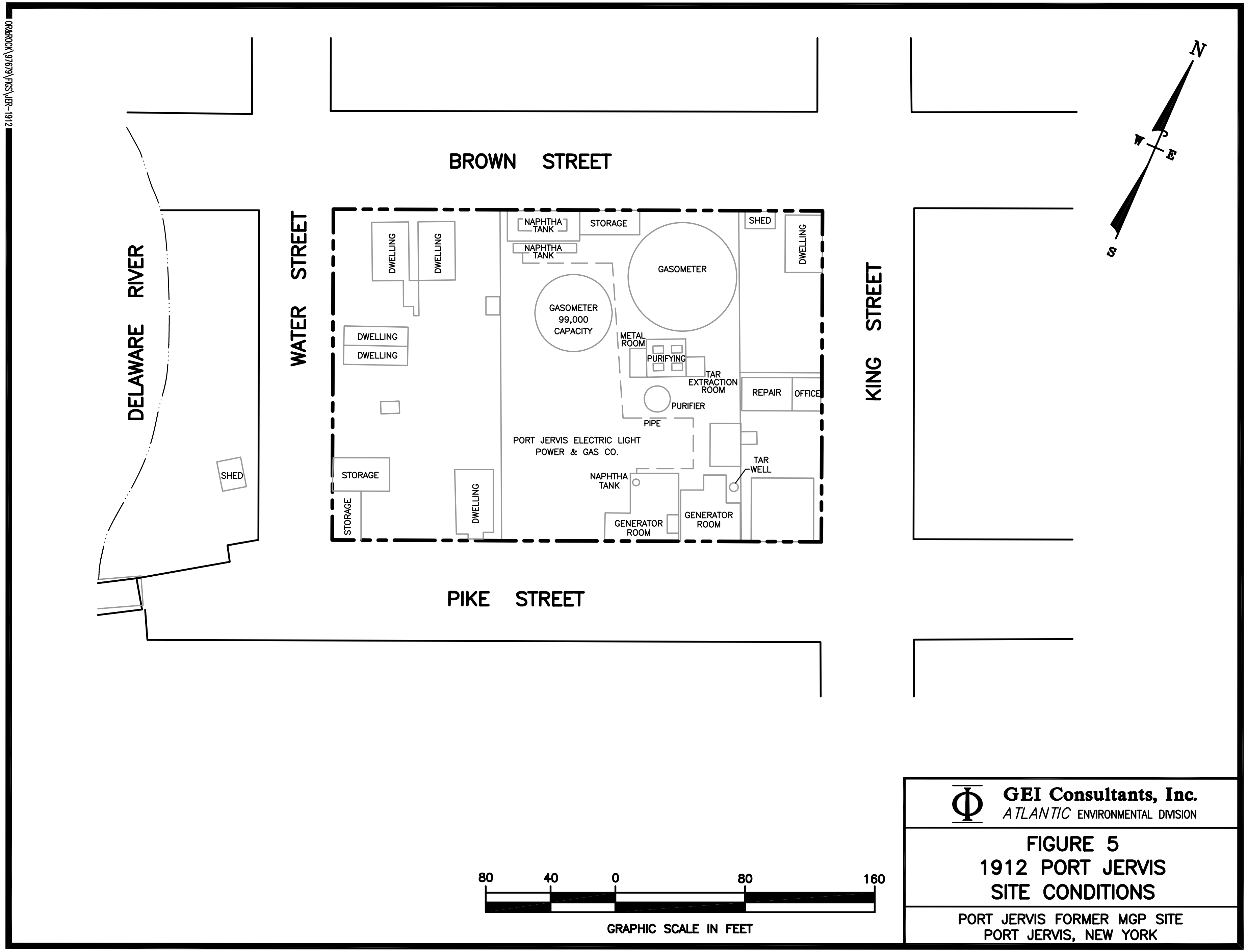
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 4
1900 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK



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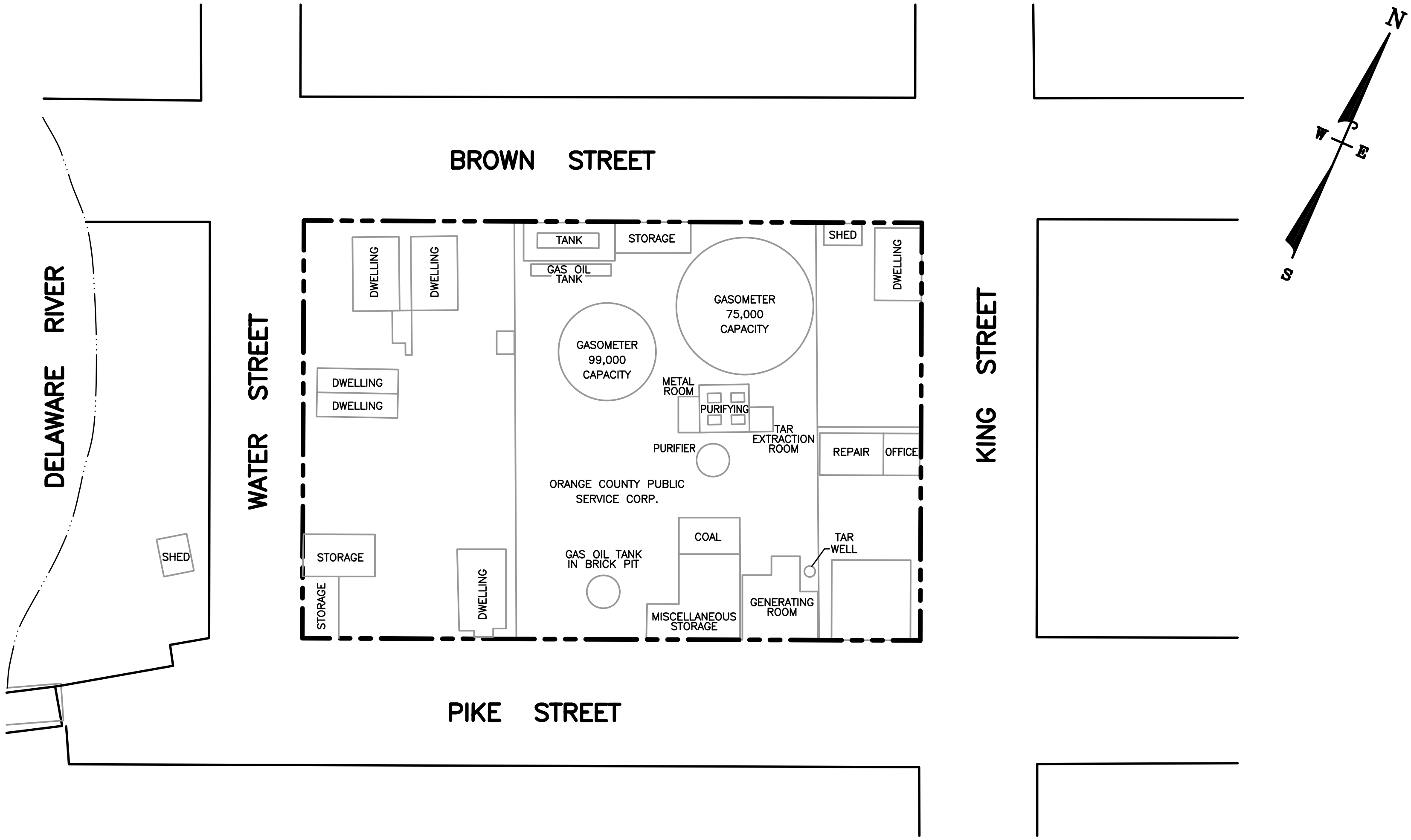
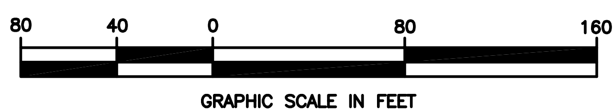
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 5
1912 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK





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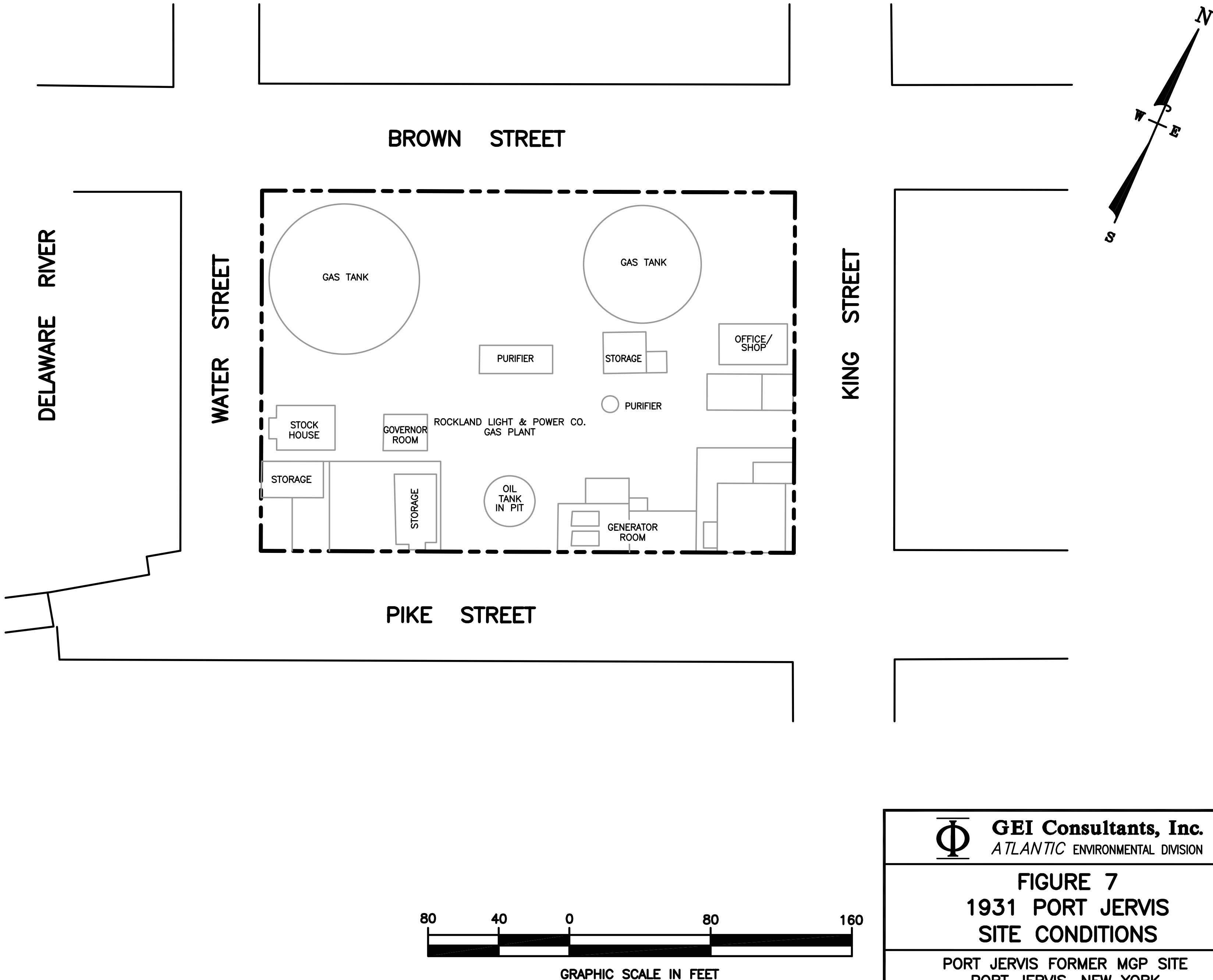
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 6
1921 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

OR&ROCK\9767\FIGS\JER-1921

OR&ROCK\97679\FIGS\JER-1931

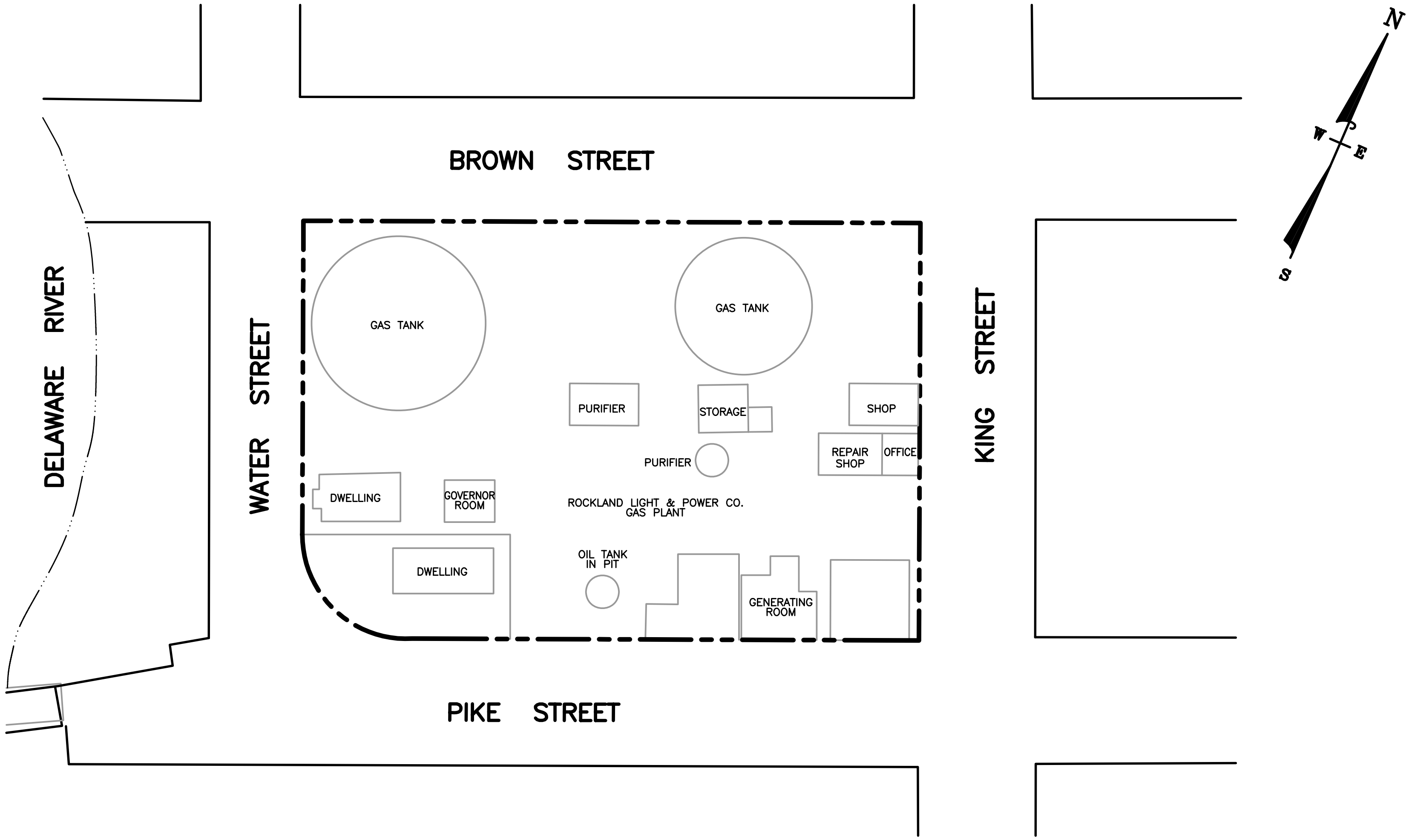


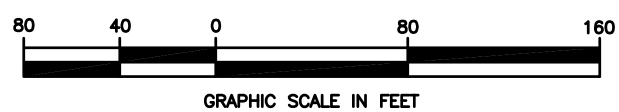
GEI Consultants, Inc.
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 7
1931 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

OR&ROCK\9679\FIGS\JER-1945





GEI Consultants, Inc.
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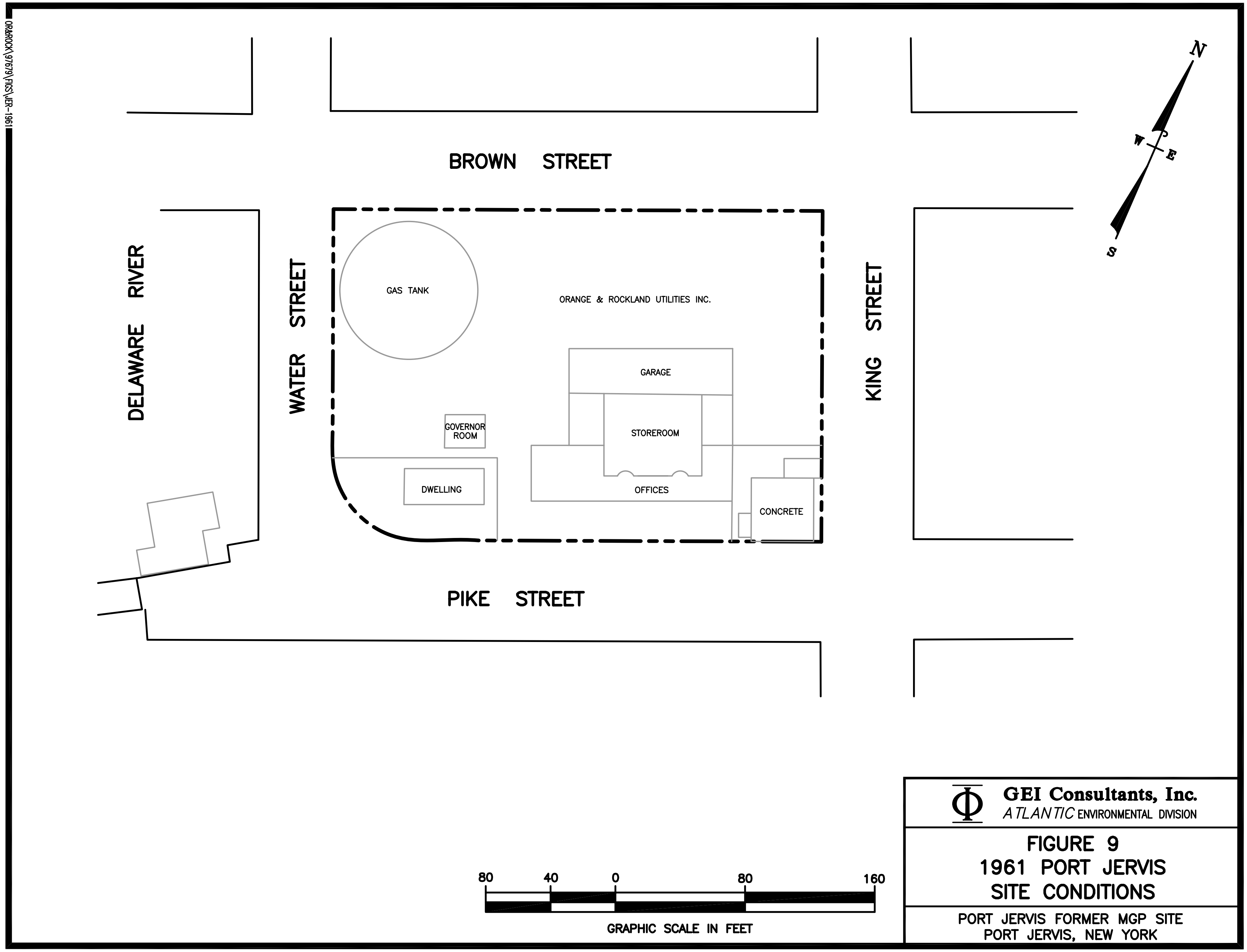
FIGURE 8
1945 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK



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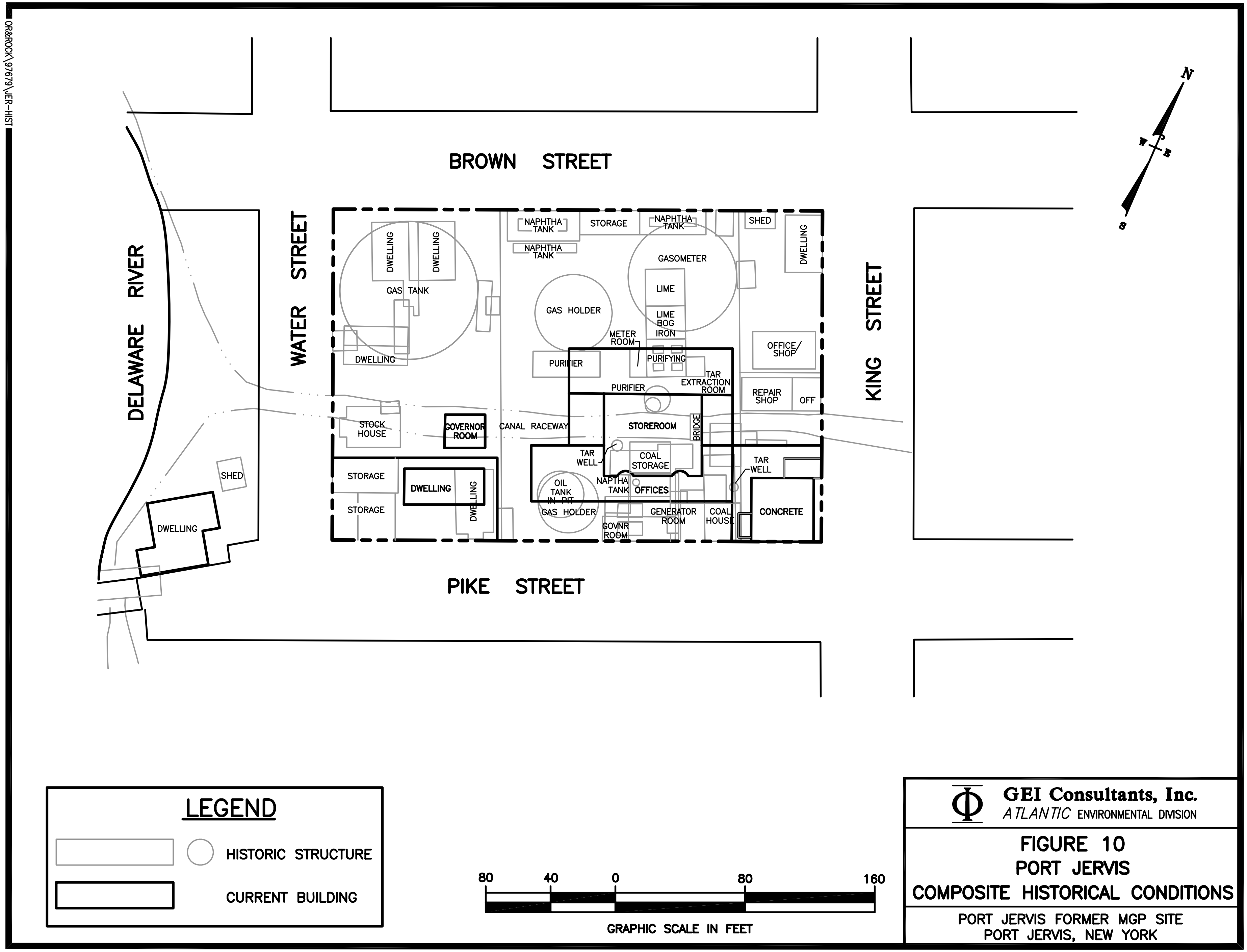
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 9
1961 PORT JERVIS
SITE CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK



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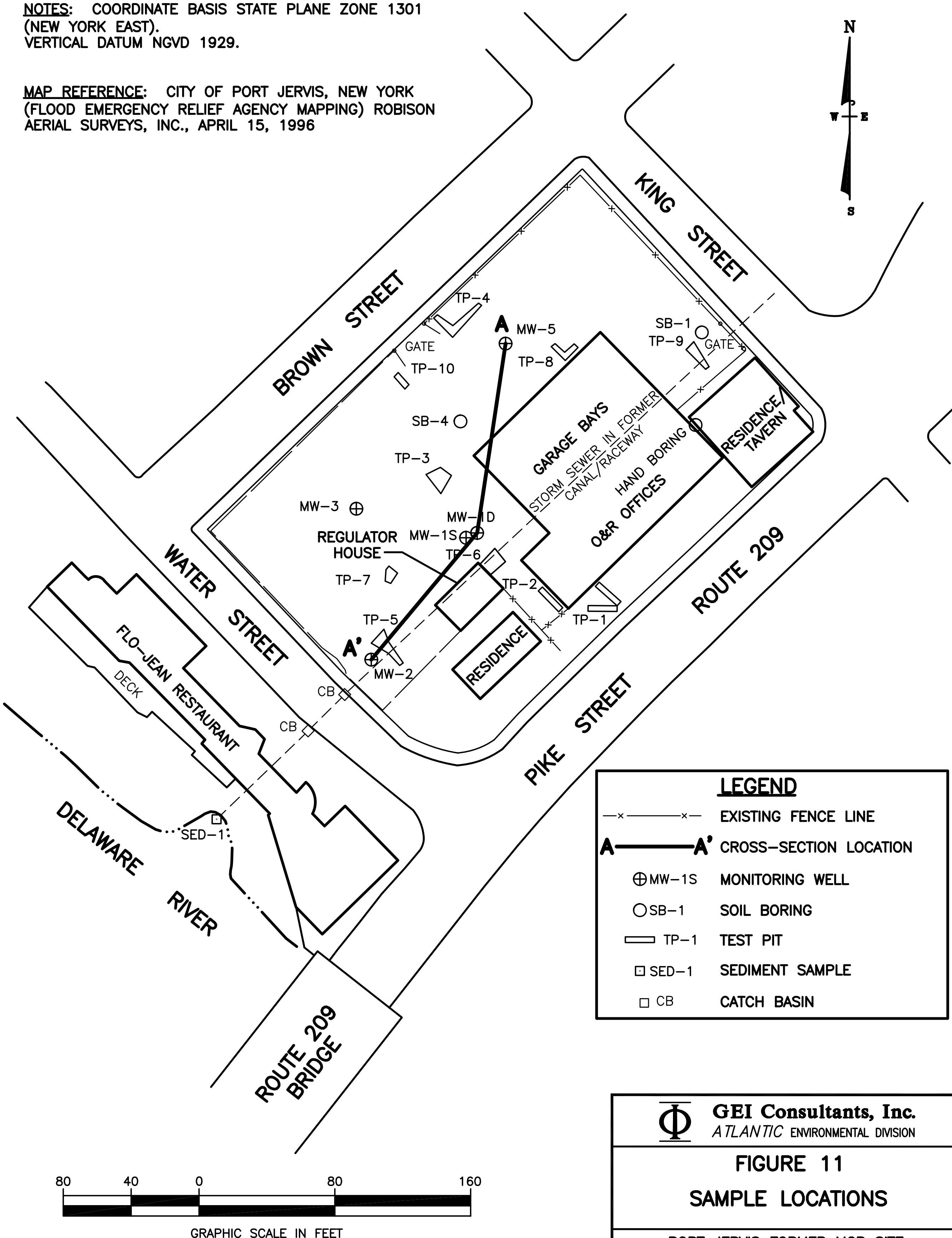
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 10
PORT JERVIS
COMPOSITE HISTORICAL CONDITIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

NOTES: COORDINATE BASIS STATE PLANE ZONE 1301 (NEW YORK EAST).
VERTICAL DATUM NGVD 1929.

MAP REFERENCE: CITY OF PORT JERVIS, NEW YORK (FLOOD EMERGENCY RELIEF AGENCY MAPPING) ROBISON AERIAL SURVEYS, INC., APRIL 15, 1996



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ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 11

SAMPLE LOCATIONS

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

OR&R\97679\JERVIS\JER-SAMP

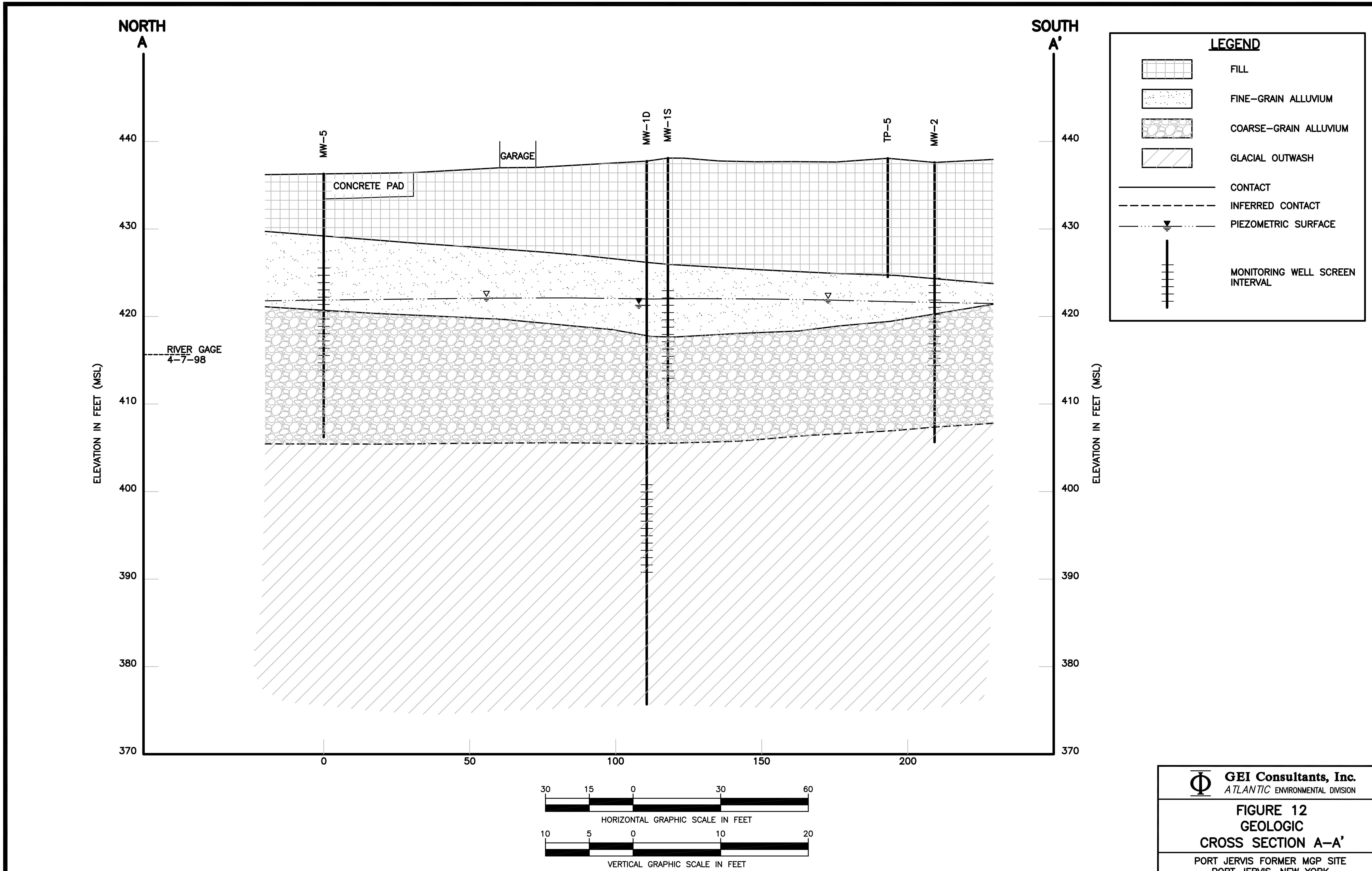

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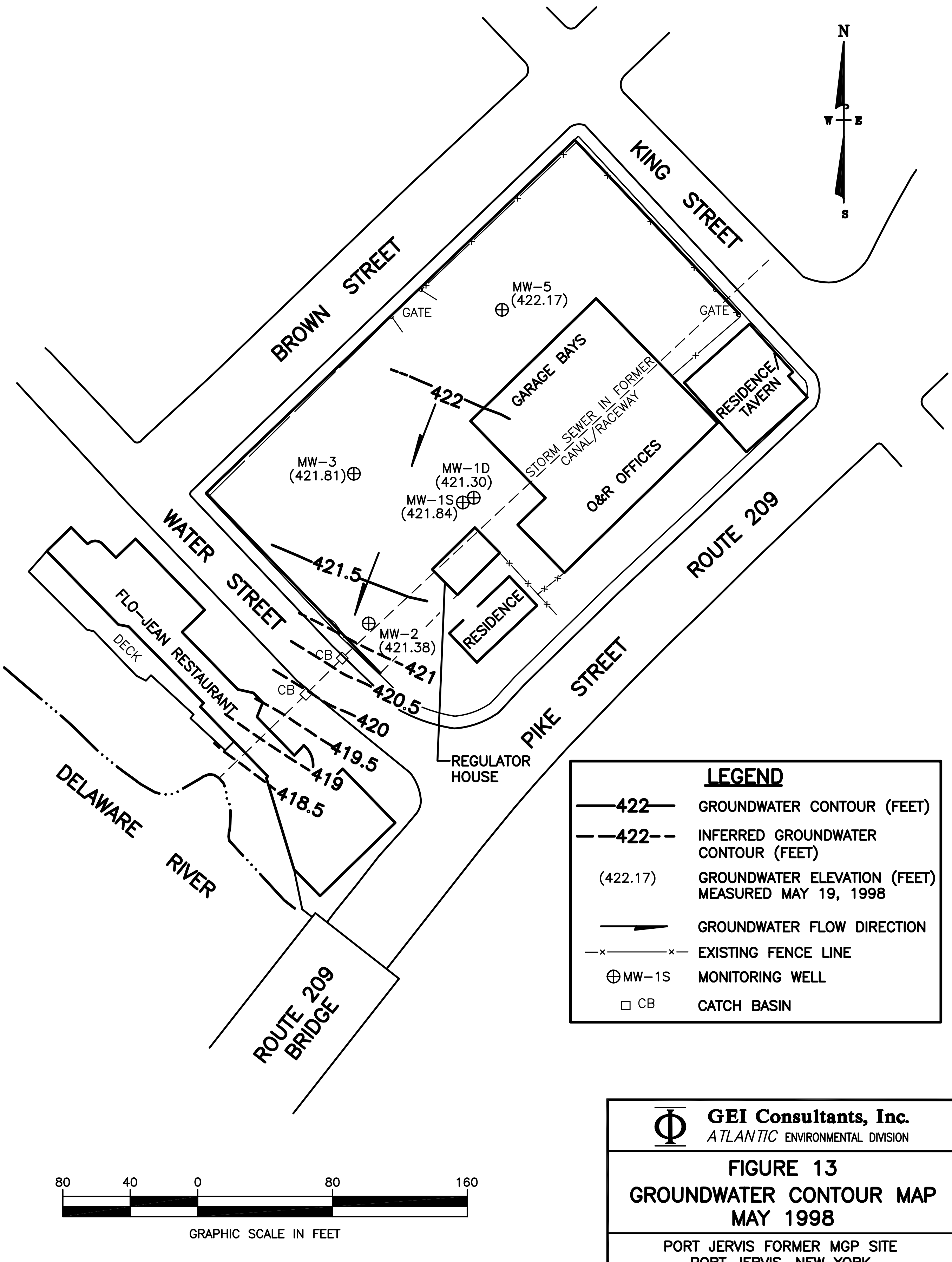
FIGURE 12
GEOLOGIC
CROSS SECTION A-A'

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK



LEGEND

—422—	GROUNDWATER CONTOUR (FEET)
– –422– –	INFERRED GROUNDWATER CONTOUR (FEET)
(422.17)	GROUNDWATER ELEVATION (FEET) MEASURED MAY 19, 1998
	GROUNDWATER FLOW DIRECTION
—×———×—	EXISTING FENCE LINE
⊕MW-1S	MONITORING WELL
□ CB	CATCH BASIN

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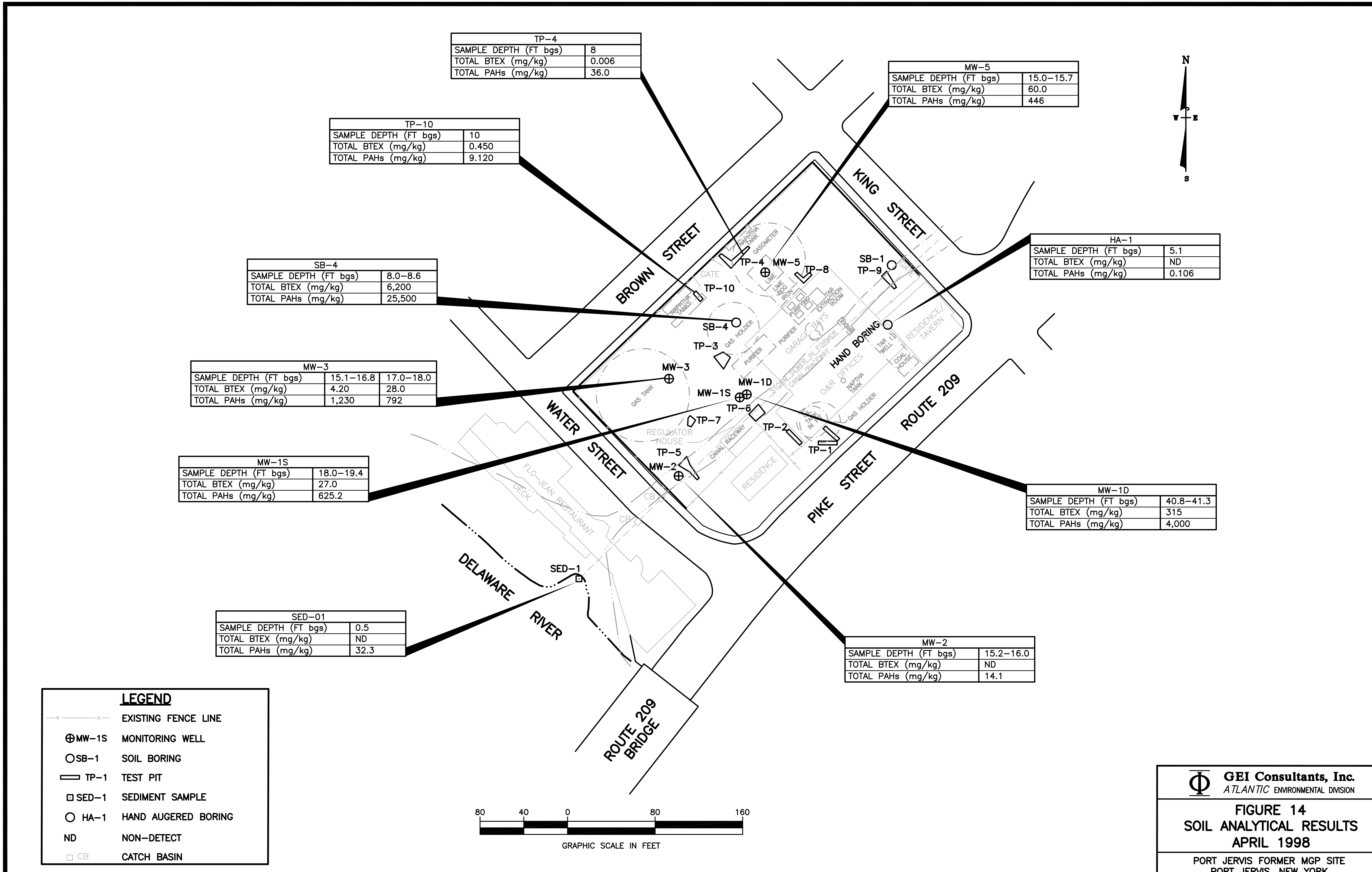
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 13
GROUNDWATER CONTOUR MAP
MAY 1998

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

OR&R\97679\JERVIS\JER-GW



TP-4	
SAMPLE DEPTH (FT bgs)	8
TOTAL BTEX (mg/kg)	0.006
TOTAL PAHs (mg/kg)	36.0

MW-5	
SAMPLE DEPTH (FT bgs)	15.0–15.7
TOTAL BTEX (mg/kg)	60.0
TOTAL PAHs (mg/kg)	446

TP-10	
SAMPLE DEPTH (FT bgs)	10
TOTAL BTEX (mg/kg)	0.450
TOTAL PAHs (mg/kg)	9.120

HA-1	
SAMPLE DEPTH (FT bgs)	5.1
TOTAL BTEX (mg/kg)	ND
TOTAL PAHs (mg/kg)	0.106

SB-4	
SAMPLE DEPTH (FT bgs)	8.0–8.6
TOTAL BTEX (mg/kg)	6,200
TOTAL PAHs (mg/kg)	25,500

MW-3		
SAMPLE DEPTH (FT bgs)	15.1–16.8	17.0–18.0
TOTAL BTEX (mg/kg)	4.20	28.0
TOTAL PAHs (mg/kg)	1,230	792

MW-1S	
SAMPLE DEPTH (FT bgs)	18.0–19.4
TOTAL BTEX (mg/kg)	27.0
TOTAL PAHs (mg/kg)	625.2

MW-1D	
SAMPLE DEPTH (FT bgs)	40.8–41.3
TOTAL BTEX (mg/kg)	315
TOTAL PAHs (mg/kg)	4,000

SED-01	
SAMPLE DEPTH (FT bgs)	0.5
TOTAL BTEX (mg/kg)	ND
TOTAL PAHs (mg/kg)	32.3

MW-2	
SAMPLE DEPTH (FT bgs)	15.2–16.0
TOTAL BTEX (mg/kg)	ND
TOTAL PAHs (mg/kg)	14.1

LEGEND

—x—x—	EXISTING FENCE LINE
⊕MW-1S	MONITORING WELL
○SB-1	SOIL BORING
▭ TP-1	TEST PIT
⊡SED-1	SEDIMENT SAMPLE
○ HA-1	HAND AUGERED BORING
ND	NON-DETECT
□ CB	CATCH BASIN

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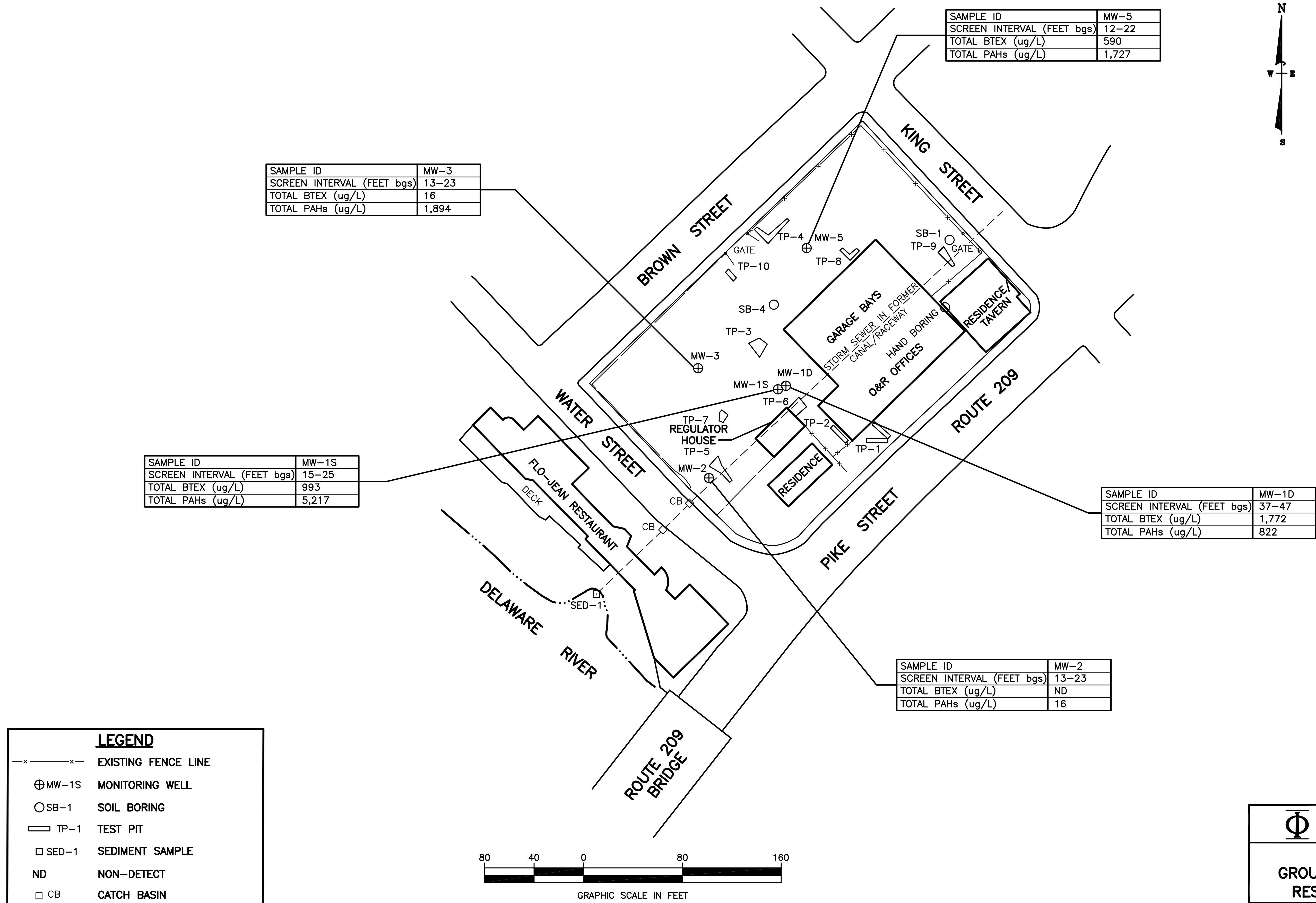
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 14
SOIL ANALYTICAL RESULTS
APRIL 1998

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK



SAMPLE ID	MW-5
SCREEN INTERVAL (FEET bgs)	12-22
TOTAL BTEX (ug/L)	590
TOTAL PAHs (ug/L)	1,727

SAMPLE ID	MW-3
SCREEN INTERVAL (FEET bgs)	13-23
TOTAL BTEX (ug/L)	16
TOTAL PAHs (ug/L)	1,894

SAMPLE ID	MW-1S
SCREEN INTERVAL (FEET bgs)	15-25
TOTAL BTEX (ug/L)	993
TOTAL PAHs (ug/L)	5,217

SAMPLE ID	MW-1D
SCREEN INTERVAL (FEET bgs)	37-47
TOTAL BTEX (ug/L)	1,772
TOTAL PAHs (ug/L)	822

SAMPLE ID	MW-2
SCREEN INTERVAL (FEET bgs)	13-23
TOTAL BTEX (ug/L)	ND
TOTAL PAHs (ug/L)	16

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FIGURE 15
GROUNDWATER ANALYTICAL RESULTS – MAY 1998

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

R&R\97679\FIG\JER-GWAN

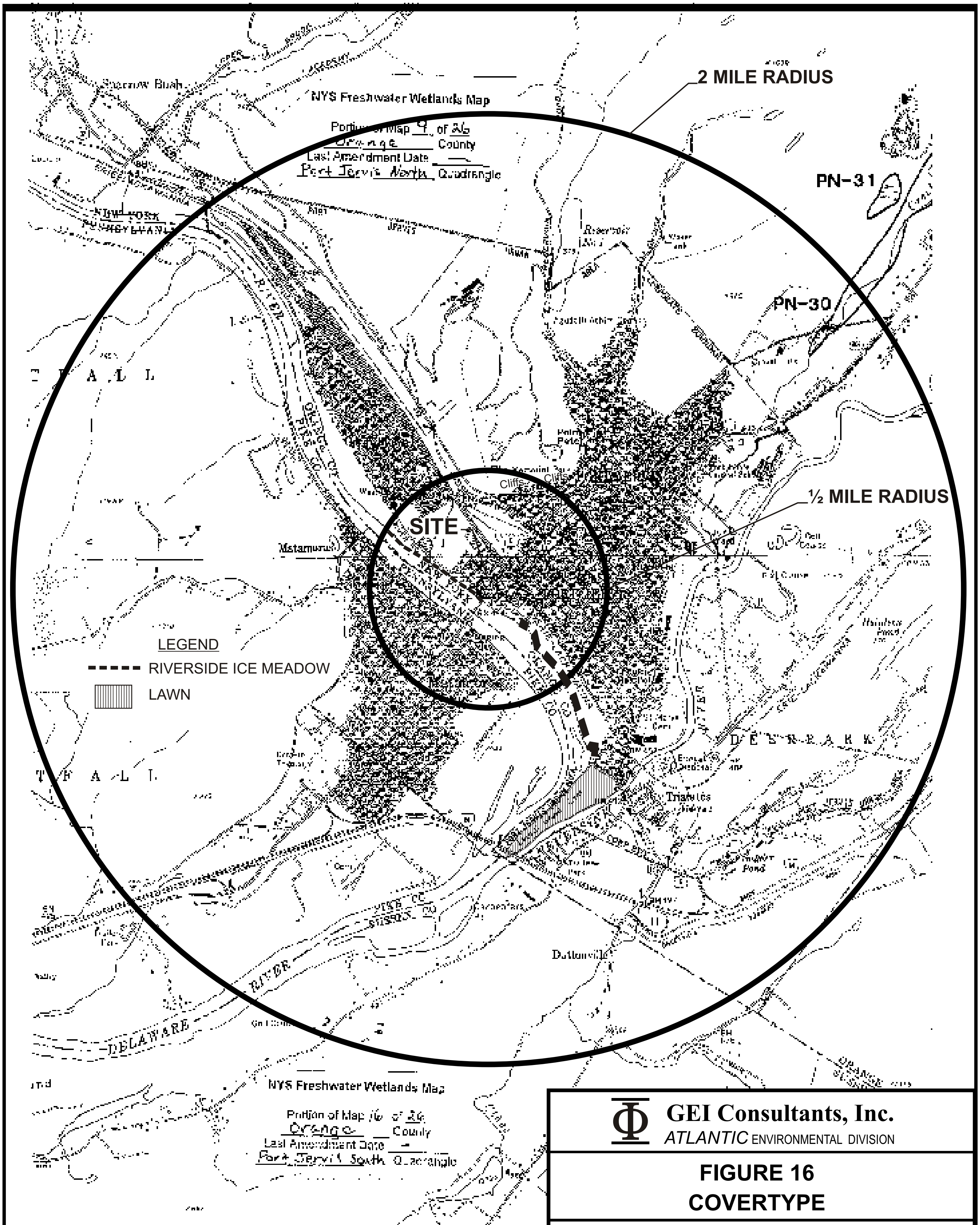

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FIGURE 16
COVERTYPE

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

OR&ROCK\97679\JERVIS\JER-WETL.CDR

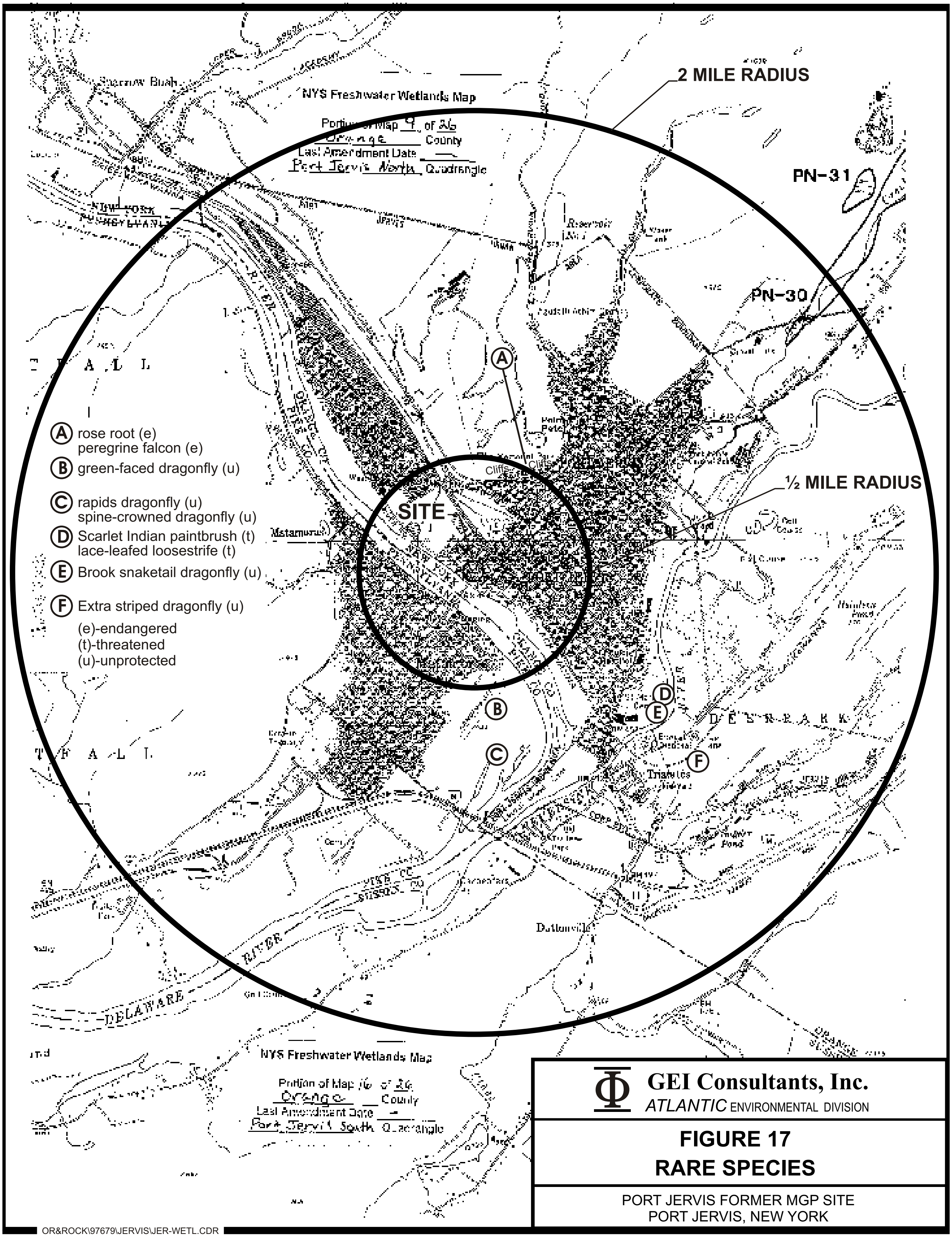

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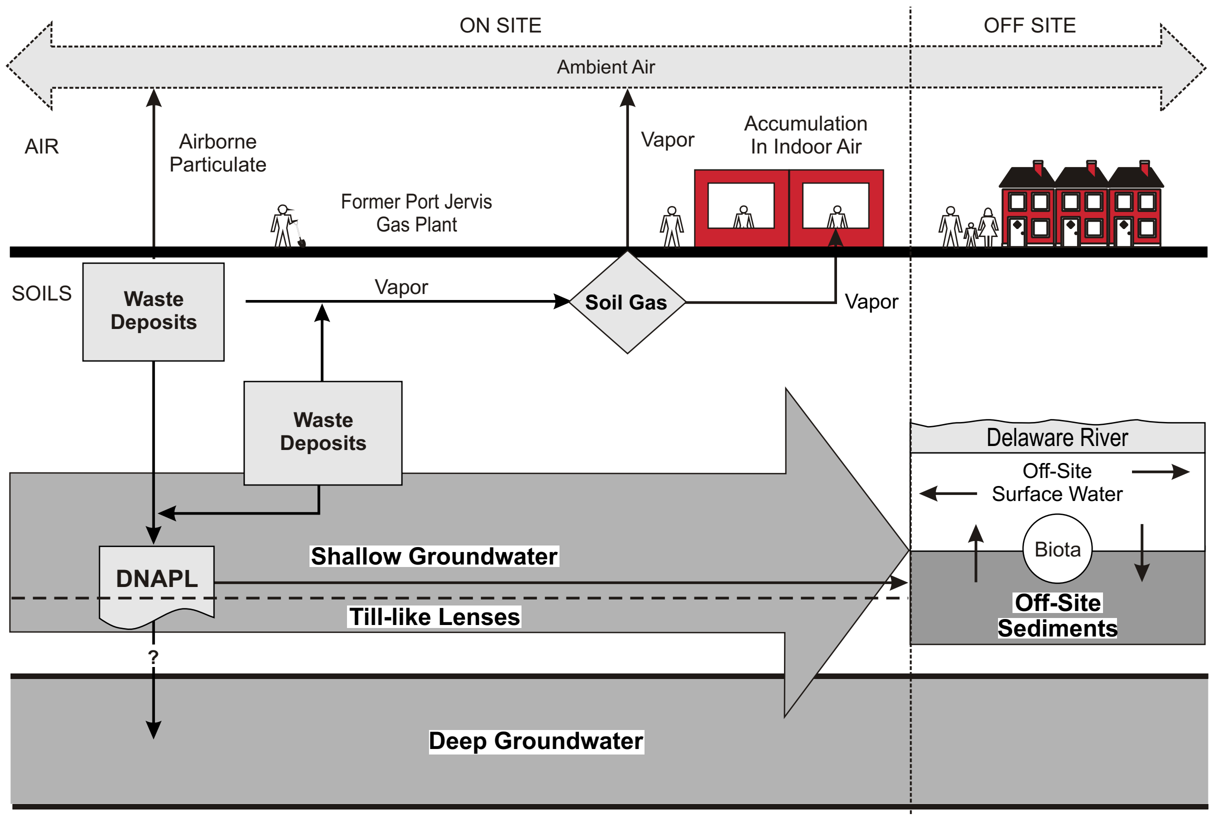
FIGURE 17
RARE SPECIES

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

OR&ROCK\97679\JERVIS\JER-WETL.CDR



Potential Scenarios

			Media	Outdoor Air		Indoor Air	Lawn Surface Soil		Subsurface Soil		Surface Water	Sediment
			Potential Exposure Route	Vapor Inhalation	Particulate Inhalation	Accumulated Vapor Inhalation	Dermal Contact	Ingestion	Dermal Contact	Ingestion	Dermal Contact	Dermal Contact
			Pathway	A	B	C	D	E	F	G	H	I
		Scenario	People									
Current/Future Conditions	On Site	1	Worker	×	×	×	×	×	—	—	—	—
	Off Site	2	Construction Worker	×	×	×	—	—	×	×	×	—
		3	Resident Adult	×	×	—	—	—	—	—	×	—
			Resident Child	×	×	—	—	—	—	—	×	—
			Biotic Receptors									
Plants			Current	—	—	—	×	×	—	—	×	×
			Future	—	—	—	×	×	—	—	×	×
Wildlife			Current	—	—	—	×	×	—	—	×	×
			Future	—	—	—	×	×	—	—	×	×

KEY:

× Potentially Complete Pathway/Route

— Incomplete Pathway/Route

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ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 18
CONCEPTUAL RISK SYSTEM MODEL

PORT JERVIS FORMER MGP SITE
PORT JERVIS, NEW YORK

APPENDIX A

Test Pit Logs

ATLANTIC
ENVIRONMENTAL DIVISION
GEI Consultants, Inc.
188 Norwich Avenue
P.O. Box 297
Colchester, CT 06415
Ph: (860) 537-0751
Fax: (860) 537-6347

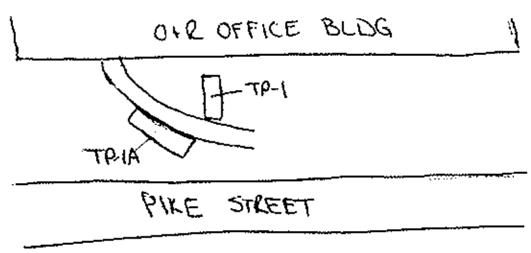
Form 1031

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
TEST PIT NUMBER: TP-1
GENERAL LOCATION AND/OR PURPOSE: East of O+R offices, along Pike Street
DATE: 4/13/98
TIME OPENED: 1200 **TIME CLOSED:** 1340

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
OBSERVER: Ben Foster
ASSISTANT: Carolyn Lewis
OTHERS:
CONTRACTOR:
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



TP-1

0-2' bgs - grass, reddish brown soil + slate chips
2.5-3' bgs - gravel, rock, and dark brown soil and black soil
3-4.5' bgs - debris - concrete, brick, coal
2-7' bgs - black soil, wall debris (concrete, brick, rock)
7-9' bgs - brown tan fine sand, some debris, wet soil; (8-9' bgs - very slight fuel oil odor)
be = 9.7' bgs
→ No odors, No impacts.

TP-1A

0-0.5' bgs - grass, dark brown soil
0.5-1' bgs - gravel chips (shale), brick, concrete, debris
1' bgs - brick wall, possibly brick pit
1-6' bgs - brown fine sand
1-6' bgs - brick then ledge, brick wall from 6-13'
6'-13' bgs - brown fine sand, wall

→ No odor, No impact

VIDEO DOCUMENTED: YES ___ NO X
PHOTOGRAPHED: YES X NO ___
PIEZOMETER NO. USED IN BACKFILL:
DEPTH TO WATER: ________ FT

NAPL SEEPAGE: YES ___ NO X
BULK SAMPLES: YES ___ NO X
QUANTITY:

ATLANTIC
ENVIRONMENTAL DIVISION
188 Norwich Avenue
P.O. Box 297
Colchester, CT 06415

GEI Consultants, Inc.

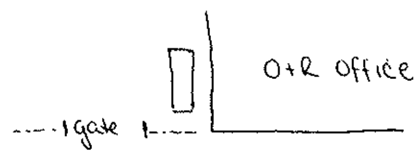
Form 1031
Ph: (860) 537-0751
Fax: (860) 537-6347

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
TEST PIT NUMBER: TP-2
GENERAL LOCATION AND/OR PURPOSE: South of O+R office, oil tank, + gasholder
DATE: 4/13/98
TIME OPENED: 1345 **TIME CLOSED:** 1500

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 20604131
OBSERVER: Ben Foster
ASSISTANT: Carolyn Lewis
OTHERS:
CONTRACTOR:
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-1' bgs - grass, brown soil, some orange tan
1-1.5' bgs - black layer of charcoal like material
1-8' bgs - brown fine sand, silt, dry

bottom elevation: 8' bgs

→ No odors, No impacts

VIDEO DOCUMENTED: YES ___ NO X
PHOTOGRAPHED: YES X NO ___
PIEZOMETER NO. USED IN BACKFILL:
DEPTH TO WATER: ________ FT

NAPL SEEPAGE: YES ___ NO X
BULK SAMPLES: YES ___ NO X
QUANTITY:

ATLANTIC
ENVIRONMENTAL DIVISION
188 Norwich Avenue
P.O. Box 297
Colchester, CT 06415

GEI Consultants, Inc.

Form 1031
Ph: (860) 537-0751
Fax: (860) 537-6347

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
TEST PIT NUMBER: TP-3
GENERAL LOCATION AND/OR PURPOSE: gasholder at center of site
DATE: 4/13/98
TIME OPENED: 1500 TIME CLOSED: 1615

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
OBSERVER: Ben Foster
ASSISTANT: Carolyn Lewis
OTHERS:
CONTRACTOR:
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.

0-1' bgs - Asphalt
1' bgs - brick and concrete holder pad
1-5' bgs - brick wall, brown fine sand

-> No odors; No impacts
be = 5 ft bgp

VIDEO DOCUMENTED: YES ___ NO X
PHOTOGRAPHED: YES X NO ___
PIEZOMETER NO. USED IN BACKFILL:
DEPTH TO WATER: ________ FT

NAPL SEEPAGE: YES ___ NO X
BULK SAMPLES: YES ___ NO X
QUANTITY:

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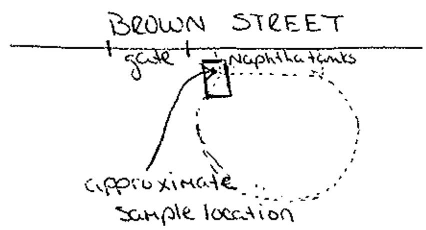
TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
TEST PIT NUMBER: TP-4
OBSERVER: Ben Foster
GENERAL LOCATION AND/OR PURPOSE: near gas holder and naphtha tanks
ASSISTANT: Carolyn Lewis
OTHERS:
DATE: 4/13/98
CONTRACTOR:
TIME OPENED: 1630 **TIME CLOSED:** 1800
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-0.4' bgs - asphalt

0.4' bgs - concrete slab

0.4-6' bgs - brown sand, rock, gravel, debris, some wet soil

- slight fuel oil odor
- some black fuel oil

6-8' bgs - black fuel oil

collected sample PJ-TP4-01 at 8 ft bgs

be = 8 ft bgs

VIDEO DOCUMENTED: YES ___ NO X
NAPL SEEPAGE: YES ___ NO ___
PHOTOGRAPHED: YES X NO ___
BULK SAMPLES: YES ___ NO ___
PIEZOMETER NO. USED IN BACKFILL:
QUANTITY:
DEPTH TO WATER: ________ FT

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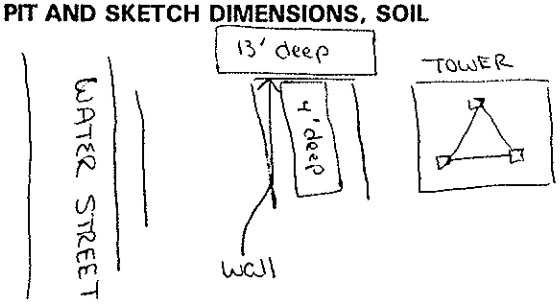
TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
TEST PIT NUMBER: TP-5
OBSERVER: Ben Foster
GENERAL LOCATION AND/OR PURPOSE:
located near stock house, along Water St; canal
ASSISTANT: Carolyn Lewis
OTHERS:
DATE: 4/14/98
CONTRACTOR:
TIME OPENED: 0800 TIME CLOSED: 0930
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-0.33' Asphalt

0.33-2' bgs - slate gravel, brown sand

2' - concrete

4' bgs - flat concrete pad

excavation inside structure - possibly stock house

concrete floor at 4' bgs, wall at 1-4' bgs

4-13' bgs - fill material - brick, soil, rock, cinders, ash; bone dry

be = 13' bgs

→ No odors, No impacts

VIDEO DOCUMENTED: YES X NO ___
NAPL SEEPAGE: YES ___ NO ___
PHOTOGRAPHED: YES X NO ___
BULK SAMPLES: YES ___ NO ___
PIEZOMETER NO. USED IN BACKFILL:
QUANTITY:
DEPTH TO WATER: ___ FT

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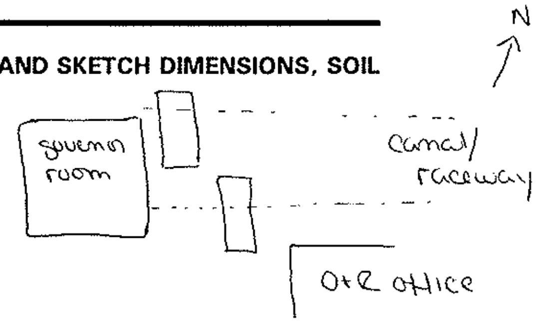
TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
TEST PIT NUMBER: TP-6
GENERAL LOCATION AND/OR PURPOSE: located near canal, north of governor room
DATE: 4/14/98
TIME OPENED: 1000 **TIME CLOSED:** 1130

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
OBSERVER: Ben Foster
ASSISTANT: Carolyn Lewis
OTHERS:
CONTRACTOR:
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-0.5' bgs - asphalt

0.5-2' bgs - brown-tan fine sand, debris
buried lines at 2' bgs, moved west 4 ft

0.5-13' bgs - gray soil, debris, brick, black soil, ash, coke; moist at bottom of excavation

be = 13' bgs

→ No odors, no impacts

VIDEO DOCUMENTED: YES X NO ___
PHOTOGRAPHED: YES X NO ___
PIEZOMETER NO. USED IN BACKFILL:
DEPTH TO WATER: ________ FT

NAPL SEEPAGE: YES ___ NO ___
BULK SAMPLES: YES ___ NO ___
QUANTITY:

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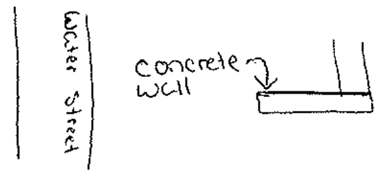
TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
TEST PIT NUMBER: TP-7
GENERAL LOCATION AND/OR PURPOSE: near large gas tank located along water St.
DATE: 4/14/98
TIME OPENED: 1150 **TIME CLOSED:** 1240

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
OBSERVER: Ben Foster
ASSISTANT: Carolyn Lewis
OTHERS:
CONTRACTOR:
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-0.33' bgs- asphalt
0.5-3.5' bgs- concrete holder pad;
0.33-13' bgs- tan fine sand,

be= 13' bgs

-> NO odors, NO impacts

VIDEO DOCUMENTED: YES X NO ___
PHOTOGRAPHED: YES X NO ___
PIEZOMETER NO. USED IN BACKFILL:
DEPTH TO WATER: __________ FT

NAPL SEEPAGE: YES ___ NO ___
BULK SAMPLES: YES ___ NO ___
QUANTITY: __________

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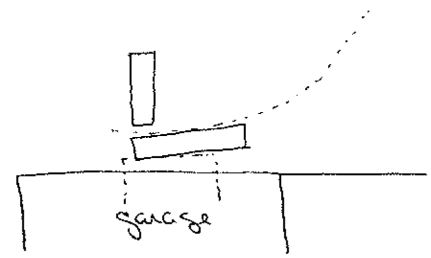
Form 1031

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
TEST PIT NUMBER: TP-8
OBSERVER: Ben Foster
GENERAL LOCATION AND/OR PURPOSE: located near northern gas holder and purifier house
ASSISTANT: Carolyn Lewis
OTHERS:
DATE: 4/14/98
CONTRACTOR:
TIME OPENED: 1335 **TIME CLOSED:** 1420
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-0.33' bgs - asphalt

0.33-1' bgs - rock with some fine sand

1-2' bgs - orange-brown sand with layers of dark gray debris

2-13' bgs - orange-brown fine sand

water table at 13' bgs

be = 13' bgs

→ No odors, No impacts

VIDEO DOCUMENTED: YES ___ NO X
NAPL SEEPAGE: YES ___ NO ___
PHOTOGRAPHED: YES X NO ___
BULK SAMPLES: YES ___ NO ___
PIEZOMETER NO. USED IN BACKFILL:
QUANTITY:
DEPTH TO WATER: ___ FT

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TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679- 1002

TEST PIT NUMBER: TP-9

GENERAL LOCATION AND/OR PURPOSE: near former canal, along King Street

DATE: 4/14/98

TIME OPENED: 1547 **TIME CLOSED:** 1640

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431

OBSERVER: Ben Foster

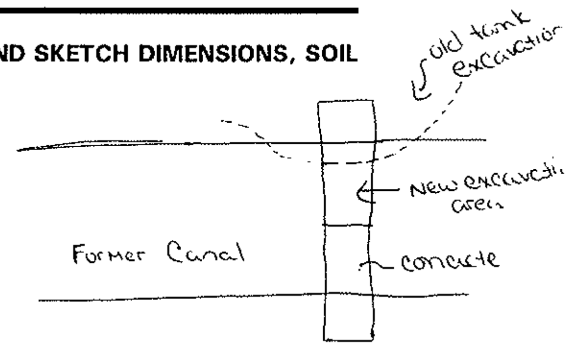
ASSISTANT: Carolyn Lewis

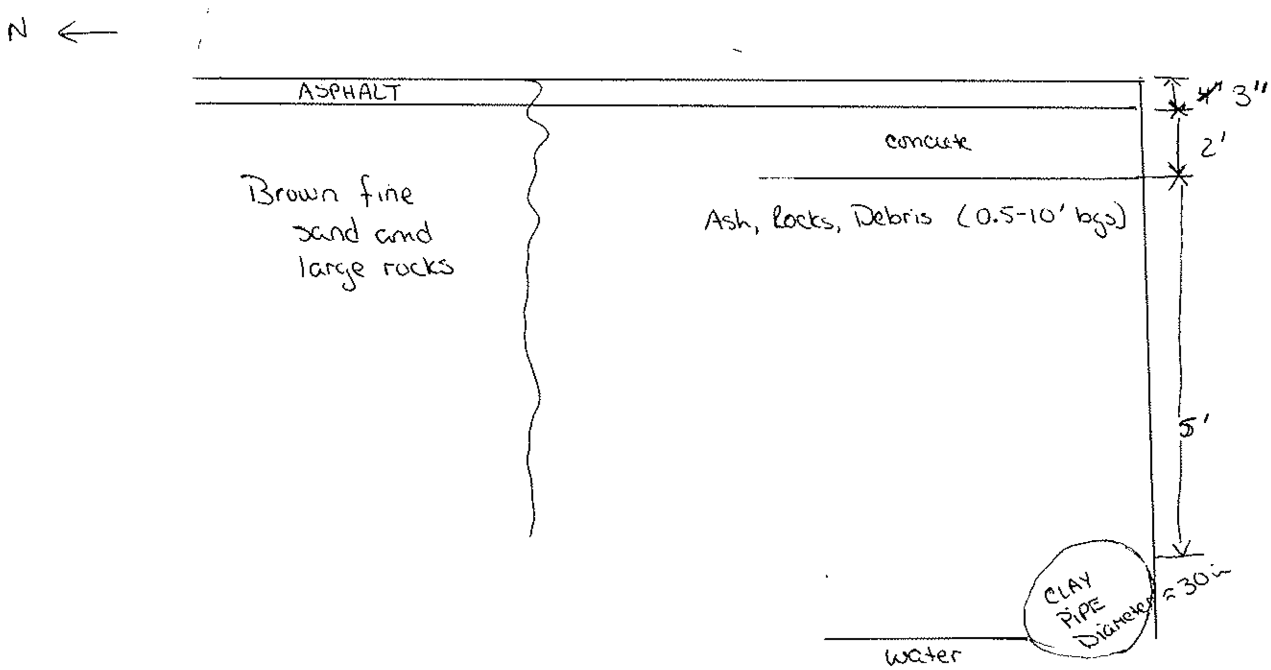
OTHERS:

CONTRACTOR:

EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.





→ No odors, No impacts

VIDEO DOCUMENTED: YES X NO ___

PHOTOGRAPHED: YES X NO ___

PIEZOMETER NO. USED IN BACKFILL:

DEPTH TO WATER: ________ FT

NAPL SEEPAGE: YES ___ NO ___

BULK SAMPLES: YES ___ NO ___

QUANTITY:

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188 Norwich Avenue
P.O. Box 297
Colchester, CT 06415

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Ph: (860) 537-0751
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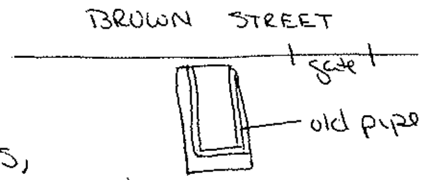
TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 97679-1002
TEST PIT NUMBER: TP-10
GENERAL LOCATION AND/OR PURPOSE: located near naphtha tanks along Brown St.
DATE: 4/14/98
TIME OPENED: 1710 **TIME CLOSED:** 1830

LOCAL "CALL BEFORE YOU DIG" CASE NO.: 2060431
OBSERVER: Ben Foster
ASSISTANT: Carolyn Lewis
OTHERS:
CONTRACTOR:
EQUIPMENT: John Deere 410E Backhoe

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



0-0.33' bgs - asphalt

0.33-10' bgs - brown fine sand and rocks, tan silty sand, slightly weathered diesel odor at 7' bgs.

8-10' bgs diesel odor in soil and dark gray staining in soil; gray silt and clay;

collected sample PJ-TP10-01 at 10' bgs.

be = 10' bgs

VIDEO DOCUMENTED: YES X NO ___
PHOTOGRAPHED: YES X NO ___
PIEZOMETER NO. USED IN BACKFILL:
DEPTH TO WATER: ________ FT

NAPL SEEPAGE: YES ___ NO ___
BULK SAMPLES: YES ___ NO ___
QUANTITY: ________

APPENDIX B

Boring Logs

Site Id: MW-1S

ATLANTIC Environmental
a Division of GEI Consultants, Inc.

Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number:
Date(s): 04/20/98 – 04/20/98	Total Depth: 31.00'
Elevation: 437.92'	Datum: Mean Sea Level
X Coordinate: 438277.07	Y Coordinate: 925210.25
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

Blank Casing:

type	dia	fm	to
PVC	2.00in	0.3'	15.00'

Screens:

type	size	dia	fm	to
Slotted	0.020in	2.00in	15.00'	25.00'

Annular Fill:

type	fm	to
Grout	1.00'	10.00'
Bentonite Pellets	10.00'	12.00'
Sand Filter	12.00'	13.00'
Sand Filter	13.00'	28.00'
Fill	28.00'	31.00'

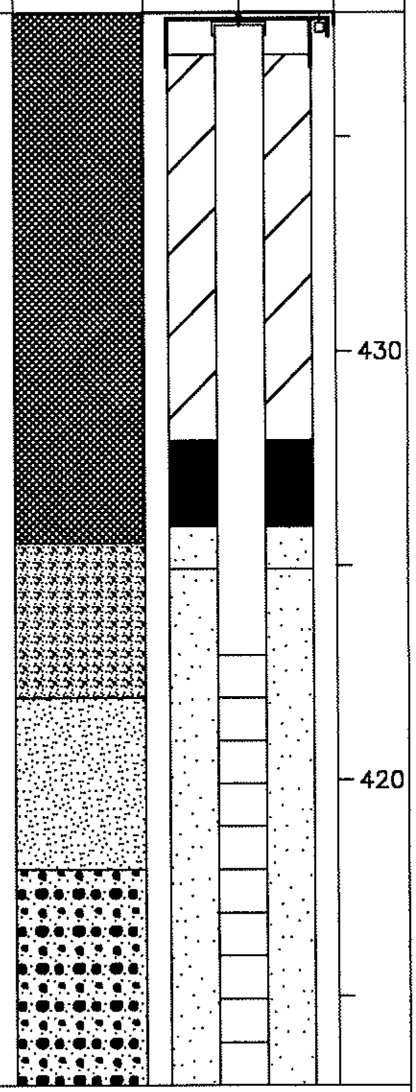
SS Sample Depth (ft.)	Blows Per 6 Inches	Recovery (%)	PID
0.5–2	7 7 5		1.4 ppm
2–4	3 2 2 4		1.2 ppm, 1.2 ppm
4–6	5 5 2 3		1.2 ppm
6–8	3 3 3 3		1.2 ppm, 1.2 ppm, 1.2 ppm
8–10	3 2 3 3		1.0 ppm, 1.2 ppm
10–12	4 5 5 4		0.7 ppm
12–14	3 3 3 2		1.0 ppm, 1.0 ppm, 1.0 ppm, 1.0 ppm
14–16	3 4 5 5		2.1 ppm, 2.8 ppm, 13 ppm
16–18	8 12 32		55 ppm
18–20	14 30 25 18		15 ppm, 72 ppm
20–22	14 18 25 99 R/.4		13 ppm, 10 ppm

Depth	Soil Description
0–0.5 ft	Augered through 6" of asphalt, FILL.
0.5–2 ft	Dark brown sand and gravel, slightly moist, some clay, no odor, FILL.
2–2.6 ft	Brown fine sand with gravel and ash (gravel size), FILL.
2.6–4 ft	Brown medium sand, dry, no odors, FILL.
4.0 ft	Hit obstruction, possibly retired gas line. Moved toward Water St. augered to 4 feet and resumed sampling, FILL.
4–6 ft	Broken concrete fragments, no odor, FILL.
6–8 ft	Brown very fine silty sand grading to fine sand at 7.5 ft, no odors, slightly moist, FILL.
8–10 ft	Brown very fine sand with little silt, moist, no odors, FILL.
10–12 ft	No recovery. piece of concrete wedged in shoe, sample material is not representative of sample interval, FILL.
12–14 ft	Brown fine sand with trace to little silt, coal fragments from 12–12.4 feet, iron staining from 12.4–13.8 feet.
14–14.7 ft	Brown to black FINE SAND, moderate odor.
14.7–16 ft	Black FINE SAND, very moist, strong tar odor, TAR BLEBS when wet.
16–18 ft	FINE SAND with rock fragments, wet with TAR in sand.
18–20 ft	FINE SAND and ROCK FRAGMENTS, TAR BLEBS and TAR STRINGERS, sample is very moist but not wet. collected SAMPLE PJ-MW1-01.
20–22 ft	ROCK FRAGMENTS and SAND, COBBLES, TAR SHEEN and BLEBS, wet.
22–25 ft	Augered to 25 feet, still in COBBLES.
25–25.7 ft	ROCK FRAGMENTS.

Depth (ft.): 10, 20

Lithology | Well Construction | Elevation (ft)

MP. EL. 437.58



Site Id: MW-1S

ATLANTIC Environmental
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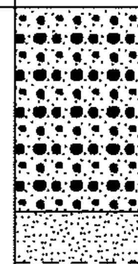
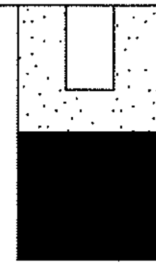
SS Sample Depth	Blows Per 6 In.	Recovery (%)	PID	Depth (ft.)	Soil Description		Elevation (ft)
25–27	50 52 48 50		13 ppm		25.7–27 ft	GRAVEL and COBBLES, no tar, but SHEEN on water, wet.	
27–28	40 51 R/2		6 ppm		27–29 ft	GRAVEL.	
						Augered to 29 feet.	410
29–31	21 31 40 40		8 ppm 10 ppm		29–29.8 ft	GRAVEL and COBBLES.	
					29.8–31 ft	FINE SAND, SAND, GRAVEL with TAR BLEBS, wet.	
					31.0 ft	End of Boring.	
				35			400
				45			390
				55			380

Lithology



Well Construction



Site Id: MW-1D

ATLANTIC Environmental
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Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number:
Date(s): 04/23/98 – 04/23/98	Total Depth: 62.00'
Elevation: 437.77'	Datum: Mean Sea Level
X Coordinate: 438283.30	Y Coordinate: 925212.94
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

Blank Casing:

type	size	dia	fm	to
PVC		2.00in	0.3'	37.00'

Screens:

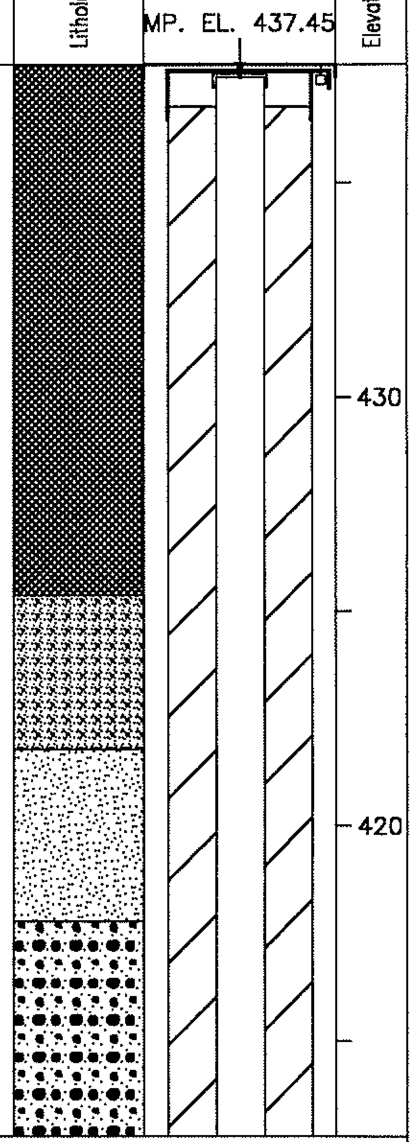
type	size	dia	fm	to
Slotted	0.020in	2.00in	37.00'	47.00'

Annular Fill:

type	fm	to
Grout	1.00'	32.00'
Bentonite Pellets	32.00'	34.00'
choker sand	34.00'	35.00'
Sand Filter	35.00'	48.00'
Fill	48.00'	60.00'

SS Sample Depth (ft.)	Blows Per 6 Inches	Recovery (%)	PID	Depth (ft.)	Soil Description
					0–30 ft For detailed description, please see boring log for MW-1S.
				10	
					15.5 ft Cobbles, cuttings are brown fine silty sand, strong odor, moist, some tar indicated by staining of plastic spoon.
				20	
					25 ft PID reading from soil cuttings = 45 ppm.

Lithology | Well Construction | Elevation (ft)



Site Id: MW-1D

ATLANTIC Environmental
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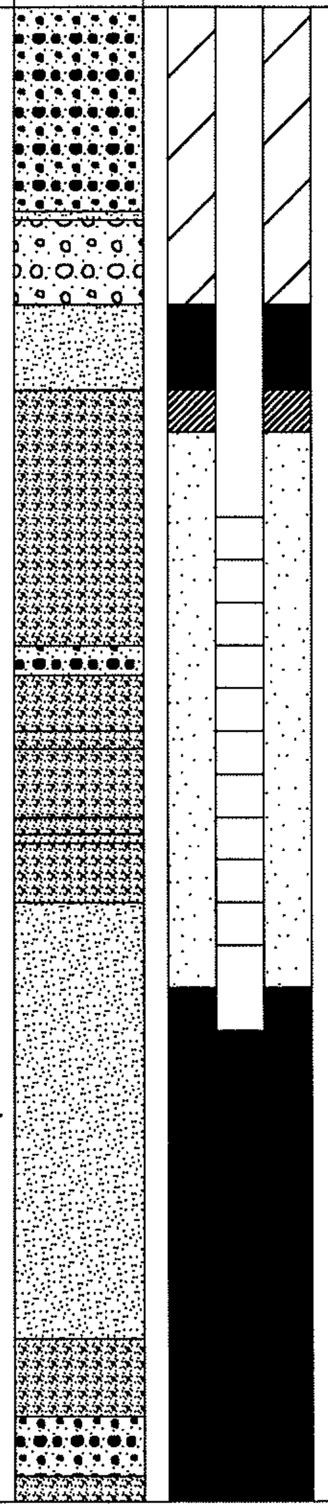
SS Sample Depth	Blows Per 6 In.	PID
		45 ppm
30–32	15, 21, 24, 29	1.4 ppm, 2.6 ppm, 2.3 ppm, 3.9 ppm
32–34	25, 25, 11, 9	1.7 ppm
34–36	9, 7, 7, 12	12 ppm, 10 ppm, 7 ppm
36–38		
38–40	4, 3, 5, 11	9 ppm, 12 ppm, 10 ppm
40–42	5, 6, 8, 11	23.5 ppm, 42 ppm, 406 ppm
42–44	5, 5, 7, 9	21.7 ppm, 366 ppm
44–46	7, 6, 12, 30	12 ppm, 8 ppm
46–48	8, 8, 13, 22	6.7 ppm, 4.6 ppm
48–50	13, 18, 24, 29	2.3 ppm, 1.2 ppm
50–51	18, 99 R/.5	0 ppm
52–54	15, 17, 18, 19	14 ppm
54–56	9, 12, 18, 18	1.9 ppm, 1 ppm, 1 ppm
56–58	9, 18, 30, 38	0.5 ppm, 2.1 ppm, 1.7 ppm
58–60	11, 18, 34, 39	3.5 ppm, 4.9 ppm, 1.4 ppm, 1.4 ppm

Depth (ft.): 35, 45, 55

Depth	Soil Description
30–32 ft	GRAVEL and COBBLES in brown silty soup, isolated TAR BLEB, moderate tar odor.
32–34 ft	FINE SAND with some gravel, moderate tar odor, SHEEN on water, TAR BLEBS on surface of gravel.
34–34.5 ft	MEDIUM SAND with gravel lense at 34.5 feet, TAR on gravel surface.
34.5–36 ft	Well sorted MEDIUM olive drab SAND, slight odor, no tar.
36–38 ft	FINE to MEDIUM brown SAND, probably wash, pockets of SHEEN, plastic spoon STAINED BY TAR but tar is not visible.
38–38.5 ft	Olive drab MEDIUM SAND with SHEEN and TAR (seen on plastic spoon), this may be wash.
38.5–40 ft	MEDIUM to COARSE olive drab SAND, no tar, slight odor, not wash.
40–40.7 ft	COARSE SAND and GRAVEL, slight odor, no tar.
40.7–42 ft	MEDIUM SAND, TAR saturated, silt lense at 41.3 feet. Collected SAMPLE PJ-MW1D-01 FROM 40.8–41.3 FEET.
42–42.4 ft	Olive drab VERY FINE SAND, no tar.
42.4–44 ft	TAR saturated FINE to MEDIUM SAND, tar running out of bottom of spoon.
44–44.4 ft	Brown VERY FINE SAND, slight odor, no tar.
44.4–44.6 ft	Gray/Brown MEDIUM SAND, slight odor, no tar.
44.6–46 ft	Brown VERY FINE SAND and SILT, SHEEN, TAR STAIN on plastic spoon.
46–46.4 ft	Brown to dark brown poorly sorted FINE SAND with little coarse to gravel, slight odor, slight STAIN on plastic.
46.4–48 ft	Brown VERY FINE SAND with trace gravel, no evidence of tar.
48–50 ft	Brown to dark brown poorly sorted FINE SAND to GRAVEL, dense, till-like, slight odor, slight TAR STAIN on plastic spoon.
50–52 ft	Brown to dark brown poorly sorted SAND to GRAVEL, no evidence of tar, SHEEN on water but not in sample.
51–52 ft	Augered to 52 feet.
52–54 ft	Poorly sorted MEDIUM to COARSE SAND with pebbles, probably wash, slight tar odor.
54–56 ft	Brown FINE to COARSE SAND, better sorted than above, slight odor at top, no odor at bottom, no visible tar.
56–56.2 ft	Brown VERY FINE SAND, SILT to GRAVEL, slight odor.
56.2–58 ft	MEDIUM SAND with some coarse sand and trace pebbles, slight odor at 56.7 feet, no odor elsewhere, no visible tar, fairly dense.
58–59.4 ft	COARSE SAND and GRAVEL, few fines, cobble lense at 58.7 feet, slight odor.
59.4–60 ft	Brown VERY FINE SAND, no odor.
60–62 ft	Brown MEDIUM to VERY COARSE to PEBBLY SAND, fairly

Lithology / Well Construction



Elevation (ft): 410, 400, 390, 380

SS Sample Depth	Blows Per 6 In.	Recovery (%)	PID	Depth (ft.)	Soil Description	Lithology	Well Construction	Elevation (ft)
60-62	9 28 45 40		1.4 ppm		dense, very slight odor.			
					62 ft End of Boring.			
				65				
								370
				75				
								360
				85				
								350

Site Id: MW-2

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Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number:
Date(s): 04/21/98 - 04/21/98	Total Depth: 32.00'
Elevation: 436.27'	Datum: Mean Sea Level
X Coordinate: 438220.40	Y Coordinate: 925138.34
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

Blank Casing:

type	size	dia	fm	to
PVC		2.00in	0.4'	13.00'

Screens:

type	size	dia	fm	to
Slotted	0.020in	2.00in	13.00'	23.00'

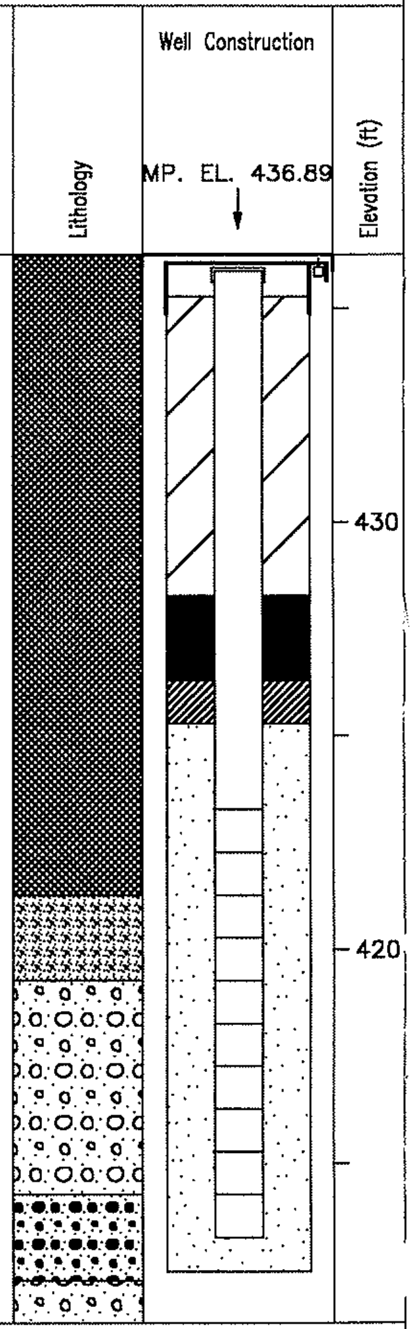
Annular Fill:

type	fm	to
Grout	1.00'	8.00'
Bentonite Pellets	8.00'	10.00'
choker sand	10.00'	11.00'
Sand Filter	11.00'	23.80'

SS Sample Depth (ft.)	Blows Per 6 Inches	PID
0.5-2	10, 11, 10	1.2 ppm, 1.0 ppm
2-4	5, 4, 19, 34	1.2 ppm, 1.2 ppm
5-7	3, 3, 2, 2	1.0 ppm
7-9	4, 5, 3, 2	0.7 ppm, 0.7 ppm
9-11	2, 2	0.7 ppm
11-13	3, 4, 3, 2	0.7 ppm
13-15	3, 4, 5, 6	0.7 ppm
15-17	4, 3, 3, 5	0.5 ppm, 0.5 ppm, 0.5 ppm
17-18	14, 51 R/3	9 ppm
20-22	21, 35, 33, 51 R/3	1.7 ppm
22-23.5	43, 35, 51 R/2	1.4 ppm

Depth	Soil Description
0-0.5 ft	Augered through top 6" of asphalt, FILL.
0.5-1 ft	Brown/black silt and gravel(rock fragments), FILL.
1-2 ft	Coarse sand with some gravel, dry, FILL.
2-2.8 ft	Brown coarse sand and gravel, moist at 2.8 feet, FILL.
2.8-4 ft	Gray mortar and cobble, slight tar odor, FILL.
4-5 ft	Augered through concrete to 5 feet, FILL.
5-7 ft	Black ash (bottom ash) and slag, no odor, slightly moist, FILL.
7-9 ft	Gravel to pebble size bottom ash, very loose, no odor, dry, FILL.
9-11 ft	Same as above with olive gray fine sand and silt, FILL.
11-11.3 ft	Black ash (bottom ash) and brown silty clay, FILL.
11.3-13 ft	Brown/black very fine sand and silt, moist, no odor, FILL.
13-13.5 ft	Fine sand with bottom ash, red slag at 13.3 feet, FILL.
13.5-15 ft	Light brown very fine sand and silt, very moist, no odor, FILL.
15-17 ft	Brown MEDIUM SAND, well sorted, wet, no odor. Collected SAMPLE PJ-MW2-01 FROM 15.2-16.0 FEET.
17-19 ft	COBBLES, wet, moderate tar odor, no visible tar, no sheen.
19-20 ft	Augered through COBBLES to 20 feet.
20-22 ft	COBBLES, wet, moderate odor, slight SHEEN on water, no visible tar.
22-24 ft	COBBLES and FINE TO COARSE SAND, slight odor, no sheen on water.
24-25 ft	Augered through hard COBBLE to 25 feet.
25-27 ft	No recovery. 0.3 ft of sandy wash. SHEEN on

Lithology / Well Construction / Elevation (ft)



Site Id: MW-2

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SS Sample Depth	Blows Per 6 In.	Recovery (%)	PID	Depth (ft.)	Soil Description		Lithology	Well Construction	Elevation (ft)
25-25.5	51 R/.3		1.2 ppm			water.			
					27-28 ft	Augered to 28 feet.			410
28-29	29 51 R/.5		1.5 ppm		28-30 ft	COBBLES, slight odor.			
30-32	3 5 8 10		0.3 ppm 0.3 ppm		30-32 ft	Brown VERY FINE SAND, well sorted, no odor, no sheen.			
					32 ft	End of Boring.			
				35					400
				45					390
				55					380

Site Id: MW-3

ATLANTIC Environmental
a Division of GEI Consultants, Inc.

Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number:
Date(s): 04/21/98 – 04/21/98	Total Depth: 30.00'
Elevation: 437.81'	Datum: Mean Sea Level
X Coordinate: 438212.52	Y Coordinate: 925227.26
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

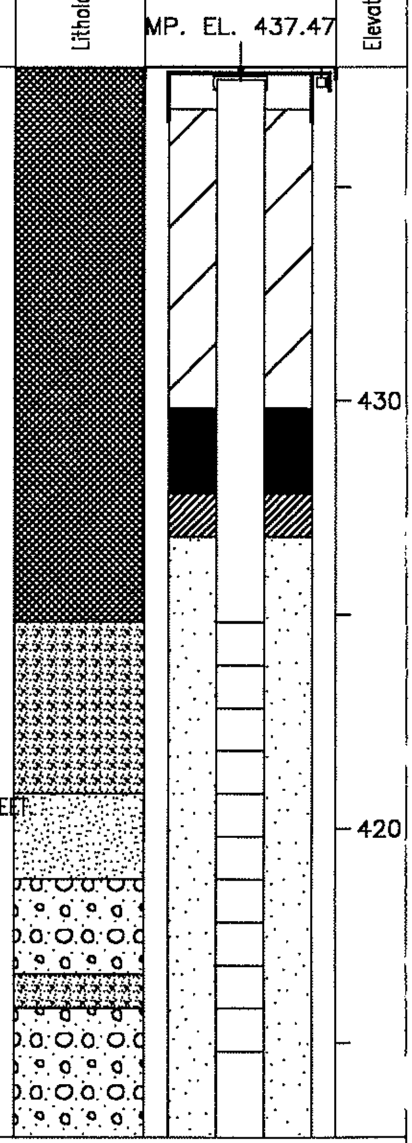
Blank Casing:			
type: PVC	dia: 2.00in	fm: 0.3'	to: 13.00'

Screens:				
type: Slotted	size: 0.020in	dia: 2.00in	fm: 13.00'	to: 23.00'

Annular Fill:		
type: Grout	fm: 1.00'	to: 8.00'
type: Bentonite Pellets	fm: 8.00'	to: 10.00'
type: choker sand	fm: 10.00'	to: 11.00'
type: Sand Filter	fm: 11.00'	to: 27.00'
type: Fill	fm: 27.00'	to: 30.00'

SS Sample Depth (ft.)	Blows Per 6 Inches	Recovery (%)	PID	Depth (ft.)	Soil Description	
					0–11 ft	Augered through concrete pad and subsurface material. Subsurface material consisted of medium sand with some gravel, no odor, FILL.
				10		
11–12	51 R/.1				11–13 ft	No recovery.
					11–13 ft	Augered to 13 feet.
13–15	38, 8, 5, 7		3 ppm, 46 ppm		13–13.5 ft	Brown FINE SAND, dry.
					13.5–15 ft	Gray FINE SAND, stained, moderate odor, moist.
15–17	2, 4, 3, 4		7 ppm, 30 ppm, 27 ppm		15–15.5 ft	Gray fine sand, TAR at 15.5, moderate odor.
					15.5–17 ft	Olive green VERY FINE SAND and SILT, no visible tar, moderate odor, very moist to wet. Collected SAMPLE PJ–MW3–02 FROM 15.1 – 16.8 FEET.
17–19	16, 19, 26, 29		21 ppm, 18 ppm, 7 ppm		17–19 ft	Black FINE SAND and COBBLES, strong odor, TAR BLEBS, wet. collected SAMPLE PJ–MW3–03 FROM 17.0–18.0 FEET.
					19–20 ft	Augered to 20 feet.
20–22	26, 25, 35, 51 R/.5		5 ppm, 3 ppm, 0.1 ppm	20	20–21.2 ft	COBBLES with TAR BLEBS.
					21.2–22 ft	Brown soupy FINE SAND and SILT, no visible tar.
22–23	38, 51 R/.3		1.0 ppm		22–24 ft	COBBLES with brown silty water, few TAR BLEBS (probably from water), moderate odor.
					24–25 ft	Augered to 25 feet.

Lithology | Well Construction | Elevation (ft)



Site Id: MW-3

ATLANTIC Environmental
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SS Sample Depth	Blows Per 6 In.	Recovery (%)	PID	Depth (ft.)	Soil Description		Lithology	Well Construction	Elevation (ft)
25–26	15 51 R/0		11 ppm		25–27 ft	COBBLES (probably wash), outside of spoon and inside of tip has some TAR COATING.			
					27–28 ft	Augered to 28 feet.			410
28–30	28 19 18 21		0.5 ppm 0.5 ppm 0.5 ppm		28–30 ft	COBBLES and GRAVEL, TAR BLEBS, but may be from water, moderate odor.			
					30 ft	End of Boring.			
				35					400
				45					390
				55					380

Site Id: MW-5

ATLANTIC Environmental
a Division of GEI Consultants, Inc.

Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number:
Date(s): 04/22/98 - 04/22/98	Total Depth: 30.00'
Elevation: 436.50'	Datum: Mean Sea Level
X Coordinate: 438300.02	Y Coordinate: 925324.45
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

Blank Casing:
type: PVC dia: 2.00in fm: 0.2' to: 12.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 12.00' to: 22.00'

Annular Fill:

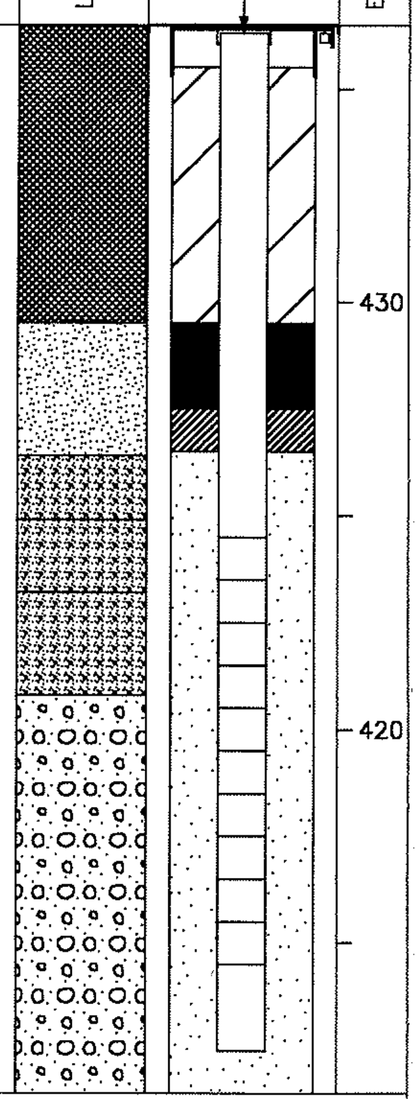
type	fm	to
Grout	1.00'	7.00'
Bentonite Pellets	7.00'	9.00'
choker sand	9.00'	10.00'
Sand Filter	10.00'	30.00'

SS Sample Depth (ft.)	Blows Per 6 Inches	PID
5-7	7, 5, 6, 6	2.7 ppm, 0.7 ppm, 0.7 ppm
7-9	4, 4, 3, 2	1.9 ppm, 1.4 ppm, 44 ppm, 37 ppm
9-11	3, 3, 4, 4	18 ppm, 4 ppm, 6 ppm, 19 ppm
11-13	3, 6, 5, 5	4 ppm, 15 ppm, 34 ppm, 35 ppm
13-15	4, 5, 5, 5	50 ppm, 91 ppm, 140 ppm
15-17	5, 11, 19, 29	17 ppm, 40 ppm
17-19	6, 9, 17, 19	14 ppm, 80 ppm
19-20	12, 51 R/.4	8 ppm
22-24	17, 19, 23, 51 R/.1	2.1 ppm, 0.3 ppm
24-24.5	51 R/.2	

Depth	Soil Description
0-0.5 ft	Augered through asphalt, FILL.
0.5-2.5 ft	Augered through concrete, FILL.
2.5-5 ft	Augered to 5 feet, FILL.
5-7 ft	Brown very fine sand with little brick fragments from 5-5.4 feet, dry, slight VOC odor from 5-5.4 feet, FILL.
7-8 ft	Brown VERY FINE SILTY SAND, slight sweet light VOC odor.
8-9 ft	Gray VERY FINE SILTY SAND, strong VOC odor as above, slightly moist at top.
9-10.1 ft	Brown VERY FINE SILTY SAND, slightly moist, some black staining (slight tar odor in stained soil).
10.1-11 ft	Gray FINE SAND, well sorted, VOC petroleum odor (moderate).
11-11.6 ft	Gray VERY FINE SAND, well sorted, moderate VOC odor, slightly moist.
11.6-13.3 ft	Dark gray FINE to MEDIUM SAND, well sorted, slightly moist, moderate VOC odor.
13.3-15 ft	VERY FINE SAND with some silt, very moist to wet, strong petroleum/VOC odor.
15-15.7 ft	Gray FINE SAND, well sorted, strong petroleum odor (fuel oil), wet. Collected SAMPLE PJ-MW5-01 FROM 15-15.7 FEET.
15.7-17 ft	COBBLES, moderate odor, less wet than above.
17-19 ft	Dark gray COBBLES and GRAVEL, moderate petroleum odor, black OIL BLEBS on water surface.
19-21 ft	Same as above, with OIL BLEBS.
21-22 ft	Augered to 22 feet.
22-24 ft	COBBLES and GRAVEL, SHEEN on water, TAR BLEBS at 22.9-23 feet.
24-26 ft	No recovery. 0.2 ft of gravel wash, SHEEN on water.

Lithology | Well Construction | Elevation (ft)

MP. EL. 436.35



Site Id: MW-5

ATLANTIC Environmental
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SS Sample Depth	Blows Per 6 In.	Recovery (%)	PID	Depth (ft.)	Soil Description		Lithology	Well Construction	Elevation (ft)
26–26.5	51 R/0		5.5 ppm		26–28 ft	No recovery. 0.3 ft of gravel wash, moderate tar odor on wash, slight SHEEN on water.			410
					28–29 ft	Augered to 29 feet.			
29–29.5	51 R/.2				29–30 ft	No recovery.			
					30 ft	End of Boring.			
				35					400
				45					390
				55					380

Site Id: SB-1

ATLANTIC Environmental
a Division of GEI Consultants, Inc.

Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number: 97679-1002
Date(s): 04/20/98 - 04/20/98	Total Depth: 12.00'
Elevation: 434.80'	Datum: Mean Sea Level
X Coordinate: 438384.24	Y Coordinate: 925338.00
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

SS Sample Depth (ft.)	Blows Per 6 Inches	PID
0.5–2	5, 5, 5, 3	0.5 ppm, 0.5 ppm
2–4	3, 3, 2, 2	1.2 ppm
4–6	2, 2, 3, 3	1.0 ppm, 1.2 ppm
6–8	1, 1, 1, 2	0.5 ppm, 0.5 ppm
8–10	2, 2, 3, 3	1.4 ppm, 1.4 ppm
10–12	4, 4, 5, 6	

Depth (ft.)	Soil Description
0–0.5 ft	Augered through concrete/asphalt, FILL.
0.5–2 ft	Brown fine sand and silt with pebbles and cobbles, moist, no odors, FILL.
2–4 ft	Same as above with brick fragments, moist, no odor, FILL.
4–6.5 ft	Brown very fine sand with trace pebble and coal fragments, very moist, FILL.
6.5–6.7 ft	Very fine sand and silt, very moist, FILL
6.7–8 ft	Very fine sand, silt, and clay, no odors, FILL.
8–8.2 ft	Brown fine silty sand, FILL.
8.2–10 ft	Brown fine sand, well sorted, clay lenses near bottom, FILL.
10–10.2 ft	Pink/brown silty fine sand, FILL.
10.2–10.8 ft	Brown very fine sand, FILL.
10.8–12 ft	Brown medium sand, FILL. note: adjacent tank excavation extended to 12 feet.
12 ft	End of Boring.

Depth (ft.): 10, 20

Lithology

Elevation (ft): 430, 420, 410

Site Id: SB-4

ATLANTIC Environmental
a Division of GEI Consultants, Inc.

Location: Port Jervis former MGP site	
Township/Range: Port Jervis, NY	Project Number:
Date(s): 04/22/98 - 04/22/98	Total Depth: 10.00'
Elevation: 436.99'	Datum: Mean Sea Level
X Coordinate: 438273.09	Y Coordinate: 925278.41
Contractor: AT&D	Drilling Method: Hollow Stem Auger
Logged By: Terry Taylor	
Remarks:	

SS Sample Depth (ft.)	Blows Per 6 Inches	Recovery (%)	PID	Depth (ft.)	Soil Description		Lithology	Elevation (ft)
					0-0.8 ft	Augered through asphalt, FILL.		
					0.8-1 ft	Augered through brick, FILL.		
					1-2.5 ft	Augered through cement, FILL.		
					2.5-4 ft	Augered through soil, FILL.		
					4-4.2 ft	Brick and ash, dry, FILL.		
4-6	5 4 3 3		0.7 ppm 12 ppm		4.2-6 ft	Ash and brick, slight odor, slight SHEEN, wet, TAR on top of spoon, FILL.		
6-8	2 2 1 4		329 ppm		6-8 ft	Rubble coated with VISCOUS TAR, not enough material to sample, FILL.		430
8-10	3 3 1 4		936 ppm		8-10 ft	TAR and rubble, FILL. Collected SAMPLE PJ-MW4-01 FROM 8.0-8.6 FEET.		
				10	10 ft	Encountered obstacle. End of Boring.		
								420
				20				

APPENDIX C

Risk Tables

Table 1
Toxicological Factors
Port Jervis Former MGP Site

CAS	Analyte	Subchronic RfD Oral		Chronic RfD Oral		Cancer Slope Factor Oral		Last	Last
		mg/kg.day	Source	mg/kg.day	Source	kg.day/mg	Source	Updated	Checked
83-32-9	Acenaphthene	0.6	HEAST1 (Tables 1 & 3), 1997	0.06	IRIS (1st Quarter), 1998		No Value	01-Jan-94	05-Feb-98
208-96-8	Acenaphthylene	0.06	Acenaphthene Surrogate	0.06	Acenaphthene Surrogate		No Value	01-Jan-94	05-Feb-98
120-12-7	Anthracene	3	HEAST1 (Tables 1 & 3), 1997	0.3	IRIS (1st Quarter), 1998		No Value	21-Apr-95	05-Feb-98
56-55-3	Benz(a)anthracene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate	0.73	EPA/NCEA TEF BaP Surrogate	21-Apr-95	05-Feb-98
50-32-8	Benzo(a)pyrene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate	7.3	IRIS (1st Quarter), 1998	30-Jan-95	05-Feb-98
205-99-2	Benzo(b)fluoranthene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate	0.73	EPA/NCEA TEF BaP Surrogate	05-Feb-98	05-Feb-98
191-24-2	Benzo(g,h,i)perylene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate		No Value	01-Jan-94	05-Feb-98
207-08-9	Benzo(k)fluoranthene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate	0.073	EPA/NCEA TEF BaP Surrogate	05-Feb-98	05-Feb-98
218-01-9	Chrysene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate	0.0073	EPA/NCEA TEF BaP Surrogate	05-Feb-98	05-Feb-98
206-44-0	Fluoranthene	0.4	HEAST1 (Tables 1 & 3), 1997	0.04	IRIS (1st Quarter), 1998		No Value	21-Apr-95	05-Feb-98
86-73-7	Fluorene	0.4	HEAST1 (Tables 1 & 3), 1997	0.04	IRIS (1st Quarter), 1998		No Value	01-Jan-94	05-Feb-98
193-39-5	Indeno(1,2,3-cd)pyrene	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate	0.73	EPA/NCEA TEF BaP Surrogate	01-Jan-94	05-Feb-98
91-57-6	Methyl Naphthalene, 2-	0.04	Naphthalene Surrogate	0.04	Naphthalene Surrogate		No Value	01-Jan-94	05-Feb-98
91-20-3	Naphthalene	0.04	Withdrawn EPA RfD	0.04	Withdrawn EPA RfD		No Value	31-Oct-95	05-Feb-98
85-01-8	Phenanthrene	0.03	Pyrene Surrogate	0.03	Pyrene Surrogate		No Value	21-Apr-95	05-Feb-98
129-00-0	Pyrene	0.3	HEAST1 (Tables 1 & 3), 1997	0.03	IRIS (1st Quarter), 1998		No Value	21-Apr-95	05-Feb-98

Table 2
Absorption Factors
Port Jervis Former MGP Site

Pathway	Factor Type	CAS	Analyte	Factor	Units	Source
Dermal Contact with Soil	Dermal Asorption Factor	83-32-9	Acenaphthene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		208-96-8	Acenaphthylene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		120-12-7	Anthracene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		56-55-3	Benz(a)anthracene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		50-32-8	Benzo(a)pyrene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		205-99-2	Benzo(b)fluoranthene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		191-24-2	Benzo(g,h,i)perylene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		207-08-9	Benzo(k)fluoranthene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		218-01-9	Chrysene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		206-44-0	Fluoranthene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		86-73-7	Fluorene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		193-39-5	Indeno(1,2,3-cd)pyrene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		91-57-6	Methyl Naphthalene, 2-	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		91-20-3	Naphthalene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		85-01-8	Phenanthrene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
		129-00-0	Pyrene	0.02	Fraction	Magee, Anderson & Burmaster, 1997
Ingestion of Soil	Oral Absorption Factor	83-32-9	Acenaphthene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		208-96-8	Acenaphthylene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		120-12-7	Anthracene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		56-55-3	Benz(a)anthracene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		50-32-8	Benzo(a)pyrene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		205-99-2	Benzo(b)fluoranthene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		191-24-2	Benzo(g,h,i)perylene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		207-08-9	Benzo(k)fluoranthene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		218-01-9	Chrysene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		206-44-0	Fluoranthene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		86-73-7	Fluorene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		193-39-5	Indeno(1,2,3-cd)pyrene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		91-57-6	Methyl Naphthalene, 2-	0.29	Fraction	Magee, Anderson & Burmaster 1996
		91-20-3	Naphthalene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		85-01-8	Phenanthrene	0.29	Fraction	Magee, Anderson & Burmaster 1996
		129-00-0	Pyrene	0.29	Fraction	Magee, Anderson & Burmaster 1996

Table 3
Exposure Factors
Port Jervis Former MGP Site

Exposure				Intake Rate			Source Fraction			Exposure Frequency		
Scenario	**Case**	**Route**	**Pathway**	**Units**		**Source**	**Units**		**Source**	**Units**		**Source**
Construction	Average	ORAL	Dermal Contact				1	unitless	Assumed	120	days/year	Assumed 5 dy/wk per 6 months
		ORAL	Ingestion	100	mg/day	EPA 1997 High End Exposure	1	unitless	Assumed	120	days/year	Assumed 5 dy/wk per 6 months
	RME	ORAL	Dermal Contact				1	unitless	Assumed	250	days/year	High End Assumption
		ORAL	Ingestion	500	mg/day	EPA 1997 Maximum	1	unitless	Assumed	250	days/year	High End Assumption
INDUSTRIAL	Average	ORAL	Dermal Contact				1	unitless	Assumed	52	days/year	Assumed 2hr/dy over 210 dy (2 mon. snow)
		ORAL	Ingestion	50	mg/day	EPA 1997 Central Tendency	1	unitless	Assumed	52	days/year	Assumed 2hr/dy over 210 dy (2 mon. snow)
	RME	ORAL	Dermal Contact				1	unitless	Assumed	62	days/year	Assumed 2hr/dy over 250dy/yr
		ORAL	Ingestion	100	mg/day	EPA 1997 High End Exposure	1	unitless	Assumed	62	days/year	Assumed 2hr/dy over 250dy/yr

Table 3 (continued)
Exposure Factors
Port Jervis Former MGP Site

Exposure				Exposure Duration			Body Weight			Averaging Time - Chronic		
Scenario	Case	Route	Pathway	units		Source	units		Source	units		Source
Construction	Average	ORAL	Dermal Contact	1	year	Assumed	70	kg	EPA 1997	180	days	6 months assumed
		ORAL	Ingestion	1	year	Assumed	70	kg	EPA 1997	180	days	6 months assumed
	RME	ORAL	Dermal Contact	1	year	Assumed	70	kg	EPA 1997	365	days	High End Assumption
		ORAL	Ingestion	1	year	Assumed	70	kg	EPA 1997	365	days	High End Assumption
INDUSTRIAL	Average	ORAL	Dermal Contact	10	year	EPA 1997 Centeral Tendency Worker Duration	70	kg	EPA 1997	3650	days	EPA 1997 Centeral Tendency Worker Duration
		ORAL	Ingestion	10	year	EPA 1997 Centeral Tendency Worker Duration	70	kg	EPA 1997	3650	days	EPA 1997 Centeral Tendency Worker Duration
	RME	ORAL	Dermal Contact	25	year	EPA 1997 UCL Worker Mobility	70	kg	EPA 1997	9125	days	EPA 1997 UCL Worker Mobility
		ORAL	Ingestion	25	year	EPA 1997 UCL Worker Mobility	70	kg	EPA 1997	9125	days	EPA 1997 UCL Worker Mobility

Table 3 (continued)
Exposure Factors
Port Jervis Former MGP Site

Exposure				Averaging Time - Life			Conversion Factor		Body Surface Area		
Scenario	**Case**	**Route**	**Pathway**		units	Source		units		units	Source
Construction	Average	ORAL	Dermal Contact	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg	5000	cm^2/day	EPA 1997 Ave. for Outdoor Activity
		ORAL	Ingestion	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg			
	RME	ORAL	Dermal Contact	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg	5800	cm^2/dy	EPA 1997 UCL for Outdoor Activity
		ORAL	Ingestion	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg			
INDUSTRIAL	Average	ORAL	Dermal Contact	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg	2000	cm^2/day	EPA 1997 Ave. of head & hands
		ORAL	Ingestion	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg			
	RME	ORAL	Dermal Contact	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg	3200	cm^2/day	EPA 1997 Heads, hands, & forearms
		ORAL	Ingestion	27375	days	EPA 1997 Life Expectancy	0.000001	kg/mg			

Table 3 (continued)
Exposure Factors
Port Jervis Former MGP Site

Exposure				Adherence Factor			Human Intake Factors			
Scenario	Case	Route	Pathway		units	Source	Chronic	units	Lifetime	units
Construction	Average	ORAL	Dermal Contact	0.2	mg/cm^2	EPA 1997 Centeral Tendency	9.5E-06	1/day	6.3E-08	1/day
		ORAL	Ingestion				1.0E-06	1/day	6.8E-09	1/day
	RME	ORAL	Dermal Contact	1	mg/cm^2	EPA 1997 UCL Value	5.7E-05	1/day	7.6E-07	1/day
		ORAL	Ingestion				4.9E-06	1/day	6.5E-08	1/day
INDUSTRIAL	Average	ORAL	Dermal Contact	0.2	mg/cm^2	EPA 1997 Centeral Tendency	8.1E-07	1/day	1.1E-07	1/day
		ORAL	Ingestion				4.1E-07	1/day	5.5E-08	1/day
	RME	ORAL	Dermal Contact	1.0	mg/cm^2	EPA 1997 UCL Value	7.8E-06	1/day	2.6E-06	1/day
		ORAL	Ingestion				9.8E-07	1/day	3.3E-07	1/day