REMEDIAL ACTION WORK PLAN
FORMER MANUFACTURED GAS PLANT
PURDY AVENUE
PORT CHESTER, NEW YORK
SITE # V00516-3

Prepared for:

The Village of Port Chester
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PROFESSIONAL ENGINEER CERTIFICATION

TYPE OF DOCUMENT Remedial Action Work Plan

SITE NAME Former Manufactured Gas Plant

SITE ADDRESS Purdy Avenue, Port Chester, Westchester County, New York

SITE NUMBER V00516-3

"I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting inaccurate or incomplete information."

PRINTED NAME FREDERICK W. WORSTELL

SIGNATURE Frederick W. Worstell **DATE** 6/3/04

NEW YORK STATE LICENSE NUMBER 080140

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1.0 INTRODUCTION

DRESDNER ROBIN has been retained by JM Sorge, Inc. (JMS) of Somerville, New Jersey to prepare a Remedial Action Work Plan (RAWP) for the property located at 85 Purdy Avenue (Block 99, Lots 15, 16, 18A through 18H and Lot 19) in the Village of Port Chester, Westchester County, New York (herein referred to as the Site). The Site is part of a larger area known as the Port Chester Marina Redevelopment Project. JMS has conducted extensive environmental investigations at the Site on behalf of the Village of Port Chester to support the Marina Redevelopment Project.

The Village of Port Chester entered into a Voluntary Cleanup Agreement (VCA) on April 9, 2002 for the Site with the New York State Department of Environmental Conservation (NYSDEC) as a non-responsible party Volunteer.

The Site is located at the intersection of Traverse and Purdy Avenues in the Village of Port Chester, and is currently a fenced, vacant lot. The surrounding area consists of mixed residential and commercial properties. To the north and the northwest of the Site are several fenced, vacant lots containing stockpiles of fill material and demolition debris associated with the Marina Redevelopment Project.

Historical information for the Marina Redevelopment Project area indicated that a Manufactured Gas Plant (MGP) operated at the Site from as early as 1860 to some time prior to 1902. Subsurface investigations conducted by JMS and DRESDNER ROBIN in 2003 located former MGP structures at the Site, including two (2) gasholders, a tar well, and a meter room. Detailed descriptions of the Site history, previous Site investigations, nature and extent of contamination, analytical data, geology, hydrology, and subsurface structures are provided in the February 2004 Site Investigation Report (SIR) prepared by JMS, and will be submitted concurrently with this RAWP under separate cover.

1.1 Work Plan Objectives

Site remedial investigations conducted by JMS and DRESDNER ROBIN have delineated soil contamination and confirmed the existence of structural remnants of the former MGP facility. Wastes usually associated with MGP sites consist of coal tar and purifier wastes. Site investigations have not identified any areas of purifier waste. Some evidence of coal tar has been observed in the vicinity of the former MGP structures. This coal tar is generally observed as small droplets of coal tar on the groundwater surface. No areas of significant coal tar impacted soils have been observed, however, the base of the gasholder foundations have not yet been exposed.

The RAWP objectives are to 1) excavate and remove former MGP structures, gasholder contents and soil to a depth of approximately four to six feet below grade surface (bgs) within the Excavation Area (EA) as depicted in Appendix A; 2) complete site investigation activities by exposing and sampling areas beneath the gasholder foundations; 3) remove structures, contaminated soil and product sources that have the potential to become mobile; 4) remove or control potential contaminant migratory pathways, and 5) restore the former MGP site to beneficial use in compliance with community redevelopment objectives and the requirements specified in the Voluntary Cleanup Agreement.

1.2 Project Objective(s)

Project Objective(s) are to achieve a beneficial reuse of the MGP site in a manner that is protective of human health and the environment. These objectives are as follows:

- Removal and off-site disposal of the top four to six feet of material located within the EA.
- Investigation of the soil remaining within the EA to a depth of twelve feet bgs.
- Removal and off-site disposal of any soil within the EA to a depth of twelve feet bgs that is visibly stained by or saturated with non aqueous phase liquid (NAPL) or flowing coal tar.
- Dewatering and investigation of the base of the MGP gasholder structures.
- Removal of the gasholder structures and visible contamination at the base or beyond unless field conditions do not warrant such action. If not, the structures will be closed in place.
- Activation of the vapor collection system after the building and Cover System are constructed.
- Recording of the environmental easement for the Site with the Village of Port Chester.
- Preparation of the Site Management Plan and the Operation, Monitoring & Maintenance (OM&M) Work Plan.
- Performance of OM&M activities, including soil vapor and groundwater monitoring.
- Submittal of the annual certification report.

1.3 Site Location and Description

The Site encompasses 0.92 acres and is situated between Don Bosco Place and Traverse Avenue at their intersection with Purdy Avenue, in the Village of Port Chester, Westchester County, New York (Figure 1). The Site includes Lots 15, 16, 18A-18H, and 19, within Block 99 in the Village of Port Chester. The Site is currently vacant, and the property boundaries are illustrated on Figure 2. The surrounding area consists of mixed-use commercial and residential properties.

1.4 Site History

Information regarding the historic use of the Site is derived from investigations and research previously conducted by JMS. The Site has historically been used for various commercial and industrial purposes. A description of these uses is listed below for each block and lot within the Site boundaries.

Block 99, Lots 18A-18G, Lot 16, eastern Lot 18H

Historic information, Sanborn fire insurance maps and deed information, indicate that by 1862, manufactured gas plant equipment such as condensers, meters, a retort, a tar well, and a gasholder were present at the Site. A second gasholder was built between 1890 and 1895. Several gas and light companies owned and may have operated the plant until it was dismantled in the 1895 -1902 time period.

After the MGP plant was dismantled, the Site was occupied by various industrial and commercial operations. Identified uses include stables, warehouse, storage, an iron works, a waste oil reclamation company, a dress factory, a machine shop, and a paper storage facility. A paper warehouse was formerly located on Lot 16, Lot 18G and the eastern portion of Lot 18H. Built between 1950 and 1990, the warehouse was destroyed by fire between 1990 and 1998.

Block 99, Lot 15

Based on a review of Sanborn fire insurance maps, the Lot 15 portion of the Site was vacant until 1890, then utilized as residential property from the late 1890's until after 1934. A warehouse structure was constructed between 1950 and 1990, and initially used as a cold storage facility and later as a waste paper and rag storage area. Most recently, the property was utilized as a mail distribution facility.

Block 99, Lot 19

Historic maps indicate that the southwestern portion of the Site was utilized as residence and a barbershop from prior to 1895 through roughly the 1920's. A retail gasoline station was present during the 1930's through at least 1950. The lot was most recently developed with a residential building.

1.5 Previous Investigation

1.5.1 Chronology

Several investigations have been performed at the Site by JMS and GZA-GeoEnvironmental, Inc. (GZA). Soil and groundwater analytical results tables included as attachments to this RAWP have been provided by JMS. DRESDNER ROBIN has not conducted an independent review of the laboratory data utilized to generate these tables. Following is a chronological summary of the significant site investigations and the results or recommendations of each:

- JMS completed various soil and groundwater investigations from November 1999 to October 2000. Test pits were excavated in the open area to the north of the site building where former MGP structures were suspected to be located. The majority of the borings and test pit work confirmed the presence of semi-volatile organic compounds (SVOCs) across the site in the interval of 5 to 7 feet bgs. The highest concentration of SVOCs was noted in the shallow depths on the western side of the Site within the black coal and ash layer. This was attributed to the fact that coal storage areas were formerly located there. However, recent spills from current operations also appeared to be a source of the elevated concentration of SVOCs. JMS soil analytical results are presented in Table 1.

- JMS installed one bedrock and four shallow groundwater monitoring wells during these investigations to determine groundwater flow direction, investigate groundwater quality, and depth to bedrock. The shallow groundwater direction was found to be generally towards the southwest. Minor impacts to shallow groundwater were noted during the sampling event along the western side of the Site. This was determined to be downgradient of the former MGP. Volatile organic compounds, such as benzene, toluene, ethylbenzene, and xylene (BTEX), SVOCs, and lead were detected in concentrations that were at or below New York State water quality standards in the remaining site wells. Bedrock was encountered at 18 feet bgs and no impacts were noted in the bedrock well (MW-18D). An off-site well (MW-10), located side gradient to the Site and on a western adjacent property, was also monitored and sampled. No impacts were noted in the well. JMS groundwater analytical results are provided in Table 2.

- Based on the results of the JMS investigation, the Village commenced negotiations with Consolidated Edison, Inc. (Con Ed) who purchased the property from the company that formerly operated the MGP. Con Ed retained GZA to conduct further investigations in the suspected location of former MGP structures. The areas of investigation included the retort, purifier, and meter room, the former MGP gasholders, the tar well, and downgradient of the Site. VOCs (BTEX), SVOCs, metals (arsenic, cadmium, copper, lead, nickel, and zinc), and cyanide were detected in soil across the Site in varying concentrations. The analytical results for the soil sampling performed by GZA are included as Table 3. Generally, the findings of the GZA investigation were similar to that of previous work performed by JMS. GZA indicated that soils below 12 feet bgs were generally considered to be native with minor contamination limited to the primary MGP areas. Further, GZA noted that the boring logs suggested that the MGP facility structure foundations may remain beneath the site at 12 to 14 feet bgs.

- GZA also installed four shallow groundwater monitoring wells during this investigation to confirm groundwater flow direction and further investigate groundwater quality. The shallow groundwater direction was found to be generally towards the southwest. Minor impacts to shallow groundwater were noted from the sampling event along the western side of the site. This was determined to be downgradient of the former MGP. Volatile organic compounds such as benzene, toluene, ethylbenzene, and xylene (BTEX), and SVOCs were detected in concentrations that were at or below New York State water quality standards in the downgradient property boundary wells.

1.5.2 Topography, Geology, and Hydrogeology

The Site topography is relatively flat. Surface elevations generally increase slightly to the east. According to the USGS topographic maps of Mamaroneck and Glenville NY quadrants, the Site is approximately 10 feet above mean sea level (Figure 1).

The natural unconsolidated surficial soils in southeastern New York, including the Byram River Basin, are comprised mostly of glacial till. Information obtained from the *Surficial Geology Map of New York (Lower Hudson)* indicates that this unit is generally poorly sorted and composed of various types of soil ranging from silt-clay to boulder-clay and gravely sands in areas underlain by gneiss, schist, or sandstone. The glacial till unit generally ranges from nonexistent to a depth of up to 150 feet. The subsurface geology of the southern extent of the Byram River Basin is primarily the Harrison Gneiss, Hartand Formation, and the Manhattan Formation of the Ordovician Period.

The majority of the Site area is blanketed by a layer of historic fill material, which was placed in various stages in the late 1800's to early 1900's. The fill is composed of various types of soil, rock, and concrete materials with varying percentages of coal, ash, glass, bricks, and other miscellaneous debris. The fill covers the Site to an average depth of approximately 4 to 6 feet below grade surface (bgs) in most areas but has been identified as deep as 8 feet bgs. The fill is underlain by natural silt and sands grading to weathered bedrock, which was encountered at depths of approximately 12 to 20 feet bgs. Layers of meadow mat (organic material) associated with the former river/swamp have been identified in the northwestern portion of the Site. A silty organic layer is present on top of the clayey meadow mat layer. Beneath the organic material, fine to course sand was encountered.

The Byram River is located approximately 1,000 feet east of the Site. Significant tidal effects influence the groundwater elevation and direction in the area of the Byram River. The area of Don Bosco Place was formerly the location of a stream and a low lying swampy area draining northward to the cove. According to information obtained from historic maps, this swampy area was filled prior to development in the 1800's.

The groundwater beneath the Site generally occurs within the sandy material at approximately 12 feet bgs. This depth coincides roughly with the top of fractured weathered bedrock underlying the Site. Significant volumes of groundwater are encountered within this zone due to the hydraulic connection to the Byram River. Limited tidal effects are seen in the westernmost portion of the Site and along Purdy Avenue. The groundwater in this area is not used for potable water supply due to the brackish nature of the groundwater caused by proximity to the tidal Byram River.

Based on surface elevations and site-specific groundwater data, the shallow groundwater in the area flows to the southwest, toward the low lying area of Don Bosco Place. Elevated groundwater levels were identified within, and immediately adjacent to, the former MGP structures located beneath the Site.

1.5.3 Nature and Extent of Contamination

The investigations completed by JMS on behalf of the Village of Port Chester and GZA on behalf of Consolidated Edison have effectively delineated the contamination present at the Site. The results confirm that the Site has been affected by over 150 years of successive industrial operations. Soil investigations confirm that contamination is present within the fill layer which is located across the Site at a depth of five to seven feet bgs. Contamination is largely confined to subsurface soils in and immediately surrounding the major MGP structures. Localized minor groundwater contamination was identified in the vicinity of significantly impacted soils. The primary contaminants of concern on the Site are SVOCs with some minor metal and VOCs contamination also detected. There was no coal tar or coal tar residue identified in the JMS or GZA borings. Small coal tar globules (black and amber) were encountered during test pit investigations of the MGP structures.

The presence of SVOCs is consistent with the history of the Site; specifically, the operation of a small MGP facility from 1861 until some time prior to 1902. More recent operations involving coal storage, iron works, garment manufacturing, and a US Mail truck maintenance and distribution facility with poor housekeeping practices are potential contributors to surficial contamination at the Site.

Site borings confirm the presence of bricks, glass, coal fragments, and wood present in the shallow soils (5 to 7 feet bgs) particularly on the western portion of the Site. Moderate SVOC with some VOC contamination is indicated within this zone across the entire Site. Deeper borings in the 7 to 12 foot depth range show less fill-related contamination but more SVOC contamination which appears to be located within the suspected MGP structure footprint. Soils deeper than twelve feet are generally native material with minor SVOC contamination limited to the primary MGP structure areas. The only exception appears to be the location of soil boring 85-10. SVOC contamination was identified at all depths within this boring. Soil boring 85-10 is located within the proposed excavation area as shown in Appendix A, Excavation Plan. The soil investigations confirm that soils have been affected by previous Site operations. The impact of the former MGP facility extends to a depth of approximately 12 feet bgs, but does not appear to have affected groundwater.

The groundwater data indicates the presence of minor contaminants along the western side of the Site in the downgradient direction from the former MGP facility. No SVOC contamination was identified in the bedrock well, which is located downgradient of the former MGP structures.

Trichloroethene (TCE) was identified in several soil gas samples collected along the eastern Site boundary. No soil or groundwater sources of TCE were identified at the Site.

1.5.4 Subsurface Structures

Subsurface structures associated with the former MGP facility remain at the Site. Although some of the soil boring installations discussed in Section 1.5.1 were located in the vicinity of these structures, the MGP structures were not field-located and uncovered in the investigations conducted through February 2001.

2.0 CONTEMPLATED USE

The contemplated use of the Site is Restricted Commercial. Engineering and institutional controls will be applied at the Site, and are discussed in detail in the following sections. The Site, as part of the Marina Urban Redevelopment Zone, is zoned for retail and/or commercial business. The proposed Site reuse will be a retail operation located in a two story, 34,000 square foot, slab on grade commercial building.

3.0 SUMMARY OF REMEDY

Based on the Site characterization results, soil and fill material are the media of concern for the Site. The constituents of potential concern within soil consist primarily of polyaromatic hydrocarbons (PAHs) resulting from petroleum releases and MGP related contaminants (coal tar) at the Site. Results of groundwater sampling indicate that constituents within the soil/fill matrix have not significantly impacted groundwater quality. Although SVOCs were historically detected in groundwater, it is likely that detected concentrations are localized and reflect constituents present in the soil/fill in those areas. Furthermore, future use of groundwater at the Site is unlikely due to its brackish nature and the fact that public water is available for the Site. The remedy consists of the following components:

- Pre-remedial investigation / mapping of MGP Plant Structures.
- Submission of remedial design documents by the contractor or their engineer to NYSDEC for review and approval. NYSDEC requires a minimum of 14 days to review the remedial design documents. These documents include, but are not limited to the site management plan, the erosion plan, dust control measures, waste management plan, decontamination plan, and the dewatering plan.
- Site preparation.
- Site excavation to a depth of 4 to 6 feet bgs of an approximately 10,000 square foot area inclusive of soil hotspots, stained or NAPL-saturated materials, coal tar, and process piping, if found. This area represents approximately 2,300 cubic yards of material.
- Removal of former MGP structure contents for off-site disposal.
- Investigation of former MGP structure foundations and removal of structures, if necessary.
- Backfill of excavated areas with recycled aggregate resulting from demolition activities related to the Port Chester Marina Redevelopment Project.
- Cover system.
- Soil/fill management.
- Institutional controls.
- Monitoring and maintenance.

The remedial action objectives (RAOs) for the Site are based primarily on the short and long term human health and environmental risks posed by the Site, and the contemplated commercial use of the property. The primary RAO is to minimize potential exposure to subsurface soil/fill material and groundwater, and will be achieved through the removal of a large portion of the Site to a depth of approximately 4 to 6 feet bgs. All soil/debris resulting from this operation will be disposed off-site. In addition, the contents of the two gasholder structures will be completely removed and this material will also be disposed off-site. This effort will require the removal of the upper portion of the structure walls (top 4 to 6 feet bgs). The structures will then be inspected, including the soil located beneath the gasholder foundations, and if NAPL-saturated soil or flowing coal tar is observed, the structures will be completely removed and any impacted material removed for off-site disposal. MGP process piping found to contain flowing coal tar will be traced to connection points or the property boundary, drained of product, excavated and removed. The lower portion of the gasholder foundations will be closed in place if NAPL-saturated soil and flowing coal tar are not observed during the inspection.

3.1 Pre-Remedial Site Investigation

The investigations were primarily completed utilizing test pits, supported by soil borings, soil gas sampling, groundwater sampling, and air monitoring. The investigation included the excavation of a series of test pits in areas depicted on historic maps of the Site as suspected MGP structure locations. Test pit locations are depicted on Figure 3. Investigations of other MGP sites suggest that MGP residuals are typically found in and around the tar well and gasholder areas of these sites. Soil boring installation, soil and soil gas sampling, was conducted along the Site perimeter to investigate any potential off site impacts. Soil boring and soil gas sampling locations are depicted on Figure 4.

The test pits provided a flexible approach for the location of the former MGP structures and any residual contamination characterization. Sampling was completed to identify areas of heavily contaminated soil.

Test pits were installed by a tracked excavator. Dry overburden materials were stockpiled adjacent to the test pit area, and saturated material was placed on plastic sheeting adjacent to the test pit area. The area was graded to allow for the stockpile runoff to flow back into the test pit. Soil and debris excavated from the test pits were characterized and screened with a calibrated photoionization detector (PID). Test pit logs were compiled and included depth to water, soil characteristics, PID data, and the presence of odors and staining. Test pits were backfilled with the excavated material observed to be free of NAPL or staining.

The test pit investigation located remaining portions of the two gasholders and the tar well. The location of the structures is illustrated on Figure 2. A detailed discussion of the pre-remedial investigations is included in the JMS SIR submitted concurrently with this report.

3.1.1 Subsurface MGP Structures

Remnants of the two gasholder structures were encountered approximately 2 to 3 feet below the original grade of the Site. The outer walls of brick construction were approximately two (2) feet thick. The gasholders measured approximately 50 feet and 40 feet in diameter, respectively. The gasholder bottoms were located by excavation inside and along the outside walls in several locations, and the interior bottom was determined to be approximately 12 feet bgs. The bottom of the structures appeared to bear on sand just above the bedrock. The depth from grade to the bottom of the outside of the gasholder was approximately 14 feet bgs. The thickness of the base of the structure inferred from the interior and exterior measurements is approximately 2 feet. The gasholder walls visible during the excavation activities were in good condition. Due to shallow groundwater conditions, the bottom of these structures could not be viewed or inspected.

The base of the large gasholder rises in the center. This "dimple" was not identified in the small gasholder. This finding is consistent with historical reports for newer gasholders.

Groundwater was encountered outside of the gasholders at approximately 12 feet bgs and inside at approximately 3 to 4 feet below the top of the structure wall (5 to 6 feet bgs). Utilizing trash pumps, water was withdrawn from test pits within the gasholders. Water levels dropped several feet and when left overnight recovered only several inches.

The results of the test pit observations and pilot dewatering exercise suggest that the gasholders are reasonably intact and potentially hydraulically separate. This is consistent with groundwater elevation measurements from the Site monitoring wells where the elevation in monitoring well MW-16 (which was installed within the large gasholder) was consistently 1.5 to 2.0 feet higher than the other site wells during previous groundwater elevation measurement events.

Tar well wall remnants were encountered approximately 2 to 3 feet bgs. The outer wall constructed of brick approximately four (4) inches thick (the width of one brick) was 12 feet in diameter. The depth to the bottom of the tar well was determined by excavation along the outside wall in one location. The depth was approximately 12 feet bgs. Pumice-like stone was encountered within the excavation adjacent to the base of the outer tar well wall. It was not possible to determine the interior depth and bottom condition of the structure by test pit installation without compromising the wall integrity. The outside of the tar well wall that was visible during the excavation activities appeared in good condition.

Significant excavation of the area surrounding the meter room revealed no piping or structures that could be identified as meter room remnants. A concrete structure with three chambers was encountered at approximately 2 feet bgs. Because of the shallow depth of the structure, it is not believed to be related to the former MGP operations. No piping was identified associated with the structure. The solid concrete floor was in good condition and no evidence of significant cracks or staining was visible. Test pits adjacent to each side of the structure revealed surficial silty sandy soil that exhibited no odors, staining, or PID readings. The structure was not removed.

3.1.2 MGP Area Sampling Program

Gasholders (Interior)

Two test pits were excavated within each gasholder. TP-207 and TP-208 were located in the small gasholder and TP-206 and TP-210 in the large gasholder. The brick gasholder walls were found in good condition. The upper 2 to 3 feet of soil within the gasholders consisted of the silty sandy fill mixed with ash, glass, brick, and metal debris. The fill exhibited slight odors and minor staining. Portions of the debris appeared to be demolition from the upper portion of the gasholders. Temporary stockpiles of excavated test pit material were screened with a PID and no significantly elevated readings were recorded. PID readings ranged from 0.0 to 5.0 parts per million (ppm).

The water level in the gasholders was approximately 5 to 6 feet bgs. Immediately outside the gasholders, groundwater was encountered at depths of approximately 10 to 12 feet bgs or 5 to 6 feet below the water level within each gasholder. The majority of the material within the gasholders was saturated. Some of the silty soil and ash removed from the lower portions of the gasholders exhibited a slight sheen. Occasional globules of black and amber colored tar were identified. The soil exhibited PID readings from 0.0 to 2.1 ppm.

Due to the type of materials identified within the gasholders, composite waste classification samples WC-207, WC-208, and WC-210 were collected and analyzed for disposal purposes.

Water within the gasholders contained suspended silt and ash as a result of the test pit disturbance; some areas exhibited surface sheen. Water was pumped from multiple test pits to an on-site storage tank. Water levels dropped significantly in the gasholders, from 3.0 to 7.5 feet below the top of the gasholder, as a result of the pumping. When left overnight, water levels rose to 6.5 feet below the top of the gasholder, a result of drainage from saturated materials within the gasholder. The water from the storage tank was sampled and transported to the laboratory for analysis.

Gasholders (Exterior)

Test pit TP-209 was excavated outside the south wall of the small gasholder and TP-211 was excavated outside the east wall of the large gasholder. TP-212 was excavated between the gasholders, extending from the south wall of the large gasholder to the northwest wall of the small gasholder. Soils from 0 to 10 feet bgs consisted of light brown silt (fill) with little fine to medium sand and little clay. Minimal staining, odors, or PID readings (<2 ppm) were recorded. At approximately 10-12 feet below grade, black stained soil exhibiting moderate odors and minimal PID (1.2-2.0 ppm) readings was identified around the outer wall of the gasholders. The zone extended approximately 2 feet outward from the gasholder walls. Soil samples from this interval were collected from several locations, RI-4 at 10 to 11 feet bgs from TP-211, RI-6A and RI-6B at 10 to 13 feet bgs from TP-212, and RI-2A and RI-2B at 10 to 12 feet bgs from test pit TP-209. Additional delineation samples, located approximately 6 feet outward from the gasholder walls, were collected from TP-211 and TP-209 and designated RI-5 and RI-3, respectively. Waste class samples WC-209 and WC-212 were collected from the 10 to12 foot bgs zone within 1 foot of the small gasholder and large gasholder walls, respectively.

Water levels outside the gasholders were consistently found at approximately 10 to 12 feet bgs. Groundwater entering the excavation from the bottom appeared to have no sheen, however, when in contact with the black silty clay material around the outer wall of the gasholders, a coal tar sheen was visible. This indicates that the black silty clay material may have been moderately impacted by coal tar. Bedrock was identified at approximately 14 feet bgs in these areas.

Tar Well Area

The tar well walls were uncovered at approximately 2.5 feet bgs. The brick wall was in good condition. Test pit TP-213 was excavated outside the east wall and extended southward. The upper 4 feet to 8 feet bgs adjacent to the tar well consisted of sandy silt with some clay and ash. At approximately 5 feet bgs, water was encountered discharging from the tar well structure. At approximately 8 to 11 feet bgs, black silty clay was identified extending downward and approximately 2 to 3 feet outward (the zone corresponded to approximately the lower 4 feet of the outer tar well wall).

Perched groundwater was encountered with TP-213 at approximately 8 feet bgs from the south and east was clear with no PID readings or sheen. Groundwater was identified at 11 feet bgs. Slightly below the water level, a "pumice-like" stone material was encountered. Released from beneath the tar well, the pumice floated to the water surface. Groundwater in contact with the stained soils adjacent to the tar well wall exhibited sheen. Occasional globules of coal tar were identified on the groundwater surface following the release of the "pumice" from beneath the tar well. A sample of stained soil (RI-7) was collected at 10 to 11 feet bgs. Sample RI-8 was collected from the eastern wall of TP-213.

The interior of the tar well was excavated approximately 3 to 4 feet bgs which corresponded to approximately 2 feet below the top of the existing tar well wall. The material encountered within the tar well appeared to be largely ash. Because of the small interior size (12 feet in diameter) the tar well could not be further excavated without compromising the structure. A delineation sample (RI-9) and a waste classification sample (WC-213) were collected of the ash material. Based on observations in TP-213, the water level in the tar well was approximately 5 feet bgs or 3 feet below the top of the structure walls.

Meter Room Area

Five shallow test pits, TP-201 through TP-205 were excavated in the southeast corner of the Site in the location indicated by the historic fire insurance maps to be the former meter room. No foundation or other evidence of the meter room was identified. The encountered soil was largely light brown silty sand with little fine to medium sand. No significant odors, staining, or elevated PID readings were recorded. The test pits were excavated to 7 to 11 feet bgs. TP-202 uncovered a three chambered concrete structure. The soil beneath this structure, as viewed from adjacent test pits 201, 203, and 205 was similar to the adjacent fill soil. No significant odors, staining, or elevated PID readings were recorded. Sewer piping from the most recent site structure was identified in TP-203; no other piping was encountered.

Debris including compressed air cylinders, wood, rubber fittings, and electrical conduit were encountered in the shallow soils of TP-205. The western end of TP-205 was extended to 9 to 10 feet bgs to delineate contamination previously identified in former boring locations 85-2 and 85-3. At 5 feet bgs, a perched groundwater conducting layer of schist was encountered. The soil above this rock layer consisted of the brown silty soil identified with the upper zone throughout the Site. At approximately 8 feet bgs, black silty clay was encountered that contained a black coal tar-like substance. The material exhibited a moderate odor however, PID readings were not significantly elevated, ranging from 0.0 to 1.3 ppm. A slight to moderate sheen was evident within the test pit groundwater after this zone was disturbed. The material was encountered on the southern edge of the test pit in the location designated RI-1. At the corresponding location on the north wall of TP-205, (approximately 4 to 5 feet north of RI-1), black stained soil was not encountered. No samples were collected from the meter room area as this area will be excavated and removed as part of the remedial action.

Lot 19

This area is located west of the former MGP structure and was formerly occupied by a gasoline service station. Previous investigations did not identify significant contamination in this area relating to the former operation of the service station. Two test pits, TP-214 and TP-215, were excavated on this lot to evaluate potential migration of contamination from the MGP site and to confirm the results of samples SB-1 through SB-6, previously collected from this property.

Similar soil was encountered in both test pits. The upper soil consisted of light brown sandy silt to a depth of approximately 4.5 feet bgs. Orange silty clay grading to orange fine to medium sand was encountered from 4.5 to 9.0 feet bgs. The test pits were excavated to 9 to 10 feet bgs where groundwater was encountered. No staining, odors, or elevated PID readings were encountered. No samples were collected from these test pits.

Lot 15

This area is located north of the former MGP site and was formerly occupied by a warehouse and mail distribution facility. Five (5) test pits, TP-216 through TP-220, were excavated on this lot to evaluate the potential for migration of contamination from the MGP site, and to determine if contamination was present as a result of former occupants. A 550 gallon heating oil UST was removed from the northwestern corner of the lot. The tank closure is discussed in Section 3.1.6. No releases were evident from the UST and the excavation was extended to become TP-220.

TP-216 was excavated immediately adjacent to the footing of the former Site building located immediately north of the large gasholder. The footing extended to 6 feet bgs. Immediately beneath the footing on the south side of the excavation, a 0.5 to 1.0 foot zone of gray stained silty sand was encountered. PID readings from this gray interval were 2.0 ppm. The test pit was extended through orange brown silty sand to approximately 12 feet bgs where weathered bedrock and groundwater was encountered. No other elevated PID readings, staining or odors were identified. Sample RI-10 was collected within the stained interval at 6.5 feet bgs and sample RI-11 was collected from the orange brown sandy interval immediately below sample RI-10 (approximately 8.0 feet bgs).

TP-217 was excavated in the northeast corner of the Site. The upper 4 to 5 feet bgs consisted of the brown sandy silt consistent with the majority of the Site, overlying native orange silt and sand. The bottom of the excavation terminated at approximately 9 feet bgs. No groundwater was encountered. Sample RI-12 was collected at 9 feet bgs from TP-217.

TP-218 was excavated beneath the western portion of the recently demolished site building. The upper soil, from 0 to 6 feet bgs, consisted of light brown sandy silt (fill) consistent with the site fill material grading to silty sand with some clay and gravel to approximately 8 feet bgs. Beneath the fill material, a one-foot thick layer of silty clay containing some organic material was present from approximately 8 to 9 feet bgs. This organic material is consistent with having been at the edge of the river/swamp area prior to filling in the late 1880's. Below the layer of organic material, orange fine to coarse sand was encountered. No staining or elevated PID readings were recorded. A sample of the orange sand, RI-13, was collected from the 9 to 10 foot bgs interval in TP-218.

TP-219 was excavated beneath the western portion of the recently demolished site building. Upper soil, from 0 to 6 feet bgs, consisted of light brown sandy silt (fill) consistent with the site fill material. At 2.5 feet bgs, a one foot thick concrete slab was encountered. The slab was in good condition and exhibited no staining. A sample, RI-14, was collected from the 4 to 5 foot bgs interval in TP-219, which consisted of a significant percentage of ashy material. Beneath the fill material, a silty sand interval (6 to 7 feet bgs) was present above a one-foot thick layer of clayey soil with organic material and roots (7 to 8 feet bgs). This material is consistent with having been at the edge of the river/swamp area prior to filling in the late 1880's. A sample of the silty sand, RI-15, was collected from the 6 to 7 foot bgs interval in TP-219. No staining or elevated PID readings were recorded.

TP-220 was completed as an extension of the 70 Don Bosco UST excavation. Upper soil, from grade to approximately 8 feet bgs, consisted of light brown sandy and silt (fill) consistent with the site fill material. Three (3) soil samples (70 DB UST-1 through 70 DB UST-3) were collected along the base of the excavation at the centerline of the former UST location (approximately 7.5 to 8.0 feet bgs). From approximately 8.5 to 11 feet bgs, black silt with a significant percentage of debris was encountered. No sheen or petroleum odors were identified. The material is consistent with this area having been at the edge of the river/swamp area. Sample TP-220 was collected from this interval. Beneath the silt layer, a 2 foot thick layer of clayey soil with organic material and roots was present from 11 to 13 feet bgs and grey brown sand was identified below the clay layer.

3.1.3 MGP Area Sampling Analytical Results

Test pit soil samples were analyzed for VOC, SVOC, and Priority Pollutant metals. Seventeen soil samples were collected from the test pits excavated during the 2003 pre-remedial investigation activities. These soil samples were collected and analyzed to characterize and delineate potential soil contamination related to former MGP operations.

Benzene was detected at 0.076 ppm in sample RI-2B, collected from boring RI-2 at 11 to 12 feet bgs. This sample was collected from the interval of stained soil adjacent to the southern outside wall of the small gasholder. Trichloroethene (TCE) was not identified in any soil samples.

SVOC compounds were identified at elevated concentrations in RI-2A and RI-2B, RI-4, RI-7, and RI-9; samples that were collected from intervals of stained soil adjacent to the outer wall of MGP structures or inside the tar well. Corresponding delineation samples collected from 4 to 6 feet horizontally outside the stained soil interval, RI-3, RI-5, and RI-8, reported no detectable SVOC concentrations. Total SVOC concentrations ranged from an estimated 0.5 ppm to an estimated 500 ppm.

Several metals including arsenic, cadmium, copper, lead, zinc, and mercury were identified in sample RI-9. The matrix of sample RI-9 represented the ash material inside the tar well. This sample was additionally analyzed for TCLP metals and the results indicated this material was nonhazardous for disposal. Mercury was identified in sample RI-14, which was collected from an area north of the large gasholder with a significant percentage of ash material. The metals concentrations were consistent with concentrations identified during the previous investigations completed at the Site.

Composite waste classification samples were collected from several test pits (TP-207, TP-208, TP-209, TP-210, TP-212, and TP-213). Analytical results were all below hazardous concentrations with the exception of lead in sample WC-210, which was collected from within the large gasholder. Two additional composite samples were collected from within the large gasholder, BGH-1 and BGH-2. These samples were analyzed for TCLP metals, and lead concentrations were below hazardous levels in both samples. Tables summarizing the waste classification sample results and the soil sample results are included as Tables 3 and 4, respectively.

A groundwater grab sample was collected from test pit TP-220 from the track hoe bucket. The sample, TP-220-GW, was analyzed for VOC and SVOC compounds. No compounds were detected above New York State Ambient Water Quality Standards and Guidance Values. Pre-remedial groundwater analytical results are presented as Table 5.

3.1.4 Perimeter Soil Boring Program

In June 2003, additional soil borings were advanced around the perimeter of the Site to assess whether contamination was migrating off site and to provide analytical data to supplement the soil gas survey (Section 3.2). Several soil borings corresponded with soil gas sampling locations to provide supporting analytical data from both sampling methods. Nine (9) soil samples were collected from twelve (12) soil boring locations.

Two borings were advanced in the vicinity of soil gas sample SG-1 and SG-1R, and are identified as RI-B1 and SG-1RB. Boring RI-B3 was located east of the sample locations 85-2 and 85-3, where significant SVOC concentrations had been previously identified. Elevated PID readings and a stained interval were identified in boring RI-B3, adjacent to soil gas sample SG-3 and SG-3R locations. Sample RI-B3A was collected from the 8 to 10 foot bgs interval, the same depth as the impacted zone identified at previous boring locations 85-2 and 85-3. A vertical delineation sample, RI-B3B was collected from the 11 to 12 foot bgs interval.

Site lithology exhibited in the soil borings was consistent with the test pit results. The upper 4 to 6 feet bgs across the Site consisted largely of sandy silt which exhibited little or no staining, odors, or elevated PID readings. Below the fill, the native soils consisted generally of silty clay underlain by largely sand and silty sands below 8 feet bgs.

Soil samples collected from the perimeter boring locations were analyzed for VOC, SVOC, and Priority Pollutant metals. Little to no VOC concentrations were detected in the soil boring samples. SVOC concentrations were identified in concentrations ranged from 1.07 ppm to 206.7 ppm. No elevated metal concentrations were identified with the exception of mercury in sample SG-9B collected from an interval consisting of silty sand fill with significant ash content. Table 4 includes a summary of the pre-remedial soil sampling analytical results.

3.1.5 85 Purdy Avenue UST Investigation

A 1,000 gallon unregulated heating oil UST was located beneath the sidewalk on the southeast corner of the Site adjacent to Purdy Avenue. The UST location is illustrated on Figure 3. A sample of the residual product encountered within the UST was collected and a "fingerprint" analysis identified the contents as weathered No. 2 or No. 4 heating oil.

The UST was emptied of residual oil, sludge, and water, and the shell was removed from the ground. The tank shell was examined and several large corrosion holes were noted. Impacted soil was encountered in the excavation beneath the UST location. The release was reported to NYSDEC Regional Spill Hotline as required. Spill No. 0304523 was assigned to the incident.

Soil encountered from the surface to approximately 6 feet bgs was primarily historic fill. The fill is composed of various types of soil, rock, and concrete materials with varying percentages of glass, bricks, and other miscellaneous debris similar to that encountered throughout the Port Chester redevelopment area.

Approximately 18 cubic yards of impacted soil was excavated and staged on Site within a covered, waterproof roll-off container. The excavated soil was characterized and disposed of off-site. A complete UST cleaning, remediation report was submitted to the NYSDEC Regional Spill Coordinator by JMS in January 2004. A copy of the 85 Purdy Avenue UST Closure Report/Remedial Action Report is included in the February 2004 Site Investigation Report.

Post excavation soil samples UST-1 through UST-4 were collected at approximately 8 to 9 feet below grade from each side wall of the final excavation, and were analyzed for SVOC and metals as instructed by the NYSDEC Project Manager. Following the collection of post-excavation soil samples, the excavation was backfilled with recycled aggregate resulting from demolition activities related to the Port Chester Marina Redevelopment Project.

Low concentrations of several SVOC compounds were detected in all post excavation soil samples. In sample UST-1, benzo(a)anthracene (0.31 ppm) and benzo(a)pyrene (0.17 ppm) were identified. The compounds remaining in the subsurface soil adjacent to the former UST location appear to be consistent with background PAH concentrations identified throughout the Port Chester Marina Redevelopment area. Analytical results are summarized in Table 6.

3.1.6 70 Don Bosco UST Investigation

A 550 gallon unregulated heating oil UST was located in the northwest corner of the Site, adjacent to Don Bosco Place. The UST location is illustrated on Figure 3. The top of the UST was situated approximately 3.5 feet bgs. A sample of the residual product encountered within the UST was sampled and a fingerprint identification analysis was inconclusive. Significant product weathering precluded a determination of whether the residual product was No. 2 or No. 4 heating oil. The NYSDEC Project Manager was present during the investigation of this UST.

Approximately 25 gallons of residual oil, sludge, and water were pumped from the UST and the shell was removed and examined. A single corrosion hole was noted. The soil immediately surrounding the UST was screened with a calibrated PID. No elevated PID readings or soil staining was identified in the UST excavation. Based on the lack of staining, PID readings and odors, no release was suspected from the UST.

Three (3) soil samples 70 DB UST-1 through 70 DB UST-3 were collected at the base of the excavation along the centerline of the UST location, at approximately 7.5 to 8.0 feet bgs. Sample 70 DB UST-1 was collected from the location immediately adjacent to the corrosion hole in the UST shell. Following the collection of post-excavation soil samples, the excavation was backfilled with recycled aggregate resulting from demolition activities related to the Port Chester Marina Redevelopment Project.

Soil samples were analyzed for full Target Compound List (TCL) VOC and SVOC as per the requirements listed in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation. The compounds remaining in the subsurface soil adjacent to the former UST location appear to be consistent with background PAH concentrations identified throughout the Port Chester Marina Redevelopment area. Analytical results are summarized in Table 6.

3.2 Soil Gas Sampling, Analysis, and Monitoring

Soil gas sampling was conducted at the Site in June 2003 and September 2003 to determine if subsurface contamination is a potential volatile emission source, to assess the potential risk of exposure to volatile emissions at adjacent properties, and to assess whether potential vapors from the former MGP could adversely affect the air quality within the enclosed space of the proposed Site building. Comments from New York State Department of Health (NYSDOH) and NYSDEC were incorporated into the soil gas sampling procedure. The soil gas testing was performed in conjunction with the perimeter soil boring program. Soil gas sampling activities were performed in accordance with the NYSDEC-approved Investigation Work Plans submitted for the Site.

Soil gas sampling was conducted through driven soil gas probes utilizing the Geoprobe® Post-Run Tubing System (PRT). At each test location the sampling device was driven to an approximate depth of five (5) feet bgs (actual depth driven was dependent on Site conditions). The probe was then retracted one (1) foot to create a void space between the 4 to 5 foot interval. All soil gas samples were collected at this depth with the exception of sample SG-6, which was collected at 3 to 4 feet bgs due to perched water encountered at the sample location.

Sample tubing (0.188 inch inner diameter Teflon) was inserted through the probe rod and attached to an adapter within the bottom probe rod utilizing the Geoprobe® PRT system. The surface and any space between the bore hole and probe rod was sealed off with bentonite and hydrated to prevent surface air from entering the system. Before purging, a properly calibrated PID was utilized to measure volatile organics by connecting the PID to the inserted Teflon tubing. Field measurements of temperature and weather conditions were also recorded at the time of sampling.

A vacuum pump was utilized to purge the standing air from the tubing and open soil interval prior to sample collection. The purge volume was adjusted depending on the depth of the boring and subsequent length of tubing. The internal volume of the 0.188 inch inner diameter tubing is 5.43 milliliters/foot (ml/ft), generally 8 feet of tubing was utilized for a 5 foot bore hole, therefore 43.44 ml/ft plus the volume of the one (1) foot void between 4 feet and 5 feet (240 ml) determined the purge volume. The purge volume for a 5 foot bore hole with 8 feet of tubing was approximately 283 ml. In general one to three volumes were purged from each soil gas sampling location.

Following purging of ambient air from the collection device, soil gas samples were collected by laboratory supplied Summa canisters and submitted to a certified laboratory. In accordance with the direction of NYSDOH, the Summa canister intake flow rate was calibrated by the laboratory and set at 150 ml/min for the June 2003 sampling event and at 100 ml/min for the September 2003 sampling event to ensure representative sample collection. The Summa canisters were opened for 40 minutes during the June event and 60 minutes during the September event in order to fill the six liter canisters.

Summa canisters were provided and certified by Severn Trent Laboratories, Inc., Knoxville, Tennessee (Certification number 10781), a NYSDOH ELAP certified lab. The canisters were certified clean by GC/MS analysis. All soil gas samples were analyzed for the Method TO-15 standard list of VOCs, including naphthalene. The following compounds were also targeted, if they could be identified as tentatively identified compounds (TICs): 2-methyl pentane, iso-pentane, 2,3-dimethylpentane, iso-octane, indene, and indane.

During the June/July 2003 site investigation, SG-2 was not successfully sampled due to a valve problem not detected in the field. The SG-2 location was re-sampled (designated SG-2R) during the investigation of the Lot 15 area. One ambient air blank was collected for each soil gas sampling event to measure the background air. To confirm contaminant concentrations detected during the June/July 2003 investigation, soil gas locations SG-1 and SG-3 were re-sampled (designated SG-1R and SG-3R). A duplicate sample was collected from SG-1R and analyzed at Accutest Laboratories, Inc., located in Dayton, New Jersey. The soil gas analytical results are presented in Table 7.

The soil gas analytical results from multiple sampling locations indicate the presence of dichlorodifluoromethane, methylene chloride, chloroform, benzene, carbon tetrachloride, trichloroethene, 1,2-dichloroethane, 1,1,2-trichloroethane, tetrachloroethene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, 1,4-dichlorobenzene, hexachlorobutadiene, and methyl tertiary butyl ether (MTBE) in concentrations that exceeded the Environmental Protection Agency (EPA) Region 3 Risk Based Criteria (RBC). These compounds are not considered to be associated with MGP-derived wastes, and there is potential that these compounds were generated by an off-site source.

Benzene was detected in excess of the RBC at concentrations ranging from not detected to 9.0 ug/m^3. The RBC for benzene is 0.23 ug/m^3. The RBC for TCE is 0.016 ug/m^3. TCE was detected in samples SG-1 and SG-3 at concentrations of 170 ug/m^3. Location SG-1 and SG-3 were resampled and designated SG-1R and SG-3R. The concentrations detected in samples SG-1R and SG-3R were significantly lower (0.83 ug/m^3 (estimated) and 50 ug/m^3, respectively) than the previous results, however still in excess of the RBC. TCE was not detected in the SG-1R duplicate sample. TCE was identified at lower concentrations in soil gas samples SG-4, SG-7, and SG-8. TCE was not detected in soil boring samples corresponding to the soil gas sampling locations. The analytical results are further discussed in the SIR Report prepared by JMS.

Future monitoring of soil gas concentrations in relation to the proposed Site redevelopment is discussed in Section 3.6 of this report.

3.3 Structure and Soil Removal

A remediation area encompassing the gasholder, meter room, and tar well limits has been determined through Site investigation and sampling activities. Appendix A, Excavation Plan, depicts the horizontal limits of the excavation area. Included with the Excavation Plan are Figures A.1 and A.2 which depict cross sections of the removal activity, specifically excavation in and around the two gasholders. Excavated soil, structures and debris will be direct loaded for off-site disposal. If necessary, temporary soil stockpiles will be placed on polyethylene sheeting with a minimum thickness of 6 mil. At the end of each workday, temporary soil stockpiles will be covered with 6 mil polyethylene sheeting. Areas of NAPL-saturated soil or flowing coal tar that are observed during the excavation process will be field delineated, excavated, and removed. Full detail of the excavation process will be presented in the remedial design document discussed in Section 5.14.

The excavation program will proceed in a series of steps:

1. DEWATERING: During the pre-remedial investigations, it was determined that water level within the gasholders is higher than the remaining areas of the Site. Wells will be installed within the two gasholders, and these structures will be dewatered into on-site storage tanks prior to excavation activities.
2. INITIAL EXCAVATIONS: Initially, the EA inclusive of the former MGP structures, gasholder contents and soil will be removed to a depth of approximately four (4) to six (6) feet below ground surface. This depth is intended to lower the grade proximate to the groundwater table while maintaining a stable equipment platform for access to deeper excavation areas (i.e. the bottom of the gasholders). This depth may vary based on field conditions.
3. GASHOLDER CONTENTS REMOVAL: Following the EA removal, the remaining interior contents of the two gasholders will be removed and the structural integrity of each foundation will be visually inspected.
4. FOUNDATION TEST PITS: Test pits will be installed through each gasholder base to determine the condition of the soil below (gasholder walls below the 4 to 6 foot level will be left in place as support for the test pit excavations). To the extent practical, soil from beneath the gasholders will be obtained from non-saturated conditions to provide a suitable sample for NYSDEC inspection. Test pit material and/or foundation structures that appear to be contaminated based on visual observations of NAPL-saturated soil or flowing coal tar will be excavated and removed. To the extent feasible, dry material will be removed for inspection using similar techniques to those employed during the Site Investigation.
5. CONTINGENT FOUNDATION REMOVAL: If NAPL-saturated soil or flowing coal tar is observed beneath the gasholder foundations, the impacted portions of the structures will be removed. If required by NYSDEC, sheeting will be installed to facilitate dewatering and removal of the impacted portions of the structures.
6. METER ROOM: The remaining portions of the meter room and tar well below six (6) feet will be excavated and removed. These structures will be excavated to a depth of approximately twelve (12) feet below ground surface, the anticipated depth of the groundwater interface.

7. CONTINGENT MISCELLANEOUS PIPE & SOIL: MGP process piping encountered during excavation activities will be traced to connection points or the property boundary. Pipes and any soil that appears to be contaminated based on visual observations of NAPL-contaminated soil or flowing coal tar will be excavated and removed. Product contained within pipes will be drained and collected prior to removal. Non-MGP related pipes encountered during excavation activities having a diameter greater than six (6) inches will be traced to connection points or the property boundary, excavated and removed. Where the removal of piping necessitates excavation beyond the EA boundary, the soil excavated beyond the boundary may be returned to its original location when it is observed to be free of NAPL or flowing coal tar at the direction of the NYSDEC project manager.
8. EXCAVATED SOIL REUSE: Soil generated from pipe removal outside of the excavation area depicted in Appendix A shall be returned to its original location if it is observed to be free of NAPL or flowing coal tar.
9. SHEETING: Driven or lagged sheeting may be required from the intersection of Purdy and Traverse Avenues along the EA boundary to the tar well to maintain structural integrity of these streets, the adjacent sidewalks, and the excavation sidewalls.
10. UST REMOVAL: The investigation and removal of a 1,000-gallon heating oil UST located at 85 Purdy Avenue was performed as part of the pre-remedial investigations. The removal of this UST and approximately 18 cubic yards of heating oil-impacted soil were previously discussed in Section 3.1.5 of this report.
11. "HOT SPOT" REMOVAL: Previous investigation indicated an area of elevated SVOC concentrations within a layer of solid asphalt-like material located 2.5 feet below grade in the vicinity of former sample locations O-11, O-12, O-13, and O-14. This area will be re-investigated as part of the remedial action. If the material is determined to be solid asphalt based on visual inspection, it will not be excavated and will remain on Site.
12. DOCUMENTATION SAMPLING: Upon completion of excavation activities, sixteen (16) soil samples will be collected and analyzed to document the conditions that remain at the Site. In addition, two (2) soil gas samples will be collected at depth following the removal of the top 4 to 6 feet of soil within the EA.

3.4 Site Restoration / Cover System

Following remedial excavation activities, site restoration will prepare the site for redevelopment in a sequence of discrete actions:

1. Backfill of the EA to pre-excavation elevation-recycled aggregate to be utilized
2. General site regrade to establish a uniform post-remedial surface elevation.
3. Elevation survey
4. Placement of a 2-foot approved fill sub-layer cap-recycled aggregate to be utilized
5. General site filling to meet final development contours
6. Placement of surface cap

Steps 1 through 4 will be completed in conjunction with the remedial excavation activities. Steps 5 and 6 will be executed in accordance with the final site redevelopment requirements. The use of recycled material by the Volunteer is performed at the sole discretion and risk of the Volunteer and with the acknowledgement that NYSDEC assumes no liability for future problems related to its use.

The proposed cover system has been designed to be protective of human health and the environment. The primary exposure pathway for contaminants at the Site (PAHs in soil and SVOCs in groundwater) is via direct contact. The proposed plan of covering the on-site soil/fill material will minimize the potential for direct contact with soil/fill and is therefore protective of human health and the environment. Results of groundwater sampling indicated that constituents present in the soil/fill material have not significantly impacted groundwater quality. Groundwater is not used at the Site and therefore no direct contact is anticipated except during invasive construction activities.

Following Site redevelopment paving and slabs will prevent exposure to the soil/fill and surface soil for future site workers/occupants and trespassers. Construction of buildings will be limited to slab-on grade structures; basements are prohibited. There do not appear to be significant wildlife resources at the former MGP site and impacts from development are expected to inhibit significant future use of the Site by these populations.

Subgrade material used to backfill excavations or placed to increase Site grade shall be recycled aggregate resulting from demolition activities related to the Port Chester Marina Redevelopment Project. If off-site material is required, the following criteria must be complied with:

- Off-site material must consist of approved soil compliant with NYSDEC TAGM 4046.

- Off-site borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.

- Off-site soils intended for use as site backfill cannot otherwise be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a).

- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.

- Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and cyanide. The soil will be acceptable for use as backfill after the analytical data is reviewed and approval from NYSDEC is granted.

It is expected that asphalt will be used in areas that will become roads, sidewalks, and parking lots. Asphalt will represent a cover in terms of remedial action, therefore a minimum cross-sectional thickness of 6 inches of material (asphalt and approved subbase material) is required for protection from exposure to the underlying soil/fill material. The cross sectional thickness of the asphalt and subbase material will be increased as required to support structural requirements of the areas use.

Concrete will be used for future slab-on-grade and foundation construction. Concrete may also be used instead of asphalt for roads, sidewalks, and parking lots. Where concrete will represent a cover in terms of remedial action, a minimum material thickness of 6 inches (concrete and approved subbase material) is required. Beneath slab-on-grade structures, a 20-mil high density polyethylene (HDPE) vapor barrier will be placed. In order to satisfy the manufacturer's requirements for the installation of the HDPE liner and the vapor collection system (Section 5.13), imported fill material may be required.

3.5 Institutional Controls

The contemplated commercial use of the Site will be controlled through Village zoning, land use and design guidelines, and deed restrictions. Deed restrictions that will prevent the use of groundwater and disturbance of the final cover system are a requirement of the Voluntary Cleanup Agreement (VCA). The use of the property will be restricted through provisions in the VCA, to which this RAWP will be attached as a reference.

The Volunteer will be responsible for the recording of an institutional control in form of an environmental easement. The easement will require that the property owner comply with the approved Site Management Plan, limit the use and development of the property to commercial or industrial uses only, restrict the use of groundwater as a source of potable or process water, and require the property owner to complete and submit to the NYSDEC an annual certification. The easement will be applicable to the entire Site and include a map showing the area of control, a description of controls, and the Property Owner Agreement enforceable by the State of New York to establish and maintain the environmental easement. The Property Owner Agreement will be of a recordable form pursuant to Real Property Law Section 291.

3.6 Monitoring and Maintenance

The aggregate cap will require no maintenance where left undisturbed. Activities that disturb the cap or require partial or full removal will be governed by the Deed Restriction and subject to the reporting and management procedures established therein. The property owner will be required to submit an annual certification report to NYSDEC documenting operations, monitoring and maintenance activities related to the Site engineering controls.

Redevelopment of the Site and the placement of structures or structural elements, through, within or above the cap will require the placement of a HDPE vapor barrier and vapor collection system beneath building foundation and lowest floor slab element(s). The HDPE system will be installed vapor tight with welded seams and the vapor collection system placed immediately below the vapor barrier within a bed of coarse aggregate stone. In order to ensure the effectiveness of these systems, installation will be performed in accordance with applicable manufacturer specifications. Following installation, precautions will be taken during building construction to avoid damage to this subsurface system. After placement of the vapor barrier and activation of the vapor collection system, the system will be monitored for effectiveness. Based on the monitoring results additional actions may be required, or monitoring may be determined to no longer be necessary.

Following completion of remedial activities and Site redevelopment, three (3) groundwater monitoring wells will be installed around the perimeter of the Site. The proposed locations of these monitoring wells are depicted on Figure 5. Groundwater quality will be monitored for a minimum of five years (5) in accordance with the Operation, Monitoring and Maintenance (OM&M) Work Plan, provided as Appendix B.

Maintenance of the remedy will be the responsibility of the property owner. Erosion of the soil cover system will be reduced by maintaining the asphalt, concrete, or vegetative cover. In order to reduce the disturbance of the cover system, berms or mounds composed of approved soil will be constructed in areas in which trees and shrubs will be planted. Cover materials, fencing, signs, and gates will be inspected annually and repaired as needed.

The main features of the OM&M Work Plan are:

- Inspection procedures.
- Evaluation of the final cover system (i.e., vegetative cover, roads, buildings, parking lots, etc.) for sloughing, cracks, settlement, erosion, distressed vegetation, damaged fencing, gates or signs.
- Monitoring of the soil vapor collection system.
- Groundwater monitoring.
- Inspection reporting.

The OM&M Work Plan will be updated to reflect existing Site conditions after the completion of construction activities. As part of the VCA, the institutional and engineering controls that comprise the executed environmental easement must be maintained. This OM&M Work Plan describes the conditions and procedures for maintaining the physical components of the completed voluntary cleanup, and as an appendix to this RAWP, it shall be an enforceable part of the VCA.

The Owner of the Site (or any portion thereof) should evaluate the criteria presented in this plan and recommend changes to NYSDEC, as appropriate, based on the actual post-closure conditions. At a minimum, this plan should be reviewed annually during the post-closure period and updated as necessary.

A Site Management Plan will be developed to address residual soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations. An environmental easement will be imposed that will (a) require compliance with the approved Site Management Plan, (b) limit the use and development of the property to commercial or industrial use only, (c) prohibit the use of groundwater, (d) require the property owner to complete and submit to the NYSDEC an annual certification. The property owner will provide an annual certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department, that certifies that the institutional controls and engineering controls put in place are unchanged from the previous certification, and that nothing has occurred that would impair the ability of the controls to protect public health or the environment or constitute a violation or failure to comply with the Site Management Plan.

4.0 ENGINEERING EVALUATION OF REMEDY

4.1 Engineering Evaluation of Remedy

Weathered MGP wastes generally consist of a wide spectrum of toxic metal and semi-volatile contaminants. The contaminant chemical characteristics make them relatively immobile in the environment. Extensive field investigations of the Site have identified soil contamination to be relatively localized to the former MGP operation units, no instances of extensive coal tar free product, and limited indications of groundwater impact.

Environmental exposure pathways to be evaluated for the MGP waste are ingestion, dermal absorption and inhalation. Exposure routes to be considered are potable groundwater use, soil ingestion, direct soil contact, vapor and particulate ingestion. Engineering alternatives to be considered are contaminant removal, conversion, encapsulation or control. The remedy to be employed at the Site involves removal and control technologies.

The previous Site investigations have identified the areas with the greatest concentration of contaminants with the potential to migrate. These areas will be largely removed to the groundwater interface. Previous groundwater investigation has not shown significant impact to groundwater from the former MGP production processes. The average depth to groundwater at the Site is approximately 12 feet below ground surface. There are no potable wells currently located at the Site or planned for the Site due to the brackish nature of the groundwater. Therefore, no contact with groundwater will occur with the contemplated Site use.

Direct soil contact, particulate and vapor inhalation will be controlled through the placement of the aggregate cap. Soil gas investigations have not identified an active movement of the coal gas related contaminants within the vapor phase. The addition of a HDPE liner and vapor collection system within the foundation of any future construction will provide an additional layer of control and ensure that contaminants do not concentrate within contained spaces. The HDPE liner and vapor collection system will be installed within at least two (2) feet of approved fill placed over the post-remedial surface elevation. In accordance with the VCA, the construction of basements is prohibited at the Site.

4.2 Protection of Human Health and the Environment

The remedial actions proposed for the Site are protective of human health and the environment. Previous investigations indicate that the existing impacts have remained localized to the Site. The proposed soil removal and engineering controls will eliminate contaminant source materials and provide an effective block/control upon each of the potential migratory pathways.

4.3 Compliance with Standards, Criteria, and Guidance

The proposed remedial action for this Site was developed in accordance with the following:

- NYSDEC Division of Environmental Remediation (DER) Voluntary Cleanup Program Guide (May 2002)
- NYSDEC DER-10 Draft Technical Guidance for Site Investigation and Remediation (December 2002)
- NYSDOH Generic Community Air Monitoring Plan (Appendix C)
- NYSDEC TAGM 4031 Fugitive dust suppression and particulate monitoring (Appendix D)
- NYSDEC TAGM 4046 Determination of Soil Cleanup Objectives and Cleanup Levels (Appendix E)

4.4 Short-term Effectiveness

Site investigation has not identified an imminent potential for contaminant release or migration. Initiation of the Site remedy will remove significant portions of those materials that are mobile, or may become mobile. Potential short term adverse impacts and risks to the community, Site workers, and environment during remedy implementation can be effectively minimized through proper Site and remedial program management. The primary hazard to these receptors is the generation of contaminated airborne particles (dust) or volatile organic compounds during excavation activities. Personnel in the immediate vicinity of the work area will be equipped with the appropriate personal protective equipment (PPE). Personal health and safety air monitoring performed in the work zone in accordance with the Health and Safety Plan provides protection for the Site workers, and perimeter air monitoring conducted during all ground intrusive activities provides protection for the surrounding community and environment. Air monitoring performed during previous Site investigations indicates that the migration of airborne contaminants off-site is not likely. Daily Air Quality Monitoring Reports for the test pit investigation are included as Appendix F.

Soil disturbance/excavation activities will be monitored for nuisance dust and odors in compliance with the NYSDOH Community Air Monitoring Plan (Appendix C). Nuisance odors shall be controlled through the application of a VOC vapor suppressant such as BioSolve or an approved equivalent. The application of nuisance odor control measures is further discussed in Section 5.8. Dust control measures shall be implemented by the contractor in order to limit the generation of airborne particulates from excavation activities. If the respirable dust levels exceed the air standards identified in the Health and Safety Plan at any time during remediation activities, dust control measures will be implemented as necessary and as required by the Health and Safety Officer (HSO) or NYSDEC. Detailed procedures for minimizing worker and public exposure to respirable particles will be conducted, including use of equipment for spraying soils with water to control dust or other appropriate effective procedures whenever they are requested by the HSO or NYSDEC including the placement of portable wind fences. Contaminated soil stockpiles will be placed on and covered with polyethylene sheeting daily. The contractor will be restricted from operating in very high winds.

Noise generated from heavy equipment may be considered an adverse impact to the surrounding community. In order to limit the duration of noise exposure while allowing the project to move forward, operation of heavy equipment will only be allowed between the hours of 7 AM and 5 PM, weekdays. The use of a ten (10) hour workday will minimize the total number of days required for material excavation and removal.

4.5 Long-term Effectiveness

The Site remedy will provide effective long-term control and management of the remaining contaminants. The engineering control provides a passive control methodology for each of the contaminant migration pathways of concern and requires no active administration or maintenance. Infiltration of rainwater or surface runoff will be further limited through the redevelopment of the property. The Deed Restriction will provide administrative notice and monitoring of activities that have the potential to disrupt the engineering controls.

4.6 Reduction of Toxicity, Mobility, or Volume

The Site remedy will reduce the volume of on-site contaminants through the excavation and removal of the former MGP structures and/or the contents. The excavation area represents the majority of MGP contamination previously identified at the Site. Toxicity is reduced by removal of areas that are potential "hot spots" that may constitute sources of contaminant exposure. Mobility of subsurface contamination is impeded through the placement of approved fill material compliant with NYSDEC TAGM 4046 and a HDPE liner and vapor collection system under the proposed Site building. These actions obstruct migration through either erosion or vaporization, and prevent contact with groundwater.

4.7 Implementability

Implementation of the proposed Site remedy is feasible within a short time period. Materials and equipment required for remedial activities are readily available, and a limited number of personnel would are required to perform excavation and removal activities. The limiting factors in commencing soil excavation and removal would be weather, off-site disposal capacity, the availability of transport vehicles and the time required to haul material to the disposal facility.

The Site remedy has been selected as an effective means of removing Site contamination without generating excessive remediation costs. The Site is situated relatively close to the Byram River, and groundwater is located approximately twelve (12) feet below ground surface. The gasholder foundations are located at this groundwater interface, and excavation of the gasholder foundations or material situated below these foundations necessitates costly dewatering operations. Excavating material below the water table accounts for a dramatic remedial cost increase of approximately sixty percent (60%). The removal of the gasholder foundations, while costly, may be required if NAPL or coal tar are observed. If conditions do not require removal, the gasholders will be closed in place. Therefore, the Site remedy has been designed to allow for the maximum protection of human health and the environment while allowing the contemplated use of the Site as a commercial retail facility.

5.0 REMEDY IMPLEMENTATION

5.1 Remedy Implementation

Implementation of the proposed Site remedy is discussed in the following sections and will be detailed further in the subsequent remedial design document.

5.2 Mobilization and Site Access

Mobilization will occur following the public comment period and subsequent approval of the RAWP by NYSDEC. Due to the small area of the Site, heavy equipment will be mobilized on an as-needed basis. Security issues require that sampling equipment, monitoring instruments, and hand and power tools will be removed from the Site at the end of each work day and returned the following morning.

Site access is under the control of JMS on behalf of the Village of Port Chester. Site security and access are further discussed in Section 5.4.

5.3 Site Preparation

Vegetation at the Site primarily consists of one large tree located near the intersection of Purdy Avenue and Don Bosco Place. This tree will be cut down and the stump removed to a depth of eighteen (18) inches bgs. Following vegetation removal, disturbed areas of the Site will be graded and compacted if necessary to allow for heavy vehicle traffic and placement of water holding tanks and roll-off containers. Grading of the Site surface will preclude the formation of standing water.

5.4 Site Security and Traffic Control Plan

Site access control and security will be provided by a six (6) foot high, chain link fence; locked when the Site is unattended. The fence will replace the existing fence, and be installed around the perimeter of the Site prior to the start of remediation activities. Due to the small size of the Site, no other security measures are judged to be necessary to control Site access. Site traffic will be coordinated by the contractor in accordance with the Port Chester Marina Redevelopment Project traffic control plan.

5.5 Soil Excavation Limits

The horizontal excavation limits are included in Appendix A, Excavation Plan. Vertical excavation limits vary within this area, but will extend to a minimum depth of six (6) feet below ground surface. Vertical excavation limits within former MGP structures will extend to a depth of approximately twelve (12) feet below ground surface, the anticipated depth of the groundwater interface. Figures A.1 and A.2, included in Appendix A, depict cross sections of the excavation plan for each of the gasholders.

5.6 Erosion and Sediment Control Plan

Soil and sediment erosion control will be established in accordance with local and State requirements. The control plan will address at minimum:

- Implementation of dust control during excavation and soil staging, backfilling and capping.
- Installation of silt fence at the Site perimeter.
- Installation of a gravel tracking pad at the Site exit.

Due to the small size of the Site and relatively flat topography, additional erosion and sediment control measures are not determined to be necessary. Erosion control facilities shall be installed prior to land disturbing activities, or as necessary to control erosion from land disturbing activities. Erosion controls shall be maintained in place until vegetation cover is established, construction is basically complete, and the approval of NYSDEC is obtained to remove these controls.

5.7 Equipment Decontamination Procedures

Heavy equipment operating on the Site will be properly decontaminated prior to leaving the Site, and whenever gross contamination is observed. Primary decontamination methods include power washing/steam cleaning vehicle tires and excavator buckets. Decontamination of personnel is discussed in Section 6.8 of this report, and decontamination of sampling equipment is discussed in Section 7.4.

5.8 Air Monitoring Plan

The NYSDOH Community Air Monitoring Plan (CAMP) requires continuous real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The monitoring is required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures.

The intent of the CAMP is to provide a measure of protection for the downwind community (i.e., off-Site receptors including residences and businesses and on-Site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The CAMP objective is to confirm that work activities do not transport contamination off-Site through the air.

The action levels specified in the Air Quality Monitoring Protocol (Appendix G) trigger increased monitoring, corrective actions to abate emissions, and/or work shutdown. This protocol was developed to comply with the requirements of the NYSDOH Generic CAMP.

Some people have a low tolerance threshold for coal tar odors even though they are not experiencing an adverse health risk. These nuisance odors may be unpleasant to Site workers and the surrounding community.

In order to minimize nuisance odors and complaints from the surrounding community, an adequate supply of VOC vapor suppressant and application equipment will be maintained at the Site during remediation. The VOC vapor suppressant shall be BioSolve, which is manufactured by the Westford Chemical Corporation of Westford, Massachusetts or approved equivalent. BioSolve is a biodegradable, water-based biosurfactant / bioremediation accelerant that emulsifies and encapsulates hydrocarbon VOC vapors. This substance is applied to soil through a spraying device, and will be used as necessary on the open excavation, soil stockpiles, material contained in the excavator bucket, and/or trucks removed excavated material from the Site. The Site Health and Safety Officer will be responsible for utilizing BioSolve based on prevailing field conditions and/or the following criteria:

- Public complaints
- NYSDEC or NYSDOH requests
- Site worker requests

In the event that the application of BioSolve or an approved equivalent is insufficient to control nuisance odors emanating from the Site, excavation work shall be halted and open excavations shall be backfilled or temporarily covered with 6 mil polyethylene sheeting. A temporary sprung-structure of sufficient size to cover the entire excavation area depicted in Appendix A will be constructed at the Site. Following installation of this structure, excavation and removal activities will resume in accordance with the procedures set forth in this RAWP.

5.9 Groundwater Management and Dewatering Plan

Prior to the start of remedial activities, JMS will install dewatering wells in the former MGP structures. The objective of these wells will be to dewater the gasholders prior to excavation. Dewatering of the gasholders will lower soil disposal costs and limit the amount of time and materials required to manage water in these structures during excavation. These dewatering wells will be installed to an approximate depth of twelve (12) feet below ground surface. The wells will be constructed of 4 inch diameter Polyvinyl Chloride (PVC) casing and screen material.

During the pilot gasholder dewatering exercise conducted in June 2003, approximately 15,000 gallons of groundwater was collected and stored in a holding tank on the Site. This water was sampled to verify that the water would meet the Westchester County Department of Environmental Facilities sanitary sewer discharge permit requirements. This water was representative of the water isolated within the gasholders. The water was collected as a grab sample and was not filtered prior to analysis.

The water in the holding tank was tested for the following parameters: Priority Pollutant (PP) Metals, barium, hexavalent chromium, cyanide, phenols, oil and grease, VOC, SVOC, pesticides, and PCBs. Ethylbenzene, the only targeted VOC detected, was identified at 2 ppb, below the 5 ppb standard. Three PAH compounds were identified at concentrations well below the NYSDEC water quality standards. This is consistent with data from the previous Site investigations. No pesticides or PCBs were detected. Lead was the only compound identified in the water from the interior of the gasholders, in excess of NY State Ambient Water Quality Standards or Guidance Values at 52.6 parts per billion (ppb).

On September 2, 2003, Robert Cea, Program Director of the Westchester County Department of Environmental Facilities issued a permit to the Village of Port Chester to discharge wastewater into the County sewer system. The permit is valid from September 2, 2003 to March 1, 2004. The permit limits the maximum discharge rate of wastewater to fifteen (15) gallons per minute, and provides limitations on permissible average daily concentrations of regulated pollutants entering the sewer system. An application to renew this permit has been submitted to the Westchester County Department of Environmental Facilities. When a new permit is issued, a copy will be forwarded to NYSDEC for inclusion in the project file. Water will not be discharged to the sewer system without a renewed permit.

Dewatering wells will be installed in Gasholder #1 and Gasholder #2. The bottom of these monitoring wells will be installed as close as possible to the bottom of the gasholder structures without penetrating the foundations. Following well installation and prior to remediation activities, each of the dewatering wells will be pumped into 20,000-gallon onsite storage tanks to dewater the MGP structures.

Effluent from dewatering operations will be staged in on-site storage tanks for testing and treatment evaluation. The tanks will be discharged either to the local sanitary system under permitted discharge or shipped by tank truck to a licensed disposal facility.

5.10 Waste Classification, Sampling, and Disposal

Soil to be removed from the Site will be disposed of at permitted off-site disposal facilities. Waste classification samples will be collected and analyzed according to the requirements of the receiving facility. Manifests will be completed for each load of soil. Licensed transporters will be used for removal. Documentation regarding transporters to be used and the off-site disposal facilities and their license and permit numbers will be provided to NYSDEC. It is expected the majority of the soil to be removed will be classified as non-hazardous for disposal purposes.

5.11 Documentation Sampling

Following completion of the soil and structure excavation and removal activities, soil samples will be collected and analyzed to provide documentation of compounds that remain in the soil after completion of the remedial action. Documentation soil sampling will be provided to NYSDEC and incorporated into the Site Deed Restrictions (Environmental Easement).

A total of sixteen (16) documentation soil samples are proposed. One (1) bottom sample and four (4) sidewall samples will be collected from each gasholder. One (1) bottom and one (1) sidewall sample will be collected from the tar well excavation, and one (1) bottom and three (3) sidewall samples will be collected from the meter room excavation. The sidewall soil samples will be collected from the six (6)-inch interval exhibiting the highest degree of contamination as determined by PID readings or visible staining. If no contamination is observed, the soil sample will be collected at a depth of 0 to 6 inches above the bottom of the excavation or 0 to 6 inches above the water table, whichever is appropriate. Documentation soil samples will be analyzed by a NYSDOH ELAP certified laboratory for Target Compound List Volatile Organic Compounds with a forward library search (TCL VOC+10), TCL Semivolatile Organic Compounds (including carcinogenic polyaromatic hydrocarbons) with a forward library search (TCL SVOC+15), and PP Metals including cyanide.

In addition to the soil sampling program, two (2) documentation soil gas samples will be collected and analyzed. Following removal of the top 4 to 6 feet of soil from within the EA, two (2) soil gas probes will be installed near the eastern portion of the Site. At each location, the sampling device will be driven to an approximate depth of eleven (11) feet below current grade surface (actual depth driven will be dependent on site conditions). The probe will then be retracted one (1) foot to create a void space between the 10 to 11 foot interval. Soil gas samples will be collected from each location and analyzed utilizing the same methods as the soil gas sampling program previously discussed in Section 3.2. If groundwater is encountered during the installation of the soil gas probes, the borehole will be abandoned and a soil gas sample will not be collected from that location. The proposed soil gas sampling locations are depicted on Figure 6.

A Data Usability Summary Report (DUSR) will then be developed for the documentation sampling analytical data and submitted to NYSDEC.

5.12 Site Restoration Requirements and Demobilization

Following remediation, equipment and materials will be properly decontaminated and removed from the Site. Following implementation of the remedy, excavated areas will be backfilled with recycled aggregate derived from demolition activities related to the Port Chester Marina Redevelopment Project. The Site will then be graded with two (2) feet of recycled aggregate, placed over the entire Site and compacted. The elevations of this layer will be measured by a New York State-licensed land surveyor, and then an additional two (2) feet of recycled aggregate will be placed over the surveyed layer. Final Site restoration will be effected through the construction of the slab-on grade commercial retail structure. Construction of basements at the Site is prohibited by the environmental easement noted in the VCA.

5.13 Installation of Vapor Barrier/Vapor Collection System

Prior to construction of the future Site building, a vapor barrier and vapor collection system will be installed within the footprint of this building. The vapor collection system consists of six (6) inch diameter perforated HDPE pipe. The pipe will be installed within a bedding material with suitable permeability to allow for gas exchange and structural stability. The pipe system will include a perimeter line installed along the building foundation and laterals installed beneath the lowest floor slab spaced approximately thirty (30) feet apart. The collection system will vent to a vertical standpipe installed at opposite ends of the building. The standpipe vents will serve as monitoring points to record gas concentrations. The vapor collection system will be activated upon installation and monitored, sampled, and documented in accordance with the Operation, Monitoring and Maintenance Work Plan (Appendix B). A conceptual vapor collection system layout is presented as Figure 7. A site-specific system design will be developed based on final Site construction blueprints.

A vapor barrier consisting of a 20 mil thick HDPE liner will be installed above the vapor collection system. The horizontal extent of the vapor barrier will be sufficient to cover the vapor collection system as well as extend to the edge of the proposed building footprint. The HDPE liner shall be installed in accordance with all applicable manufacturers' specifications. Installation of the liner as well as installation of the building foundation slab shall be carefully monitored to ensure the liner remains intact.

5.14 Notification and Reporting

The following minimum notification and reporting requirements shall be followed by the Volunteer prior to and following site development, as appropriate.

- Prior to initiation of the remedial action, the Volunteer shall submit the necessary remedial design documents to the NYSDEC for review and approval.
- A minimum of seven (7) working days notice will be provided to the NYSDEC prior to the initiation of remedial activities at the site or before future construction activities as required by the Site Management Plan.
- If buried drums or underground storage tanks are encountered during the remedial action or future redevelopment activities, excavation will cease and the NYSDEC will be immediately notified.

As discussed in Section 8.0 of this report, Citizen Participation Plan, the NYSDEC will provide notice to the public and appropriate government agencies that the RAWP is available for review and comment. Following approval of the RAWP by the NYSDEC, the remedial design documents discussed above will be submitted for review and approval.

Upon completion of the remedial activities, a construction certification report stamped by a New York State licensed Professional Engineer (P.E.), will be prepared and submitted to the NYSDEC and NYSDOH within 90 days after the completion of the remedial action. At a minimum, the report will include:

- An area map showing the development and the property's tax map number(s).
- Plans showing before and after survey elevation on a 100-foot grid system to document the thickness of the surface soil cover system.
- Description of erosion control measures.
- A topographic map of the developed property showing actual building locations and dimensions, roads, parking areas, utility locations, berms, fences, property lines, sidewalks, green areas, contours and other pertinent improvements and features. The topographic map will be stamped by a New York State licensed land surveyor.
- Plans showing structures removed or depth of soil removal.
- Copies of daily inspection reports.
- "As-Built" drawings that include all changes made to the final design during construction.
- A text narrative describing the excavation activities performed, health and safety monitoring performed (both site-specified and Community Air Monitoring), quantities and locations of soil/fill excavated, disposal locations for the soil/fill, soil sampling locations and results, a description of problems encountered, location and acceptability test results for fill sources, and other pertinent information necessary to document proper completion of Site activities.
- A certification that all work was performed in accordance with the Remedial Action Work Plan. The certification by the New York State Professional Engineer should include the following language: "I certify that the Remedial Action Work Plan and Remedial Design were implemented and that all construction activities were completed substantially in accordance with the Department-approved Remedial Action Work Plan and Remedial Design and were personally witnessed by me or a person under my direct supervision."

Applications, permits, and legal documentation must be submitted to the appropriate parties as required by the Remedial Action Work plan and are noted below:

- The permit to discharge wastewater into the county sewer system from the Westchester County Department of Environmental Facilities will be properly renewed before any such discharge occurs at the site.
- The filing of an environmental easement and the associated preparation of a Site Management Plan will be conducted after the completion of the remedial action. Both documents will require review and approval by the NYSDEC and NYSDOH.

Notification contacts are as follows:

Mr. Ram Pergadia, P.E.
Hazardous Waste Regional Engineer
Division of Environmental Remediation
NYSDEC – Region 3
21 South Putt Corners Road
New Paltz, New York 12561
(845) 256-3146

Mr. Jamie Malcolm, P.E.
Environmental Engineer
Division of Environmental Remediation
NYSDEC - Central Office
625 Broadway
Albany, New York 12233-7014
(518) 402-9662

Mr. Joe Crua
Public Health Specialist III
New York State Department of Health
547 River Street
Troy, New York 12180-2216
(518) 402-7890

6.0 HEALTH AND SAFETY PLAN

6.1 Introduction

The purpose of this Health and Safety Plan (HASP) is to define the health and safety requirements necessary to protect nearby residents and workers involved in the remedial activities to be conducted at the former Manufactured Gas Plant in Port Chester, New York.

6.2 Site Information/Characterization of Work

Remedial activities will be implemented at the Site in order to address the contamination found at the Site. The previously noted investigations conducted at the Site revealed SVOCs and metals contamination, the primary constituents being lead and mercury.

The proposed remedial activities require excavation of soils contaminated with the compounds mentioned above. The HASP has been developed (i) to minimize public or worker exposure to respirable particles and vapors, (ii) to protect the skin and face from dermal contact with potentially hazardous materials and (iii) to establish hygiene guidance to prevent accidental ingestion of contaminants.

6.3 Safety Officer/Alternate

The Site Safety Officer, or alternate, will be responsible for assuring Site safety. The Safety Officer or alternate will assure that air monitoring for particulates is conducted during all field activities. The Safety Officer or alternate will be responsible for determining when the level of protection for all personnel on Site, including subcontractors, must be increased or decreased.

All field personnel, including subcontractors, will report any safety problems or concerns to the Site Safety Officer or the designated alternate.

6.4 Medical Monitoring

Field personnel are subject to annual physical examinations that are in accordance with EPA and National Institute for Occupational Safety and Health (NIOSH) guidelines for work at hazardous waste sites. Medical releases demonstrating approval for work at hazardous waste Sites must be provided.

6.5 Definition of Exclusion Zone

Disturbance of the Site is anticipated during remediation and construction activities. Worker exposure to potentially hazardous materials is expected to be limited to investigative, excavation and soil sampling operations. The exclusion zone will be defined as the area within thirty (30) feet of the backhoe or test pit for all soil sampling activities and the area within the Site fence boundaries for all excavation and soil disposal activities.

6.6 Training

All field personnel must be properly trained in health and safety procedures in accordance with 29 CFR 1910.120. Field personnel must possess the necessary medical clearance and equipment to upgrade their level of protection to EPA protocol Level B and Level C if required.

6.7 Levels of Protection/Air Monitoring Activities

Any individual involved in conducting field activities will be appropriately trained in the use of personal protective equipment. The initial Level of Protection for the remedial activities will be EPA protocol Level D, which includes steel-toed boots, hard hats and gloves. Real-time personnel exposure monitoring will be conducted by using portable instruments to determine levels of respirable airborne particulates (dust) and volatile organic compounds (VOCs) to which on-Site personnel may be exposed, as well as to detect off-Site excursions. Personnel exposure air monitoring will be conducted with portable instruments such as the GCA Data Ram for respirable airborne dust and instruments such as RAE Systems ppbRAE for VOCs. Specific air monitoring requirements are presented in Appendix G, Air Quality Monitoring Protocol.

6.8 Personal Hygiene and Personnel Decontamination

Eating, drinking and smoking are prohibited within the exclusion zone. Alcoholic and controlled substances are forbidden anywhere on the Site.

All contaminated disposable clothing will be placed in appropriate containers. Personnel will not be permitted to leave the Site with clothing suspected of being contaminated. Soap and water will be provided for cleaning hands and face.

6.9 Emergency and Contingency Planning

The Site Safety Officer, or Alternate, shall be notified of any on-site emergencies and shall be responsible for ensuring that the appropriate procedures are followed. The following emergency numbers will be available to all field personnel:

Organization	Phone Number
Ambulance: (Port Chester / Rye Volunteer)	911
Police: (Port Chester Police Department)	911
Fire: (Port Chester Fire Department)	911
Poison Information, Nationwide	(800) 222-1222
Chemtrec	(800) 424-8802

Hospital:

NY United Hospital Medical Center (914) 934-3000
406 Boston Post Road
Port Chester, New York 10573

Directions from the Site to the hospital are as follows:

Turn right out of the Site onto Purdy Avenue. Continue through the light at Don Bosco Place. In one block continue through the traffic light at Main Street. Go under a railroad bridge. NY United Hospital Medical Center is on the right in approximately 1 mile.

7.0 QUALITY ASSURANCE / QUALITY CONTROL PLAN

7.1 Scope and Objectives

The Quality Assurance / Quality Control (QA / QC) Plan has been prepared to ensure that the precision, accuracy, sensitivity and completeness of the data are known and documented, and that the data quality objectives are satisfied.

7.2 Laboratory

All laboratory sample analysis will be conducted by a NYSDOH ELAP Certified laboratory audited by NYSDOH ELAP and found to be satisfactory.

7.3 Responsibilities

The following individuals are responsible for the functions identified below:

- Overall Project Coordination
  Joseph Sorge, JM Sorge, Inc.
  Jamie Malcolm, NYSDEC
  Joe Crua, NYSDOH
  Fred Worstell, Dresdner Robin

- Sampling and Investigative Activities
  Alison Kokorsky, JM Sorge, Inc.
  Jamie Malcolm, NYSDEC
  Brian Leuner, Dresdner Robin

- Health and Safety Officer
  Alison Kokorsky, JM Sorge, Inc.

- Laboratory Activities
  Laboratory Manager

7.4 Sampling Methods, Storage, Handling and Decontamination Procedures

Soil samples will be collected with disposable, polyethylene scoops. Sampling scoops shall be used once and then discarded. Decontamination of sampling equipment will not be required.

7.4.1 Sample Handling

The sample containers will be labeled with sample number, date, and time of collection, analytical parameters and Site name. Samples will be kept cool at 4°C and transported in coolers to the laboratory. Proper chain of custody documentation will be maintained, beginning with the laboratory's release of the bottles. A detailed log of subsurface conditions encountered, sample depths and sampling locations will be recorded. The sample holding time will begin at the time of sample collection.

7.4.2 Record Keeping

Field measurements and observations will be recorded daily in the bound field logbook. Upon collection of samples for analysis, additional documentation will be completed on the chain of custody form. Documentation of all Site activities in the field log book will include: complete description of all Site activities, including dates and times of activities; name of person keeping the log; names of all persons on-site; documentation of all sampling locations, number of samples, sample depths, sample collection time and analytical parameters; and documentation of all sample location landmarks, including the location of sample points on a map.

7.5 Field Instrumentation

A photoionization detector (PID) will be utilized during field construction and sampling activities. The PID lamp will be cleaned regularly and the battery fully recharged at the end of each day of field use. The PID will be sent to the manufacturer for routine maintenance approximately once per year.

The PID will be calibrated at the beginning of each day of field use by comparing the response with a test atmosphere referenced to a primary calibration standard of known concentration. The calibration gas used for the PID is isobutylene.

Personnel exposure air monitoring will be conducted with portable instruments such as the GCA Data Ram for respirable airborne dust. Perimeter air monitoring will be performed in accordance with the requirements presented in Appendix G, Air Quality Monitoring Protocol.

7.6 Sample Containers and Chain of Custody Procedures

Clean sample containers will be supplied by the laboratory for all soil sampling events. The appropriate sample preservatives will be added to the sample bottles by the laboratory prior to shipment. Chain of custody procedures will be initiated by the person responsible for cleaning the sample containers. The chain of custody will accompany the bottles during transportation from the laboratory to the field, sample collection, transporting back to the laboratory, analysis and final disposal of the sample. The chain of custody form will list each of the individual sample containers and will be signed by the sampling team members. Samples will be stored on ice at 4^{o} C in a secure area until they are relinquished to a courier for delivery to the laboratory.

7.7 Laboratory Data Deliverable Format

Laboratory analysis of the soil samples will be conducted by a NYSDOH ELAP lab, qualified to generate Category A deliverables. Laboratory quality assurance/quality control data will be submitted with the laboratory data deliverables provided. The laboratory QA/QC manager is responsible for ensuring the overall quality of data and deliverables and that the specific analytical methods are followed.

8.0 CITIZEN PARTICIPATION PLAN

In accordance with the requirements of the VCP, the NYSDEC Project Manager will distribute a Fact Sheet to the public and other interested parties to inform them of the proposed remedial action at the Site, the start and end dates of the public comment period, where to find and review the project documents, and how to submit comments. The NYSDEC will then issue a notice of availability of the RAWP for public review and comment in the Environmental Notice Bulletin. This will occur at least 30 days before the NYSDEC approves the RAWP. The notice will provide for a 30-day comment period during which written comments may be submitted to NYSDEC. The NYSDEC Project Manager will be listed as the contact person in the notice. A document repository has been established at the Port Chester Public Library located at 1 Haseco Avenue in Port Chester, New York where interested citizens can conveniently review the project RAWP.

In accordance with NYSDEC's guidance for Voluntary Cleanup Agreements, a Citizen Participation Plan is included as Appendix H.

Table 1

JMS Soil Analytical Results Summary
Former Service Station Property
Port Chester, New York

Sample Number: / Sample Depth (ft): / Date Collected:	Recommended Soil Cleanup Criteria (ppm)	SB-1 9.0-9.5 10/03/2000	SB-2 9.5-10.0 10/03/2000	SB-3 8.0-8.5 10/03/2000	SB-4 10.0-10.5 10/03/2000	SB-5 11.0-11.5 10/03/2000	SB-6 7.5-8.0 10/03/2000
Volatile Organics (ppm)							
Acetone	0.2	ND	ND	ND	ND	ND	ND
Benzene	0.06	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.5	ND	ND	ND	ND	ND	ND
Methylene chloride	0.1	ND	ND	ND	ND	ND	ND
Styrene	NS	ND	ND	ND	ND	ND	ND
Toluene	1.5	ND	ND	ND	ND	ND	ND
Xylene (total)	1.2	ND	ND	ND	ND	ND	ND
Total Non-Targeted Volatiles	NS	0	0	0	0	0	0
Semi-volatiles (ppm)							
Acenaphthene	50	0.0196	ND	ND	ND	ND	ND
Acenaphthylene	41	ND	ND	0.0369 J	ND	ND	ND
Anthracene	50	ND	ND	0.102	ND	ND	0.0292 J
Benzo(a)anthracene	0.224 or MDL	ND	ND	**0.473**	0.0295 J	0.0644 J	0.062 J
Benzo(a)pyrene	0.061 or MDL	ND	ND	**0.416**	0.0315 J	0.069 J	0.0438 J
Benzo(b)fluoranthene	1.1	ND	ND	0.329	0.0231 J	0.0575 J	0.0408 J
Benzo(g,h,i)perylene	50	ND	ND	0.151	ND	0.0357 J	0.0213 J
Benzo(k)fluoranthene	1.1	ND	ND	0.392	0.0324 J	0.052 J	0.0437 J
Carbazole	NS	ND	ND	ND	ND	ND	ND
Chrysene	0.4	ND	ND	0.394	0.0271 J	0.0574 J	0.0528 J
1,4-Dichlorobenzene	50	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	0.014 or MDL	ND	ND	0.0596 J	ND	ND	ND
Dibenzofuran	6.2	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NS	ND	ND	ND	ND	ND	ND
Fluoranthene	50	ND	ND	0.724	0.0315 J	0.0963	0.125
Fluorene	50	ND	ND	0.0325 J	ND	ND	ND
Indeno(1,2,3-cd)pyrene	3.2	ND	ND	0.206	ND	0.0332 J	0.023 J
2-Methylnaphthalene	36.4	ND	ND	ND	ND	ND	ND
Naphthalene	13	ND	ND	ND	ND	ND	ND
Phenanthrene	50	ND	ND	0.269	ND	0.035 J	0.0995
Pyrene	50	ND	ND	0.583	0.0294 J	0.0787	0.0897
Total Targeted Semi-Volatiles	NS	0.0196	0	4.039	0	0.175	0.3142
Total Non-Targeted Semi-Volatiles	NS	0.7	0.18	1.44	0.17	0	3.52

Notes:
J - estimated value
ppm - parts per million
ND - Non Detect

Table 1

JMS Soil Analytical Results Summary
Former Manufactured Gas Plant
Port Chester, New York

Sample Number: / Sample Depth (ft): / Date Collected:	Recommended Soil Cleanup Criteria (ppm)	TP-101 6.0-6.5 06/19/2000	TP-102 6.0-6.5 06/19/2000	TP-103 7.0-7.5 06/22/2000	TP-104 8.0-8.5 06/22/2000	TP-105 6.0-6.5 06/22/2000	TP-106 8.0-8.5 06/22/2000	TP-107 7.0-7.5 06/22/2000
Volatile Organics (ppm)								
Acetone	0.2	NA	ND	0.0206	NA	ND	0.0336	ND
Benzene	0.06	NA	0.0042	ND	NA	ND	ND	ND
Ethylbenzene	5.5	NA	ND	ND	NA	ND	ND	ND
Methylene chloride	0.1	NA	ND	ND	NA	ND	ND	0.0061
Toluene	1.5	NA	ND	ND	NA	ND	ND	ND
Xylene (total)	1.2	NA	ND	ND	NA	ND	ND	ND
Semi-volatiles (ppm)								
Acenaphthene	50	2.62	ND	0.223	ND	0.0239 J	0.0215 J	ND
Acenaphthylene	41	0.661	ND	0.0844 J	ND	0.112	0.0521 J	ND
Anthracene	50	7.67	0.0224 J	0.967	ND	0.27	0.0981	0.0204 J
Benzo(a)anthracene	0.224 or MDL	**14**	ND	**2.05**	0.102	**1.12**	**0.4**	0.184
Benzo(a)pyrene	0.061 or MDL	**14.7**	ND	**1.96**	**0.0777**	**0.792**	**0.256**	**0.169**
Benzo(b)fluoranthene	1.1	**14.1**	ND	**1.8**	0.073	0.648	0.215	0.149
Benzo(g,h,i)perylene	50	5.41	ND	0.738	ND	0.228	0.0659 J	0.0571 J
Benzo(k)fluoranthene	1.1	**9.85**	ND	**1.63**	0.0536 J	0.8	0.268	0.181
Carbazole	NS	1.37	0.0909	0.142	ND	0.0334 J	0.0349 J	ND
Chrysene	0.4	**15.2**	ND	**2.08**	0.0949	**0.916**	0.319	0.157
Butyl benzyl phthalate	50	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	0.014 or MDL	**2.91**	ND	ND	ND	ND	ND	ND
Dibenzofuran	6.2	2.5	ND	0.106	ND	0.0386 J	ND	ND
bis(2-Ethylhexyl)phthalate	NS	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	33.5	ND	5.11	0.172	1.98	0.634	0.238
Fluorene	50	4.21	0.0547 J	0.294	ND	0.0826	0.03 J	ND
Indeno(1,2,3-cd)pyrene	3.2	**6.06**	ND	0.731	ND	0.279	0.0902	0.0787
2-Methylnaphthalene	36.4	0.651	ND	0.0847 J	ND	0.0279 J	ND	ND
Naphthalene	13	1.91	ND	0.194	ND	0.0448 J	ND	ND
Phenanthrene	50	25	0.0127 J	3.48	0.165	0.562	0.179	0.06
Pyrene	50	24.9	ND	4.44	0.164	1.67	0.524	0.208
Total Non-Targeted Semi-Volatiles	NS	49.7	71.7	15.02	0.18	5.84	1.01	0.47

Notes:
J - estimated value
ppm - parts per million
NA - Not Analyzed
ND - Non Detect

Table 1

JMS Soil Analytical Results Summary
Former Manufactured Gas Plant
Port Chester, New York

Sample Number:	Recommended Soil Cleanup Criteria (ppm)	O3-S1	O5-S2	O-11	O-12A	O-12B	O-13A	O-13B	O-14A	O-14B
Sample Depth (ft):		3.0-3.5	7.5-8.0	7.5-8.0	5.0-5.5	6.0-6.5	3.0-3.5	6.0-6.5	2.0-2.5	2.5-3.0
Date Collected:		11/19/1999	11/19/1999	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000
Volatile Organics (ppm)										
Acetone	0.2	ND	ND	NA	NA	NA	NA	NA	NA	NA
Benzene	0.06	**1.48**	**0.296**	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5.5	0.606	0.865	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	0.1	ND	ND	NA	NA	NA	NA	NA	NA	NA
Styrene	NS	2.85	0.779	NA	NA	NA	NA	NA	NA	NA
Toluene	1.5	**4.18**	**3.42**	NA	NA	NA	NA	NA	NA	NA
Xylene (total)	1.2	**15.5**	**12.3**	NA	NA	NA	NA	NA	NA	NA
Total Non-Targeted Volatiles	NS	397	173.8	NA	NA	NA	NA	NA	NA	NA
Semi-volatiles (ppm)										
Acenaphthene	50	**80.9**	8.83	0.127	1.6	ND	6.18	ND	3.09	ND
Acenaphthylene	41	**259**	27.8	0.199	14.1	ND	21.5	0.0444 J	12.9	ND
Anthracene	50	**419**	43.9	1.38	25.4	0.0333 J	**166**	0.0478 J	34.7	0.0287 J
Benzo(a)anthracene	0.224 or MDL	**478**	**35.1**	**3.7**	**94.7**	0.0991	**94**	0.218	**102**	0.0971
Benzo(a)pyrene	0.061 or MDL	**316**	**24.2**	**2.61**	**66.8**	0.076	**81.1**	0.117	**66.3**	0.0682 J
Benzo(b)fluoranthene	1.1	**250**	**22.8**	**1.92**	**61.4**	0.0746	**73.8**	0.102	**68.2**	0.0636 J
Benzo(g,h,i)perylene	50	25.4	6.22	1.4	22.9	0.0233 J	25.2	0.0329 J	20.2	0.0245 J
Benzo(k)fluoranthene	1.1	**295**	**16.4**	**2.43**	**51.3**	0.0822	**69.9**	0.111	**64.2**	0.0791
Carbazole	NS	140	18.1	NA	NA	NA	NA	NA	NA	NA
Chrysene	0.4	**479**	**25.6**	**3.04**	**70.8**	0.0709 J	**77.7**	0.136	**81.5**	0.0661 J
Butyl benzyl phthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	0.014 or MDL	**27.8**	**5.01**	**0.952**	**14.9**	ND	**17**	ND	**15**	ND
Dibenzofuran	6.2	**300**	**36.6**	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	**1100**	**72.2**	5.38	**198**	0.196	**205**	0.217	**180**	0.141
Fluorene	50	**347**	**52.6**	0.415	8.24	ND	29	ND	22.3	ND
Indeno(1,2,3-cd)pyrene	3.2	**152**	**7.74**	1.34	**27.2**	0.0277 J	**29.1**	0.025 J	**24.6**	0.0254 J
2-Methylnaphthalene	36.4	**373**	**81.1**	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13	**589**	**208**	0.137	3.68	ND	**17.2**	ND	5.5	ND
Phenanthrene	50	**1620**	**146**	2.7	**57.6**	0.0716 J	**155**	0.0548 J	**106**	0.0874
Pyrene	50	**750**	44.7	5.11	**142**	0.174	**139**	0.255	**113**	0.128
Total Non-Targeted Semi-Volatiles	NS	122.9	179.5	204.9	133.5	219.1	167	2.16	99.6	0.59
Metals Analysis (ppm)										
Antimony	7.8	<6.9	<6.7	NA	NA	NA	NA	NA	NA	NA
Arsenic	13.115	**62.8**	2.4	NA	NA	NA	NA	NA	NA	NA
Beryllium	NS	<0.58	<0.56	NA	NA	NA	NA	NA	NA	NA
Cadmium	5.659	1.1	<0.56	NA	NA	NA	NA	NA	NA	NA
Chromium	96.348	32.5	26.9	NA	NA	NA	NA	NA	NA	NA
Copper	118.108	21	27.5	NA	NA	NA	NA	NA	NA	NA
Lead	896.503	66.3	<11	NA	NA	NA	NA	NA	NA	NA
Mercury	0.72	0.53	0.065	NA	NA	NA	NA	NA	NA	NA
Nickel	43.737	24	23.1	NA	NA	NA	NA	NA	NA	NA
Selenium	NS	<12	<11	NA	NA	NA	NA	NA	NA	NA
Silver	NS	<1.2	<1.1	NA	NA	NA	NA	NA	NA	NA
Thallium	NS	<1.2	<1.1	NA	NA	NA	NA	NA	NA	NA
Zinc	373.424	264	40.8	NA	NA	NA	NA	NA	NA	NA
General Chemistry										
Petroleum Hydrocarbons (ppm)	NS	735	164	NA	NA	NA	NA	NA	NA	NA
Solids, Percent	NS	86.5	89.6	NA	NA	NA	NA	NA	NA	NA
PCB	1*									
	10**	ND	ND	NA	NA	NA	NA	NA	NA	NA

Notes:
J - estimated value
ppm - parts per million
NA - Not Analyzed
ND - Non Detect

* - Surface
** - Subsurface

Table 1

JMS Soil Analytical Results Summary
Former Manufactured Gas Plant
Port Chester, New York

Sample Number: / Sample Depth (ft): / Date Collected:	Recommended Soil Cleanup Criteria (ppm)	B-1C 5.5-6.0 07/27/2000	B-1D 7.0-7.5 07/27/2000	B-2A 7.0-7.5 07/27/2000	B-3A 6.5-7.0 07/27/2000	B-11A 2.5-3.0 10/05/2000	B-11B 5.0-5.5 10/05/2000	B-12A 3.5-4.0 10/05/2000	B-12B 6.5-7.0 10/05/2000	B-14A 5.5-6.0 10/05/2000
Volatile Organics (ppm)										
Benzene	0.06	NA	NA	NA	NA	ND	ND	NA	NA	NA
Ethylbenzene	5.5	NA	NA	NA	NA	ND	ND	NA	NA	NA
Methylene chloride	0.1	NA	NA	NA	NA	0.119 B	0.0154 B	NA	NA	NA
Toluene	1.5	NA	NA	NA	NA	ND	ND	NA	NA	NA
Xylene (total)	1.2	NA	NA	NA	NA	ND	ND	NA	NA	NA
Total Non-Targeted Volatiles	NS	NA	NA	NA	NA	7.4	0.1949	NA	NA	NA
Semi-volatiles (ppm)										
Acenaphthene	50	5.21	10.3	ND	ND	ND	0.0474 J	0.268	0.886	ND
Acenaphthylene	41	16.1	**54.4**	ND	ND	ND	0.0258 J	0.243	1.46	ND
Anthracene	50	34.9	47.6	0.106	0.0322 J	0.156 J	0.139	2.36	6.63	0.0419 J
Benzo(a)anthracene	0.224 or MDL	**33.8**	**30.6**	0.293	0.0953	0.211 J	**0.339**	**13.6**	**53.4**	0.14
Benzo(a)pyrene	0.061 or MDL	**22.8**	**19.9**	0.196	0.0785 J	0.292 J	**0.316**	**12.3**	**58.2**	**0.156**
Benzo(b)fluoranthene	1.1	**17**	**15**	0.158	0.0535 J	0.268 J	0.292	**1.42**	**5.61**	0.157
Benzo(g,h,i)perylene	50	8.1	7.11	0.0806 J	0.0353 J	ND	0.0881 J	2.22	1.24	0.066 J
Benzo(k)fluoranthene	1.1	**19**	**15.7**	0.19	0.074 J	0.194 J	0.269	**11.3**	**56.2**	0.151
Carbazole	NS	7.44	16.2	0.0593 J	ND	NA	NA	NA	NA	NA
Chrysene	0.4	**25**	**22.7**	0.24	0.0927	0.276 J	0.328	**10.3**	**36.4**	0.11
Butyl benzyl phthalate	50	ND	ND	ND	ND	ND	1.31	ND	ND	ND
Dibenzo(a,h)anthracene	0.014 or MDL	**6.27**	**5.12**	0.0487 J	ND	ND	0.0526 J	**1.98**	**10.2**	ND
Dibenzofuran	6.2	**16.9**	**38.3**	0.0257 J	ND	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NS	ND	ND	ND	ND	3.29	0.151	ND	ND	ND
Fluoranthene	50	**67.4**	**64.6**	0.512	0.0986	0.392 J	0.735	9.37	33.1	0.179
Fluorene	50	30.6	**54.3**	0.0354 J	ND	ND	0.0635 J	0.454	1.64	ND
Indeno(1,2,3-cd)pyrene	3.2	**10.1**	**8.57**	0.0952	0.0397 J	ND	0.0918	2.88	**14.8**	0.0707 J
2-Methylnaphthalene	36.4	1.06	**83.7**	ND	ND	NA	NA	NA	NA	NA
Naphthalene	13	11.4	**319**	ND	ND	0.0684 J	0.0286 J	0.275	2.49	ND
Phenanthrene	50	**86**	**124**	0.406	0.0607 J	0.928	0.6	5.93	15	0.115
Pyrene	50	**54.7**	**53.5**	0.497	0.102	0.709	0.436	9.14	34.8	0.212

Notes:
J - estimated value
ppm - parts per million
NA - Not Analyzed
B - Compound also found in method blank
ND - Non Detect

Table 1

Soil Analytical Results Summary
Additional Samples Collected by JMS from GZA Boring Locations
Former Manufactured Gas Plant
Port Chester, New York

Sample Number: Sample Depth (ft): Date Collected:	Recommended Soil Cleanup Criteria (ppm)	85-1 7.0-8.0 01/04/2001	85-2 9.5-10.0 01/04/2001	85-3 12.5-13.0 01/04/2001	85-5 11.0-11.5 01/04/2001	85-9 2.5-3.0 01/04/2001	85-12 11.5-12.0 01/05/2001	85-14A 5.5-6.0 01/05/2001	85-14B 11.5-12.0 01/05/2001	85-MW3 12.0-13.0 01/03/2001	85-MW3R 5.0-10.0 02/28/2001
Semi-volatiles (ppm)											
Acenaphthene	50	ND	3.26	1.09	ND	3.35	ND	1.04	0.877	ND	0.0409 J
Acenaphthylene	41	ND	5.47	3.78	ND	9.97	ND	0.293	0.465	ND	0.029 J
Anthracene	50	0.108	**68.1**	35.3	ND	40.7	ND	1.02	1.32	0.0176 J	0.0668 J
Benzo(a)anthracene	0.224 or MDL	0.0797	**59.4**	**36.8**	ND	**85**	0.0365 J	**2.97**	**2.83**	0.0231 J	0.132
Benzo(a)pyrene	0.061 or MDL	0.0279 J	**39.9**	**24.5**	ND	**67.8**	ND	**2.6**	**2.21**	ND	**0.12**
Benzo(b)fluoranthene	1.1	ND	**34.7**	**21.1**	ND	**52.2**	ND	**2.49**	**2.18**	ND	0.0863
Benzo(g,h,i)perylene	50	ND	14.3	9.85	ND	26.8	ND	0.985	0.68	ND	0.0323 J
Benzo(k)fluoranthene	1.1	ND	**25.2**	**19.9**	ND	**67.1**	ND	**2.35**	**1.93**	ND	0.127
Carbazole	NS	0.0319 J	2.77	1.49	ND	14	ND	0.436	1.31	0.493	NA
Chrysene	0.4	0.0676 J	**48.3**	**27.7**	ND	**67.8**	0.0293 J	**2.73**	**2.8**	0.0187 J	0.112
1,4-Dichlorobenzene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	0.014 or MDL	ND	**4.21**	**3.21**	ND	**12.6**	ND	**0.318**	**0.226**	ND	ND
Dibenzofuran	6.2	0.0716 J	**37.5**	**6.39**	ND	**13.6**	ND	0.511	1.28	0.0374 J	NA
Di-n-butyl phthalate	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	NS	1.27	0.876	ND	0.0489 J	ND	ND	ND	ND	0.215	ND
Fluoranthene	50	0.22	**161**	**91.8**	ND	**135**	0.0464 J	5.72	7.41	0.0367 J	0.246
Fluorene	50	0.0466 J	2.33	14	ND	23.4	ND	1.21	2.31	0.126	0.104
Indeno(1,2,3-cd)pyrene	3.2	ND	**16.2**	**11.1**	ND	**29.2**	ND	1.02	0.767	ND	0.0504 J
2-Methylnaphthalene	36.4	ND	ND	ND	ND	7.87	ND	0.601	1.63	ND	NA
Naphthalene	13	ND	0.211 J	ND	ND	6.05	ND	4.99	4.86	0.0457 J	0.0914
Phenanthrene	50	0.394	**92.2**	24.6	ND	**112**	0.0356 J	4.36	9.21	0.0353 J	0.227
Pyrene	50	0.153	**98.9**	**60.5**	ND	**88.4**	0.038 J	4.7	5.52	0.0289 J	0.204
Total Non-Targeted Semi-Volatiles	NS	0.17	341	215.9	1	113.3	0.18	38.59	81.7	4.16	2.24
Metals Analysis (ppm)											
Antimony	7.8	<1.1	<1.1	<1.0	<1.1	<1.2	<1.1	<1.4	<2.0	<1.0	<1.1
Arsenic	13.115	1.2	<1.1	1.7	2.1	9.5	1.1	**38.2**	**17.9**	1.8	3.2
Beryllium	NS	0.58	<0.53	<0.51	<0.56	0.76	<0.56	<0.73	<0.98	<0.51	0.61
Cadmium	5.659	<0.53	<0.53	<0.51	<0.56	<0.6	<0.56	<0.73	**7.2**	<0.51	<0.56
Chromium	96.348	35.1	16	15.4	11.3	23.3	13.4	31.4	34.4	30	29
Copper	118.108	16.7	19.9	21.7	14.3	26.6	39.8	73.5	**155**	37.5	18.7
Lead	896.503	4.9	4.8	3.4	4.3	45	7.2	**1640**	549	9.1	10.7
Mercury	0.72	<0.037	<0.036	<0.036	<0.036	0.12	<0.035	**3.6**	**3.2**	<0.036	<0.035
Nickel	43.737	22.3	28.2	34.7	16.3	22.3	13.5	**44.1**	30.4	20.8	19
Selenium	NS	<1.0	<1.1	<1.0	<1.1	1.4	<1.1	2	3	1.6	<1.1
Silver	NS	<1.0	<1.1	<1.0	<1.1	<1.2	<1.1	<1.4	<2.0	<1.0	<1.1
Thallium	NS	<1.0	<1.1	<1.0	<1.1	<1.2	<1.1	<1.4	<2.0	<1.0	<1.1
Zinc	373.424	46.1	20.3	27.7	24.8	59.9	31.8	**498**	**3820**	55.7	33

Notes:
J - estimated value
ppm - parts per million
NA - Not Analyzed
ND - Not Detected

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		85-1		85-1		85-1		85-2		85-2		85-2	
Sample Depth (ft.)		5-6		10-11		13-14		6-7		7-8		8-9	
Analyte	RSCO		Q		Q		Q		Q		Q		Q
VOC by EPA 8260 (ppb)													
Methylene Chloride	100	**220**	JB	**200**	JB	**350**	JB	82	J	50	J	**190**	J
Acetone	110	**2,100**	JB	**1,800**	JB	**980**	JB	**1,500**	J	**1,100**	J	**1,000**	J
Benzene	60	ND		ND		ND		ND		ND		ND	
Toluene	1500	ND		ND		22	J	ND		ND		ND	
Xylenes (Total)	1200	ND		ND		26	J	ND		ND		ND	
Semivolatiles by EPA 8270 (ppb)													
Phenol	30	ND		ND		ND		ND		ND		ND	
2-Chlorophenol	800	ND		ND		ND		ND		ND		ND	
2-Methylphenol	100	ND		ND		ND		ND		18	J	ND	
4-Methylphenol	900	ND		ND		ND		ND		79	J	ND	
Naphthalene	13000	ND		ND		ND		700	J	220	J	1,900	J
2-Methylnaphthalene	36400	ND		ND		ND		140	J	15	J	610	J
Acenaphthylene	41000	ND		22	J	ND		3,200	J	1,000		41,000	
Dibenzofuran	6200	ND		ND		ND		150	J	520		**67,000**	
Fluorene	50000	ND		ND		ND		170	J	1000		5400	
Phenanthrene	50000	21	J	11	J	15	J	1,900	J	1,200		**210,000**	
Anthracene	50000	14	J	15	J	ND		2,300	J	1,200		**88,000**	
Fluoranthene	50000	38	J	26	J	15	J	16,000		2,300		**140,000**	
Pyrene	50000	30	J	83	J	16	J	19,000		2,200		**99,000**	
Benzo [a] anthracene	224	24	J	92	J	ND		**18,000**		**1,200**		**60,000**	
Chrysene	400	18	J	64	J	ND		**13,000**		**1,000**		**48,000**	
Benzo [b] Fluoranthene	1100	11	J	10	J	ND		**7,100**		810		**25,000**	J
Benzo [k] Fluoranthene	1100	18	J	11	J	ND		**11,000**		810		**42,000**	
Benzo [a] Pyrene	61	12	J	9	J	ND		**10,000**		**1,000**		**38,000**	
Indeno [1,2,3-cd] Pyrene	3200	ND		ND		ND		2,000	J	310	J	**18,000**	J
Dibenzo [a,h] anthracene	14	ND		ND		ND		**1,100**	J	**120**	J	**6,400**	J
Metals (ppm)	**SB**												
Arsenic	13.1	1.5	B	2.0	B	1.3	B	6.0		1.6	B	2.7	
Cadmium	5.66	0.22	N	0.21	N	0.20	N	0.23	N	0.21	N	0.22	N
Chromium	96.3	19.0		15.0		13.4		23.4		42.8		27.3	
Copper	118	17.1		9.9		24.1		14.4		33.0		22.9	
Lead	896	3.7		3.4		4.7		49.8		8.1		6.0	
Mercury	0.72	0.0050		0.0033		0.0029		0.020		0.0040		0.0038	
Nickel	43.4	19.1		11.6		14.3		17.8		43.2		32.2	
Zinc	373.4	23.8		24.8		24.0		41.8		63.8		32.6	
Wet Chem Analysis (ppm)													
Cyanide (Total)	**	0.56		0.56		0.57		6.47		20.7		30.3	
Phenols	0.03	0.28		0.28		**0.48**		**8.63**		**3.24**		**13.4**	
% Solids		87.3		87.6		90.5		78		87.5		88.2	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		85-3		85-3		85-3		85-4		85-4	
Sample Depth (ft.)		9-10		10-11		12-13		7-8		8-9	
Analyte	**RSCO**		**Q**		**Q**		**Q**		**Q**		**Q**
VOC by EPA 8260 (ppb)											
Methylene Chloride	100	**120**	JB	**110**	JB	**410**	JB	**200**	JB	**180**	JB
Acetone	110	**1300**	JB	**1200**	JB	**1600**	JB	**2300**	JB	**2000**	JB
Benzene	60	ND		ND		ND		ND		ND	
Toluene	1500	22	J	ND		23	J	15	J	24	J
Xylenes (Total)	1200	ND		ND		ND		ND		ND	
Semivolatiles by EPA 8270 (ppb)											
Phenol	30	ND		ND		ND		ND	U	ND	U
2-Chlorophenol	800	ND		ND		ND		ND	U	ND	U
2-Methylphenol	100	ND		ND		ND		ND		ND	
4-Methylphenol	900	ND		ND		ND		30	J	ND	
Naphthalene	13000	ND		ND		ND		13	J	13	J
2-Methylnaphthalene	36400	ND		ND		ND		ND		13	J
Acenaphthylene	41000	12000	J	16	J	4900	J	64	J	120	J
Dibenzofuran	6200	**9300**	J	ND		6000	J	25	J	24	J
Fluorene	50000	23000		20	J	12000		12	J	46	J
Phenanthrene	50000	39000		24	J	24000		88	J	320	J
Anthracene	50000	**58000**		56	J	25000		58	J	150	J
Fluoranthene	50000	**83000**		160	J	36000		170	J	570	
Pyrene	50000	**68000**		76	J	31000		110	J	460	
Benzo [a] anthracene	224	**55000**		67	J	**24000**		100	J	**430**	
Chrysene	400	**38000**		37	J	**17000**		71	J	340	J
Benzo [b] Fluoranthene	1100	**26000**		29	J	**10000**		54	J	240	J
Benzo [k] Fluoranthene	1100	**32000**		48	J	**15000**		94	J	410	
Benzo [a] Pyrene	61	**32000**		41	J	**14000**		**74**	J	**320**	J
Indeno [1,2,3-cd] Pyrene	3200	**19000**		20	J	**9800**		41	J	200	J
Dibenzo [a,h] anthracene	14	**7800**	J	ND		**3600**	J	**20**	J	**94**	J
Metals (ppm)	**SB**										
Arsenic	13.1	4.2		0.99		1.0		1.9	B	2.8	
Cadmium	5.66	0.19	N	0.20	N	0.21	N	0.21	N	0.22	N
Chromium	96.3	11.1		16.0		18.5		26.2		13.6	
Copper	118	17.0		22.8		17.5		26.0		22.6	
Lead	896	3.7		3.9		3.0		7.3		20.5	
Mercury	0.72	0.0046		0.0033		0.0038		0.0036		0.0060	
Nickel	43.4	41.1		17.3		18.8		29.4		20.2	
Zinc	373.4	32.7		26.0		24.9		40.2		27.6	
Wet Chem Analysis (ppm)											
Cyanide (Total)	**	12.4		0.54		10.2		0.52		0.56	
Phenols	0.03	**11.7**		0.27		**4.44**		**0.32**		**0.34**	
% Solids		96.4				92.4		92.5		88.2	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		**85-5**		**85-5**		**85-5**		**85-5A**		**85-6**		**85-6**	
Sample Depth (ft.)		**4-5**		**6-7**		**12-13**		**12-13**		**2-3**		**12-15**	
Analyte	**RSCO**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**
VOC by EPA 8260													
Methylene Chloride	100	**360**	J	**130**	J	**120**	J	**130**	J	**200**	J	**260**	J
Acetone	110	**2200**	J	**1000**	J	**1200**	J	**1000**	J	**1100**	JB	**1700**	JB
Benzene	60	ND		ND		ND		ND		ND		ND	
Toluene	1500	200	J	ND		ND		ND		ND		ND	
Xylenes (Total)	1200	260	J	ND		ND		ND		ND		ND	
Semivolatiles by EPA 8270													
Phenol	30	**1100**	J	ND		**53**	J	ND		ND		ND	
2-Chlorophenol	800	ND		ND		ND		ND		ND		ND	
2-Methylphenol	100	**400**	J	ND		ND		ND		ND		ND	
4-Methylphenol	900	**1800**	J	ND		85	J	77	J	30	J	86	J
Naphthalene	13000	2600	J	6	J	210	J	160	J	60	J	360	J
2-Methylnaphthalene	36400	1400	J	ND		140	J	100	J	60	J	150	J
Acenaphthylene	41000	6500	J	14	J	160	J	170	J	72	J	560	J
Dibenzofuran	6200	2200	J	ND		210	J	190	J	60	J	330	J
Fluorene	50000	3200	J	6	J	350	J	210	J	92	J	1,200	
Phenanthrene	50000	38000		42	J	3000		2500		850		4,400	
Anthracene	50000	19000		26	J	1400	J	1100		240	J	1,200	
Fluoranthene	50000	**79000**		120	J	4300		3300		970		4,400	
Pyrene	50000	**98000**		120	J	5400		4900		1,100		5,000	
Benzo [a] anthracene	224	**100000**		140	J	**6500**		**5100**		**740**		**2,400**	
Chrysene	400	**84000**		120	J	**5600**		**4200**		**850**		**2,900**	
Benzo [b] Fluoranthene	1100	**69000**		91	J	**6500**		**6400**		1,000		**2,400**	
Benzo [k] Fluoranthene	1100	**64000**		100	J	**9400**		**4000**		710		**1,900**	
Benzo [a] Pyrene	61	**82000**		**100**	J	**6300**		**4400**		**800**		**2,400**	
Indeno [1,2,3-cd] Pyrene	3200	**7300**	J	50	J	300	J	150	J	60	J	350	J
Dibenzo [a,h] anthracene	14	**4400**	J	**24**	J	**180**	J	**80**	J	**19**	J	**130**	J
Metals (ppm)	**SB**												
Arsenic	13.1	**16.5**		3.0		1.7	B	1.7	B	4.9		**28.2**	
Cadmium	5.66	1.2	N	0.21	N	0.21	N	0.20	N	0.21	N	0.60	BN
Chromium	96.3	20.0		21.7		18.0		21.5		30.5		15.0	
Copper	118	29.3		21.4		19.6		20.8		28.8		74.3	
Lead	896	68.5		7.7		5.5		4.9		152		316	
Mercury	0.72	0.019		0.012		0.0066		0.0038		0.1500		0.3000	
Nickel	43.4	20.7		24.5		19.5		23.5		18.2		26.6	
Zinc	373.4	43.7		32.1		24.0		28.7		246		**983**	
Wet Chem Analysis (ppm)													
Cyanide (Total)	**	0.58	U	0.68		0.82		0.6		0.54		0.59	
Phenols	0.03	**11.6**		**0.94**		**1.86**		**4.71**		**0.38**		**2.28**	
% Solids		85.8		77.2		80.2		82.6		89.3		83.2	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		**85-7**		**85-7**		**85-7**		**85-8**		**85-8**		**85-9**		**85-9**	
Sample Depth (ft.)		**6-7**		**7-8**		**16-17**		**8-12**		**12-13**		**8-9**		**9-10**	
Analyte	**RSCO**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**
VOC by EPA 8260 (ppb)															
Methylene Chloride	100	**170**	J	**160**	J	**160**	J	**730**	J	**1200**	J	**280**	J	**150**	J
Acetone	110	**1400**	J	**1400**	J	**1100**	J	**2600**	B	**3800**	B	**1400**	JB	**1600**	J
Benzene	60	ND		ND		ND		ND		**200**	J	ND		ND	
Toluene	1500	ND		ND		ND		ND		230	J	ND		ND	
Xylenes (Total)	1200	ND		ND		ND		ND		530	J	ND		ND	
Semivolatiles by EPA 8270 (ppb)															
Phenol	30	ND		ND		ND		ND		**1,400**	J	ND		ND	
2-Chlorophenol	800	ND		ND		ND		ND		ND		ND		ND	
2-Methylphenol	100	16	J	ND		ND		ND		**800**	J	**230**	J	ND	
4-Methylphenol	900	ND		ND		ND		ND		**2,700**	J	ND		ND	
Naphthalene	13000	28	J	5	J	ND		64	J	**15,000**		1,000	J	46	J
2-Methylnaphthalene	36400	13	J	ND		ND		20	J	11,000		1,500	J	71	J
Acenaphthylene	41000	54	J	5	J	ND		8	J	6,900	J	3,400	J	190	J
Dibenzofuran	6200	15	J	ND		ND		21	J	**14,000**		2,900	J	160	J
Fluorene	50000	21	J	ND		ND		94	J	20,000		3,900		230	J
Phenanthrene	50000	220	J	14	J	ND		220	J	**73,000**		18,000		1200	
Anthracene	50000	96	J	6	J	ND		64	J	14,000		6,900		420	
Fluoranthene	50000	460		8	J	ND		120	J	44,000		15,000		1100	
Pyrene	50000	440		8	J	4	J	190	J	34,000		14,000		860	
Benzo [a] anthracene	224	**440**		5	J	ND		54	J	**18,000**		**10,000**		**700**	
Chrysene	400	400		4	J	ND		73	J	**18,000**		**8,800**		**580**	
Benzo [b] Fluoranthene	1100	320	J	ND		ND		86	J	**9,000**	J	**4,600**		300	J
Benzo [k] Fluoranthene	1100	430		ND		ND		43	J	**14,000**		**7,100**		550	
Benzo [a] Pyrene	61	**450**		ND		ND		92	J	**12,000**		**7,200**		**460**	
Indeno [1,2,3-cd] Pyrene	3200	260	J	ND		ND		96	J	**64,000**	J	2,100	J	230	J
Dibenzo [a,h] anthracene	14	**110**	J	ND		ND		**30**	J	**2,300**	J	**1,000**	J	**92**	J
Metals (ppm)	**SB**														
Arsenic	13.1	1.7	B	1.1		1.3	B	1.9		10		5.5		1.7	B
Cadmium	5.66	0.21	N	0.22	N	0.20	N	0.19	N	0.22	N	0.24	N	0.21	N
Chromium	96.3	33.5		7.9		10.1		26.3		31.5		30.3		16.1	
Copper	118	31.6		8.6		14.8		23.9		58.1		27.8		30.4	
Lead	896	22.5		2.4		3.6		135		79		16.4		7.3	
Mercury	0.72	0.064		0.0021		0.0022		0.079		0.14		0.075		0.0079	
Nickel	43.4	43.2		12.8		19.8		**57.9**		26.5		22.4		38.9	
Zinc	373.4	53.8		12.5		19.6		72		98		42.4		68.2	
Wet Chem Analysis (ppm)															
Cyanide (Total)	**	0.60		5.07		0.970		0.56		0.59		0.59		0.56	
Phenols	0.03	**0.29**		**0.630**		**0.510**		**0.47**		**10.9**		**4.78**		**0.910**	
% Solids		84.3		86.7		77.3		85		84.7		83.9		88.2	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		85-10		85-10		85-11		85-11		85-12		85-12		85-12		85-12A	
Sample Depth (ft.)		6-8		12-14		4-6		6-8		9-10		10-11		14-15		14-15	
Analyte	RSCO		Q		Q		Q		Q		Q		Q		Q		Q
VOC by EPA 8260 (ppb)																	
Methylene Chloride	100	**210**	J	**480**	J	**250**	J	**290**	J	**160**	JB	**170**	JB	**200**	JB	**190**	JB
Acetone	110	**960**	JB	**5900**	J	**1,300**	JB	**1000**	JB	**1700**	JB	**1,900**	JB	**2,100**	JB	**1300**	JB
Benzene	60	ND		**1400**	J	ND		ND		ND		ND		ND		ND	
Toluene	1500	ND		**5000**	J	150	J	420	J	49	J	19	J	ND		ND	
Xylenes (Total)	1200	ND		**16000**		ND		ND		110	J	ND		ND		ND	
Semivolatiles by EPA 8270 (ppb)																	
Phenol	30	22	J	ND		ND		ND		**38**	J	ND		ND		ND	
2-Chlorophenol	800	ND		ND		ND		ND		ND	U	ND		ND		ND	
2-Methylphenol	100	19	J	ND		ND		29	J	39	J	ND		ND		ND	
4-Methylphenol	900	63	J	ND		ND		93	J	150	J	ND		ND		ND	
Naphthalene	13000	190	J	**140,000**		1,700	J	120	J	1400		90	J	30	J	ND	
2-Methylnaphthalene	36400	230	J	**92,000**		780	J	100	J	310	J	59	J	32	J	ND	
Acenaphthylene	41000	470		**68,000**		4,200	J	520	J	140	J	60	J	23	J	ND	
Dibenzofuran	6200	310	J	**61,000**		1,000	J	95	J	400		37	J	14	J	ND	
Fluorene	50000	500		**89,000**		1,800	J	100	J	800		60	J	27	J	ND	
Phenanthrene	50000	1,500		**200,000**		27,000		1,000		420		240	J	85	J	12	J
Anthracene	50000	620		**82,000**		6,600	J	590	J	210	J	100	J	39	J	ND	
Fluoranthene	50000	1,700		**110,000**		43,000		3,500		150	J	190	J	70	J	16	J
Pyrene	50000	1,800		**80,000**		47,000		4,100		100	J	150	J	62	J	13	J
Benzo [a] anthracene	224	**1,700**		**54,000**		**27,000**		**3,300**		110	J	160	J	60	J	13	J
Chrysene	400	**1,400**		**43,000**		**28,000**		**2,700**		77	J	120	J	41	J	8	J
Benzo [b] Fluoranthene	1100	**1,100**		**21,000**	J	**23,000**		**1,600**		52	J	76	J	24	J	ND	
Benzo [k] Fluoranthene	1100	**1,200**		**35,000**	J	**22,000**		**1,800**		93	J	140	J	47	J	ND	
Benzo [a] Pyrene	61	**1,100**		**31,000**	J	**28,000**		**2,000**		**76**	J	**110**	J	37	J	ND	
Indeno [1,2,3-cd] Pyrene	3200	180	J	**14,000**	J	**13,000**		240	J	35	J	49	J	18	J	ND	
Dibenzo [a,h] anthracene	14	**99**	J	**6,100**	J	**4,100**	J	**130**	J	**23**	J	**28**	J	ND		ND	
Metals (ppm)	**SB**																
Arsenic	13.1	1.6	B	2.0	B			2.0		1.1		1.1	B	1.1		1.0	
Cadmium	5.66	0.21	N	0.21	N			0.20	N	0.22	N	0.20	N	0.22	N	0.20	N
Chromium	96.3	17.7		20.8				18.4		16.5		13.0		22.2		22.6	
Copper	118	16.0		22.5				17.0		**583**		75.6		63.0		57.2	
Lead	896	4.8		9.4				4.5		9.0		5.1		6.2		8.9	
Mercury	0.72	0.0028		0.0210				0.0026		0.0045		0.0032		0.0036		0.0034	
Nickel	43.4	21.3		24.9				22.8		14.9		12.8		22.1		20.4	
Zinc	373.4	27		33				26.8		95.4		40.6		63.8		56.2	
Wet Chem Analysis (ppm)																	
Cyanide (Total)	**	0.55		2.47				0.54		0.56		0.53		0.74		0.51	
Phenols	0.03	**0.39**		**2.53**				**1.24**		**7.13**		**1.47**		0.28		**1.63**	
% Solids		88.2		80.8				89.9		91		91		88.3		93.1	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		85-13		85-13		85-13A		85-14		85-14		85-14	
Sample Depth (ft.)	NYSDEC	7-8		13-14		13-14		3-4		4-5		11-12	
Analyte	RSCO		Q		Q		Q		Q		Q		Q
VOC by EPA 8260 (ppb)													
Methylene Chloride	100	**180**	JB	**190**	JB	**220**	JB	**180**	JB	**470**	JB	**330**	JB
Acetone	110	**1200**	JB	**1000**	JB	**1100**	JB	**1100**	JB	**2200**	JB	**1200**	JB
Benzene	60	**160**	J	**900**	J	**1300**	J	45	J	**530**	J	**170**	J
Toluene	1500	270	J	350	J	530	J	80	J	430	J	220	J
Xylenes (Total)	1200	180	J	500	J	810	J	170	J	490	J	1000	J
Semivolatiles by EPA 8270 (ppb)													
Phenol	30	**1200**	J	**410**	J	**84**	J	**47**	J	ND		**150**	J
2-Chlorophenol	800	ND		ND		ND		ND		ND		ND	
2-Methylphenol	100	ND		ND		64	J	44	J	ND		93	J
4-Methylphenol	900	**2100**	J	600	J	230	J	150	J	ND		380	J
Naphthalene	13000	2000	J	1300	J	580	J	210	J	1300	J	7300	E
2-Methylnaphthalene	36400	1100	J	870	J	380	J	120	J	2000	J	4800	E
Acenaphthylene	41000	6800	J	2300	J	690	J	ND		1800	J	1700	
Dibenzofuran	6200	1400	J	1600	J	490	J	140	J	2500	J	4500	E
Fluorene	50000	2900	J	4400	J	1100		340	J	13000		7400	E
Phenanthrene	50000	25000		24000		4800		2200		**110000**	E	23000	E
Anthracene	50000	15000	J	13000		2900		980		42000	E	7900	E
Fluoranthene	50000	42000		27000		5000		2500		**59000**	E	10000	E
Pyrene	50000	**54000**		30000		7200		2400		**83000**	E	7700	E
Benzo [a] anthracene	224	**71000**		**34000**		**10000**	E	**2700**		**68000**	E	**7700**	E
Chrysene	400	**58000**		**26000**		**8800**	E	**2600**		**66000**	E	**6500**	E
Benzo [b] Fluoranthene	1100	**44000**		**16000**		**9500**	E	**2400**		**38000**	E	**6900**	E
Benzo [k] Fluoranthene	1100	**54000**		**19000**		**4200**		**1700**		**18000**		**2500**	
Benzo [a] Pyrene	61	**61000**		**21000**		**9200**	E	**2400**		**51000**	E	**5800**	E
Indeno [1,2,3-cd] Pyrene	3200	**38000**		**16000**		1800		370	J	**14000**		560	
Dibenzo [a,h] anthracene	14	**21000**		**9300**		**1200**		**200**	J	**7700**		**280**	J
Metals (ppm)	**SB**												
Arsenic	13.1	4.8		3.6		6.9		**13.2**		7.6		9.2	
Cadmium	5.66	0.22	N	0.20	N	0.21	N	**14.6**	N	2.0	N	0.85	BN
Chromium	96.3	18.2		8.0		21.2		20.0		18.7		26.2	
Copper	118	28.8		37.9		68.4		32.2		114		54.2	
Lead	896	81.2		31.9		107		**967**		683		266	
Mercury	0.72	0.11		0.074		0.071		0.53		**1.6**		**1.1**	
Nickel	43.4	21.2		13.5		26.1		11.8		14.6		27.5	
Zinc	373.4	117		46.6		187		**1790**		**880**		**820**	
Wet Chem Analysis (ppm)													
Cyanide (Total)	**	0.56		0.59		10.6		0.53		0.59		0.63	
Phenols	0.03	**10.8**		**4.81**		**4.23**		**2.26**		**8.58**		**3.98**	
% Solids		90		87.2		86.2		93.7		81.9		83.1	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

Sample Name		85-MW-2		85-MW-2		85-MW-2		85-MW-3		85-MW-3		85-MW-3	
Sample Depth (ft.)		7-8		8-9		13-14		5-6		8-9		13-14	
Analyte	NYSDEC RSCO		Q		Q		Q		Q		Q		Q
VOC by EPA 8260 (ppb)													
Methylene Chloride	100	**380**	JB	**360**	JB	**250**	JB	**620**	J	**580**	J	**880**	J
Acetone	110	**1200**	JB	ND		**940**	JB	**2100**	JB	**2000**	JB	**1800**	JB
Benzene	60	ND		ND		ND		ND		ND		ND	
Toluene	1500	ND		ND		ND		ND		ND		ND	
Xylenes (Total)	1200	ND		ND		ND		ND		ND		ND	
Semivolatiles by EPA 8270 (ppb)													
Phenol	30	ND		ND		ND		ND		ND		ND	
2-Chlorophenol	800	ND		ND		ND		ND		ND		ND	
2-Methylphenol	100	ND		ND		ND		ND		ND		ND	
4-Methylphenol	900	ND		ND		ND		41	J	ND		ND	
Naphthalene	13000	ND		120	J	ND		13	J	ND		28	J
2-Methylnaphthalene	36400	ND		88	J	ND		150	J	ND		5	J
Acenaphthylene	41000	ND		160	J	ND		190	J	22	J	4	J
Dibenzofuran	6200	ND		160	J	ND		630	J	ND		30	J
Fluorene	50000	ND		240	J	ND		1,100	J	ND		88	J
Phenanthrene	50000	ND		1700		ND		1,800		26	J	19	J
Anthracene	50000	ND		800	J	ND		460		11	J	12	J
Fluoranthene	50000	ND		3400		ND		870		33	J	15	J
Pyrene	50000	ND		3600		ND		730		32	J	15	J
Benzo [a] anthracene	224	ND		**5000**		ND		**380**		10	J	11	J
Chrysene	400	ND		**4500**		ND		280	J	8	J	10	J
Benzo [b] Fluoranthene	1100	ND		**4200**		ND		120	J	5	J	6	J
Benzo [k] Fluoranthene	1100	ND		**2100**		ND		200	J	7	J	8	J
Benzo [a] Pyrene	61	ND		**4900**		ND		**160**	J	7	J	8	J
Indeno [1,2,3-cd] Pyrene	3200	ND		1300		ND		56	J	ND		ND	
Dibenzo [a,h] anthracene	14	ND		**590**	J	ND		**25**	J	ND		ND	
Metals (ppm)	**SB**												
Arsenic	13.1	2.2		3.2		2.0		1.7	B	1.5	B	1.5	B
Cadmium	5.66	1.1		1.3		0.98		0.20	N	0.24	N	0.21	N
Chromium	96.3	23.2		23.3		40.4		26.7		69.8		17.2	
Copper	118	26.4		38.4		8.7		32.5		30.7		37.4	
Lead	896	5.4		46.7		4.3		5.5		7.9		6.3	
Mercury	0.72	0.0036		0.10		0.0044		0.0046	B	0.0036		0.0027	
Nickel	43.4	28.5		17.1		**53.7**		22.0		**235**		19.7	
Zinc	373.4	44.7		64.0		98.4		47		96		37	
Wet Chem Analysis (ppm)													
Cyanide (Total)	**	0.550		0.620		0.520		0.55		0.57		0.58	
Phenols	0.03	0.270		**1.58**		0.270		**1.05**		**0.48**		**3.26**	
% Solids		90.3		76.7		92.4		88.6		83.6		85.4	

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.

Table 1

GZA Soil Analytical Results

Former Manufactured Gas Plant

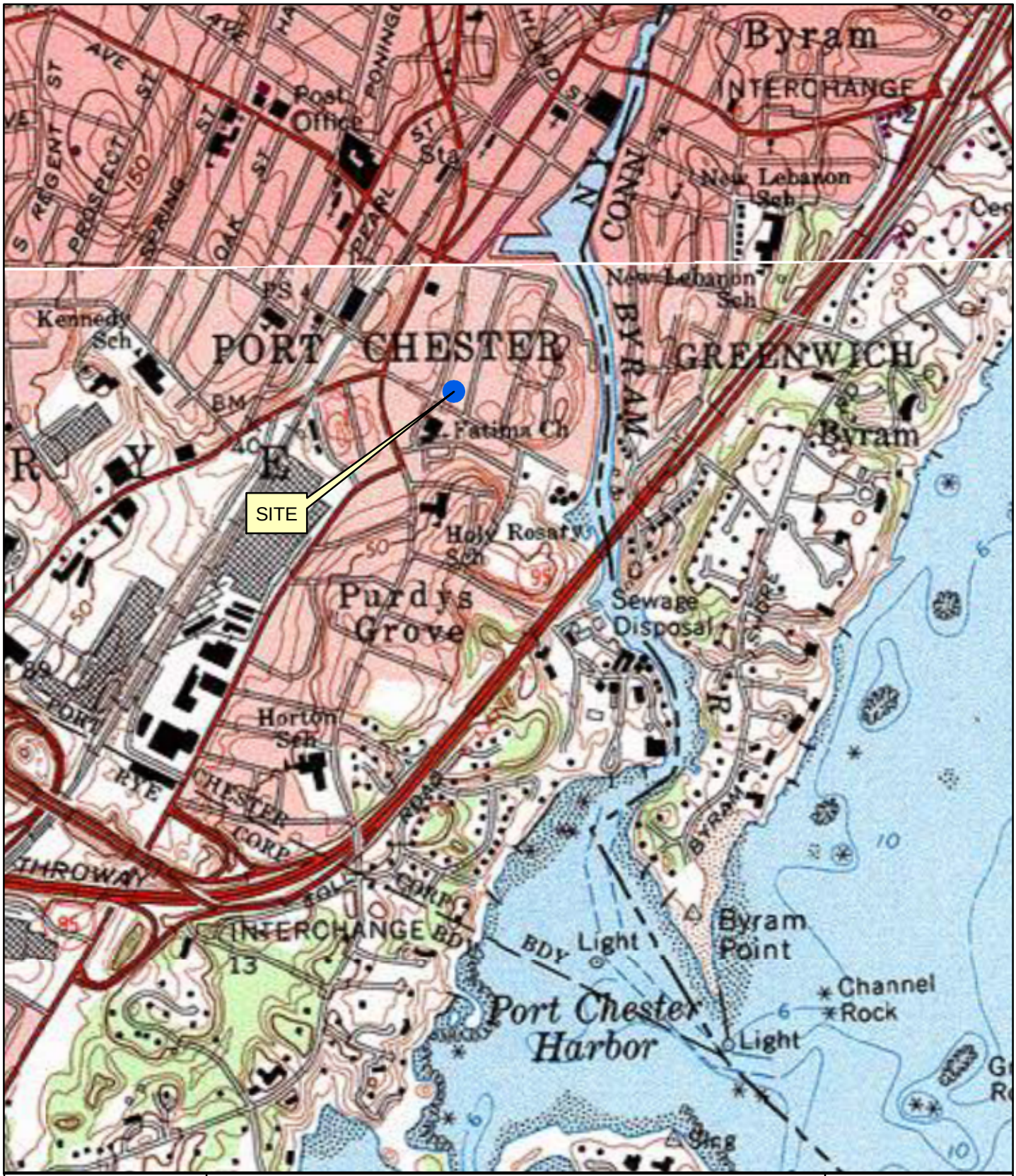
Sample Name		MW3R		MW3R		85-MW-4		85-MW-4		MW5	
Sample Depth (ft.)		6-8		10-12		7-8		8-9		9.5-10	
Analyte	NYSDEC RSCO		Q		Q		Q		Q		Q
VOC by EPA 8260 (ppb)											
Methylene Chloride	100	79	J	71	J	**310**	JB	**460**	JB	72	J
Acetone	110	ND		**1,500**		**1300**	JB	**1700**	JB	**1,500**	
Benzene	60	47	J	**190**	J	ND		ND		**100**	J
Toluene	1500	25	J	79	J	ND		ND		120	
Xylenes (Total)	1200	ND		200	J	ND		ND		180	J
Semivolatiles by EPA 8270 (ppb)											
Phenol	30	ND		ND		ND		ND		ND	
2-Chlorophenol	800	ND		ND		ND		ND		ND	
2-Methylphenol	100	ND		ND		ND		ND		ND	
4-Methylphenol	900	ND		ND		ND		ND		ND	
Naphthalene	13000	29	J	86	J	ND		ND		20	J
2-Methylnaphthalene	36400	20	J	51	J	ND		ND		12	J
Acenaphthylene	41000	180	J	40	J	ND		ND		14	J
Dibenzofuran	6200	1,400		50	J	ND		ND		12	J
Fluorene	50000	1,900		65	J	ND		ND		15	J
Phenanthrene	50000	1,200		170	J	ND		ND		91	J
Anthracene	50000	440	J	62	J	ND		ND		39	J
Fluoranthene	50000	990		210	J	ND		ND		200	
Pyrene	50000	740		230	J	ND		ND		230	J
Benzo [a] anthracene	224	**330**	J	190	J	ND		ND		190	J
Chrysene	400	280	J	180	J	ND		ND		180	J
Benzo [b] Fluoranthene	1100	210	J	230	J	ND		ND		210	J
Benzo [k] Fluoranthene	1100	310	J	250	J	ND		ND		280	J
Benzo [a] Pyrene	61	**310**	J	**270**	J	ND		ND		**330**	J
Indeno [1,2,3-cd] Pyrene	3200	190	J	160	J	ND		ND		320	J
Dibenzo [a,h] anthracene	14	**78**	J	**57**	J	ND		ND		**92**	J
Metals (ppm)	**SB**										
Arsenic	13.1					2.3		2.2			
Cadmium	5.66					1.1		1.1			
Chromium	96.3					20.9		15.4			
Copper	118					27.5		24.9			
Lead	896					5.4		4.7			
Mercury	0.72					0.0040		0.0040			
Nickel	43.4					25.8		23.9			
Zinc	373.4					43.8		39.3			
Wet Chem Analysis (ppm)											
Cyanide (Total)	**					0.540		0.560			
Phenols	0.03					0.280		0.280			
% Solids						90.4		88.3			

ND - Not Detected

SB - Site Background Metals Standards - Table 1

B - Compound also found in Blank

Table is based on GZA analytical results from samples collected in January and February 2001.



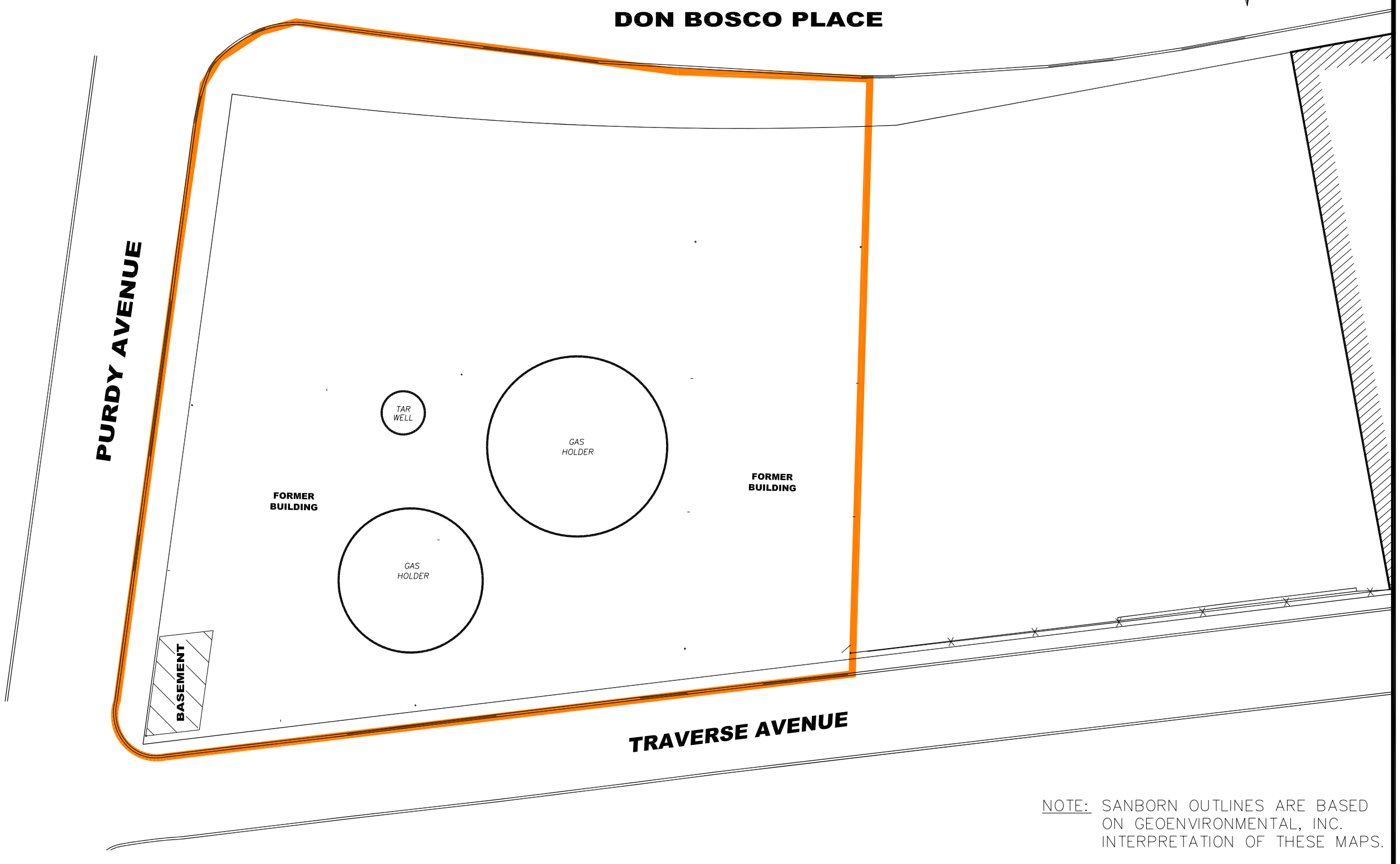
N

Scale 1:12,000

Site Location Map
Former Manufactured Gas Plant
Purdy Avenue
Port Chester, New York
Site # V00516-3
Index # D3-0001-02-02
Source: National Geographic, USGS 2002

Figure 1

Dresdner Robin
Project #
B-716-01



NOTE: SANBORN OUTLINES ARE BASED ON GEOENVIRONMENTAL, INC. INTERPRETATION OF THESE MAPS.

LEGEND:

FORMER MANUFACTURED GAS PLANT (MGP) SITE

APPROXIMATE LOCATION OF FORMER MGP PLANT

30 0 30 60

scale feet

SCALE SUBJECT TO VERIFICATION

SITE PLAN – BOUNDARIES AND SUSPECTED LOCATION OF FORMER MGP STRUCTURES
PORT CHESTER, NEW YORK

PREPARED FOR
VILLAGE OF PORT CHESTER

DATE: 02/25/02	DWG. # 2002.095-016
JM SORGE,INC.	FIGURE 2

DON BOSCO PLACE

PURDY AVENUE

TRAVERSE AVENUE

TP215

TP214

TP220

TP-220
TP-22GW

TP219
RI-14
RI-15

TP218
RI-13

RI-9

TAR WELL

TP213
RI-7

RI-8

TP206

GAS HOLDER

TP210

RI-6
TP212

FORMER BUILDING

FORMER BUILDING

RI-10
RI-11
TP216

RI-4
TP211

RI-5

TP207

PIT

TP205

GAS HOLDER

RI-2

RI-3

TP209

TP202

TP203

TP204

TP208

TP201

RI-12
TP217

LEGEND:

- APPROXIMATE TEST PIT SAMPLE LOCATION
- APPROXIMATE FORMER UST LOCATIONS
- APPROXIMATE TEST PIT LOCATION
- FENCE BOUNDARY
- SITE BOUNDARY
- APPROXIMATE LOCATION OF FORMER MGP PLANT STRUCTURES

0 25 50
scale feet
SCALE SUBJECT TO VERIFICATION

TEST PIT AND
UST LOCATIONS – 2003 SITE INVESTIGATION
PORT CHESTER, NEW YORK

PREPARED FOR
VILLAGE OF PORT CHESTER

DATE: 02/12/04	DWG. # 2002.095-dr3
JM SORGE,INC.	FIGURE 3

DON BOSCO PLACE

PURDY AVENUE

TRAVERSE AVENUE

SG-6
RI-B6
RI-B7
RI-B8
SG-9B
SG-9
RI-B5
SG-5
SG-8
SG-8B
TAR WELL
GAS HOLDER
FORMER BUILDING
RI-B4
SG-4
FORMER BUILDING
GAS HOLDER
SG-7
SG-7B
SG-1
RI-B1
SG-1R
SG-1RB
SG-2
RI-B2
SG-2R
SG-3
RI-B3
SG-3R

LEGEND:

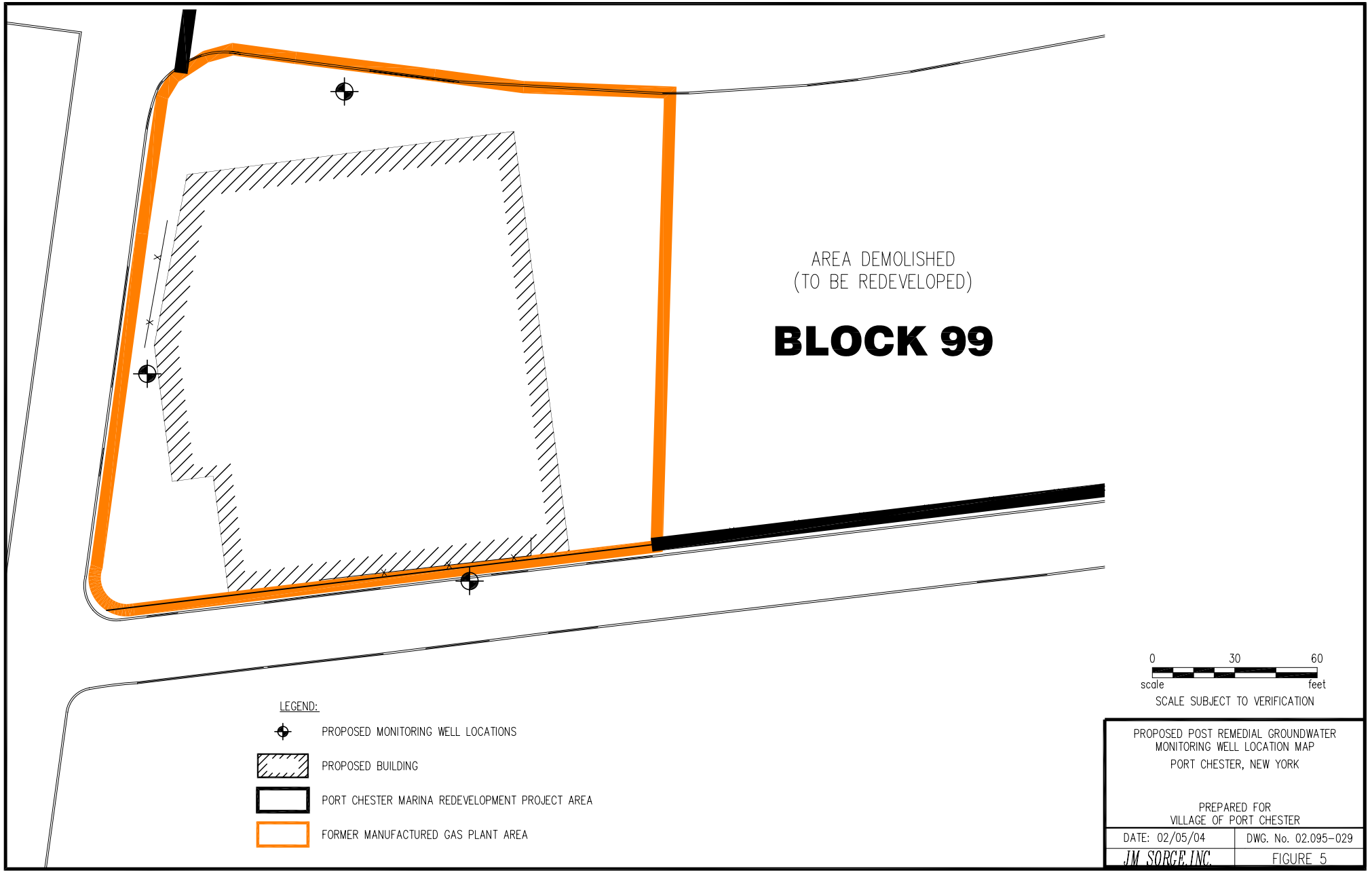
- APPROXIMATE SOIL GAS LOCATION
- APPROXIMATE SOIL SAMPLE LOCATION
- FENCE BOUNDARY
- SITE BOUNDARY
- APPROXIMATE LOCATION OF FORMER MGP PLANT STRUCTURES

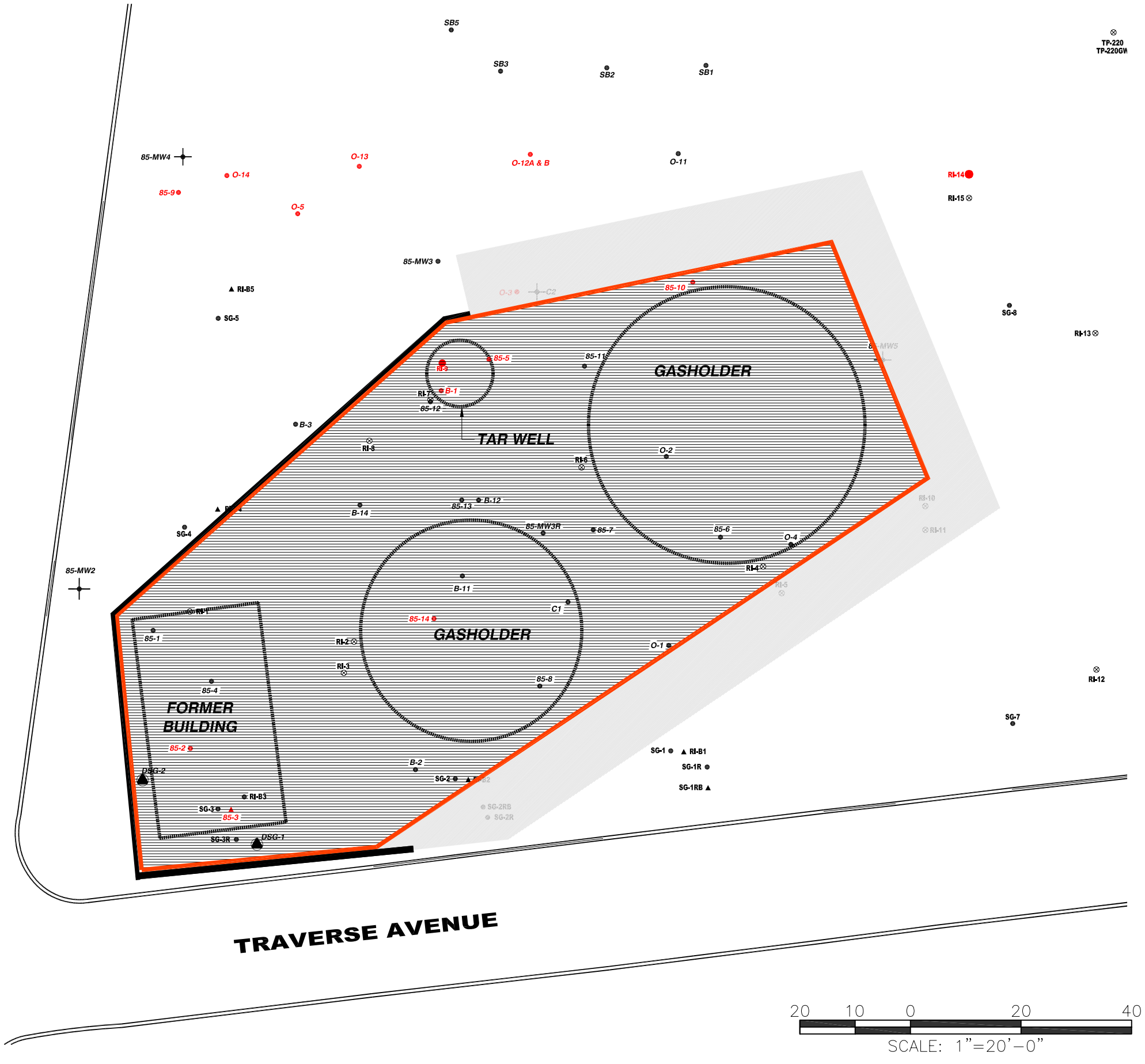
0 25 50
scale feet
SCALE SUBJECT TO VERIFICATION

SITE PLAN SHOWING
SOIL GAS AND SOIL BORING LOCATIONS
PORT CHESTER, NEW YORK

PREPARED FOR
VILLAGE OF PORT CHESTER

DATE: 02/25/02	DWG. # 2002.095-dr4
JM SORGE,INC.	FIGURE 4


AREA DEMOLISHED
(TO BE REDEVELOPED)
BLOCK 99
LEGEND:
PROPOSED MONITORING WELL LOCATIONS
PROPOSED BUILDING
PORT CHESTER MARINA REDEVELOPMENT PROJECT AREA
FORMER MANUFACTURED GAS PLANT AREA
0
30
60
scale
feet
SCALE SUBJECT TO VERIFICATION
PROPOSED POST REMEDIAL GROUNDWATER MONITORING WELL LOCATION MAP
PORT CHESTER, NEW YORK
PREPARED FOR
VILLAGE OF PORT CHESTER
DATE: 02/05/04
DWG. No. 02.095-029
JM SORGE INC.
FIGURE 5



LEGEND:

- SOIL BORING LOCATIONS
- DSG-1 PROPOSED SOIL GAS SAMPLING LOCATIONS
- APPROXIMATE LOCATION OF FORMER MGP PLANT
- EXCAVATION AREA
- SHEETING
- 1:1 SLOPE

PROJECT:

FORMER MANUFACTURED GAS PLANT

LOCATION:

VILLAGE OF PORT CHESTER
PORT CHESTER, NEW YORK

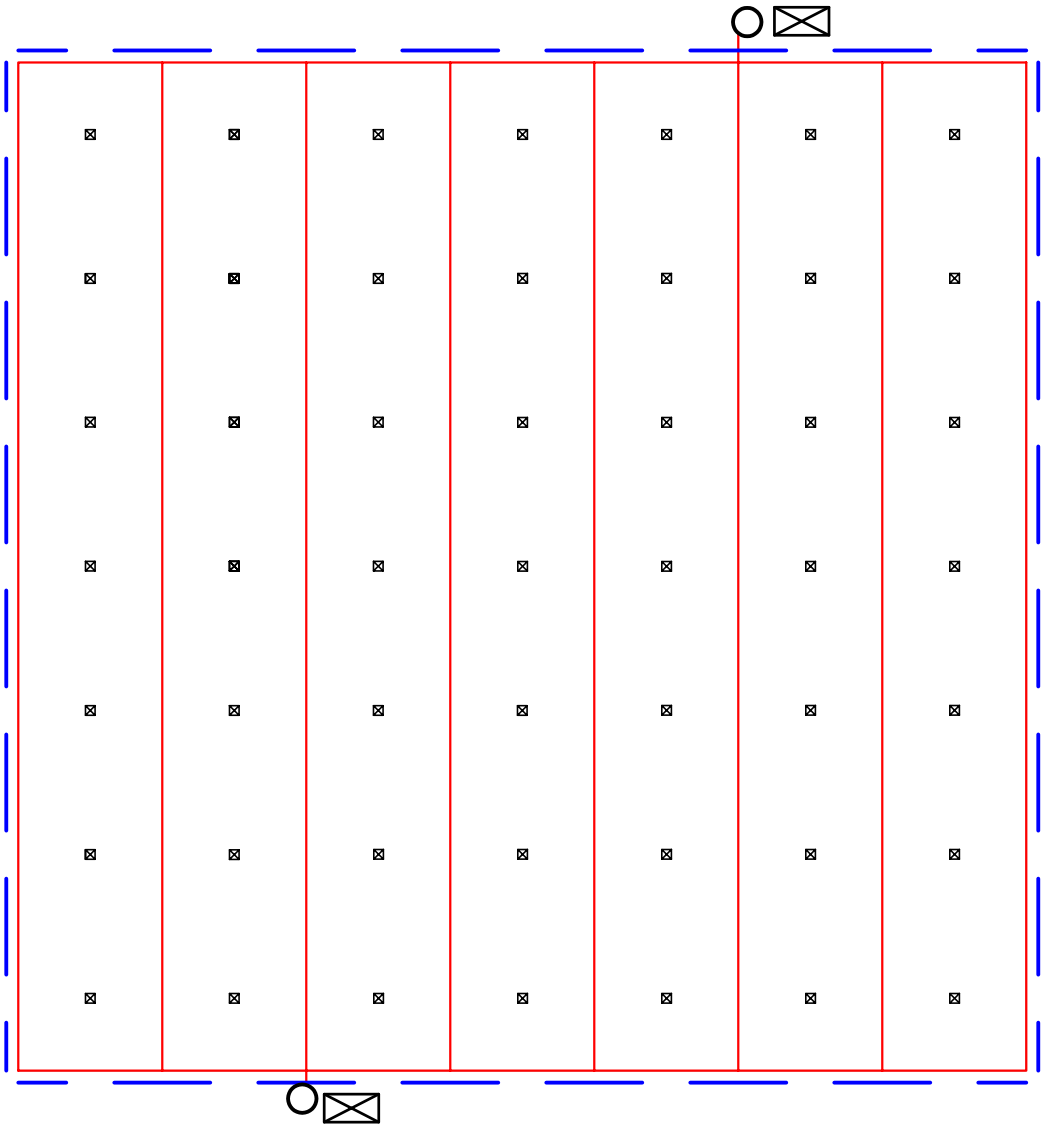
DRAWING TITLE:

PROPOSED SOIL GAS SAMPLING LOCATIONS MAP

DRESDNER ROBIN
371 WARREN STREET
JERSEY CITY, NEW JERSEY 07302
(201) 217-9200

DRAWN BY: OP	JOB NUMBER: B-716-01
CHECKED BY: BL	FILE:
DATE: 03.29.04	DWG. NUMBER: 6
SCALE: AS SHOWN	

J:_ENV.MANAGE.GROUP\B-716-01 PORT CHESTER MGP\FIGURES\SUBMISSION 02-29-04\FIG-6



6" DIAMETER PERFORATED HDPE PIPE

BUILDING FOOTPRINT

VERTICAL STANDPIPE

VENTILATION EQUIPMENT

COLUMNS

DRESDNER ROBIN

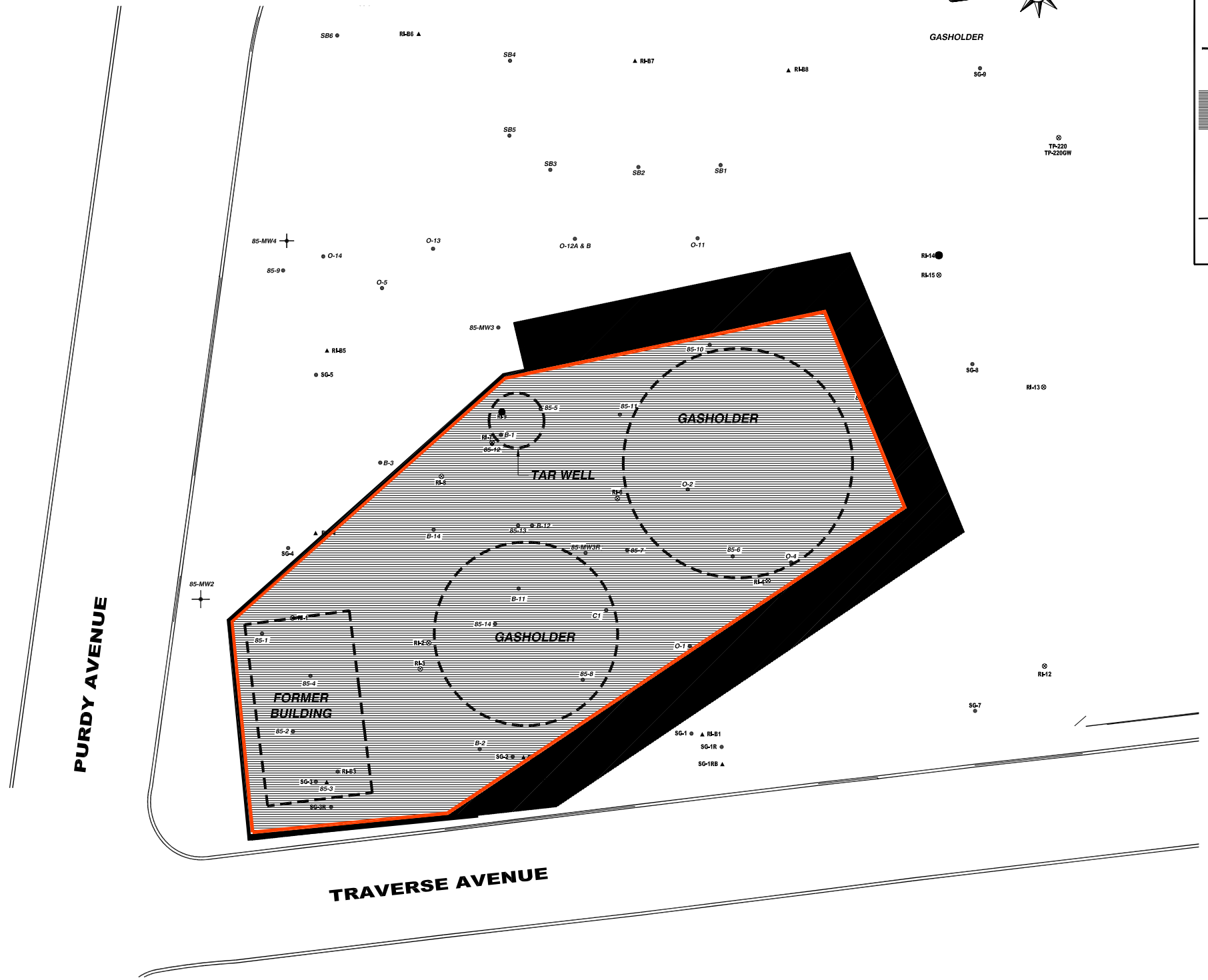
371 WARREN STREET
JERSEY CITY, NEW JERSEY 07302
(201) 217-9200

FORMER MANUFACTURED GAS PLANT

VILLAGE OF PORT CHESTER
PORT CHESTER, NEW YORK

CONCEPTUAL VAPOR COLLECTION SYSTEM LAYOUT

DRAWN BY: OP	JOB NUMBER: B-716-01
CHECKED BY: BL	FILE: FIG-6
DATE: FEBRURY 11, 2004	DWG. NUMBER: 7
SCALE: 1"= 40'-0"	



LEGEND:

- SOIL BORING LOCATIONS
- APPROXIMATE LOCATION OF FORMER MGP PLANT
- EXCAVATION AREA
- 1:1 SLOPE
- SHEETING

REVISIONS

NO.	DATE	ISSUED OR REVISION	BY

CONSULTANTS:

SCALE:

DRESDNER ROBIN
571 WARREN STREET, JERSEY CITY, NEW JERSEY 07302
(TEL) 201.217.9200 (FAX) 201.217.9607

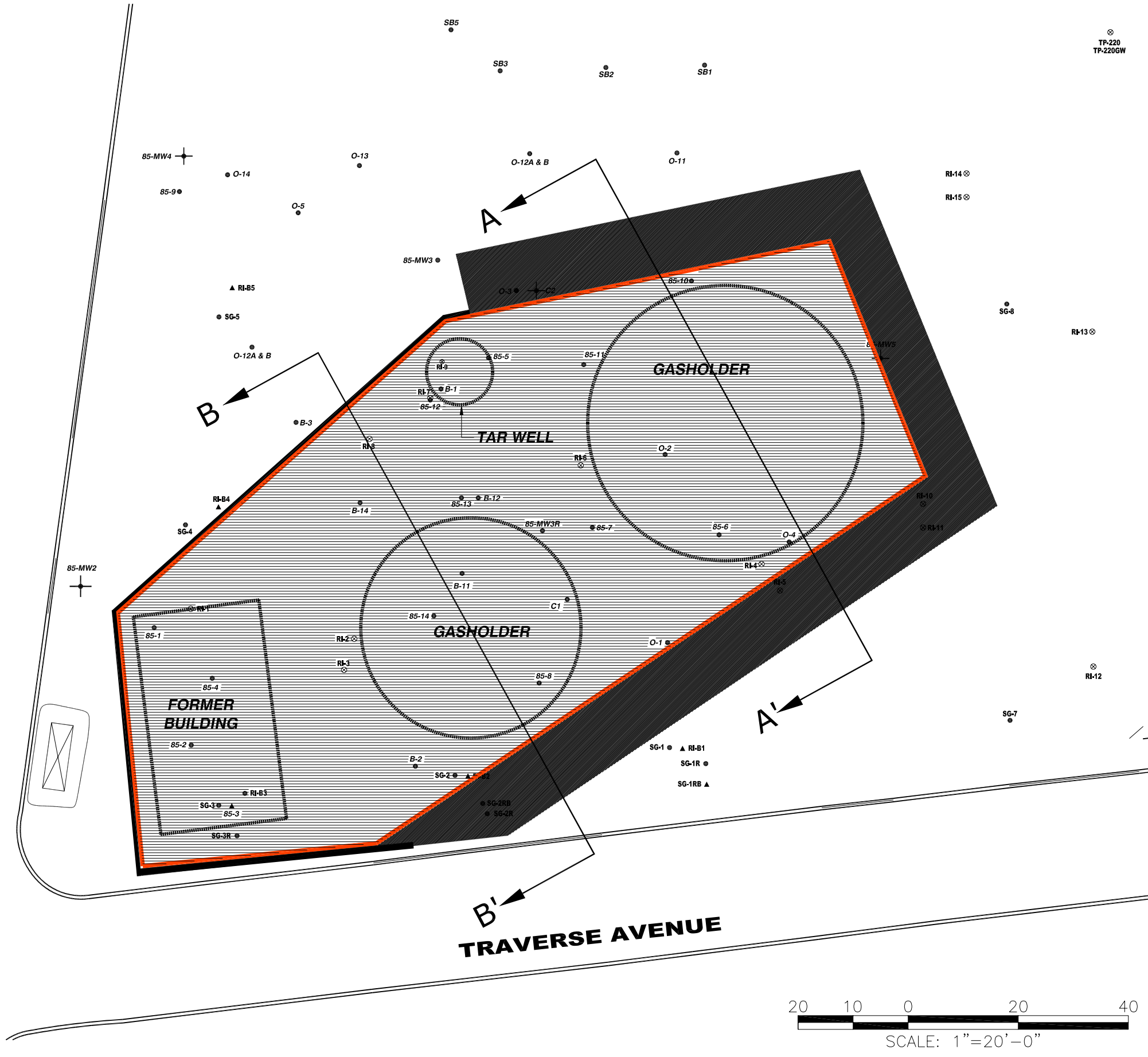
PROJECT:
FORMER MANUFACTURED GAS PLANT

LOCATION:
VILLAGE OF PORT CHESTER
PORT CHESTER, NEW YORK

DRAWING TITLE:
EXCAVATION PLAN

DRAWN BY: OP	JOB NUMBER: B0716-01
CHECKED BY: FW	FILE: FIGURES/FIG-2
DATE: 11.04.03	REVISION NO: 0
STAMP	DRAWING NUMBER: A

FREDERICK W. WORSTELL
PROFESSIONAL ENGINEER
NY STATE LICENSE NUMBER 069404



LEGEND:

- SOIL BORING LOCATIONS
- APPROXIMATE LOCATION OF FORMER MGP PLANT
- EXCAVATION AREA
- 1:1 SLOPE
- SHEETING
- A — CROSS SECTION LINE

PROJECT:

FORMER MANUFACTURED GAS PLANT

LOCATION:

VILLAGE OF PORT CHESTER
PORT CHESTER, NEW YORK

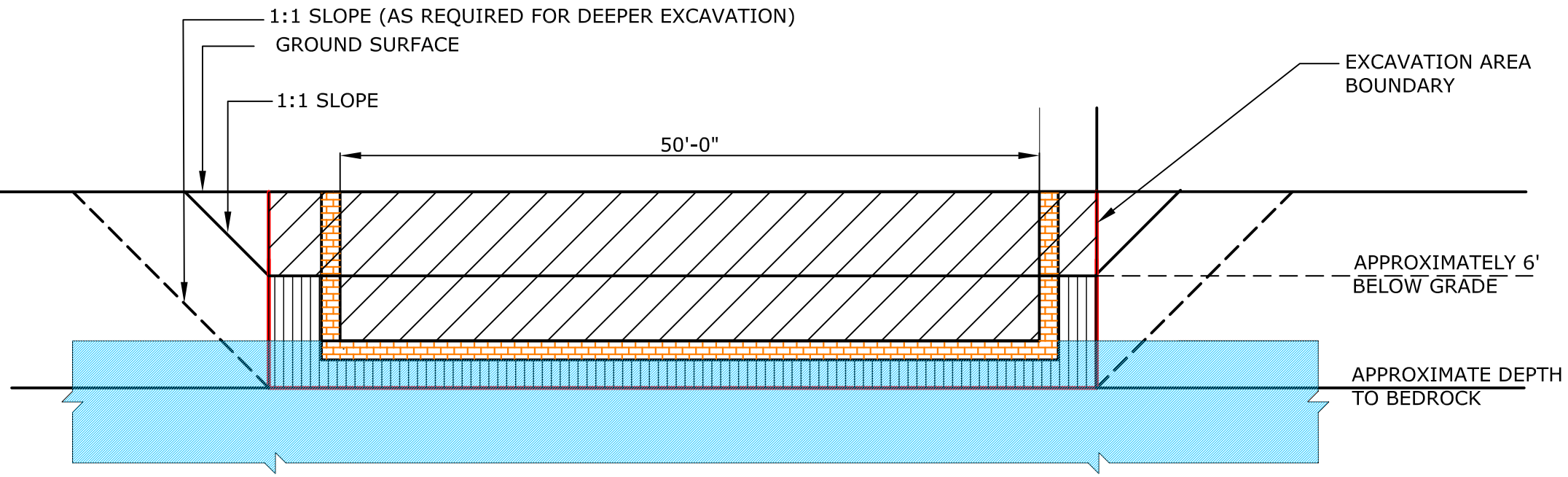
DRAWING TITLE:

GASHOLDER EXCAVATION PLAN
CROSS SECTION LINES

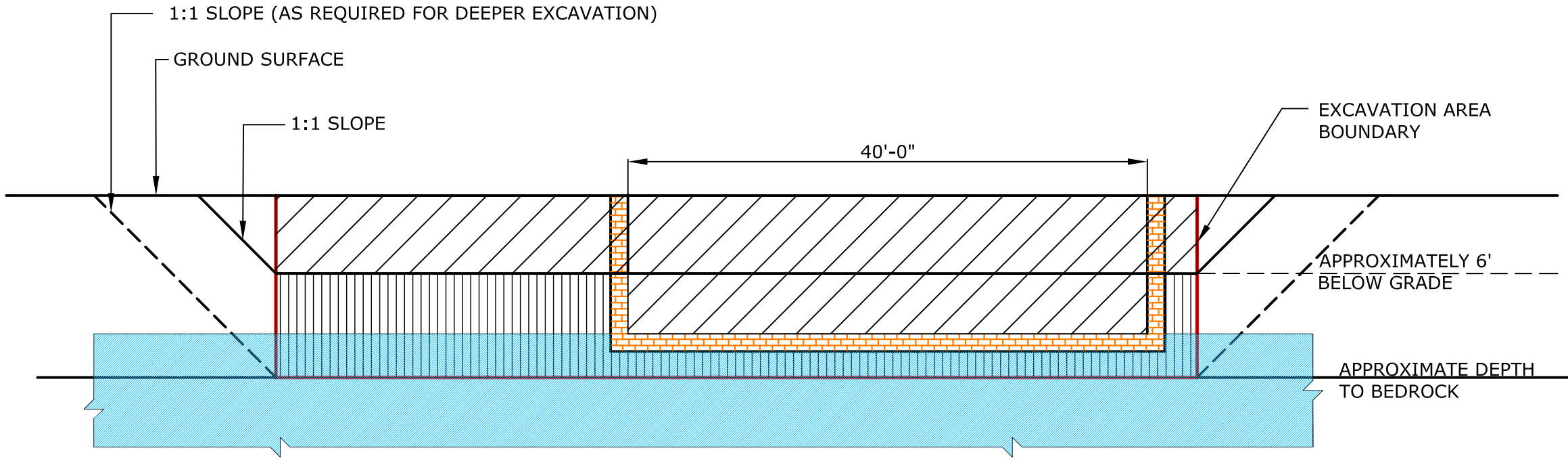
DRESDNER ROBIN
371 WARREN STREET
JERSEY CITY, NEW JERSEY 07302
(201) 217-9200

DRAWN BY: OP	JOB NUMBER: B-716-01
CHECKED BY: BL	FILE:
DATE: 11/04/03	DWG. NUMBER: A-1
SCALE: AS SHOWN	

J:_ENV.MANAGE.GROUP\B-716-01 PORT CHESTER MGP\FIGURES\FIG-A



SECTION A-A'



SECTION B-B'

LEGEND:

- REMOVED IF NAPL OR COAL TAR IS IDENTIFIED
- EXCAVATED AND REMOVED FROM THE SITE
- GASHOLDER FOUNDATION AND SIDEWALLS (MGP PLANT STRUCTURE)
- APPROXIMATE GROUND WATER SATURATED AREAS
- EXCAVATION AREA BOUNDARY

HORIZONTAL AND VERTICAL SCALE

10 5 0 10 20

SCALE: 1"=10'-0"

PROJECT:

FORMER MANUFACTURED GAS PLANT

LOCATION:

VILLAGE OF PORT CHESTER
PORT CHESTER, NEW YORK

DRAWING TITLE:

GASHOLDER EXCAVATION
CROSS SECTIONS

DRESDNER ROBIN
371 WARREN STREET
JERSEY CITY, NEW JERSEY 07302
(201) 217-9200

DRAWN BY:	JOB NUMBER:
OP	B-716-01
CHECKED BY:	FILE:
BL	
DATE:	DWG. NUMBER:
12/11/03	A-2
SCALE: AS SHOWN	

J:\ENV.MANAGE.GROUP\B-716-01 PORT CHESTER MGP\FIGURES\FIG-A

APPENDIX B
OPERATION, MONITORING & MAINTENANCE WORK PLAN
FORMER MANUFACTURED GAS PLANT
PURDY AVENUE
PORT CHESTER, NEW YORK
SITE # V00516-3

1.0 INTRODUCTION

1.1 Purpose

The property, 85 Purdy Avenue (Block 99, Lots 15, 16, 18A through 18H and Lot 19) in the Village of Port Chester, Westchester County, New York (herein referred to as the Site) was the former location of a Manufactured Gas Plant (MGP) and has undergone a remedial action. Site remedial investigations delineated soil contamination and confirmed the existence of structural remnants of the former MGP, including two (2) gasholders, and a tar well.

Remedial actions consisted of 1) investigations to expose and sample areas beneath the gasholder foundations; 2) removal of structures, contaminated soil, and product sources that have the potential to become mobile; and 3) control of potential contaminant migratory pathways.

These remedial actions performed pursuant to a Voluntary Cleanup Agreement (VCA) and a Remedial Action Work Plan has established administrative and engineering controls (Controls) to ensure protection of the general environment and site occupants. These controls as described more fully herein are to be administered in strict accord with the provisions of this Operation, Monitoring and Maintenance (OM&M) Work Plan.

1.2 General History

Historical information indicates a small MGP operated at the Site from the 1860's through the 1880's. After the MGP was dismantled, portions of the Site were utilized for various commercial and industrial operations including stables, warehouse, storage, iron works, a waste oil reclaiming company, a dress factory, machine shop, paper storage, mail distribution facility, and a retail gasoline station.

Soil and groundwater investigations have been performed at the Site since November 1999. Soil contamination consisting of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCS), and metals (arsenic, cadmium, copper, mercury, lead, nickel, zinc, and cyanide) was detected across the Site in varying concentrations. VOCs (including benzene, toluene, ethylbenzene, and xylene) and SVOCs were detected in the groundwater at the Site.

Remedial investigations were performed in 2003 that located subsurface elements of the former MGP facility including two (2) gasholders and a tar well structure. In addition, two (2) underground storage tanks (USTs) not associated with the MGP operations were located. The USTs were investigated and removed from the Site under the oversight of the New York State Department of Environmental Conservation (NYSDEC) Project Manager. The remediation of contamination associated with the MGP structures is addressed in the Site Remedial Action Work Plan (RAWP). Soil gas sampling was performed as part of the Site Remedial Investigations. Soil gas analytical results indicated the presence of trichloroethene (TCE) in multiple locations along the eastern Site boundary. No soil or groundwater sources of TCE were identified at the Site.

1.3 Summary of Remedial Actions

Remedial actions conducted at the property have removed areas of contaminated soil/debris and remnants of the MGP including a tar well and portions of the gasholder structures. Soils contaminated with various chemical and toxic metal constituents remain on the property at depths beginning 3 to 4 feet below ground surface (bgs). Groundwater underlying the property has been marginally impacted by these constituents. The remedy was designed to remove the top four to six feet of soil and material within a defined excavation area. The interval below this layer to a depth of approximately twelve feet below grade surface (bgs) was investigated for the presence of non aqueous phase liquid (NAPL) or flowing coal tar. Areas found to contain these conditions were excavated and removed.

1.4 Summary of Administrative and Engineering Controls

A Deed Restriction (Environmental Easement) for the Site provides notice of the existence of subsurface contamination at the Site to a depth of approximately twelve (12) feet bgs. This administrative control also provides details regarding the engineering controls implemented at the Site. These engineering controls serve to protect human health and the environment by controlling potential migratory pathways of the subsurface contamination.

Engineering controls consist of a Cover System, a Vapor Barrier, Vapor Collection System, and groundwater monitoring wells. The Vapor Barrier and Vapor Collection System are installed within the footprint of the Site building. The Vapor Collection System consists of six (6) inch diameter perforated HDPE pipe. The pipe is installed within a bedding material with granular material to allow for gas exchange. The pipe system includes a perimeter line installed along the building foundation and laterals spaced approximately thirty (30) feet apart beneath the lowest floor slab. The collection system vents to vertical standpipes installed at opposite ends of the building. The standpipe vents serve as monitoring points to record soil gas concentrations. Three (3) groundwater monitoring wells are installed in the overburden soils at the Site perimeter.

A 20 mil thick HDPE vapor barrier is installed above the Vapor Collection System. The Vapor Barrier covers the Vapor Collection System and extends to the edge of the building footprint.

The Cover System consists of concrete, asphalt, and clean soil. Concrete and/or asphalt are utilized as surface cover for roads, sidewalks, and parking lots. Slabs and foundations are constructed of concrete, and landscaped areas are covered with clean soil. The property owner is required to contact the NYSDEC when any disturbance of the Cover System occurs beyond six inches for pavement or two feet for landscaped areas.

2.0 INSPECTION AND MONITORING PROCEDURES

2.1 Personnel

Personnel qualified to perform inspections and monitoring of Site Controls shall be environmental professionals such as engineers, scientists, or consultants. Qualified individuals shall be properly trained in health and safety procedures in accordance with 29 CFR 1910.120. The number of personnel required for property inspections, monitoring activities, and repairs to the Site Controls will be determined on an as needed basis. The property owner is responsible for hiring qualified personnel to perform inspections, monitoring, and repairs at the Site.

2.2 Conditions to Be Monitored

All observations and activities related to the OM&M program shall be recorded in a bound field logbook. A copy of the logbook shall be made available to NYSDEC personnel upon written request.

Cover System

A physical inspection of the Cover System will be performed to identify damaged areas or excessive wear.

- Asphalt and cement areas will be examined for cracks, punctures, and spills/stains. Asphalt and concrete found to have cracks that are more extensive than surficial damage require repair.
- Soil in landscaped areas will be examined for erosion and spills/stains. Eroded topsoil must be replaced to maintain a minimum thickness of two (2) feet in landscaped areas.

Vapor Collection System

Inspection and monitoring of the Vapor Collection System will consist of the following:

- The ventilation equipment should be inspected to ensure that it is operating properly and the exhaust is maintained at the appropriate flow rate. Repairs to these components are required if they are found to be damaged.
- The vertical standpipes should be inspected for physical blockage, structural integrity, and to assure that rain deflection caps are in place to prevent the Vapor Collection System from filling with rainwater. Repairs to these components are required if they are found to be damaged.
- Objectionable or nuisance odors emanating from the vertical standpipes will be documented.

- Vertical standpipes will be monitored for VOCs utilizing a properly calibrated photoionization detector (PID). PID monitoring will be performed at each standpipe. VOC concentrations shall be recorded every two (2) minutes for a period of up to one half hour, or until readings stabilize within 10% for three (3) consecutive measurements.
- Soil gas samples should be collected from each vertical standpipe through Teflon tubing into laboratory-supplied Summa canisters over an eight-hour time period (one standard work shift). Soil gas samples should be analyzed for VOCs using United States Environmental Protection Agency (EPA) Method TO-15 with a forward library search. Sampling frequency is discussed in Section 5.0.

Groundwater Monitoring

- Groundwater level measurements and headspace readings should be collected from each of the three (3) groundwater monitoring wells. Headspace readings should be measured with a properly calibrated PID.
- Groundwater samples should be collected from each monitoring well utilizing the EPA Low-Flow Groundwater Sampling Procedures. Sampling frequency is discussed in Section 5.0.
- Groundwater samples should be analyzed for VOCs, SVOCs, and Metals.
- Repairs to the monitoring wells are required if they are found to be damaged.

3.0 MAINTENANCE PROCEDURES

The property owner is responsible for the completion of repairs to the Site Controls, including retaining qualified personnel to perform necessary repairs.

- Asphalt shall be repaired with bituminous patch material.
- Concrete shall be repaired with masonry patch material.
- Landscaped areas shall be maintained with clean topsoil.
- Cracks in the Vapor Collection System standpipes shall be repaired with an appropriate sealant, or the standpipes shall be replaced with high density polyethylene (HDPE) pipe.
- Rain deflector caps for the Vapor Collection System shall be replaced as needed.
- Repairs to the Vapor Collection System ventilation system shall be completed as needed.
- Repairs to the groundwater monitoring wells shall be completed as needed.

4.0 COVER SYSTEM MODIFICATION

Modification of the Cover System is defined as intrusive activities that penetrate greater than six (6) inches through either asphalt or cement cover, and two (2) feet through landscaped cover areas. Activities that constitute a Cover System modification require the notification and approval of NYSDEC prior their initiation. A work plan shall be submitted to NYSDEC for review that includes, but is not limited to the following:

- The purpose of the intrusive activities.
- The horizontal and vertical limits of the Cover System disturbance, including a scaled Site plan indicating these areas.
- A Health and Safety Plan detailing personal protective equipment and monitoring instruments to be utilized during ground intrusive activities.
- Scaled drawing, figures, and text narrative detailing the proposed changes to the Site.

Modification of the Cover System and modification of subsurface Site structures may require modification of the property's Deed Restriction (Environmental Easement). The property owner is responsible for submitting modifications to this document.

5.0 SCHEDULE AND REPORTING

The provisions of this OM&M Work Plan should be implemented upon completion of construction activities at the Site. The initial inspection and monitoring activities should be performed on the following schedule for a period of up to five (5) years. Following this time period, the accumulated data should be reviewed and discussed with NYSDEC to determine the future scope of work and schedule of OM&M activities. Monitoring and operation of the Vapor Collection System may be modified after a period of two (2) years with the written approval of NYSDEC as discussed below.

- Inspection of the Cover System, Vapor Collection System, and groundwater monitoring wells should be performed twice a year (semi-annually) to determine if repairs are required. Repairs should be performed as soon as possible after damage is noted.
- PID monitoring of the Vapor Collection System should be performed quarterly for the first two (2) years. A petition may be filed with NYSDEC after this period to request that the monitoring frequency be reduced and that the operation of the vapor collection system be ceased. All of the data collected during this period should be provided, as well as sufficient technical rationale to justify the request.
- Soil gas sampling from the Vapor Collection System should be performed annually. Soil gas samples should be collected after completion of PID monitoring activities.
- Groundwater level measurements and headspace reading should be performed semi-annually.
- Groundwater samples should be collected and analyzed semi-annually.
- A letter report summarizing the OM&M activities and laboratory analytical results should be submitted by the property owner to the NYSDEC annually. The annual certification report should be prepared and submitted by a professional engineer or an environmental professional acceptable to the Department. The property owner shall certify in the annual report that the institutional controls and engineering controls put in place, are unchanged from the previous certification and nothing has occurred that would impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation and maintenance or soil management plan. The property owner is required to retain all correspondence with the NYSDEC, documentation regarding repairs to the Site Controls, and analytical data.

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

Technical and Administrative Guidance Memorandum #4031

Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites

More information from this division:

Division of Environmental Remediation
More TAGMs

To: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs

From: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation (signed)

Subject: Technical and Administrative Guidance Memorandum -- Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites

Date: Oct 27, 1989

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete

particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may

generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
   Temperature: 0 to 40^oC
   Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.
5. The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind

background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.
7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:
    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.
    3. Spraying water on buckets during excavation and dumping.
    4. Hauling materials in properly tarped or watertight containers.
    5. Restricting vehicle speeds to 10 mph.
    6. Covering excavated areas and material after excavation activity ceases.
    7. Reducing the excavation size and/or number of excavations.

    Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess

water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

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Heavy Metals Soil Cleanup Criteria Table

More information from this division:

Division of Environmental Remediation
More TAGMs

Appendix A

TAGM #4046
Shortcut to TAGM 4046 Tables for
VOCs
SVOCs
Pesticides/PCBs

TABLE 4 Recommended soil cleanup objectives (mg/kg or ppm) Heavy Metals				
Contaminants	**Protect Water Quality (ppm)**	**Eastern USA Background (ppm)**	*** CRDL (mg/kg or ppm)**	******* Rec. Soil Cleanup Objective (ppm)**
Aluminum	N/A	33,000	2.0	SB
Antimony	N/A	N/A	0.6	SB
Arsenic	N/A	3-12 **	0.1	7.5 or SB
Barium	N/A	15-600	2.0	300 or SB
Beryllium	N/A	0-1.75	0.05	0.16 (HEAST) or SB
Cadmium	N/A	0.1-1	0.05	1 or SB

Calcium	N/A	130 - 35,000 ***	50.0	SB
Chromium	N/A	1.5 - 40 **	0.1	10 or SB
Cobalt	N/A	2.5 - 60 **	0.5	30 or SB
Copper	N/A	1 - 50	0.25	25 or SB
Cyanide	N/A	N/A	0.1	***
Iron	N/A	2,000 - 550,000	1.0	2,000 or SB
Lead	N/A	****	0.03	SB ****
Magnesium	N/A	100 - 5,000	50.0	SB
Manganese	N/A	50 - 5,000	0.15	SB
Mercury	N/A	0.001 - 0.2	0.002	0.1
Nickel	N/A	0.5 -25	0.4	13 or SB
Potassium	N/A	8,500 - 43,000 **	50.0	SB
Selenium	N/A	0.1 - 3.9	0.05	2 or SB
Silver	N/A	N/A	0.1	SB
Sodium	N/A	6,000 - 8,000	50.0	SB
Thallium	N/A	N/A	0.1	SB
Vanadium	N/A	1-300	0.5	150 or SB
Zinc	N/A	9-50	0.2	20 or SB

Note: Some forms of metal salts such as Aluminum Phosphide, Calcium Cyanide, Potassium Cyanide, Copper cyanide, Silver cyanide, Sodium cyanide, Zinc phosphide, Thallium salts, Vanadium pentoxide and Chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.

SB is site background

N/A is not available

CRDL is contract required detection limit which is approx. 10 times the CRDL for water.

** New York State background

*** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

**** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

***** Recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

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Organic Pesticides/Herbicides and PCBs Soil Cleanup Criteria Table

More information from this division:

Division of Environmental Remediation
More TAGMs

Appendix A

TAGM #4046
Shortcut to TAGM 4046 Tables for
VOCs
SVOCs
Heavy Metals

Table 3 Recommended soil cleanup objectives (mg/kg or ppm) Organic Pesticides / Herbicides and PCBs								
Contaminant	**Partition Coefficient, Koc**	**Groundwater Standards/ Criteria, Cw (ug/l or ppb)**	**a Allowable soil conc., Cs (ppm)**	**b ** Soil cleanup objectives to protect GW quality (ppm)**	USEPA Health Based (ppm) Carcinogens	 Systemic Toxicants	**CRQL (ppb)**	**** Rec. Soil Cleanup Objective (ppm)**
Aldrin	96,000	ND (<0.01)	0.005	0.5	0.041	2	8	0.041

alpha-BHC	3,800	ND (<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	3,800	ND (<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	6,600	ND (<0.05)	0.003	0.3	N/A	N/A	8	0.3
Chlordane	21,305 *	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	104 *	4.4	0.005	0.5	N/A	800	800	0.5
4,4'-DDD	770,000 *	ND (<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	440,000 *	ND (<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	243,000 *	ND (<0.01)	0.025	2.5	2.1	40	16	2.1
Dibenzo-P-dioxins (PCDD) 2,3,7,8 TCDD	1709800	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
Dieldrin	10,700 *	ND (<0.01)	0.0010	0.1	0.044	4	16	0.044
Endosulfan I	8,168 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	8,031 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	10,038 *	0.1	0.01	1.0	N/A	N/A	16	1.0
Endrin	9,157 *	ND (<0.01)	0.001	0.1	N/A	20	8	0.10
Endrin keytone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma - BHC (Lindane)	1,080	ND (<0.05)	0.0006	0.06	5.4	20	8	0.06
gamma - chlordane	140,000	0.1	0.14	14.0	0.54	5	80	0.54
Heptachlor	12,000	ND (<0.01)	0.0010	0.1	0.16	40	8	0.10

Heptachlor epoxide	220	ND (<0.01)	0.0002	0.02	0.077	0.8	8	0.02
Methoxychlor	25,637	35.0	9.0	900	N/A	400	80	***
Mitotane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parathion	760	1.5	0.012	1.2	N/A	500	8	1.2
PCBs	17,510 *	0.1	0.1	10.0	1.0	N/A	160	1.0 (Surface) 10 (sub-surf)
Polychlorinated dibenzo-furans (PCDF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silvex	2,600	0.26	0.007	0.7	N/A	600	330	0.7
2,4,5-T	53	35	0.019	1.9	N/A	200	330	1.9

a Allowable Soil Concentration Cs = f x Cw x Koc

b Soil Cleanup Objective = Cs x Correction Factor (CF)

N/A Not available

***** Partition coefficient is calculated by using the following equation:

log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
Other Koc values are experimental values.

****** Correction Factor (CF) of 100 is used as per TAGM #4046

******* As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1% (5% for PCBs as per PCB Guidance Document), and should be adjusted for the actual soil organic carbon content if it is known.

SVOCs Soil Cleanup Criteria Table 2

More information from this division:

Division of Environmental Remediation
More TAGMs

Appendix A

TAGM #4046
Shortcut to TAGM 4046 Tables for
VOCs
Pesticides/PCBs
Heavy Metals

TABLE 2
Recommended soil cleanup objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil clean up objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	USEPA Health Based (ppm) Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Acenaphthene	4,600	20	0.9	90.0	N/A	5,000	330	50.0 ***
Acenaphthylene	2,056 *	20	0.41	41.0	N/A	N/A	330	41.0
Aniline	13.8	5	0.001	0.1	123	N/A	330	0.1

Anthracene	14,000	50	7.00	700.0	N/A	20,000	330	50.0 ***
Benzo(a)anthracene	1,380,000	0.002	0.03	3.0	0.224	N/A	330	0.224 or MDL
Benzo (a) pyrene	5,500,000	0.002 (ND)	0.110	11.0	0.0609	N/A	330	0.061 or MDL
Benzo (b) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Benzo (g,h,i) perylene	1,600,000	5	8.0	800	N/A	N/A	330	50.0 ***
Benzo (k) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
bis(2-ethylhexyl)phthalate	8,706 *	50	4.35	435.0	50	2,000	330	50.0 ***
Butylbenzylphthlate	2,430	50	1.215	122.0	N/A	20,000	330	50.0 ***
Chrysene	200,000	0.002	0.004	0.4	N/A	N/A	330	0.4
4-Chloroaniline	43 ****	5	0.0022	0.22	200	300	330	0.220 or MDL
4-Chloro-3-methylphenol	47	5	0.0024	0.24	N/A	N/A	330	0.240 or MDL
2-Chlorophenol	15 *	50	0.008	0.8	N/A	400	330	0.8
Dibenzofuran	1,230 *	5	0.062	6.2	N/A	N/A	330	6.2
Dibenzo(a,h)anthracene	33,000,000	50	1,650	165,000	0.0143	N/A	330	0.014 or MDL
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	380	1	0.004	0.4	N/A	200	330	0.4
2,4-Dinitrophenol	38	5	0.002	0.2	N/A	200	1,600	0.200 or

								MDL
2,6 Dinitrotoluene	198*	5	0.01	1.0	1.03	N/A	330	1.0
Diethylphthlate	142	50	0.071	7.1	N/A	60,000	330	7.1
Dimethylphthlate	40	50	0.020	2.0	N/A	80,000	330	2.0
Di-n-butyl phthalate	162*	50	0.081	8.1	N/A	8,000	330	8.1
Di-n-octyl phthlate	2,346 *	50	1.2	120.0	N/A	2,000	330	50.0 ***
Fluoranthene	38,000	50	19	1900.0	N/A	3,000	330	50.0 ***
Fluorene	7,300	50	3.5	350.0	N/A	3,000	330	50.0 ***
Hexachlorobenzene	3,900	0.35	0.014	1.4	0.41	60	330	0.41
Indeno (1,2,3-cd)pyrene	1,600,000	0.002	0.032	3.2	N/A	N/A	330	3.2
Isophorone	88.31 *	50	0.044	4.40	1,707	20,000	330	4.40
2-methylnaphthalene	727 *	50	0.364	36.4	N/A	N/A	330	36.4
2-Methylphenol	15	5	0.001	0.1	N/A	N/A	330	0.100 or MDL
4-Methylphenol	17	50	0.009	0.9	N/A	4,000	330	0.9
Naphthalene	1,300	10	0.130	13.0	N/A	300	330	13.0
Nitrobenzene	36	5	0.002	0.2	N/A	40	330	0.200 or MDL
2-Nitroaniline	86	5	0.0043	0.43	N/A	N/A	1,600	0.430 or MDL
2-Nitrophenol	65	5	0.0033	0.33	N/A	N/A	330	0.330 or MDL
4-Nitrophenol	21	5	0.001	0.1	N/A	N/A	1,6	0.100

							00	or MDL
3-Nitroaniline	93	5	0.005	0.5	N/A	N/A	1,600	0.500 or MDL
Pentachlorophenol	1,022	1	0.01	1.0	N/A	2,000	1,600	1.0 or MDL
Phenanthrene	4,365 *	50	2.20	220.0	N/A	N/A	330	50.0 ***
Phenol	27	1	0.0003	0.03	N/A	50,000	330	0.03 or MDL
Pyrene	13,295 *	50	6.65	665.0	N/A	2,000	330	50.0 ***
2,4,5-Trichlorophenol	89 *	1	0.001	0.1	N/A	8,000	330	0.1

a Allowable Soil Concentration Cs = f x Cw x Koc

b Soil Cleanup Objective = Cs x Correction Factor (CF)

N/A Not available

MDL Method Detection Limit

* Partition coefficient is calculated by using the following equation:

log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
Other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm., Total Semi-VOCs < 500ppm. and Individual Semi-VOCs < 50 ppm.

**** Koc is derived from the correlation Koc = 0.63 Kow (Determining Soil Response Action Levels.....

EPA/540/2-89/057). Kow is obtained from the USEPA computer database 'MAIN'.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

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VOCs Soil Cleanup Criteria Table

More information from this division:

Division of Environmental Remediation
More TAGMs

APPENDIX A

TAGM #4046
Shortcut to TAGM 4046 Tables for
SVOCs
Pesticides/PCBs
Heavy Metals

Table 1
Recommended soil cleanup objectives (mg/kg or ppm)
Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcinogens	Systemic Toxicants		
Acetone	2.2	50	0.001	0.11	N/A	8,000	10	0.2

			1					
Benzene	83	0.7	0.0006	0.06	24	N/A	5	0.06
Benzoic Acid	54 *	50	0.027	2.7	N/A	300,000	5	2.7
2-Butanone	4.5 *	50	0.003	0.3	N/A	4,000	10	0.3
Carbon Disulfide	54 *	50	0.027	2.7	N/A	8,000	5	2.7
Carbon Tetrachloride	110 *	5	0.006	0.6	5.4	60	5	0.6
Chlorobenzene	330	5	0.017	1.7	N/A	2,000	5	1.7
Chloroethane	37 *	50	0.019	1.9	N/A	N/A	10	1.9
Chloroform	31	7	0.003	0.30	114	800	5	0.3
Dibromochloromethane	N/A	50	N/A	N/A	N/A	N/A	5	N/A
1,2-Dichlorobenzene	1,700	4.7	0.079	7.9	N/A	N/A	330	7.9
1,3-Dichlorobenzene	310 *	5	0.0155	1.55	N/A	N/A	330	1.6
1,4-Dichlorobenzene	1,700	5	0.085	8.5	N/A	N/A	330	8.5
1,1-Dichloroethane	30	5	0.002	0.2	N/A	N/A	5	0.2
1,2-Dichloroethane	14	5	0.001	0.1	7.7	N/A	5	0.1
1,1-Dichloroethene	65	5	0.004	0.4	12	700	5	0.4
1,2-Dichloroethene (trans)	59	5	0.003	0.3	N/A	2,000	5	0.3
1-3	51	5	0.003	0.3	N/A	N/A	5	0.3

dichloropropane								
Ethylbenzene	1,100	5	0.055	5.5	N/A	8,000	5	5.5
113 Freon (1,1,2 Trichloro-1,2,2 Trifluoroethane)	1,230 *	5	0.060	6.0	N/A	200,000	5	6.0
Methylene chloride	21	5	0.001	0.1	93	5,000	5	0.1
4-Methyl-2-Pentanone	19 *	50	0.01	1.0	N/A	N/A	10	1.0
Tetrachloroethene	277	5	0.014	1.4	14	800	5	1.4
1,1,1-Trichloroethane	152	5	0.0076	0.76	N/A	7,000	5	0.8
1,1,2,2-Tetrachloroethane	118	5	0.006	0.6	35	N/A	5	0.6
1,2,3-trichloropropane	68	5	0.0034	0.34	N/A	80	5	0.4
1,2,4-trichlorobenzene	670 *	5	0.034	3.4	N/A	N/A	330	3.4
Toluene	300	5	0.015	1.5	N/A	20,000	5	1.5
Trichloroethene	126	5	0.007	0.70	64	N/A	5	0.7
Vinyl chloride	57	2	0.0012	0.12	N/A	N/A	10	0.2
Xylenes	240	5	0.012	1.2	N/A	200,000	--	1.2

a. Allowable Soil Concentration Cs = f x Cw x Koc

b. Soil cleanup objective = Cs x Correction Factor (CF)

N/A is not available

* Partition coefficient is calculated by using the following equation:

log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.

All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

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Technical and Administrative Guidance Memorandum #4046

Determination of Soil Cleanup Objectives and Cleanup Levels

More information from this division:

Division of Environmental Remediation
More TAGMs

Appendix A - Recommended Soil Cleanup Objectives

To: Regional Haz. Waste Remediation Engineers, Bureau Directors, and Section Chiefs

From: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation (signed)

Subject: Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels

Date: JAN 24, 1994

The cleanup goal of the Department is to restore inactive hazardous waste sites to predisposal conditions, to the extent feasible and authorized by law. However, it is recognized that restoration to predisposal conditions will not always be feasible.

1. **Introduction:**

This TAGM provides a basis and procedure to determine soil cleanup levels at individual Federal Superfund, State Superfund, 1986 EQBA Title 3 and Responsible Party (RP) sites, when the Director of the DHWR determines that cleanup of a site to predisposal conditions is not possible or feasible.

The process starts with development of soil cleanup objectives by the Technology Section for the contaminants identified by the Project Managers. The Technology Section uses the procedure described in this TAGM to develop soil cleanup objectives. Attainment of these generic soil cleanup objectives will, at a minimum, eliminate all significant threats to human health and/or the environment posed by the inactive hazardous waste site. Project Managers should use these cleanup objectives in selecting alternatives in the Feasibility Study (FS). Based on the proposed selected remedial technology (outcome of FS), final site specific soil cleanup levels are established in the Record of Decision (ROD) for these sites.

It should be noted that even after soil cleanup levels are established in the ROD, these levels may prove to be unattainable when remedial construction begins. In that event, alternative remedial actions or institutional controls may be necessary to protect the environment.

2. **Basis for Soil Cleanup Objectives:**

The following alternative bases are used to determine soil cleanup objectives:

1. Human health based levels that correspond to excess lifetime cancer risks of one in a million for Class A[1] and B[2] carcinogens, or one in 100,000 for Class C[3] carcinogens. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;
2. Human health based levels for systemic toxicants, calculated from Reference Doses (RfDs). RfDs are an estimate of the daily exposure an individual (including sensitive individuals) can experience without appreciable risk of health effects during a lifetime. An average scenario of exposure in which children ages one to six (who exhibit the greatest tendency to ingest soil) is assumed. An intake

rate of 0.2 gram/day for a five-year exposure period for a 16-kg child is assumed. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

3. Environmental concentrations which are protective of groundwater/drinking water quality; based on promulgated or proposed New York State Standards;
4. Background values for contaminants; and
5. Detection limits.

A recommendation on the appropriate cleanup objective is based on the criterion that produces the most stringent cleanup level using criteria a, b, and c for organic chemicals, and criteria a, b, and d for heavy metals. If criteria a and/or b are below criterion d for a contaminant, its background value should be used as the cleanup objective. However, cleanup objectives developed using this approach must be, at a minimum, above the method detection limit (MDL) and it is preferable to have the soil cleanup objectives above the Contract Required Quantitation Limit (CRQL) as defined by NYSDEC. If the cleanup objective of a compound is "non-detectable", it should mean that it is not detected at the MDL. Efforts should be made to obtain the best MDL detection possible when selecting a laboratory and analytical protocol.

3. **Determination of Soil Cleanup Goals for Organics in Soil for Protection of Water Quality**

The water/soil partitioning theory is used to determine soil cleanup objectives which would be protective of groundwater/drinking water quality for its best use. This theory is conservative in nature and assumes that contaminated soil and groundwater are in direct contact. This theory is based upon the ability of organic matter in soil to adsorb organic chemicals. The approach predicts the maximum amount of contamination that may remain in soil so that leachate from the contaminated soil will not violate groundwater and/or drinking water standards.

This approach is not used for heavy metals, which do not partition appreciably into soil organic matter. For heavy metals, eastern USA or New York State soil background

values may be used as soil cleanup objectives. A list of values that have been tabulated is attached. Soil background data near the site, if available, is preferable and should be used as the cleanup objective for such metals. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

Protection of water quality from contaminated soil is a two-part problem. The first is predicting the amount of contamination that will leave the contaminated media as leachate. The second part of the problem is to determine how much of that contamination will actually contribute to a violation of groundwater standards upon reaching and dispersing into groundwater. Some of the contamination which initially leaches out of soil will be absorbed by other soil before it reaches groundwater. Some portion will be reduced through natural attenuation or other mechanism.

Part A: Partition Theory Model

There are many test and theoretical models which are used to predict leachate quality given a known value of soil contamination. The Water-Soil Equilibrium Partition Theory is used as a basis to determine soil standard or contamination limit for protection of water quality by most of the models currently in use. It is based on the ability of organic carbon in soil to adsorb contamination. Using a water quality value which may not be exceeded in leachate and the partition coefficient method, the equilibrium concentration (Cs) will be expressed in the same units as the water standards. The following expression is used:

Allowable Soil Concentration Cs = f x Koc x Cw . . . . (1)

Where:

f = fraction of organic carbon of the natural soil medium.

Koc = partition coefficient between water and soil media. Koc can be
estimated by the following equation:

log Koc = 3.64 - 0.55 log S

S = water solubility in ppm

Cw = appropriate water quality value from TOGS 1.1.1

Most Koc and S values are listed in the Exhibit A-1 of the USEPA Superfund Public Health Evaluation Manual (EPA/540/1-86/060). The Koc values listed in this manual should be used for the purpose. If the Koc value for a contaminant is not listed, it should be estimated using the above mentioned equation.

Part B: Procedure for Determination of Soil Cleanup Objectives

When the contaminated soil is in the unsaturated zone above the water table, many mechanisms are at work that prevent all of the contamination that would leave the contaminated soil from impacting groundwater. These mechanisms occur during transport and may work simultaneously. They include the following: (1) volatility, (2) sorption and desorption, (3) leaching and diffusion, (4) transformation and degradation, and (5) change in concentration of contaminants after reaching and/or mixing with the groundwater surface. To account for these mechanisms, a correction factor of 100 is used to establish soil cleanup objectives. This value of 100 for the correction is consistent with the logic used by EPA in its Dilution Attenuation Factor (DAF) approach for EP Toxicity and TCLP. (Federal Register/Vol. 55, No. 61, March 29, 1990/Pages 11826-27). Soil cleanup objectives are calculated by multiplying the allowable soil concentration by the correction factor. If the contaminated soil is very close (<3' - 5') to the groundwater table or in the groundwater, extreme caution should be exercised when using the correction factor of 100 (one hundred) as this may not give conservative cleanup objectives. For such situations the Technology Section should be consulted for site-specific cleanup objectives.

Soil cleanup objectives are limited to the following maximum values. These values are consistent with the approach promulgated by the States of Washington and Michigan.

1. Total VOCs < 10 ppm.
2. Total Semi VOCs < 500 ppm.
3. Individual Semi VOCs < 50 ppm.
4. Total Pesticides < 10 ppm.

One concern regarding the semi-volatile compounds is that some of these compounds are so insoluble that their Cs values are fairly large. Experience (Draft TOGS on Petroleum Contaminated Soil Guidance) has shown that soil containing some of these insoluble substances at high concentrations can exhibit a distinct odor even though the substance will not leach from the soil. Hence any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria.

4. **Determination of Final Cleanup Levels:**

   Recommended soil cleanup objectives should be utilized in the development of final cleanup levels through the Feasibility Study (FS) process. During the FS, various alternative remedial actions developed during the Remedial Investigation (RI) are initially screened and narrowed down to the list of potential alternative remedial actions that will be evaluated in detail. These alternative remedial actions are evaluated using the criteria discussed in TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 15, 1990, and the preferred remedial action will be selected. After the detailed evaluation of the preferred remedial action, the final cleanup levels which can be actually achieved using the preferred remedial action must be established. Remedy selection, which will include final cleanup levels, is the subject of TAGM 4030.

   Recommended soil cleanup objectives that have been calculated by the Technology Section are presented in Appendix A. These objectives are based on a soil organic carbon content of 1% (0.01) and should be adjusted for the actual organic carbon content if it is known. For determining soil organic carbon content, use attached USEPA method (Appendix B). Please contact the Technology Section, Bureau of Program Management for soil cleanup objectives not included in Appendix A.

TAGM 4046 Footnotes:

1. Class A are proved human carcinogens
2. Class B are probable human carcinogens
3. Class C are possible human carcinogens

Appendix A - Recommended Soil Cleanup Objectives:

Appendix B - Total Organic Carbon (TOC)

Appendix B To TAGM 4046

Conventional Sediment Variables
Total Organic Carbon (TOC)
March 1986

Total Organic Carbon (TOC)

Use and Limitations

Total organic carbon is a measure of the total amount of nonvolatile, volatile, partially volatile, and particulate organic compounds in a sample. Total organic carbon is independent of the oxidation state of the organic compounds and is not a measure of the organically bound and inorganic elements that can contribute to the biochemical and chemical oxygen demand tests.

Because inorganic carbon (e.g., carbonates, bicarbonates, free CO_2) will interfere with total organic carbon determinations, samples should be treated to remove inorganic carbon before being analyzed.

Field Procedures

Collection

Samples can be collected in glass or plastic containers. A minimum sample size of 25 g is recommended. If unrepresentative material is to be removed from the sample, it should be removed in the field under the supervision of the chief scientist and noted on the field log sheet.

Processing

Samples should be stored frozen and can be held for up to 6 months under that condition. Excessive temperatures should not be used to thaw samples.

Laboratory Procedures

Analytical Procedures

- Equipment
    - Induction furnace

        e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyzer, Perkin Elmer 240 elemental analyzer, Carlo-Erba 1106

    - Analytical balance

        0.1 mg accuracy

    - Desiccator
    - Combustion boats
    - 10 percent hydrochloric acid (HCL)
    - Cupric oxide fines (or equivalent material)
    - Benzoic acid or other carbon source as a standard.
- Equipment preparation
    - Clean combustion boats by placing them in the induction furnace at 950^{o} C. After being cleaned, combustion boats should not be touched with bare hands.
    - Cool boats to room temperature in a desiccator.
    - Weigh each boat to the nearest 0.1 mg.
- Sample preparation
    - Allow frozen samples to warm to room temperature.
    - Homogenize each sample mechanically, incorporating any overlying water.
    - Transfer a representative aliquot (5-10 g) to a clean container.
- Analytical procedures
    - Dry samples to constant weight at 70 + 2^{o}C. The drying temperature is relatively low to minimize loss of volatile organic compounds.
    - Cool dried samples to room temperature in a desiccator.
    - Grind sample using a mortar and pestle to break up aggregates.

- Transfer a representative aliquot (0.2-0.5 g) to a clean, preweighed combustion boat.
- Determine sample weight to the nearest 0.1 mg.
- Add several drops of HCL to the dried sample to remove carbonates. Wait until the effervescing is completed and add more acid. Continue this process until the incremental addition of acid causes no further effervescence. Do not add too much acid at one time as this may cause loss of sample due to frothing. Exposure of small samples (i.e., 1-10 mg) having less than 50 percent carbonate to an HCL atmosphere for 24-48 h has been shown to be an effective means of removing carbonates (Hedges and Stern 1984). If this method is used for sample sizes greater than 10 mg, its effectiveness should be demonstrated by the user.
- Dry the HCL-treated sample to constant weight at 70 + 2^{o} C.
- Cool to room temperature in a desiccator.
- Add previously ashed cupric oxide fines or equivalent material (e.g., alumina oxide) to the sample in the combustion boat.
- Combust the sample in an induction furnace at a minimum temperature of 950 + 10^{o} C.

- Calculations
  - If an ascarite-filled tube is used to capture CO_2, the carbon content of the sample can be calculated as follows:

    Percent carbon = A (0.2729) (100) **/** B

    Where:

    A = the weight (g) of CO_2 determined by weighing the ascarite tube before and after combustion

    B = dry weight (g) of the unacidified sample in the combustion boat

    0.2729 = the ratio of the molecular weight of carbon to the molecular weight of carbon dioxide

    A silica gel trap should be placed before the ascarite tube to catch any moisture driven off during sample combustion. Additional silica gel should be placed at the exit end of the ascarite tube to trap any water that might

be formed by reaction of the trapped CO_2 with the NaOH in the ascarite.

- If an elemental analyzer is used, the amount of CO_2 will be measured by a thermal conductivity detector. The instrument should be calibrated daily using an empty boat blank as the zero point and at least two standards. Standards should bracket the expected range of carbon concentrations in the samples.

QA/QC Procedures

It is critical that each sample be thoroughly homogenized in the laboratory before a subsample is taken for analysis. Laboratory homogenization should be conducted even if samples were homogenized in the field.

Dried samples should be cooled in a desiccator and held there until they are weighed. If a desiccator is not used, the sediment will accumulate ambient moisture and the sample weight will be overestimated. A color-indicating desiccant is recommended so that spent desiccant can be detected easily. Also, the seal on the desiccator should be checked periodically and, if necessary, the ground glass rims should be greased or the "O" rings should be replaced.

It is recommended that triplicate analyses be conducted on one of every 20 samples, or on one sample per batch if less than 20 samples are analyzed. A method blank should be analyzed at the same frequency as the triplicate analyses. The analytical balance should be inspected daily and calibrated at least once per week. The carbon analyzer should be calibrated daily with freshly prepared standards. A standard reference material should be analyzed at least once for each major survey.

Data Reporting Requirements

Total organic carbon should be reported as a percentage of the dry weight of the unacidified sample to the nearest 0.1 unit. The laboratory should report the results of all samples (including QA replicates, method blanks, and standard reference measurements) and should note any problems that may have influenced sample quality. The laboratory should also provide a summary of the calibration procedure and results (e.g., range covered, regression equation, coefficient of determination).

PART 1 - GENERAL

1.01 DESCRIPTION

A. A Community Air Monitoring Plan (CAMP) requires continuous real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The monitoring is required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures.

B. The intent of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The CAMP objective is to confirm that work activities do not spread contamination off-site through the air.

C. The action levels specified herein trigger increased monitoring, corrective actions to abate emissions, and/or work shutdown.

1.02 DEFINITIONS

A. “Ground intrusive activities” include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

B. “Immediate work area” is defined as the exclusion zone

C. “NYSDEC” means the New York State Department of Environmental Conservation

D. “NYSDOH” means the New York State Department of Health

E. “PID” – Photo Ionization Detector

F. “PM10” – Particulate Matter 10 microns and less in diameter

G. “Readily observable wind direction change” is defined as a change in wind direction manifested by a sudden increase in the speed of the wind, the observation of dust carried in the wind, or the observation of olfactory cues in the wind.

H. “VOC” – Volatile Organic Compounds

I. “Wind direction” is a directional bearing determined by visual identification from a streamer tape.

1.03 REFERENCES

A. New York State Department of Environmental Conservation

B. Voluntary Cleanup Program Guide-Draft, Appendix D: Generic Community Air Monitoring Plan, May 2002.

C. JM Sorge, Inc., Investigation Workplan, Former Manufactured Gas Plant, 85 Purdy Avenue, Port Chester, New York, Site # V00516-3, July 2002. (Previously provided to NYSDEC)

D. Dresdner Robin

E. Instructions for the Operation of the DataRAM 4

F. Instructions for the Downloading and Deleting of Data for the DataRAM 4

PART 2 - SUBMITTALS

2.01 Dresdner Robin will prepare two copies of a final report summarizing the monitoring results and including the VOC and particulate support data as attachments.

PART 3 - MATERIALS

3.01 Volatile Organic Compounds (VOCs) Monitoring

G. Two (2) PPB RAE model PGM-7240 monitors (PID)

H. One (1) Pelican case (for sheltering from weather).

I. One (1) Calibration kit including two (2) cylinders of calibration gas, regulator and tedlar bag for the PID.

J. One (1) tripod mount.

K. Particulate (PM10) Monitoring

L. Three (3) Thermo/MIE Model DataRAM 4 monitors.

M. Three (3) Omni-Directional Inlets

N. Three (3) Aerodynamic Particle Size Separators for PM 10

O. Two (2) Pelican cases (for sheltering from weather).

P. Two (2) tripod mounts

Q. Two (2) strobe light units with cabling

R. Meteorological Monitoring

S. Plastic streamer tape

T. Eight Foot Pipe or Post or similar fixed object for attaching streamer tape

1. Volatile Organic Compounds (VOCs) Monitoring

a. The monitor (PID) will be calibrated prior to use.

b. The monitor will be setup to log data as 15-minute averages.

c. The wind direction will be observed to determine downwind and upwind positions

d. Prior to ground intrusive activities, the monitor will be positioned at an upwind location to establish background concentrations for thirty minutes (two fifteen minute averages)

e. Upon completion of the background monitoring and prior to the start of ground intrusive activities, the monitor will be moved to the downwind perimeter of the immediate work area

f. The monitor will remain in the downwind position. Wind direction will be observed at the streaming tape once an hour to verify the downwind position of the monitor. If the wind direction has changed, the monitor will be repositioned to the new downwind position. If a readily observable wind direction change is observed before checking the streaming tape, the monitor will be repositioned.

g. Periodically throughout the day, the monitor will be moved to an upwind position to determine background conditions. The monitor will be moved to an upwind position every two hours. Preference will be given to moving the monitor when there are no activities, (ie. breaks or lunch). If breaks are not available, the monitor should be moved upwind when the activities do not include ground intrusion. Observe the monitor for two minutes and record the background concentration. When the two minute interval is complete, return the monitor to the downwind position.

h. The data from the monitor will be scanned for recording in the field log once every two hours

i. If an exceedance is noted at the downwind perimeter of the immediate work area, the monitor will be observed to determine the appropriate action level from Section 5.0.1. Notify the proper site personnel.

j. At the completion of ground intrusive activities, the monitor will be shut down and removed from the immediate work area

k. The data collected in the monitor's internal memories will be digitally downloaded to a computer

2. Particulate (pm10) Monitoring

a. Two monitors will be zeroed prior to use.

b. The monitors will be setup to log data as 15-minute averages. The alarm level will be set to 100 ug/m3.

c. The wind direction will be observed to determine downwind and upwind positions.

d. One monitor will be positioned at the downwind perimeter of the immediate work area and one monitor will be positioned at the upwind perimeter of the immediate work area prior to the start of ground intrusive activities.

e. The data from the monitors will be scanned and recorded in the field log once every two hours.

f. If an alarm is observed from either the downwind or the upwind monitors, both the downwind and upwind monitors will be checked. Determine if an action level is indicated from a comparison of the downwind and upwind monitors as described in Section 5.0.2. Observations of the upwind and downwind monitors will be continued until readings are below any action levels.

g. If airborne dust is observed, the actions described in Section 5.0.2.1 shall be taken.

h. At the completion of ground intrusive activities, the monitors will be shut down and removed from the immediate work area

i. The data collected in the monitors' internal memory will be digitally downloaded to a computer.

PART 4 - ACTION LEVELS

1.04 Volatile Organic Compounds

A. If the ambient air concentration of total organic vapors at the downwind perimeter of the immediate work area exceeds 5 (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued.

B. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

C. If total organic vapor levels at the downwind perimeter of the immediate work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level half the distance from the downwind perimeter of the immediate work area to the nearest potential receptor or residential/commercial structure, is below 5 ppm over background for the 15-minute average.

D. If the organic vapor level is above 25 ppm at the perimeter of the immediate work area, activities must be shutdown.

1.05 Particulate (PM10) Monitoring

A. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

B. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

1.06 RECORD KEEPING

A. All 15-minute readings must be recorded and be available for NYSDEC or NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

B. 15-minute readings will be recorded in a written log and will be digitally stored on a computer. Instantaneous readings will be recorded in the written log only.

C. Meteorological observations will be recorded in a written log.

1.07 CALIBRATION

A. Volatile Organic Compounds (VOCs) Monitoring

1. The PPB RAE model PGM-7240 monitor is to be calibrated according to the manufacture's instruction with appropriate calibration gas prior to use.

2. If the calibration fails, the spare PPB RAE shall be used.

3. Particulate (PM 10)Monitoring

4. The DataRAM 4 monitors shall have been calibrated by the manufacturer or the instrument rental company within less than one year of use.

5. The DataRAM 4 shall be zeroed prior to use in accordance with Dresdner Robin "Instructions for the Operation of the DataRAM 4".

6. If the zero check fails, the spare DataRAM 4 shall be used.

1.08 METEOROLOGICAL DATA

A. A compass will be used to determine the north, northeast, east, southeast, south, southwest, west and northwest position relative to the site.

B. The wind direction will be determined through observation of a plastic streamer attached to a mast and compared to the compass orientations.

END OF SECTION

Appendix H

Citizen Participation Plan

CITIZEN PARTICIPATION PLAN

Former MGP Site - 85 Purdy Avenue, Port Chester, New York

List of Figures

1.0 Introduction

The Village of Port Chester (Village) entered into a Voluntary Cleanup Agreement (Agreement) with the New York State Department of Environmental Conservation (NYSDEC) in April 2002, to complete the investigation and remediation of the former Manufactured Gas Plant (MGP) located at 85 Purdy Avenue, Port Chester, New York. Historical information indicates a small MGP operated at the site from the 1860's through the 1880's. A site location map is included as Figure 1. A site illustration is included as Figure 2.

Investigations were completed to characterize the site, identify areas of significant concern, and obtain sufficient data to develop an effective remediation plan for the site.

2.0 Site Background

2.1 Site Setting

The Site is situated between Don Bosco Place and Traverse Avenue at their intersection with Purdy Avenue, in Port Chester, Westchester County, New York. The Village of Port Chester is comprised of an integrated mix of commercial and residential properties. The site is currently a vacant. It is bordered to the east and south by residential and commercial properties. The properties to the north and west of the site are being developed as part of the Port Chester Marina Redevelopment Project.

2.2 Site History

Historic information, Sanborn fire insurance maps and deed information, indicates that by 1862, a manufactured gas plant was present on the site. Several gas and light companies owned and may have operated the plant until it was dismantled some time after 1985 but before 1902. A more detailed description of the MGP history of the site is included in the JMS December 2001 Remedial Investigation Report.

After the MGP plant was dismantled, portions of the site were used for various industrial and commercial operations. Identified uses included residential, stables, warehouse, storage, an iron works, a waste reclaiming company, barbershop, a dress factory, a machine shop, filling station, mail distribution facility, and a paper storage facility.

2.3 Environmental Issues Identified at the Site

Site investigations were completed by J.M. Sorge, Inc. (JMS) and GZA GeoEnvironmental, Inc. (GZA) in 2000 and 2001. A *Remedial Investigation Report* (RIR) was submitted to NYSDEC in December 2001, which provided data acquired during those investigations. NYSDEC approved the data submitted in the December 2001 RIR in a letter dated June 11, 2003. Additional investigation was completed in June/July and September 2003 and the Site Investigation Report

was submitted to NYSDEC in February 2004. Copies of these reports are available at the document repositories identified in Section 6.0 of this CPP.

The investigations completed on the site confirmed the locations of all abandoned MGP structures. Soil sampling indicated various contaminants were present on the site including semi volatile organic compounds as well as several Priority Pollutant metals in the soil. Sampling results confirm that the contamination identified is in part associated with the former MGP operations, but also results from other industrial operations, which took place after the MGP facility was abandoned. Minor isolated volatile organic soil contamination was also identified. Minor amounts of coal tar were noted in the area beneath the tar well and in sediment from within the interior of the gas holders. A complete investigation of the interior of the holders will be completed during the remediation.

Groundwater investigations indicate that no significant impact to the area groundwater has occurred as a result of past site operations. Minor petroleum related contamination was identified in several wells. No non-aqueous phase liquid (NAPL) was identified in any site monitoring well.

In addition, two abandoned underground storage tanks, not associated with the former MGP facility, were cleaned and removed as part of the investigation process. Impacted soil, associated with the UST located at 85 Purdy Avenue, was excavated and removed from the site.

3.0 Project Description

3.1 Voluntary Cleanup Objective

The investigation was completed to characterize the site, identify areas of significant concern, and obtain sufficient data to develop an effective remediation plan for the site. As a non-responsible party Volunteer, the Village is required to complete the investigation and remediation of the former MGP site in accordance with the Agreement, to guidelines appropriate for the intended commercial use of the site and to determine if any off-site impacts are occurring.

3.2 Voluntary Cleanup Activities

The investigation included installation of a series of test pits within the former MGP facilities as well as within native soils. In addition, a series of soil, soil gas, and groundwater sampling was also completed. The investigation also included an assessment of the site's potential to impact off site locations and to determine if off-site migration has occurred.

Two abandoned underground storage tanks, not associated with the former MGP facility, were cleaned and removed as part of the investigation process. Impacted soil, associated with the UST located at 85 Purdy Avenue, was excavated and removed from the site.

A Remedial Action Work Plan (RAWP) for the remediation of the site has been prepared and submitted to NYSDEC for review. The remediation of the site will include excavation of significantly contaminated soil surrounding the former MGP structures. A copy of the Workplan will be available for review upon approval by NYSDEC.

3.3 Project Schedule

Environmental investigations at the site were completed in September 2003. The associated Site Investigation Report (SIR) and the Remedial Action Work Plan (RAWP) were submitted to NYSDEC for review in February 2004. In accordance with the CPP, the RAWP will be made available for public review and comment for 30 days. NYSDEC will review and consider comments during their subsequent review of the Work Plan.

Upon approval of the RAWP, the Village will commence remediation of the site. The Work Plan activities are scheduled to begin in April 2004, weather permitting, and will continue for approximately 3-4 weeks. Upon completion of the remedial activities, the Village will prepare a Remedial Action Report documenting the remediation completed at the site and any monitoring or maintenance activities required to insure the remediation continues to provide for protection of the public and the environment.

4.0 Project Contacts

For more information about this project, please contact the following persons:

Environmental Concerns

Mr. Ram Pergadia, P.E.
Hazardous Waste Regional Engineer
Division of Environmental Remediation
NYSDEC – Region 3
21 South Putt Road
New Paltz, New York 12561
(845) 256-3146

Mr. Jamie Malcolm, P.E.
Environmental Engineer
Division of Environmental Remediation
NYSDEC - Central Office
625 Broadway
Albany, New York 12233-7014
(518) 402-9662

Health Related Concerns

Mr. Dan Geraghty
New York State Department of Health
547 River Street
Troy, New York 12180-2216
(518) 402-7890

Citizen Participation

Mr. Michael Knipfing
NYSDEC - Region 3
21 South Putt Corners Road
New Paltz, New York 1261
(845) 256-3154

5.0 Public Mailing List

The mailing list is used to provide information to area residents, elected officials, media and other interested parties who want to be kept informed about the former Port Chester MGP site. If you would like to request your name to be added to the list, please contact Jamie Malcolm, Project Manager in the NYSDEC Central Office at (518) 402- 9662.

6.0 Identification of Document Repositories

Documents related to the Former Port Chester MGP site will be available for public review at the locations listed below. As additional documents are created during the remediation process, they will be added to the repositories.

Port Chester Public Library
Reference Department
1 Haseco Avenue
Port Chester, New York 10573
Hours of Operation: Monday: 9 AM – 9 PM
Tuesday: 9 AM – 8 PM
Wed. - Sat.: 9 AM - 5 PM

Village of Port Chester
Town Clerk's Office
10 Pearl Street
Port Chester, New York 10573
Hours of Operation: Monday - Friday: 9 AM - 4:30 PM

NYSDEC - Region 3 Office
Attn: Mr. Michael Knipfing
21 South Putt Corners Road
New Paltz, New York 12561
Hours of Operation: Monday - Friday: 8:30 AM - 4:45 PM

7.0 Description of Specific Citizen Participation Activities

NYSDEC and NYSDOH are committed to keeping the public informed and involved throughout the process of investigation and remediation of this Site. At a minimum, the Citizen Participation Activities will include:

At least 30 days prior to NYSDEC approval of the voluntary cleanup Agreement, A Voluntary Cleanup Agreement Application Fact Sheet will be sent to addressees of the Mailing List. After construction is completed, an End of Construction Fact Sheet will be sent to addressees of the Mailing List. At any time, the mailing may be updated. At any time, the public is encouraged to

contact the officials listed in Section 4.0 of the CPP to express any concerns or questions they may have regarding this project.

8.0 Glossary of Key Terms and Major Program Elements

This glossary defines terms associated with New York's hazardous waste site citizen participation program, and important elements of the hazardous waste site remedial program. A list of acronyms often used in the remedial program is presented at the end of this section.

Administrative Record
Part of a site's Record of Decision that lists and defines documents used in the development of NYSDEC's decision about selection of a remedial action.

Availability Session
A scheduled gathering of program staff and members of the public in a casual setting, without a formal presentation or agenda but usually focusing on a specific aspect of a site's remedial process

Citizen Participation
A program of planning and activities to encourage communication among people affected by or interested in hazardous waste sites and the government agencies responsible for investigation and remediation.

Citizen Participation (CP) Record
A document prepared at a major remedial stage that describes the citizen participation activities required at that stage. A CP Record also directs a scoping process to determine if additional citizen participation activities are appropriate and feasible.

Citizen Participation Specialist
A staff member from a NYSDEC central office or regional office who has specialized training and experience to assist a project manager and other staff to plan, conduct and evaluate a site-specific citizen participation program.

Classification
A process to place a hazardous waste site within a category which defines its hazardous waste status and its threat or potential threat to public health and the environment. Sites are listed along with their classification in the Registry of Inactive Hazardous Waste Disposal Sites.

- Class 1 – causing or representing an imminent danger of causing irreversible or irreparable damage to public health or environment – immediate action required.

- Class 2 – significant threat to public health or environment – action required.

- Class 2a - temporary classification assigned to a site for which there is inadequate or insufficient data for inclusions in any other classification

- Class 3 – does not present a significant threat to public health or environment – action may be deferred.

- Class 4 – site properly closed – requires continued management.

- Class 5 – site properly closed – no further action required.

- Delisted – site no longer considered an inactive hazardous waste disposal site.

Comment Period
A time period for the public to review and comment about various documents and Division of Environmental Remediation (DER) actions. For example, a 30-day comment period is provided when DER issues a Proposed Remedial Action Plan (PRAP), and when DER proposes to delist a site from the Registry of Inactive Hazardous Waste Disposal Sites.

Consent Order
A legal and enforceable agreement negotiated between NYSDEC and a responsible party. The order sets forth agreed upon terms by which a responsible party will undertake site investigation and/or cleanup, or pay for the costs of those activities. The order includes a description of the remedial actions to be taken by the responsible party with NYSDEC oversight, and a schedule for implementation.

Contact List
Names, addresses and/or telephone numbers of individuals, groups, organizations, government officials and media affected by or interested in a particular hazardous waste site. The size of a contact list and the categories included are influenced by population density, degree of interest in a site, the stage of the remedial process and other factors. It is an important tool needed to conduct outreach activities.

Delist
Action by which DER removes a hazardous waste site from the Registry of Inactive Hazardous Waste Disposal Sites upon determination that: the site contains inconsequential amounts of hazardous wastes; or that a remediated site no longer requires Operation and Maintenance. A proposal to delist a site triggers a public notification and comment period process.

Division of Environmental Enforcement (DEE)
A unit within NYSDEC that works with the Division of Environmental Remediation and others to negotiate with responsible parties to achieve agreements for the investigation and remediation of hazardous waste sites. A negotiated agreement is contained in a consent order.

Division of Environmental Remediation (DER)
Formerly the Division of Hazardous Waste Remediation, a major program unit within NYSDEC created to manage the hazardous waste site remedial program from site discovery through Operation and Maintenance activities. Staff include: engineers, geologists, chemists, attorneys, citizen participation specialists, environmental program specialists and support staff.

Division of Hazardous Waste Remediation
(See Division of Environmental Remediation.)

Document Repository
A file of documents pertaining to a site's remedial and citizen participation programs which is made available for public review. The file generally is maintained in a public building near the hazardous waste site to provide access at times and a location convenient to the public.

Enforcement
NYSDEC's effort, through legal action if necessary, to compel a responsible party to perform or pay for site remedial activities. NYSDEC may perform this effort by itself or in concert with other agencies.

Environmental Quality Bond Act (EQBA)
The 1986 Environmental Quality Bond Act which gives New York State bonding authority of up to $1.2 billion to fund the State's share of the total cost of remediating hazardous waste sites in New York State.

Fact Sheet
A written discussion about part or all of a site's remedial process, prepared and provided by DER to the public. A fact sheet may focus on: a particular element of the site's remedial program; opportunities for public involvement; availability of a report or other information, or announcement of a public meeting or comment period. A fact sheet may be mailed to all or part of a site's contact list, distributed at meetings, placed in a document repository and/or sent on an "as requested" basis.

Interim Remedial Measure (IRM)
A discrete action which can be conducted at a site relatively quickly to reduce the risk to people's health and the environment from a well-defined hazardous waste problem. Examples of IRMs include removing contaminated soil and drums, providing alternative water supplies or securing a site to prevent access.

National Priorities List
The U.S. Environmental Protection Agency's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response using money from a special trust fund.

New York State Department of Health
Agency within the executive branch of New York State government which: performs health-related inspections at suspected hazardous waste sites; conducts health assessments to determine potential risk from environmental exposure; reviews Risk Assessments prepared during the Remedial Investigation and Feasibility Study; conducts health-related community outreach around sites; and review remedial actions to assure that public health concerns are adequately addressed.

New York State Department of Law
Agency within the executive branch of New York State government that takes the lead on hazardous waste sites requiring civil enforcement through court action. Litigation can involve negotiations and court action with responsible parties to clean up sites; natural resource damage claims, and recovery of remedial costs.

New York State Registry of Inactive Hazardous Waste Disposal Sites
The "Registry." A document that NYSDEC is directed by law to maintain and that lists and provides information about every hazardous waste site in New York State that meets criteria established through a definition of hazardous waste and classification system.

Operable Unit
A discrete part of an entire site that produces a release, threat of release, or pathway of exposure. An Operable Unit can receive specific investigation, and a particular remedy may be proposed. A Record of Decision is prepared for each Operable Unit.

Operation and Maintenance
A period in which remedial action may be conducted following construction at a site (for example, operation of a "pump and treat" system), or which is performed after a remedial action to assure its continued effectiveness and protection of people's health and the environment. Activities can include site inspections, well monitoring and other sampling.

Preliminary Site Assessment (PSA)
A PSA is DER's first investigation of a site. A PSA is performed to determine if a site meets New York State's definition of an inactive hazardous waste disposal site by confirming the presence of hazardous waste and determining if the site poses a significant threat to public health or the environment.

Project Manager
An NYSDEC staff member within the DER (usually an engineer, geologist or hydrogeologist) responsible for the day-to-day administration of remedial activities at, and ultimate disposition of, a hazardous waste site. The Project Manager works with legal, health, citizen participation and other staff to accomplish site-related goals and objectives.

Proposed Remedial Action Plan (PRAP)
An analysis by DER of each alternative considered for the remediation of a hazardous waste site and a rationale for selection of the alternative it recommends. The PRAP is created based on information developed during the site's Remedial Investigation and Feasibility Study. The PRAP is reviewed by the public and other state agencies.

Public Meeting
A scheduled gathering of DER staff with the affected/interested public to give and receive information, ask questions and discuss concerns about a site's remedial program. Staff from other NYSDEC divisions, legal and health staff, and staff from consultants and a responsible party often also attend. A public meeting, unlike an availability session, generally features a formal presentation and a detailed agenda.

Reclassification
A process by which DER redefines the threat posed by a hazardous waste site to public health and the environment by developing and assessing site information and, based on findings and conclusions, assigning a new classification code.

Record of Decision (ROD)
A document that provides definitive record of the cleanup alternative that will be used to remediate a hazardous waste site. The ROD is based on information and analyses developed during the Remedial Investigation/Feasibility Study and the public comment.

Remedial Alternatives Report (RAR)
A report that contains an evaluation of options for the remediation of any contamination in, on, or under, or emanating from, a property that includes an analysis of data and other information concerning the nature and extent of that property's contamination and is generally performed concurrently, and in an interactive fashion, with the site investigation.

Remedial Construction
The physical development, assembly and implementation of the remedial alternative selected to remediate a site. Construction follows the Remedial Design stage of a site's remedial program.

Remedial Design
The process following finalization of a Record of Decision in which plans and specifications are developed for the Remedial Construction of the alternative selected to remediate a site.

Remedial Investigation/Feasibility Study (RI/FS)
The RI fully defines and characterizes the type and extent of hazardous waste contamination at the site. The FS, which may be conducted during or after the RI, uses information developed during the RI to develop alternative remedial actions to eliminate or reduce the threat of hazardous waste contamination to public health and the environment.

Responsible Party
An individual or business who: currently owns or operates a hazardous waste site; or historically owned or operated a site when hazardous waste was disposed; or generated hazardous waste at a site; or transported hazardous waste to a site.

Responsiveness Summary
A written summary of major oral and written comments received by DER during a comment period about key elements of a site's remedial program, such as a Proposed Remedial Action Plan, and DER's response to those comments.

Site Investigation (SI)
A process undertaken to determine the nature and extent of contamination in, on, and under, and emanating from a property. The SI includes the gathering of sufficient information to determine the necessity for, and the selection of the appropriate method of, remediation of contamination in, on, or under, or emanating from a property.

Site Issues And Community Profile Scoping Sheet
A document prepared to support each Citizen Participation Record. Each Scoping Sheet identifies issues and information important to DER and the community and information that needs to be exchanged at a particular remedial stage. The Scoping Sheet also summarizes information about the surrounding community, including demographics, special needs, etc.

Superfund
The common name for the Federal program established by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended in 1986. The Superfund law authorizes the U.S. Environmental Protection Agency to investigate and clean up sites nominated to the National Priorities List.

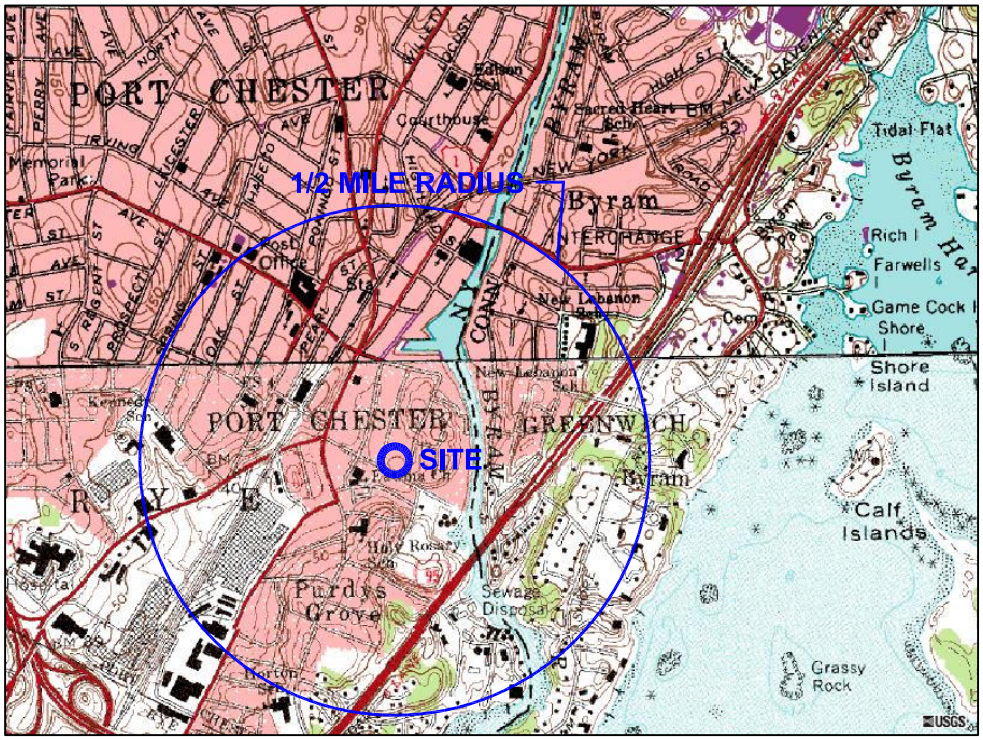
Title 3 Project
Remediation of a municipally owned site through the State Superfund Title 3 Program whereby New York State pays 75 percent of eligible costs for remediation and the municipality pays 25 percent.

Acronyms

AG	New York State Attorney General's Office
ARAR	Applicable or Relevant and Appropriate Requirement
C&D	Construction and Debris
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CO	Consent Order
CP	Citizen Participation
CPP	Citizen Participation Plan

CPS	Citizen Participation Specialist
CQC/CQA	Construction Quality Control/Construction Quality Assurance
DEE	Division of Environmental Enforcement
DER	Division of Environmental Remediation, formerly the Division of Hazardous Waste Remediation
DHWR	Division of Hazardous Waste Remediation, now the Division of Environmental Remediation
DOD	Department of Defense
DOL	Department of Law
DOW	Division of Water
ENB	Environmental Notice Bulletin
EQBA	1986 Environmental Quality Bond Act
EPA	Environmental Protection Agency
F&W	Division of Fish and Wildlife
FDA	Food and Drug Administration
FSF	Federal Superfund
FOIL	Freedom of Information Law
FS	Feasibility Study
FY	Fiscal Year
GPM	Gallons Per Minute
HeLP	Health Liaison Program
IRM	Interim Remedial Measure
mg/kg	milligrams per kilogram
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PM	Project Manager
ppm/ppb/ppt	parts per million/parts per billion/parts per trillion
PRAP	Proposed Remedial Action Plan
PRP	Potentially Responsible Party
PRS	Priority Ranking System
PSA	Preliminary Site Assessment
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFP	Request for Proposals
RHWRE	Regional Hazardous Waste Remediation Engineer
RI	Remedial Investigation

RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Responsible Party
SSF	State Superfund
SVOC	Semi-Volatile Organic Compound
TAGM	Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leading Procedure
TSDF	Treatment, Storage and Disposal Facility
ug/l	micrograms per liter
USGS	U.S. Geological Service
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound



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1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

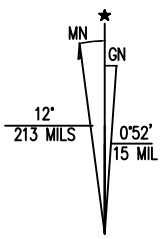
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

DATUM IS MEAN SEA LEVEL

SOURCE:

U.S.G.S. 7.5 MINUTE SERIES MAMARONECK AND GLENVILLE QUADRANGLE – NY–CT



UTM GRID AND 1967 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SITE LOCATION MAP
PORT CHESTER, NY

PREPARED FOR
G & S PORT CHESTER, L.L.C.

DATE: 04/11/02	DWG. No. mgp FIG 1
JM SORGE, INC.	FIGURE 1