

**SUBSURFACE HYDROCARBON ASSESSMENT
REPORT**

BP Service Station Number 3887
164 4th Avenue
Brooklyn, New York

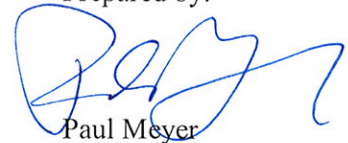
NYSDEC Spill Number 97-13442

July 27, 2005

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1.0 INTRODUCTION

This Subsurface Hydrocarbon Assessment Report (SHAR) presents the results of subsurface assessment activities conducted by Delta Environmental Consultants, Inc. (Delta) on behalf of Atlantic Richfield Company, a BP affiliated company (Atlantic Richfield), at BP Service Station Number 3887 between November 19, 2004 and January 25, 2005.

The objective of this SHAR was to assess soil and ground water conditions off-site and downgradient from the subject site by installing two monitoring wells. The scope of work for this assessment included the following:

- pre-clear off-site monitoring well boring locations MW-13 and MW-14
- advancement of off-site monitoring well borings MW-13 and MW-14;
- collect soil samples during boring advancement for field screening and laboratory analysis;
- install off-site monitoring wells MW-13 and MW-14;
- develop monitoring wells MW-13 and MW-14;
- survey monitoring well MW-13 and MW-14 casing elevations;
- collect liquid level data from monitoring wells MW-13 and MW-14;
- collect ground water samples from monitoring wells MW-13 and MW-14 for laboratory analysis; and,
- prepare this Subsurface Hydrocarbon Assessment Report containing the observations and information obtained from the aforementioned activities.

2.0 SITE CHARACTERIZATION

2.1 Site Description

BP Service Station Number 3887 is located at 164 4th Avenue, Brooklyn, Kings County, New York (the "subject site"). The subject site is located on the southwestern corner of the intersection of 4th Avenue and Douglass Street. According to the United States Geological Survey (USGS) *Brooklyn, New York-New Jersey 7.5 Minute Series Topographic Map*, the subject site is situated on a generally level parcel at an elevation of approximately 30 feet (ft) above mean sea level. The location of the site is shown on the Site Location Map, Figure 1, Appendix A.

The subject site has an irregular shape and can be accessed from the east along 4th Avenue and from the north along Douglass Street. Above ground structures at the subject site consist of a single-story convenience store, a canopy, two vacuums, and six pump islands with six dispensers. Below ground structures consist of two 10,000-gallon double-wall fiberglass-reinforced plastic gasoline underground storage tanks (USTs), one 12,000-gallon double-wall fiberglass-reinforced plastic gasoline UST, four detention basins, two catch basins, and numerous utilities (electrical, water, sewer, and natural gas). Site features are shown on the Site Plan, Figure 2, Appendix A.

2.2 Surrounding Land Use

To the north across Douglass Street are the "Marble Tile Terrazzo and Granite Corporation" and the "Big Apply Industry of New York" facilities. To the south across Degraw Street are industrial and commercial facilities, including "Gino's Auto Body Shop." Adjacent to the west are multi-level commercial and industrial facilities. Adjacent to the northwest is the "Emco, Inc." industrial warehouse facility. Across 4th Avenue, approximately 120 ft to the east, are multi-level residential apartments

improved with basements. Additionally, approximately 65 ft east of the subject site, beneath 4th Avenue, is the 4th Avenue subway tunnel. A Surrounding Land Use Map is provided as Figure 3, Appendix A.

2.3 Sensitive Receptor Survey

Delta conducted a sensitive receptor survey of the subject site and surrounding properties. Several utility vaults and subsurface improvements were identified both on site and off site, including those located beneath 4th Avenue, approximately 5 to 10 ft east of the subject site. Four detention basins were identified near the southern portion of the subject site. Additionally, there are two catch basins located on the subject site. These features are shown on the Site Plan, Figure 2, Appendix A. According to a review of an Environmental Data Resources, Inc. (EDR) Report, there are no Federal or State Public Water Supply Wells within a one-mile radius of the subject site. The structure with a basement that is closest to the subject site, and hydraulically downgradient, is located approximately 100 ft to the southeast, across Degraw Street. Approximately 65 ft to the east is the 4th Avenue Subway tunnel.

3.0 REGIONAL GEOLOGY/HYDROGEOLOGY

According to the Surficial Geologic Map of New York, Lower Hudson Sheet (Cadwell, 1989), this area of New York is underlain by Pleistocene-age glacial till, dominantly consisting of fine to coarse-grained sand with interstitial lenses of gravel and silt, which are remnants of glacial deposition. According to the United States Department of Agriculture Soil Survey Classification and Nomenclature System, this soil would likely be referred to as *Urban Land*, because the original composition and structure of the soil has been significantly altered by urbanization and development activities.

According to a review of the United States Department of the Interior Geological Survey's Water-Table Map of Kings and Queens Counties, Long Island, New York Map, dated March 1997, ground water is located at a depth of approximately 9 ft below ground surface (bgs) and flows to the southwest.

There are no predominant geological surface features such as bedrock outcroppings on the subject site. Site-specific stratigraphy was gathered during soil boring advancement activities. Based on soil collected via continuous macrocore sampling and split-spoon sampling activities during this and previous subsurface assessments, the subject site is underlain by brown medium to coarse-grained silty-sand with construction debris, ash, and clay lenses to a depth of 24 ft bgs, the depth of the deepest boring. Soil boring logs generated during the soil boring advancement and monitoring well installation activities are provided in Appendix C.

3.1 Site Hydrogeology

Ground water movement varies in relation to topography, lithology, elevations of recharge and discharge areas, and man-made influences. Ground water elevations were determined for this site by measuring each monitoring well's top of casing (TOC) relative to an arbitrary benchmark with an assigned elevation of 100.00 ft, measuring the water level in the monitoring wells relative to the TOC, and computing the reference elevation of the ground water at the time of the measurement. The depth to ground water at the newly installed wells was measured on January 25, 2005 to be between 15.23 and 16.03 ft bgs.

The direction of ground water flow within unconsolidated deposits is interpolated between monitoring wells by comparing the ground water elevations in the monitoring wells and taking into consideration the types of influencing factors mentioned above. Previous ground water monitoring activities at the site have shown ground water flow to the west-southwest.

4.0 FIELD EXPLORATION METHODS

Field explorations performed as part of the subsurface assessment activities included the following:

- pre-clear off-site soil boring locations MW-13 and MW-14;
- advance off-site soil borings MW-13 and MW-14;
- collect soil samples MW-13 (13-14 ft) and MW-14 (14-15 ft) during soil boring advancement for field screening and laboratory analysis;
- install one-inch diameter, off-site ground water monitoring well MW-13
- install two-inch diameter, off-site ground water monitoring well MW-14
- survey monitoring well MW-13 and MW-14 casing elevations;
- develop monitoring wells MW-13 and MW-14;
- collect liquid level data from monitoring wells MW-13 and MW-14; and,
- collect ground water samples from monitoring wells MW-13 and MW-14 for laboratory analysis.

4.1 Geoprobe Soil Borings

On November 19, 2004, monitoring well soil boring locations MW-13 and MW-14 were pre-cleared using the “air knife” technique by Earth Technology, LLC. The soil borings were cleared to a depth of 5 ft bgs and 110% of the hollow stem auger diameter.

Zebra Environmental Corporation (Zebra) of Lynbrook, New York, on behalf of Delta, installed monitoring wells MW-13 and MW-14 using a Geoprobe Model 6600 direct-push unit with hollow-stem auger drill capability. Monitoring wells MW-13 and MW-14 were installed off-site, south of the service station along Degraw Street, specifically, monitoring well MW-13 was installed on the sidewalk on the south side of Degraw Street, and monitoring well MW-14 was installed on the sidewalk on the north side of Degraw Street. The locations of the monitoring wells are shown on Figure 2, Site Plan, Appendix A.

On January 4, 2005, Zebra used a macrocore soil sampler, advanced by direct-push technique, to collect continuous soil samples from a depth of 5 to 20 ft bgs during the advancement of monitoring well borings MW-13 and MW-14. Soil samples from the macrocore were inspected for visual evidence of petroleum impact and were screened for total volatile organic compounds (VOCs) using a photoionization detector (PID). The soil samples were classified in general accordance with the Unified Soil Classification System. Boring logs/monitoring well construction summaries for MW-13 and MW-14 are included in Appendix B.

Soil samples for laboratory analysis were collected from monitoring well boring MW-13 at the 13 to 14 ft bgs depth interval and from monitoring well boring MW-14 at the 14 to 15 ft bgs depth interval. These depth intervals generally represent the ground water interface as determined by field observations.

The soil samples were forwarded under chain-of-custody procedures to Accutest Laboratories (Accutest) of Dayton, New Jersey. Accutest is a New York State Department of Health-certified laboratory (Certification Number 10983). The soil samples were analyzed for New York State Department of Environmental Conservation (NYSDEC) Spill Technology and Remediation Series (STARS) Memo #1-listed VOCs in accordance with United States Environmental Protection Agency (EPA) Method 8260. The analytical results for these soil samples are discussed in Section 5.1.

4.2 Monitoring Well Installation

On January 4, 2005, soil borings MW-13 and MW-14 were completed as monitoring wells to a depth of 20 ft bgs. The depth to ground water in monitoring wells MW-13 and MW-14 at the time of installation was approximately 16 ft bgs.

Monitoring well MW-13 was constructed of 10 ft of one-inch-diameter, Schedule 40, 0.010-inch slot, polyvinyl chloride (PVC) well screen and 9.5 ft of one-inch-diameter, Schedule 40, solid, PVC riser pipe. Monitoring well MW-14 was constructed of 10 ft of two-inch-diameter, Schedule 40, 0.010-inch slot, polyvinyl chloride (PVC) well screen and 9.5 ft of two-inch-diameter, Schedule 40, solid, PVC riser pipe. A sand pack of Morie #2 well sand was installed from the completion depth of each well to two feet above the top of each well screen. A two-foot-thick Bentonite seal was installed above each sand pack. The annular space of each well was backfilled with native material from the top of the Bentonite seal to approximately one ft bgs. A bolt-down, flush-mount protective casing was installed at ground surface using concrete to seal each well from approximately 1 ft bgs to grade level.

4.3 Monitoring Well Survey

Monitoring wells MW-13 and MW-14 were surveyed on January 4, 2005. The elevation of the top-of-casing for each monitoring well was surveyed to an accuracy of 0.01 ft. The monitoring well survey was referenced to a local, arbitrary benchmark with an assigned elevation of 100.00 ft.

4.4 Monitoring Well Development

Monitoring wells MW-13 and MW-14 were developed on January 11, 2005. The monitoring wells were developed by the over-purging method using a peristaltic pump. At a minimum, five casing volumes of water were purged from each monitoring well. The ground water purged from each monitoring well was observed to have moderate to low turbidity at the conclusion of purging activities.

4.5 Monitoring Well Gauging and Sampling

On January 25, 2005, monitoring wells MW-13 and MW-14 were gauged for depth to ground water and monitored for the presence of light non-aqueous phase liquid (LNAPL) to an accuracy of 0.01 ft using an oil/water interface probe. Liquid level measurements for the January 25, 2005 sampling event are discussed in Section 5.2.

On January 25, 2005, ground water samples MW-13 and MW-14 were collected from monitoring wells MW-13 and MW-14, respectively. Prior to sampling, the volume of water contained within each monitoring well was calculated using the well diameter and water column height. Whenever possible, a volume of ground water equivalent to at least three well volumes was purged from each monitoring well using a disposable polyethylene bailer and/or a mechanical pump with dedicated polyethylene tubing. Dedicated polyethylene bailers were used to collect the ground water samples. The samples were poured from the bailers into dedicated laboratory-supplied glassware. The glassware was then placed into a cooler and maintained at a temperature of less than 4-degrees Celsius for transportation to the laboratory.

The ground water samples were forwarded with a trip blank and under chain-of-custody procedures to Accutest. The ground water samples were analyzed for NYSDEC STARS Memo #1-listed VOCs in accordance with EPA Method 8260. The analytical results for these ground water samples are discussed in Section 5.3.

5.0 INVESTIGATION ANALYTICAL RESULTS

5.1 Soil Analytical Results

On January 4, 2005, Delta advanced off-site soil borings MW-13 and MW-14 to a depth of 20 and 22 ft bgs, respectively, using a Geoprobe 6600 unit. Soil samples MW-13 (13-14 ft) and MW-14 (14-15 ft) were collected from monitoring well borings MW-13 and MW-14, respectively, and forwarded to Accutest for analysis of NYSDEC STARS Memo #1-listed VOCs in accordance with EPA Method 8260. The locations of the soil borings are shown on Figure 2, Site Plan, Appendix A. The laboratory analytical results are summarized in Table 1, Soil Analytical Results, Appendix C. Analytical results in **bold** exceed applicable NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Soil Cleanup Objectives. The Laboratory Analytical Results Report is provided in Appendix D.

As shown in Table 1, laboratory analysis of these soil samples did not identify VOC concentrations in excess of applicable NYSDEC Soil Cleanup Objectives in either of the two soil samples. BTEX concentrations (benzene, toluene, ethylbenzene, and xylenes) and methyl tertiary-butyl ether (MTBE) were not detected in either soil sample. Total VOC concentrations in the soil samples ranged from not detected in soil sample MW-13 to 236 micrograms per kilogram ($\mu\text{g}/\text{K}\text{g}$) in soil sample MW-14.

Figure 4, Soil Analytical Results, Appendix A, illustrates the distribution of VOCs present in the soil samples collected during the January 25, 2005 soil boring activities. Figure 4 indicates that BTEX and MTBE concentrations were not detected at either boring location and detectable VOCs were only detected at MW-14.

5.2 Monitoring Well Gauging Results

On January 25, 2005, ground water monitoring wells MW-13 and MW-14 were gauged for depth to ground water and were monitored for the presence of LNAPL. The depth to ground water in monitoring wells MW-13 and MW-14 was measured to be 15.23 and 16.03 ft bgs, respectively. LNAPL was not detected in either of the gauged wells. The results of the gauging event are shown on Figure 5, Ground Water Elevation Map, Appendix A and summarized in Table 2, Liquid Level Measurements, Appendix C.

5.3 Ground Water Analytical Results

On January 25, 2005, ground water samples MW-13 and MW-14 were collected from off-site monitoring wells MW-13 and MW-14, respectively. The ground water samples were forwarded to Accutest for analysis of NYSDEC STARS Memo #1-listed VOCs in accordance with EPA Method 8260. The laboratory analytical results are summarized in Table 3, Ground Water Analytical Results, Appendix C. Analytical results in **bold** exceed applicable NYSDEC Ground Water Quality Standards (GWQS). The Laboratory Analytical Results Report is provided in Appendix E.

As shown in Table 3, laboratory analysis of these ground water samples identified one VOC concentration (naphthalene) in excess of the applicable NYSDEC GWQS in one of the two ground water samples (MW-13). BTEX concentrations were not detected in either ground water sample. MTBE concentrations in the ground water samples ranged from 4.6 micrograms per liter ($\mu\text{g}/\text{L}$) in MW-13 to 7.5 $\mu\text{g}/\text{L}$ in MW-14. Total VOC concentrations in the ground water samples ranged from 7.5 $\mu\text{g}/\text{L}$ in MW-14 to 48.6 $\mu\text{g}/\text{L}$ in MW-13.

Figure 6, Ground Water Analytical Results, Appendix A, illustrates the distribution of VOCs present in the ground water samples collected during the January 25, 2005 sampling event. Figure 6 indicates that the maximum MTBE concentration was identified at off-site monitoring well MW-14, the maximum total VOC concentration was identified at monitoring well MW-13, and BTEX concentrations were not identified in either of the two monitoring wells.

6.0 CONCLUSIONS/FUTURE PLANS

Laboratory analysis did not identify BTEX, MTBE, or other target VOCs in excess of applicable NYSDEC Soil Cleanup Objectives in either of the two soil samples collected during off-site monitoring well installation. Laboratory analysis identified one VOC concentration (naphthalene) in excess of the applicable NYSDEC GWQS in one of the two ground water samples collected (MW-13). Delta will sample the monitoring wells on a quarterly schedule and will continue to delineate off-site impacts.

7.0 REMARKS

The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's client and anyone else specifically listed on this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

8.0 REFERENCES

United States Geologic Survey, *Brooklyn, New York*, 7.5 Minute Series Topographic Map, dated 1967 (photorevised 1979), scale 1:24,000.

Cadwell, Donald H., *et al.*, 1989, Surficial Geologic Map of New York, Lower Hudson Sheet: New York State Geologic Survey.

New York State Department of Environmental Conservation, Spill Technology and Remediation Series Memo #1 Petroleum-Contaminated Soil Guidance Policy, dated August 1992.

New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation, Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels, dated January 24, 1994, revised August 22, 2001.

New York State Department of Environmental Conservation, Division of Water Resources, Water Quality Regulations, Surface Water and Groundwater Classifications and Standards, New York State, Codes, Rules and Regulations Title 6, Chapter X, Parts 700-706, through March 1998.

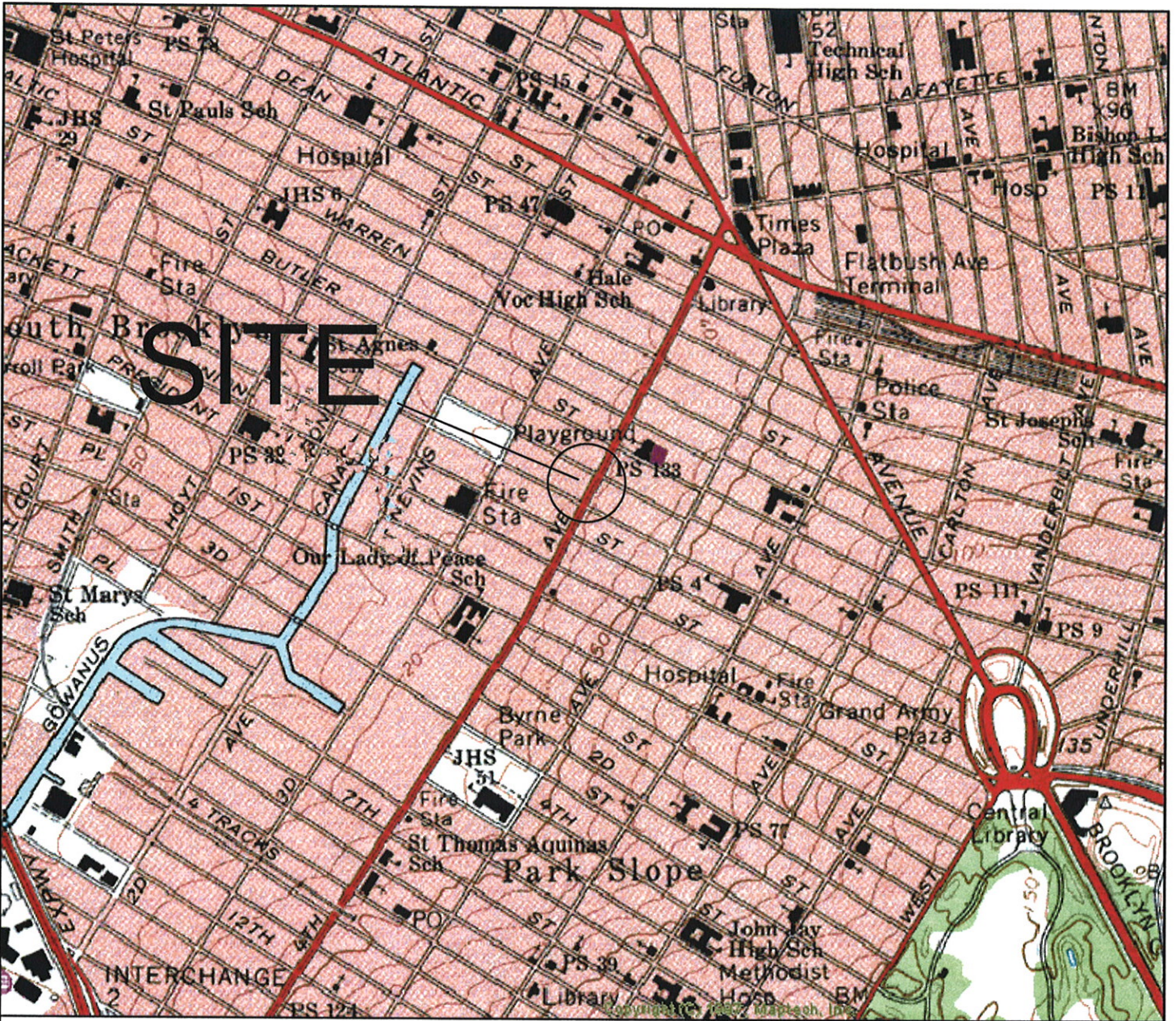
United States Department of the Interior Geological Survey, Water-Table Configuration of Kings and Queens Counties, Long Island, New York Map, dated March 1997.

Delta Environmental Consultants, Inc.
BP Service Station Number 3887
164 4th Avenue, Brooklyn, New York
Subsurface Hydrocarbon Assessment Report

July 27, 2005

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Appendix A



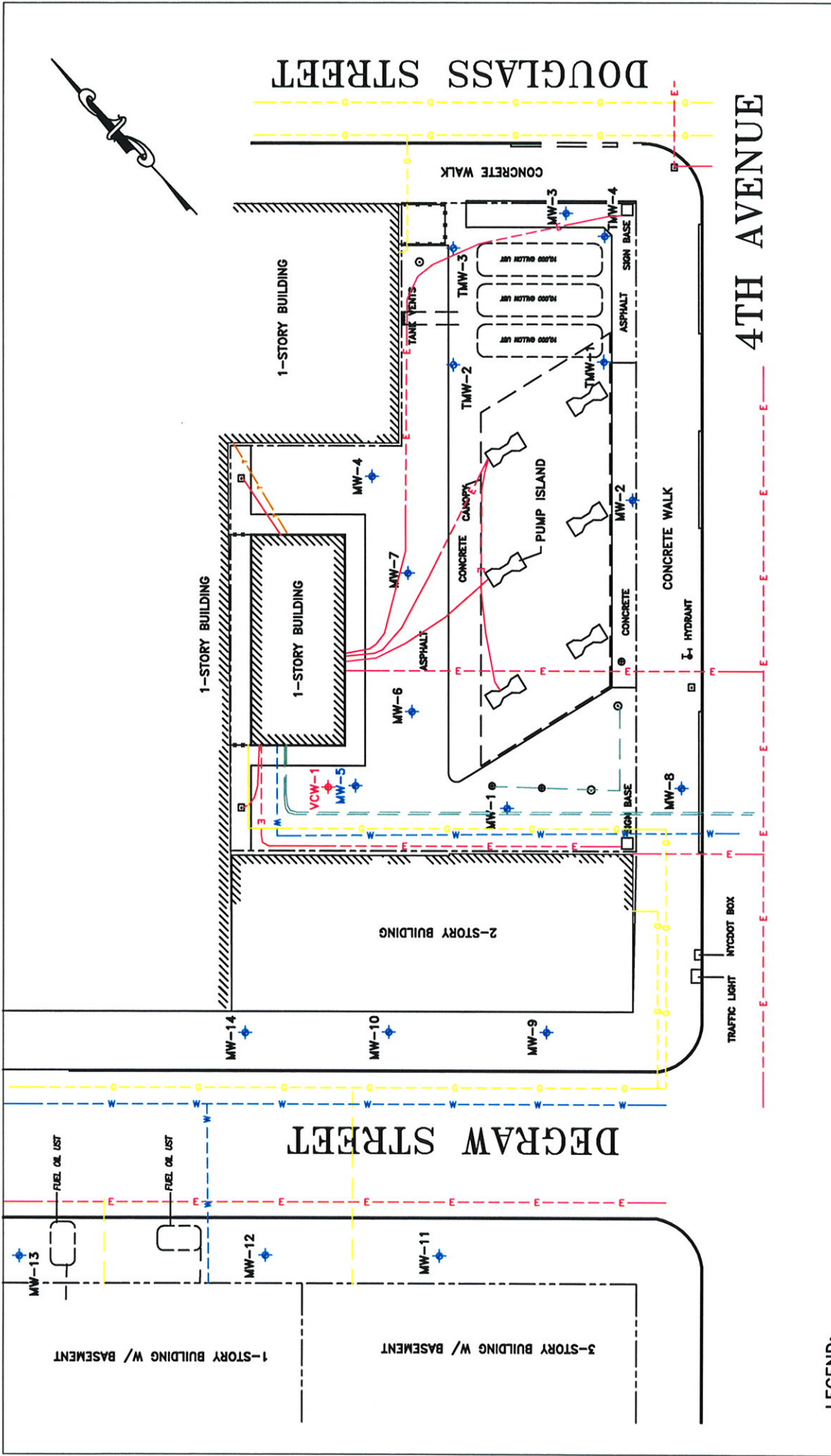
MAP BASED ON USGS 7.5 MINUTES SERIES TOPOGRAPHIC MAP
 BROOKLYN, NEW YORK QUADRANGLE
 DATE: 1967 REVISED 1979

FIGURE 1 SITE LOCATION MAP

BP SERVICE STATION NUMBER 3887
 164 4TH AVENUE
 BROOKLYN, NEW YORK

PROJECT NO.: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: DS	DATE: 2/21/05
FILE NAME: SLOC	REVIEWED BY: PZM





LEGEND:

- MW-1
- WATER LINE
- TELEPHONE LINE
- ELECTRICAL LINE
- GAS LINE
- SEWER LINE



FIGURE 2

SITE PLAN

BP SERVICE STATION NUMBER 3887
164 4TH AVENUE
BROOKLYN, NEW YORK

PROJECT NO: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: SCJ	DATE: 1/17/05
FILE NAME: MASTER SITE PLAN	



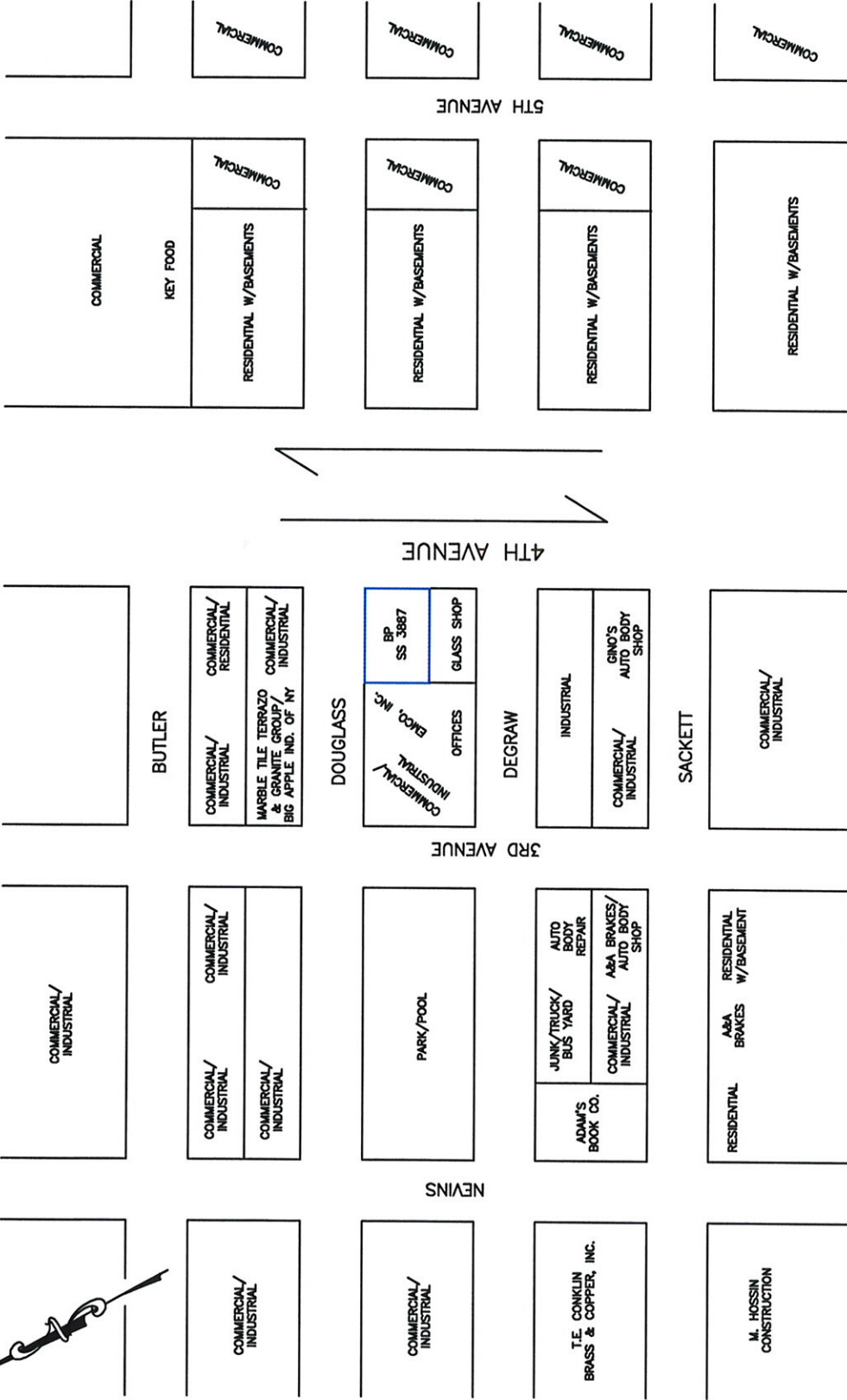


FIGURE 3
SURROUNDING LAND USE MAP

BP SERVICE STATION NUMBER 3887
164 4TH AVENUE
BROOKLYN, NEW YORK

PROJECT NO: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: SCJ	DATE: 1/17/05
FILE NAME: SLUSE	REVIEWED BY: PZM

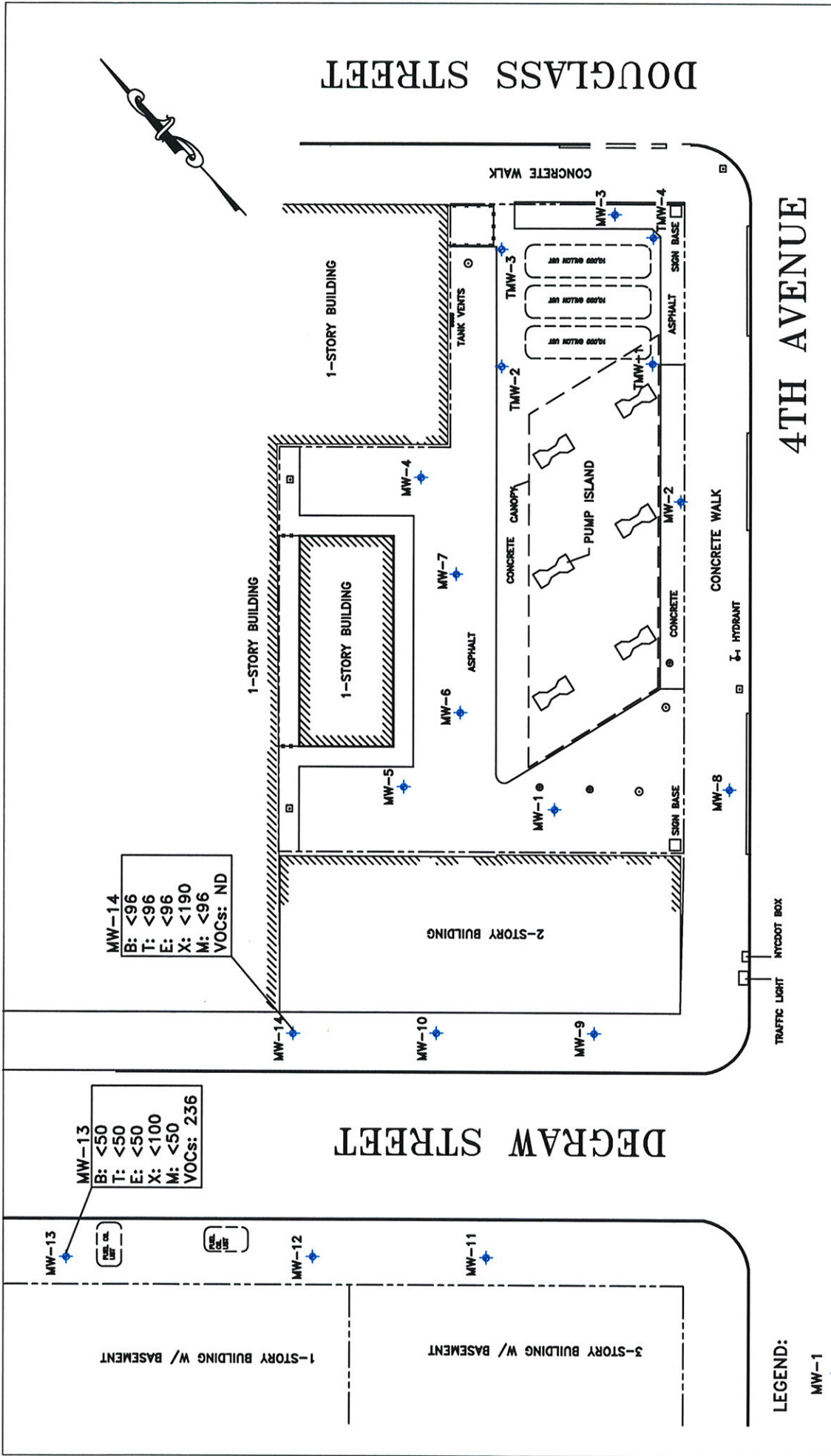


FIGURE 4

SOIL ANALYTICAL RESULTS MAP
 JANUARY 4, 2005

BP SERVICE STATION NUMBER 3887
 164 4TH AVENUE
 BROOKLYN, NEW YORK

PROJECT NO.: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: DS	DATE: 2/21/05
FILE NAME: SHAR 2005-01	REVIEWED BY: PZM



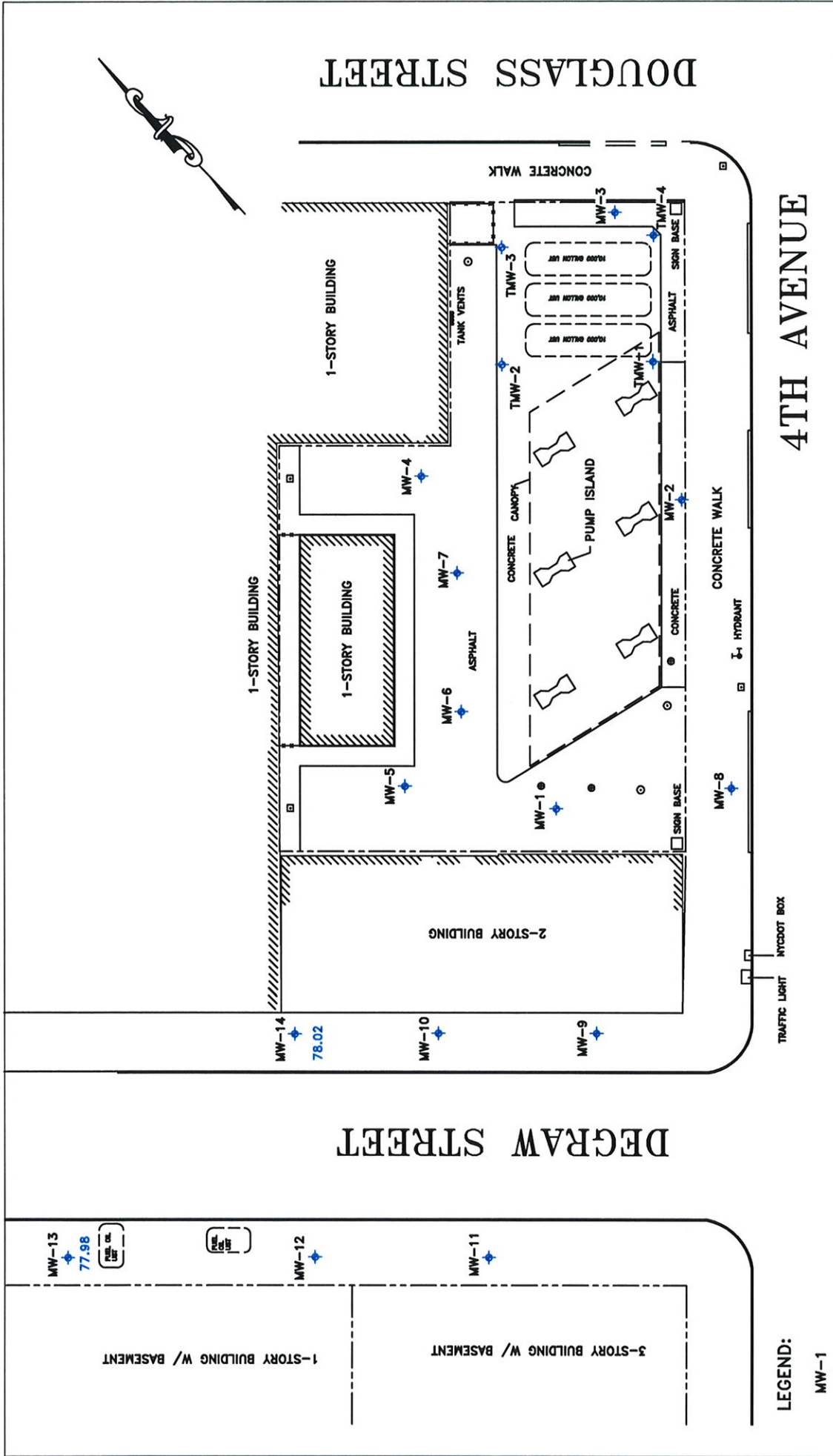


FIGURE 5
 GROUND WATER ELEVATION MAP
 JANUARY 25, 2005
 BP SERVICE STATION NUMBER 3887
 164 4TH AVENUE
 BROOKLYN, NEW YORK

LEGEND:

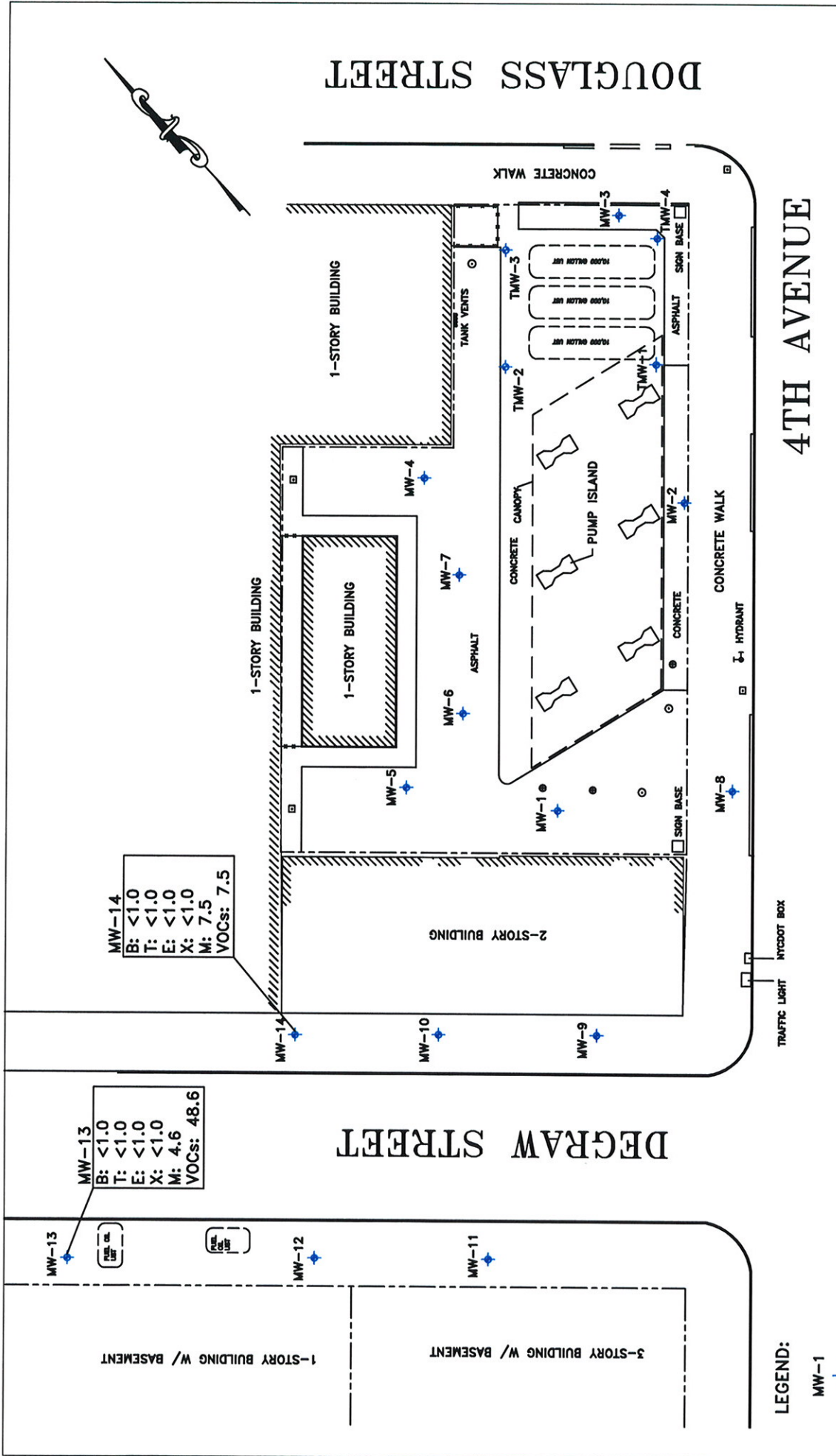
MW-1

SOIL BORING/MONITORING WELL LOCATION

54.34 GROUND WATER ELEVATION (FT)

PROJECT NO.: 602JF-RP50
 DRAWN BY: SCJ
 PREPARED BY: DS
 DATE: 2/21/05
 FILE NAME: SHAR 2005-01
 REVIEWED BY: PZM

Delta
 Environmental Consultants Inc.



MW-14
 B: <1.0
 T: <1.0
 E: <1.0
 X: <1.0
 M: 7.5
 VOCs: 7.5

MW-13
 B: <1.0
 T: <1.0
 E: <1.0
 X: <1.0
 M: 4.6
 VOCs: 48.6

LEGEND:
 MW-1

SOIL BORING/MONITORING WELL LOCATION

- B: BENZENE
- T: TOLUENE
- E: ETHYLBENZENE
- X: TOTAL XYLENES
- M: METHYL TERTIARY-BUTYL ETHER (MTBE)
- VOCs: TOTAL VOLATILE ORGANIC COMPOUNDS

NYSDEC CRITERIA EXCEEDENCE SHOWN IN RED

RESULTS SHOWN IN MICROGRAMS PER LITER (µg/L)

FIGURE 6

GROUND WATER ANALYTICAL RESULTS
 JANUARY 25, 2005
 BP SERVICE STATION NUMBER 3887
 164 4TH AVENUE
 BROOKLYN, NEW YORK

PROJECT NO.: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: DS	DATE: 2/21/05
FILE NAME: SHAR 2005-01	REVIEWED BY: PZM



Appendix B



PROJECT INFORMATION

PROJECT: **BP S/S 3887**
 SITE LOCATION: **Brooklyn, NY**
 JOB NO.: **G02HPRP5**
 LOGGED BY: **Andre Obligado**
 PROJECT MANAGER: **Brad Fisher**
 DATES DRILLED: **January 4, 2005**

DRILLING INFORMATION

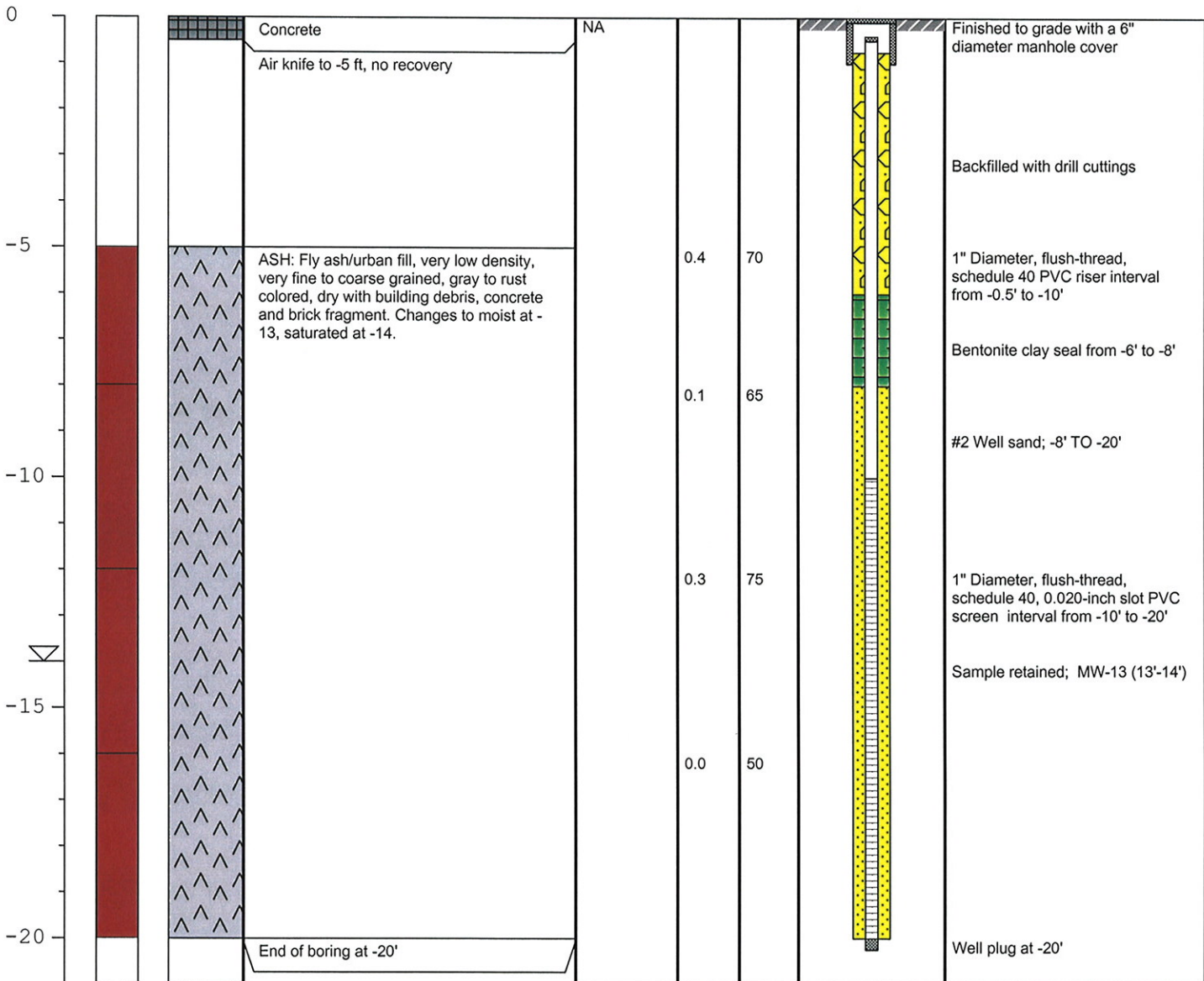
DRILLING CO.: **Zebra Environmental Corp**
 DRILLER: **Evan**
 RIG TYPE: **Geoprobe Model 6600**
 METHOD OF DRILLING: **Direct push**
 SAMPLING METHODS: **3-inch x 4-foot macrocore**
 HAMMER WT./DROP: **NA**

NOTES:
 South side of Degraw Street

- ⚡ Initial water level measurement
- ⚡ Static water level measurement

SAMPLE ID: MW-13 (13'-14')

DEPTH	SAMPLE INTERVAL	SOIL TYPE	SOIL DESCRIPTION	BLOW COUNT	PID ppm	% REC	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
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PROJECT INFORMATION

PROJECT: **BP S/S 3887**
 SITE LOCATION: **Brooklyn, NY**
 JOB NO.: **G02HPRP5**
 LOGGED BY: **Andre Obligado**
 PROJECT MANAGER: **Brad Fisher**
 DATES DRILLED: **January 4, 2005**

DRILLING INFORMATION

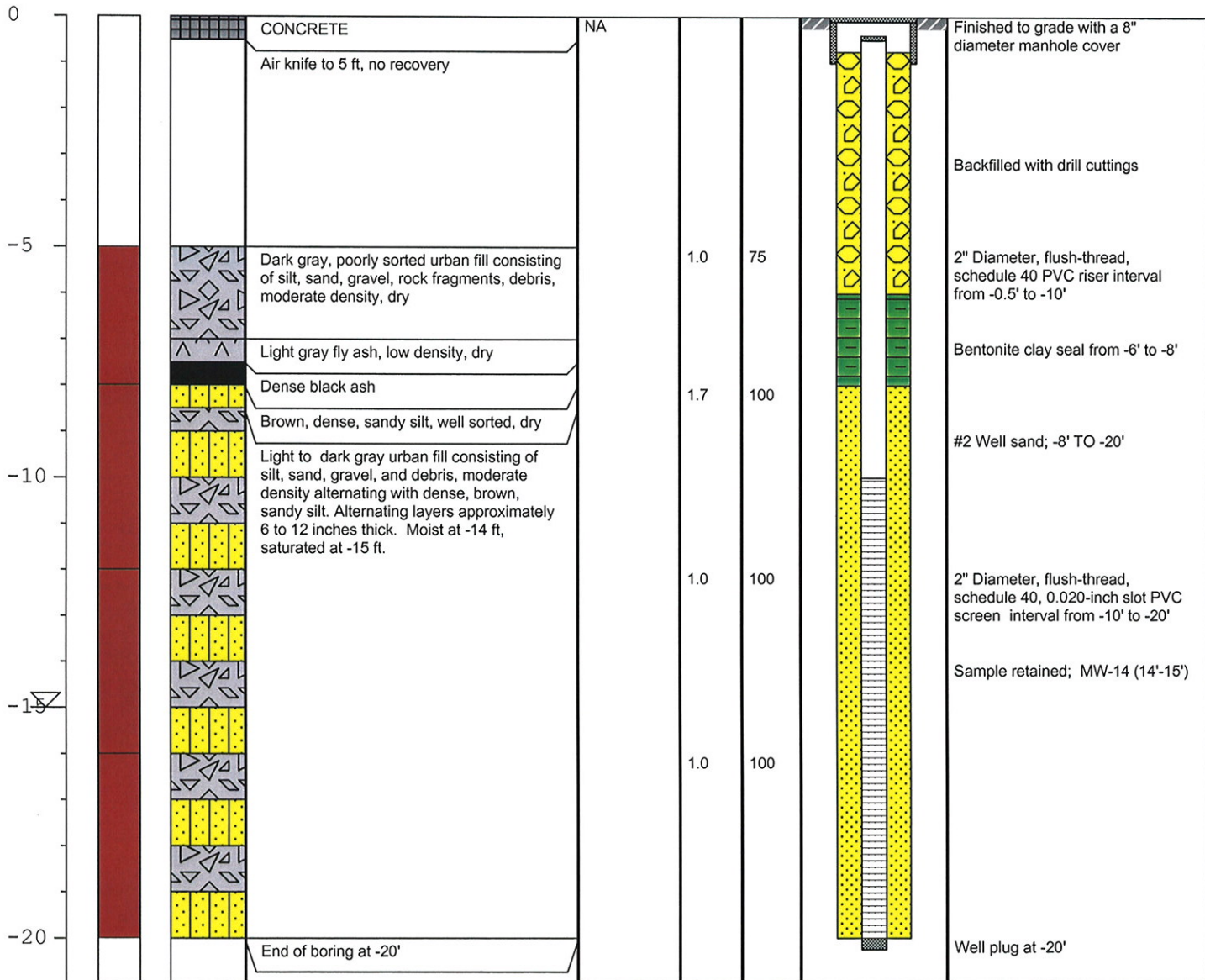
DRILLING CO.: **Zebra Environmental Corp**
 DRILLER: **Evan**
 RIG TYPE: **Geoprobe Model 6600**
 METHOD OF DRILLING: **Direct push/4.25-inch ID HSA**
 SAMPLING METHODS: **3-inch x 4-foot macrocore**
 HAMMER WT./DROP: **NA**

NOTES:

- ⊘ Initial water level measurement
- ▼ Static water level measurement

SAMPLE ID: MW-14 (14'-15')

DEPTH	SAMPLE INTERVAL	SOIL TYPE	SOIL DESCRIPTION	BLOW COUNT	PID ppm	% REC	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
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Appendix C

Table 1
Soil Analytical Results
January 4, 2005

BP Service Station Number 3887
 Brooklyn, New York

Analytical Parameter	NYSDEC Soil Cleanup Objectives ($\mu\text{g}/\text{Kg}$)	Soil Sample Location and Concentration ($\mu\text{g}/\text{Kg}$)	
		MW-13 (13-14 ft)	MW-14 (14-15 ft)
Benzene	60	<96	<50
Ethylbenzene	5,500	<96	<50
Toluene	1,500	<96	<50
Xylenes (total)	1,200	<190	<100
Methyl Tertiary Butyl Ether	120	<96	<50
n-Butylbenzene	12,000	<480	<250
sec-Butylbenzene	11,000	<480	<250
tert-Butylbenzene	11,000	<480	<250
Isopropylbenzene	2,300	<480	<250
p-Isopropyltoluene	11,000	<480	<250
Naphthalene	13,000	<480	236 J
n-Propylbenzene	3,700	<480	<250
1,2,4-Trimethylbenzene	13,000	<480	<250
1,3,5-Trimethylbenzene	3,300	<480	<250
Total BTEX	NGV	ND	ND
Total VOCs	NGV	ND	236

NOTES:

NYSDEC - New York State Department of Environmental Conservation

NYSDEC Soil Clean-up Objectives are based on NYSDEC Technical and Administrative Guidance Memorandum

No. 4046 Soil Clean-up Objectives to protect ground water

All VOC concentrations reported in micrograms per kilogram ($\mu\text{g}/\text{Kg}$)

NGV - No guidance value

Table 2
Liquid Level Measurements
January 25, 2005

BP Service Station Number 3887
Brooklyn, New York

Well Number	Top of Casing Elevation	Depth to Ground Water	Depth to LNAPL	LNAPL Thickness	Ground Water Elevation
MW-13	93.21	15.23	NP	NP	77.98
MW-14	94.05	16.03	NP	NP	78.02

Notes:

All measurements are in feet

LNAPL - Light non-aqueous phase liquid

NP - LNAPL not present

Top of casing elevation based upon arbitrary on-site benchmark

Ground water elevation corrected for LNAPL, as applicable

Table 3
Ground Water Analytical Results
January 25, 2005

BP Service Station Number 3887
 Brooklyn, New York

Analytical Parameter	NYSDEC GWQS	Sample Location and Concentration (µg/L)	
		MW-13	MW-14
Benzene	1	<1.0	<1.0
Toluene	5	<1.0	<1.0
Ethylbenzene	5	<1.0	<1.0
Xylenes	5	<1.0	<1.0
Methyl Tertiary Butyl Ether	10	4.6	7.5
n-Butylbenzene	5	<5.0	<5.0
sec-Butylbenzene	5	<5.0	<5.0
tert-Butylbenzene	5	<5.0	<5.0
Isopropylbenzene	5	<2.0	<2.0
p-Isopropyltoluene	5	<5.0	<5.0
Naphthalene	10	44.0	<5.0
n-Propylbenzene	5	<5.0	<5.0
1,2,4-Trimethylbenzene	5	<5.0	<5.0
1,3,5-Trimethylbenzene	5	<5.0	<5.0
Total BTEX	NGV	ND	ND
Total VOCs	NGV	48.6	7.5

NOTES:

NYSDEC GWQS - New York State Department of Environmental Conservation Ground Water Quality

All concentrations reported in micrograms per liter (µg/L)

< - Not detected at or above indicated laboratory reporting limit

NGV - No guidance value available for this parameter

ND - Not detected

Results in **bold** exceed the applicable NYSDEC GWQS

Appendix D



New Jersey

07/27/05

Technical Report for

BP Amoco Corporation

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

GO2H-BRP-2

Accutest Job Number: N87601

Sampling Date: 01/04/05

Report to:

Delta Environmental Consultants

pmeyer@deltaenv.com

ATTN: Paul Meyer

Total number of pages in report: 7



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, IL, IN, KS, KY, LA, MA, MD, MI, MT, NC, PA, RI, SC, TN, VA, WV

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3.1: Chain of Custody 7



Sample Summary

BP Amoco Corporation

Job No: N87601

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY
Project No: GO2H-BRP-2

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
N87601-1	01/04/05	10:15 AO	01/05/05	SO	Soil	MW-13(13-14)
N87601-2	01/04/05	12:23 AO	01/05/05	SO	Soil	MW-14(14-15)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-13(13-14)	Date Sampled:	01/04/05
Lab Sample ID:	N87601-1	Date Received:	01/05/05
Matrix:	SO - Soil	Percent Solids:	69.0
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	D92001.D	1	01/07/05	YL	n/a	n/a	VD3671
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.9 g	5.0 ml	100 ul
Run #2			

VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	96	23	ug/kg	
104-51-8	n-Butylbenzene	ND	480	85	ug/kg	
135-98-8	sec-Butylbenzene	ND	480	26	ug/kg	
98-06-6	tert-Butylbenzene	ND	480	43	ug/kg	
100-41-4	Ethylbenzene	ND	96	55	ug/kg	
98-82-8	Isopropylbenzene	ND	480	100	ug/kg	
99-87-6	p-Isopropyltoluene	ND	480	30	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	96	32	ug/kg	
91-20-3	Naphthalene	ND	480	240	ug/kg	
103-65-1	n-Propylbenzene	ND	480	14	ug/kg	
108-88-3	Toluene	ND	96	22	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	480	75	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	480	94	ug/kg	
	m,p-Xylene	ND	190	75	ug/kg	
95-47-6	o-Xylene	ND	96	41	ug/kg	
1330-20-7	Xylene (total)	ND	190	41	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	93%		67-119%
17060-07-0	1,2-Dichloroethane-D4	90%		58-128%
2037-26-5	Toluene-D8	92%		75-121%
460-00-4	4-Bromofluorobenzene	89%		67-132%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-14(14-15)	Date Sampled:	01/04/05
Lab Sample ID:	N87601-2	Date Received:	01/05/05
Matrix:	SO - Soil	Percent Solids:	88.2
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	D92002.D	1	01/07/05	YL	n/a	n/a	VD3671
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.5 g	5.0 ml	100 ul
Run #2			

VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	12	ug/kg	
104-51-8	n-Butylbenzene	ND	250	44	ug/kg	
135-98-8	sec-Butylbenzene	ND	250	14	ug/kg	
98-06-6	tert-Butylbenzene	ND	250	22	ug/kg	
100-41-4	Ethylbenzene	ND	50	28	ug/kg	
98-82-8	Isopropylbenzene	ND	250	52	ug/kg	
99-87-6	p-Isopropyltoluene	ND	250	15	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	50	16	ug/kg	
91-20-3	Naphthalene	236	250	120	ug/kg	J
103-65-1	n-Propylbenzene	ND	250	7.2	ug/kg	
108-88-3	Toluene	ND	50	12	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	250	39	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	250	49	ug/kg	
	m,p-Xylene	ND	100	39	ug/kg	
95-47-6	o-Xylene	ND	50	21	ug/kg	
1330-20-7	Xylene (total)	ND	100	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	94%		67-119%
17060-07-0	1,2-Dichloroethane-D4	91%		58-128%
2037-26-5	Toluene-D8	92%		75-121%
460-00-4	4-Bromofluorobenzene	90%		67-132%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody



Chain of Custody Record

Page 1 of N87601
 Project Name: ss 3887
 BP BU/AR Region/Enfos Segment: East Coast/Retail
 State or Lead Regulatory Agency: NYSDEC

 On-site Time: 8:20 Temp: 40
 Off-site Time: 4:00 Temp: 40
 Sky Conditions: Cloudy
 Meteorological Events: ---
 Wind Speed: --- Direction: ---

 YEAR: 2005
 Requested Due Date (mm/dd/yy): STANDARD
 COC TRACKING No.: ---

 Lab Name: Accutest BP/AR Facility No.: ss 3887
 Lab Address: 2235 Highway 130 BP/AR Facility Address: 164 4th Avenue, Brooklyn, ny
Dayton, NJ Site Lat/Long: ---
 Lab PM: Diane Komar California Global ID #: ---
 Tele/Fax: 732-329-0200 Enfos Project No.: ---
 BP/AR PM Contact Name: Charles Wein Provision or RCOP: Provision
 Address: 41 Regan Road Phase/WBS: ---
 Sub Phase/Task: 03
 Tele/Fax: --- Cost Element: 05

 Consultant/Contractor: Delta Environmental Consultants
 Address: 84 Business Park Drive Suite 107
Armonk, NY 10504
 e-mail EDD to: pmeyer@deltacnv.com
 Consultant/Contractor Project No.: G02H-BRP-2
 Consultant/Contractor Tele/Fax: 914-765-8806
 Consultant/Contractor PM: Paul Meyer
 Invoice to: Consultant or BP or AR Co. (Circle one)

Item No.	Sample Description	Time	Date	Matrix			Laboratory Tracking No.	Preservatives					3200 STARS list VOCs	Requested Analysis	Sample Point Lat/Long and Comments		
				Soil/Solid	Water/Liquid	Air		No. of containers	Unpreserved	H ₂ SO ₄	HNO ₃	HCl				Methanol	
1	MW-13 (13-14)	10:15	1/4	X			-1	2	1								
2	MW-14 (14-15)	12:23	1/4	X			-2	2	1								
3																	
4																	
5																	
6																	
7																	

 Sampler's Full Name: Andre Oblgado Relinquished By / Affiliation (Sign): [Signature] Date: 1/4/05 Time: 12:00
 Sampler's Company: Delta Accepted By / Affiliation (Sign): [Signature] Date: 1/4/05 Time: 12:00
 Shipment Date: 1/4/2004
 Shipment Method: FedEx
 Shipment Tracking No.: 849370872568

 Special Instructions: Leads Sample

 Custody Seals in Place (circle one) N Temp Blank (circle one) Y Cooler Temperature on Receipt Y °F/C (circle one) Trip Blank Y / N (Circle one)
 Distribution: White Copy - Laboratory / Yellow Copy - BP/GEM / Pink Copy - Consultant/Contractor BP COC Rev. 2 4/18/03

3887 new coc.xls

1/4/2005

COC Sheet 3

Appendix E



New Jersey

07/27/05

Technical Report for

BP Amoco Corporation

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

PROJ# G02JF-0050 PHASE 01 SUB 03 COST 05

Accutest Job Number: N89316

Sampling Date: 01/25/05

Report to:

Delta Environmental Consultants

pmeyer@deltaenv.com

ATTN: Paul Meyer

Total number of pages in report: 8



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, IL, IN, KS, KY, LA, MA, MD, MI, MT, NC, PA, RI, SC, TN, VA, WV

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Sample Summary

BP Amoco Corporation

Job No: N89316

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY
Project No: PROJ# G02JF-0050 PHASE 01 SUB 03 COST 05

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
N89316-1	01/25/05	12:02 BH	01/26/05	AQ	Ground Water	MW-13
N89316-2	01/25/05	12:26 BH	01/26/05	AQ	Ground Water	MW-14
N89316-3	01/25/05	12:26 BH	01/26/05	AQ	Trip Blank Water	TRIP BLANK

Report of Analysis

Client Sample ID: MW-13			
Lab Sample ID: N89316-1		Date Sampled: 01/25/05	
Matrix: AQ - Ground Water		Date Received: 01/26/05	
Method: SW846 8260B		Percent Solids: n/a	
Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY			

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	A92594.D	1	02/02/05	NDJ	n/a	n/a	VA2914
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	4.6	1.0	0.28	ug/l	
91-20-3	Naphthalene	44.0	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		79-119%
17060-07-0	1,2-Dichloroethane-D4	112%		68-129%
2037-26-5	Toluene-D8	103%		83-118%
460-00-4	4-Bromofluorobenzene	99%		82-120%

(a) Sample pH did not satisfy field preservation criteria.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-14		
Lab Sample ID:	N89316-2	Date Sampled:	01/25/05
Matrix:	AQ - Ground Water	Date Received:	01/26/05
Method:	SW846 8260B	Percent Solids:	n/a
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	A92595.D	1	02/02/05	NDJ	n/a	n/a	VA2914
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	7.5	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		79-119%
17060-07-0	1,2-Dichloroethane-D4	110%		68-129%
2037-26-5	Toluene-D8	104%		83-118%
460-00-4	4-Bromofluorobenzene	99%		82-120%

(a) Sample pH did not satisfy field preservation criteria.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	N89316-3	Date Sampled:	01/25/05
Matrix:	AQ - Trip Blank Water	Date Received:	01/26/05
Method:	SW846 8260B	Percent Solids:	n/a
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A92596.D	1	02/02/05	NDJ	n/a	n/a	VA2914
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		79-119%
17060-07-0	1,2-Dichloroethane-D4	115%		68-129%
2037-26-5	Toluene-D8	106%		83-118%
460-00-4	4-Bromofluorobenzene	97%		82-120%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

6W
-P



Chain of Custody Record

121690

N89316

Page 1 of 1

Project Name SS # 3887 Brooklyn, NY
 BP BU/GEM CO Portfolio: retail
 BP Laboratory Contract Number: _____
 Requested Due Date (mm/dd/yy) Standard

On-site Time:	Temp:
Off-site Time:	Temp:
Sky Conditions:	
Meteorological Events:	
Wind Speed:	Direction:

Send To: <u>Diane Konar</u>	BP/GEM Facility No.: <u>SS # 3887</u>	Consultant/Contractor: <u>Delta Environmental</u>
Lab Name: <u>Accutest</u>	BP/GEM Facility Address: <u>164 4th Ave.</u>	Address: <u>84 Business Park Dr.</u>
Lab Address: <u>2275 Rt. 120</u>	Site ID No.: <u>Brooklyn, NY</u>	Armonk, NY 10504
<u>Dayton, NJ 08810</u>	Site Lat/Long:	e-mail EDD: <u>pmeyer@deltainv.com</u>
	California Global ID #:	Consultant/Contractor Project No.: <u>G02JF-RP50-1.03</u>
Lab PM: <u>D.K.</u>	BP/GEM PM Contact: <u>A. Lapine</u>	Consultant/Contractor Tele/Fax: <u>914-765-8886</u>
Tel/Fax: <u>732-329-0206</u>	Address: <u>84 Business Park Dr.</u>	Consultant/Contractor PM: <u>Paul Meyer</u>
Report Type & QC Level:	<u>Armonk, NY 10504</u>	Invoice to: <u>Consultant or BP or Atlantic Richfield Co. (Circle one)</u>
BP/GEM Account No.: <u>G02JF-RP50-1.03</u>	Tel/Fax: <u>914-765-8196</u>	BP/GEM Work Release No:
Lab Bottle Order No.: <u>DK-11102005-7</u>		

Item No.	Sample Description	Time	Date	Matrix		Laboratory No.	No. of containers	Preservatives				Requested Analysis				Sample Point Lat/Long and Comments
				Soil/Solid	Water/Liquid			Unpreserved	H ₂ SO ₄	HNO ₃	HCl	BTEX 8240+8260	BTEX/TPH	EPA 8240	EPA 8270	
1	MW-13	1202	12/15/05	✓		-1	3					✓				837
2	MW-14	1226	↓	✓		-2	3					✓				
3	Trip Blank	-	-	✓		-3	2					✓				
4																
5																
6																
7																
8																
9																
10																

Sampler's Name: <u>Brian Howe</u>	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: <u>Bea Hee Assoc.</u>	<u>Michael Baldo</u>	<u>12/15/05</u>	<u>1700</u>	<u>Paul ex</u>	<u>12/15/05</u>	<u>1700</u>
Shipment Date: <u>12/5/05</u>	<u>FedEx</u>	<u>1/24/06</u>	<u>0910</u>	<u>Coastal</u>	<u>1/24/06</u>	<u>0930</u>
Shipment Method: <u>Fed-ex</u>						
Shipment Tracking No:						

Special Instructions: _____

Custody Seals In Place Yes No Cooler Temperature on Receipt 4.0 °F/C Trip Blank Yes No

LABORATORY DK-1110/05-7 BP COC Rev. 2 4/18/03