**City of New York**
**Department of Environmental Protection**

**Emily Lloyd**
**Commissioner**

# PHASE II HAZARDOUS MATERIALS ANALYSIS FOR PREFERRED SHAFT 33B SITE

**OCTOBER 2005**

**Prepared By: Malcolm Pirnie, Inc.**

**CONTRACT: 561 (No. 20000030105)**

**City of New York Department of Environmental Protection**

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# 1.0 INTRODUCTION

## 1.1 Scope of Services

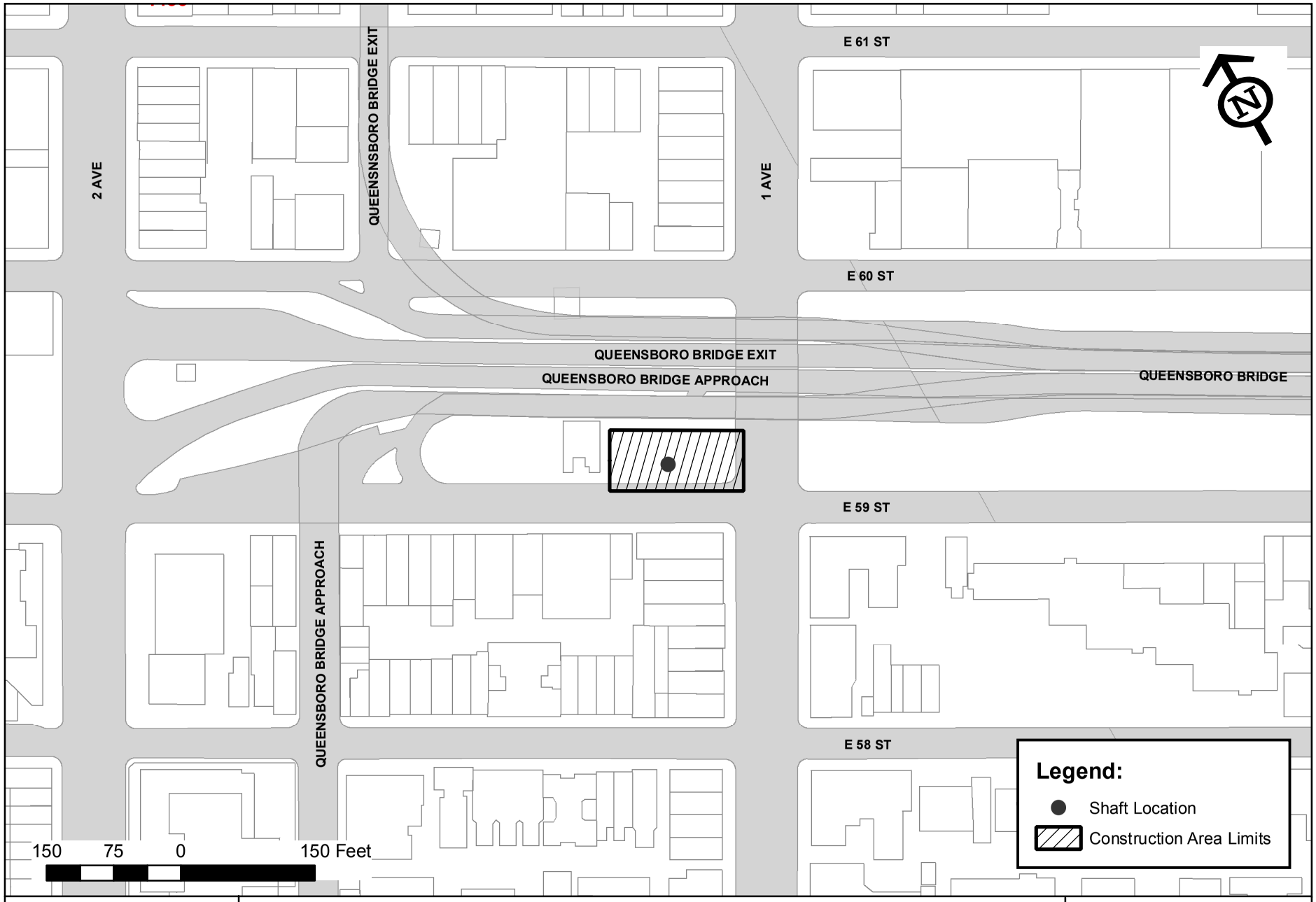
This Report presents the findings of the Phase II Hazardous Materials Analysis (Phase II HMA) for the property located at the intersection of E. 59th Street and First Avenue. The site is bordered by the eastbound Queensboro Bridge approach to the north and west, E. 59th Street to the south, First Avenue to the east, and a multi-use area (Honey Locusts Park / Gateway Plaza) to the west (the preferred Shaft 33B Site). The Phase II HMA was commissioned by the New York City Department of Environmental Protection (NYCDEP) and was conducted by Malcolm Pirnie, Inc. (MPI) pursuant to an Agreement, under Contract 561 (No. 20000030105) and a scope of services first described in MPI's proposal to the NYCDEP: A500203 Tunnel 3 DSC.

## 1.2 Intent of Phase II HMA

This Phase II HMA environmental boring program for the preferred Shaft 33B Site was intended to investigate subsurface conditions at the Site to determine maximum concentrations of contaminants present in the overburden soil material and groundwater. The information will be used for bidding purposes in Contract Documents. The collected data will be used to update Detailed Specification 01355, where the Contractor is given maximum concentrations found for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), metals, etc. from grade to final subgrade elevation.

The preferred Shaft 33B Site is located at the intersection of E. 59th Street and First Avenue. The site is bordered by the eastbound Queensboro Bridge approach to the north and west, E. 59th Street to the south, First Avenue to the east, and a multi-use area (Honey Locusts Park / Gateway Plaza) to the west. The properties in the immediate area across E. 59th Street and to the south are primarily four- to five-story structures with commercial storefronts at street level and residential space above. Figure 1 is a Site schematic showing the location of the preferred Shaft 33B Site and its boundaries. The preferred

Source:-
Department of Information Technology and Telecommunications (DoITT). NYC Landbase, 2000.




Map Document: (S:\Projects\2175158\GIS_Figures\Shaft_33B\EIS_Field_Work\DEP_Site_J(HazMat).mxd)
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# NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
# CITY TUNNEL NO. 3, STAGE 2
# PREFERRED SHAFT 33B SITE
# SITE LOCATION MAP

**FIGURE 1**

Shaft 33B Site would encompass most of the area at the Site that is currently fenced and in use by the New York City Department of Transportation (NYCDOT). An 11-foot-wide accessway would remain alongside the Queensboro Bridge, allowing NYCDOT access from First Avenue to the NYCDOT Queensboro Bridge Engineer's Office beneath the Bridge. In addition, the preferred Shaft 33B Site would also extend onto a portion of the sidewalk on both E. 59th Street and on First Avenue. The sidewalk on the west side of First Avenue would be reduced in width from 13.5 feet to 5 feet, and the sidewalk on the north side of E. 59th Street would be reduced in width from 10 feet to 5 feet. In total, the preferred Shaft 33B Site (NYCDOT site and portions of the adjacent sidewalks) would be 7,400 square feet in size.

The preferred Shaft 33B Site is currently used for bridge maintenance and as a construction staging area for the Queensboro Bridge rehabilitation effort. There are underground electrical utilities serving lamp posts and traffic signals. Pavement, asphalt, curbing, and sidewalks cover the proposed location. The Phase I Environmental Site Assessment for the preferred Shaft 33B Site did not reveal any historic onsite uses of hazardous materials over the last 100 years. However, leaking underground storage tanks (LUSTs), reported spills (mostly petroleum products), and environmental releases including 1,1,1-trichloroethylene and asbestos were identified all within 0.25 miles of the preferred Shaft 33B Site. Many of these incidents are identified as having been closed or mitigated. The Site, being in the vicinity of heavily trafficked areas, may have historic deposits of lead from vehicle exhausts. As is common in many metropolitan New York City areas, historic fill containing contaminants such as polycyclic aromatic hydrocarbons (PAHs) from coal ash or other sources may be present. Although there is no operation or history of direct contamination from hazardous materials at the preferred Shaft 33B Site, off-site sources of hazardous materials from adjacent properties and the surrounding area could have migrated onto the site.

# 2.0 ENVIRONMENTAL SUBSURFACE INVESTIGATION

## 2.1 Field Activities

Subsurface geotechnical and environmental investigations were conducted at the preferred Shaft 33B Site on June 20 and June 21, 2005. The subsurface investigation was conducted in accordance with the approved June 2005 "Shaft 33B, Phase II Hazardous Materials Analysis Work Plan". MPI staff was present at the Site during the environmental boring program to conduct air monitoring for personal health and safety and to collect environmental samples. Air monitoring for VOCs in environmental samples was conducted with a Photoionization Detector (PID) and all readings were recorded in the field logbook. Environmental soil samples (both composite and discrete samples) were collected from each of the environmental soil boring locations. A total of three geotechnical/environmental soil borings were proposed. Only two samples were conducted in the field based on field conditions. A copy of the field notes summarizing all of the field activities during the investigation is presented in Appendix A.

## 2.2 Soil Sampling Locations

Three sample locations were proposed. One location is upgradient to the direction of groundwater flow and declining surface contours from west to east. This upgradient location is to the north and west of the Site near the Queensboro Bridge. The two proposed downgradient locations are approximately 30 feet west of First Avenue.

Field conditions suggested that only two borings would be necessary as proposed borings ENV02 and ENV03 were only six feet apart. Mr. Masud Ahmed of NYCDEP approved of the Work Plan change in the field. The proximity of the two locations to each other and no historical information to suggest that borings within six feet of each other were warranted justified the elimination of one of the borings. The proposed and actual sampling locations of the environmental borings are shown in Figure 2.

## 2.3 Field Calibration Procedures for Monitoring Equipment

Monitoring equipment (e.g., PID and combustible gas detector) was calibrated in accordance with the Work Plan prior to the start of work and in accordance with the manufacturer's instructions. When necessary and based on field staff experience and manufacturers' recommendations, the field instrumentation was recalibrated according to the manufacturer's instruction.

## 2.4 Soil Sampling Procedures

A rotary drill rig was used to collect the soil samples. The environmental soil samples were screened in the field for indications of volatile organic and/or petroleum contaminants using a PID. PID readings would have determined which discrete sample of each sampling interval would have been sent to the laboratory for analysis; however, all PID readings were zero and therefore, all samples sent to the laboratory were composites of each sampling interval.

There were six composite samples collected for ENV01 over the sampling intervals in feet of 1-3, 3-5, 5-7, 7-11, 11-15 and 15-20. For ENV02 there were also six composite samples collected for analysis over the sampling intervals in feet of 1-3, 3-5, 5-7, 7-9, 9-15, 15-20. The laboratory analysis followed the SW-846 analytical protocols, "Test Methods for Evaluating Solid Waste" (see Table 2 for details). Each matrix spike/matrix spike duplicate (MS/MSD) sample set was analyzed for all of the parameters outlined in Table 2 of the Work Plan, while field duplicates and field blanks were only analyzed for VOCs and SVOCs. Sample containers were laboratory cleaned, pre-preserved, and sealed with the appropriate documentation prior to arriving on site.

The procedures outlined in the June 2005 Work Plan were followed for sample collection and analysis. All samples were analyzed by Chemtech, a NY State Environmental Laboratory Accreditation Program (ELAP) certified laboratory.

## 2.5 Groundwater Sampling Procedures

One event of groundwater sampling was conducted and one sample was collected. The method of sampling was 'Low Stress (Low Flow)' sampling method, as detailed by the United States Environmental Protection Agency (USEPA), Region II (1998). Chemtech, a New York State ELAP certified laboratory, also analyzed the groundwater sample. The sample was analyzed for NYSDEC Region 2 Dewatering Sampling and Testing Requirements in accordance with Table 4, and NYCDEP Bureau of Wastewater Treatment Limitations for Effluent to Sanitary or Combined Sewers.

The monitoring well sampled was installed by NYCDEP approximately two weeks prior to the groundwater sampling event. The well installation detail is provided in Appendix D.

# 3.0 SUMMARY OF RESULTS

## 3.1 Soil Sampling Results

The soil sample results are summarized in Tables 1 and 2 of Appendix B. The summary tables only present those compounds that were detected at the site. Compounds not detected but analyzed for are included as part of the complete laboratory data package in Appendix C, which is available from:

Malcolm Pirnie Inc.
75-20 Astoria Boulevard, Suite 350
Jackson Heights, New York 11370

Compounds detected were compared to NYSDEC's recommended soil cleanup objectives in TAGM #4046, "Technical and Administrative Guidance Memorandum". Compounds detected and those that exceeded TAGM Recommended Soil Cleanup Objectives (RSCOs) and cleanup criteria are highlighted in bold on the Tables.

The soils organic analysis data for both ENV-01 and ENV-02 shows that many of the organic compounds detected are Polycyclic Aromatic Hydrocarbons (PAHs). PAHs are common contaminants in urban environments and are often associated with asphalt and oil based products.

For ENV-01, the metals detected in the soils; beryllium, chromium, copper, iron, lead, mercury, nickel, and zinc all exceeded TAGM soil cleanup objectives at depths down to 20 feet. Arsenic and selenium also exceeded TAGM RSCOs and cleanup criteria at the 3-5 foot sampling interval.

Soil sample results for ENV-02 are similar to those of ENV-01 with PAHs and metals being the primary contaminants.

### 3.2 Groundwater Sampling Results

The groundwater sample was analyzed for all of the parameters indicated in the approved June 2005 Work Plan including NYCDEP, "Limitations for Effluent to Sanitary or Combined Sewers" and NYSDEC, "Dewatering Sampling and Testing Requirements". Table 3 provides a summary of the groundwater parameters that were detected based on the list of parameters analyzed.

The data show that two parameters exceeded NYCDEP limitations. Polychlorinated Biphenyl (PCB) (ARCOCLOR 1016) was detected at 5.50 ug / L (NYCDEP limit, 1 ug/L total PCBs). The groundwater total suspended solids (TSS) of 8,500 mg/L also exceeded the NYCDEP limit of 350 mg/L. A summary of the groundwater data is presented in Table 3 of Appendix B.

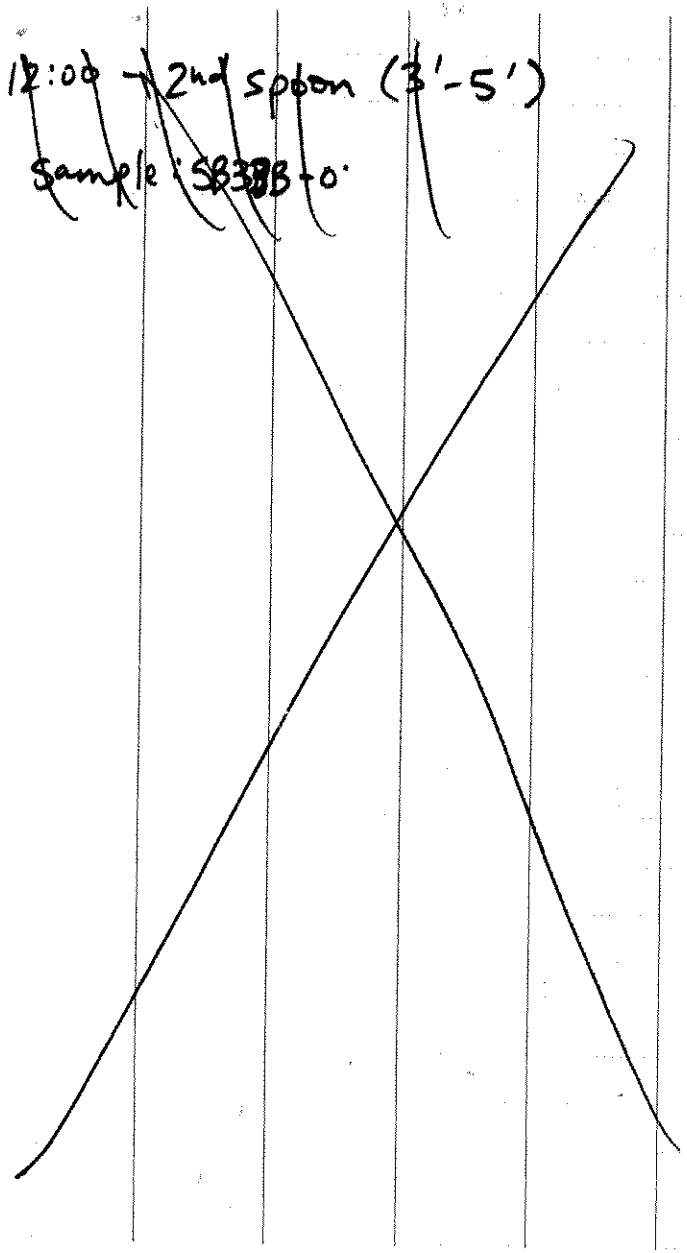
## 4.0 CONCLUSIONS

The soil testing results show some SVOCs and many metals exceeding TAGM cleanup levels, however many of the compounds detected are within the range of typical Eastern US Background levels for soils. The relative total concentrations of the compounds found also suggest that samples taken during construction for Toxicity Characteristics Leaching Procedures (TCLP) would most likely not exceed TCLP limits. Therefore, based on the results of the two soil samples, the Site soils would not be classified as hazardous waste for disposal purposes.

Groundwater testing data shows that dewatering during construction may have to be pretreated with settling or filtration to remove the suspended solids detected in the groundwater. Additionally, NYCDEP may require pretreatment for removal of PCBs.

# APPENDIX A

# FIELD NOTES




Shaft 33B Site 6/20/05

0800 - T. Ledbetter arrive on site @ 59th St. + 1st Ave.
0810 - K. Donahue arrives on site
0845 - Drill rig broke down in route; estimated time of arrival is 10:30
1000 - Meet with DEP Representative (Mihai Caranica from Baker Engineering)
1030 - Driller arrives on site (ADT)
1100 - ADT begins drilling at first boring location (ENV-01)
1145 - 1st spoon (1'-3'); using 3" spoons

Sample: SB33B-01/E-01/1-3/06202005 (Discreet)
" /E-02/ " (Composit)
Blow counts: 3, 8, 8, 4
75% recovery
PID = 0.0 ppm; no visible contamination; (asphalt, brick, soil)

Shaft 33B Borings

1200 - 2nd spoon (3'-5')

Sample: " /E-03/3-5/ "
(Discreet)
" /E-04/3-5/ "
(composit)

Blow counts: 3,3,3,5
30% recovery
PID = 0.0 ppm ; NVC (brick, soil)

1210 - 3rd spoon (5'-7')

sample: " /E-05/5-7/ "
(Dis)
" /E-06/5-7/ "
(comp)

Blow counts: 3,7,7,3
~~DT~~ 40% rec.
PID = 0.0 ; NVC (soil, brick, rock)

1215 - 4th spoon (7'-9')

TL ~~Sample~~ Blow counts: 7,7,7,12
20% rec.
PID: 0.0 ; NVC (brick, soil, rock)

- not enough recovery for a sample ⇒ will extend sampling interval.

12:35 - 5th spoon (9'-11')

sample: " /E-07/7-11/ "
(Dis)
" /E-08/7-11/
(comp)

Blow counts: —
100% rec.
PID = 0.0 ; NVC (brick, moist soil)

1240 - 6th spoon (11'-13')

Blow counts: 11, 11, 50, 5
50% rec.
0.0 = PID ; NVC (moist soil)

1245 - 7th spoon (13'-15')

sample: " /E-09/11-15/ "
(Dis)
" /E-10/11-15/ "
(comp)

Blow counts: 6, 8, 8, 20
100% rec.
PID = 0.0 ; NVC (moist soil ; $H_2O$ @ 13'-14')

1310 - 8th spoon (15'-17')

Blow counts: 37, 37, 19, 12
100% rec.
PID = 0.0 ; NVC (TL moist soil)

1330 - 9th spoon (17'-19')

Blow counts: 19, 16, 30, 48
100% rec.
PID = 0.0 ; NVC (moist soil)

1345 - 10th spoon (19'-20')

sample: " /E-11/15-20/ " (Dis)
" /E-12/15-20/ " (Comp)

Blow counts: —

50% rec.
PID = 0.0 ; NVC (moist soil)

1400 - confusion over one of the locations (ENV-03) which is approximately 10 ft. away from ENV-01 ; Decision is made to wait until tomorrow to start a new location since it may not be necessary to drill @ location ENV-03.

1430 - ADT leaves site ; purging

~~1545~~ - begin ~~sampling~~ ground water from (TL) existing well near location ENV-01

1545 - begin sampling ground water from well

1600 - DEP rep. leaves site (provides T. Ledbetter w/ key to gated area)

1615 - Chemtech courier arrives to pick-up samples.

1640 - T. Ledbetter & K. Donahue lock up site and leave.

6/21/05

0745 - T. Ledbetter arrives on site; K. Donahue already on site

0800 - DEP rep (M. Caranica) arrives on site w/ another DEP rep; ADT arrives on site.

0815 - ADT sets up on location ENV-02 until a decision is made about ENV-03.

0825 - Masud Ahmed (DEP) → Section Chief Geotechnical Section Division of Waterworks Construction, BEE, arrives on site an T. Ledbetter discusses ENV-03 with him; it is agreed that ENV-03 will be eliminated from the boring program due to its close proximity to ENV-01

0840 - ADT begins coring concrete @ ENV-02

0950 - 1st spoon (1'-3')

Sample: SB33B-02/E-01/06212005 (dis)
" E-02/ " (comp).

Blow: 7, 10, 10, 9
80% rec.
PID = 0.0 ppm; NVC (asphalt, soil, conc.)

-0955 - 2nd (3'-5')
E-03 (dis)
E-04 (comp)

Blow: 15, 17, 17, 21
70% rec
0.0 = PID; NVC (soil rock)

1005 - 3rd (5'-7')
E-05 (dis) + Dup
E-06 (comp)

Blow: 11, 13, 13, 10
100% rec.
PID = 0.0; NVC (soil, brick)

1010 - 4th (7'-9')
E-07 (dis)
E-08 (comp)

Blow: 5, 6, 8, 4
100% rec.
PID = 0.0; NVC (soil)

1020 - 5th (9'-11')

Blow: ~~15, 50, 3~~ 7, 7, 8, 9
30% rec.
PID = 0.0 ; NVC. (soil, cobbles)

1025 - 6th (11'-12')

Blow: 18, 19, 50, 3
10% rec.
PID = 0.0 ; NVC. (soil, cobbles)

refusal @ 12' → will try to core through

1110 - 7th (13'-15')
(9'-15') X E-09 (dis)
E-10 (comp)
MS/MSD

Blow: 20, 22, 25, 27
80% rec.
PID = 0.0 ; NVC (soil)

1130 - 8th (15'-17')

Blow: —
70% rec
PID = 0.0 ; NVC (soil, cobble)

1200 - 9th (17'-19')

Blow: 14, 19, 20, 27
100%
PID = 0.0 ; NVC (soil)

CURVE FORMULAE

1 Hectare = 2.471 or 2½ acres
$\pi$ = 3.14159
1 Radian = 57.2958 degrees

J. TOBY LEDBETTER

1205 – 10th (19'-20') Blow: 12, 12, 14, 17
(15'-20') E-11 (dis) 40% rec
E-12 (comp) PID=0.0; NUC (soil)

1215 – collect field blank
1320 – Drillers leave site; DEP reps leave site.
1345 – T. Ledbetter & K. Donahue leave site.

CURVE FORMULAE

MALCOLM PIRNIE

MALCOLM PIRNIE, INC., 104 CORPORATE PARK DRIVE, BOX 751, WHITE PLAINS, NY 10602-0751 914-694-2100 fax 914-694-9286

# APPENDIX B

# SOIL AND GROUNDWATER RESULTS SUMMARY TABLES

| Table 1 - SHAFT 33B - SOIL SAMPLING RESULTS<br>Compounds Detected | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (SB33B-01) | | | Environmental Boring ENV-01 | | | | | |
| | | | Discreet Depth of Sampling Intervals Feet | | | | | |
| TAGM #4046 | | | 1-3 | 3 - 5 | 5 - 7 | 7 - 11 | 11 - 15 | 15 - 20 |
| PARAMETER | UNITS | VALUE | E-02-1-3 | E-04-3-5 | E-06-5-7 | E-08-7-11 | E-10-11-15 | E-12-15-20 |
| ORGANICS - ug/Kg | | | | | | | | |
| Acetone | mg/Kg | 0.2 | ND | 6.2 | ND | ND | ND | ND |
| Acenaphthylene | mg/Kg | 41 | 67 | 170 | 220 | ND | ND | ND |
| Anthracene | mg/Kg | 50 | ND | **320** | 200 | ND | ND | ND |
| Benzo(a)anthracene | mg/Kg | 0.224 | **340** | **620** | **1200** | ND | ND | ND |
| Benzo(b)fluoranthene | mg/Kg | 1.1 | 490 | 520 | **1500** | ND | ND | ND |
| Benzo(k)fluoranthene | mg/Kg | 1.1 | 210 | 240 | **630** | ND | ND | ND |
| Benzo(a)pyrene | mg/Kg | 0.061 | **410** | **480** | **1300** | ND | ND | ND |
| Benzo(g,h,i)perylene | mg/Kg | 50 | 270 | 280 | 780 | ND | ND | ND |
| bis(2-Ethylhexyl)phthalate | mg/Kg | 50 | 210 | ND | 72 | ND | ND | ND |
| Carbazole | mg/Kg | ND | ND | 73 | 130 | ND | ND | ND |
| Chrysene | mg/Kg | 0.04 | **340** | **660** | **1300** | ND | ND | ND |
| Dibenz(a,h)anthracene | mg/Kg | 0.014 | ND | ND | 66 | ND | ND | ND |
| Dibenzofuran | mg/Kg | 6.2 | ND | 71 | 110 | ND | ND | ND |
| Flouranthene | mg/Kg | 50 | 640 | 1300 | 3200 | ND | ND | ND |
| Fluorene | mg/Kg | 50 | ND | 120 | 96 | ND | ND | ND |
| Indeno(1,2,3-cd)pyrene | mg/Kg | 3.2 | 210 | 210 | 700 | ND | ND | ND |
| Naphthalene | mg/Kg | 13 | ND | 70 | 88 | ND | ND | ND |
| Phenanthrene | mg/Kg | 50 | 90 | 1700 | 2000 | ND | ND | ND |
| Pyrene | mg/Kg | 50 | 640 | 1500 | 2800 | ND | ND | ND |
| METALS - mg/Kg | | | | | | | | |
| Aluminum | mg/Kg | SB | 5640 | 7250 | 7280 | 9450 | 6760 | 6920 |
| Antimony | mg/Kg | SB | 7.14 | 79.3 | ND | 2.42 | ND | ND |
| Arsenic | mg/Kg | 7.5 or SB | 5.53 | **14.7** | 6.65 | 0.132 | 0.892 | 0.91 |
| Barium | mg/Kg | 300 or SB | 93.2 | 91.4 | 151 | 107 | 73.9 | 72.1 |
| Beryllium | mg/Kg | 0.16 or SB | **0.23** | **0.223** | **0.332** | **0.441** | **0.334** | **0.341** |
| Cadmium | mg/Kg | 1 or SB | ND | 0.223 | 0.111 | ND | 31.4 | ND |
| Calcium | mg/Kg | SB | 48000 | 46600 | 44700 | 7570 | 2420 | 2320 |
| Chromium | mg/Kg | 10 or SB | **15.2** | **24.2** | **32** | **21.3** | **16.5** | **15.6** |
| Cobalt | mg/Kg | 30 or SB | 5.18 | 19 | 16.3 | 11 | 8.7 | 8.87 |
| Copper | mg/Kg | 25 or SB | **118** | **1000** | **163** | **28.6** | **31.4** | **26.8** |
| Iron | mg/Kg | 2000 or SB | **16400** | **41400** | **19000** | **19200** | **15500** | **15600** |
| Lead | mg/Kg | SB(200-500 | **234** | **753** | **526** | 21.8 | 15.1 | 6.03 |
| Magnesium | mg/Kg | SB | 4290 | 13000 | 13900 | 4790 | 3430 | 3460 |
| Manganese | mg/Kg | SB | 259 | 1020 | 817 | 430 | 254 | 341 |
| Mercury | mg/Kg | 0.1 | **2** | **5.9** | **5.3** | **0.226** | **0.129** | **0.23** |
| Nickel | mg/Kg | 13 OR sb | **16.6** | **126** | **30.7** | **21.7** | **17.6** | **17.6** |
| Potassium | mg/Kg | SB | 874 | 1280 | 1300 | 4880 | 3190 | 3260 |
| Selenium | mg/Kg | 2 or SB | 1.61 | **2.34** | 1.55 | 0.661 | 1 | 0.455 |
| Silver | mg/Kg | SB | ND | 1.11 | 0.554 | ND | ND | ND |
| Sodium | mg/Kg | SB | 526 | 649 | 572 | 156 | 265 | 371 |
| Thallium | mg/Kg | SB | 1.15 | ND | ND | ND | 0.78 | ND |
| Vanadium | mg/Kg | 150 or SB | 18.5 | 55.4 | 24.8 | 31.7 | 24.3 | 26.3 |
| Zinc | mg/Kg | 20 or SB | **73.4** | **161** | **280** | **87.2** | **51** | **40.8** |

* ND = Non-detect

## Table 2 - SHAFT 33B - SOIL SAMPLING RESULTS
### Compounds Detected

| (SB33B-02) | | | Environmental Boring ENV-02 | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Composite Depth of Sampling Intervals, Feet | | | | | |
| TAGM #4046 | | | 1-3 | 3 - 5 | 5 - 7 | 7 - 9 | 9 - 15 | 15 - 20 |
| **PARAMETER** | **UNITS** | **VALUE** | E-02-1-3 | E-04-3-5 | E-06-5-71 | E-08-7-9 | E-10-9-15 | E-12-15-20 |
| ORGANICS - ug/Kg | | | | | | | | |
| Acetone | mg/Kg | 0.2 | 9.8 | 34 | 35 | 5.4 | 65 | 23 |
| Benzo(a)anthracene | mg/Kg | 0.224 | **3000** | ND | ND | **4200** | **1300** | ND |
| Benzo(b)fluoranthene | mg/Kg | 1.1 | **2700** | ND | ND | **4100** | **1500** | ND |
| Benzo(a)pyrene | mg/Kg | 0.061 | ND | ND | ND | **3200** | **1100** | ND |
| 2-Butanone | mg/Kg | 4.5 | ND | 4.2 | 4.3 | ND | ND | ND |
| Chloroform | mg/Kg | 31 | ND | ND | 1.4 | 6 | ND | ND |
| Chrysene | mg/Kg | 0.04 | ND | ND | ND | **3500** | **1100** | ND |
| Flouranthene | mg/Kg | 50 | 2900 | 6900 | 3100 | 11000 | 3400 | ND |
| Phenanthrene | mg/Kg | 50 | 3400 | ND | ND | 13000 | 2600 | ND |
| Trichlorofluoromethane | mg/Kg | ND | ND | 1.5 | 1.4 | ND | ND | ND |
| Pyrene | mg/Kg | 50 | 5600 | ND | ND | 8200 | 2500 | ND |
| METALS - mg/Kg | | | | | | | | |
| Aluminum | mg/Kg | SB | 6810 | 5120 | 7370 | 6270 | 8560 | 7170 |
| Antimony | mg/Kg | SB | ND | ND | ND | ND | 4.76 | ND |
| Arsenic | mg/Kg | 7.5 or SB | 3.25 | 2.5 | 2.95 | 2.34 | 2.32 | ND |
| Barium | mg/Kg | 300 or SB | 69.8 | 48 | 74.6 | 67.7 | 89.2 | 73.7 |
| Beryllium | mg/Kg | 0.16 or SB | **0.433** | **0.217** | **0.328** | **0.223** | **0.348** | **0.447** |
| Cadmium | mg/Kg | 1 or SB | 0.108 | ND | ND | ND | ND | 1.34 |
| Calcium | mg/Kg | SB | 40500 | 38000 | 43700 | 43700 | 24700 | 17.4 |
| Chromium | mg/Kg | 10 or SB | **18** | **15.9** | **19.9** | **15.2** | **20.5** | **17.4** |
| Cobalt | mg/Kg | 30 or SB | 7.14 | 4.67 | 6.89 | 6.36 | 9.86 | 9.27 |
| Copper | mg/Kg | 25 or SB | **36.7** | 23.1 | **42.4** | **33.4** | **38.9** | 23.4 |
| Iron | mg/Kg | 2000 or SB | **14400** | **11900** | **13400** | **12200** | **176000** | **14400** |
| Lead | mg/Kg | SB | 45.1 | 29.1 | 36.4 | 34.3 | 25.5 | 5.58 |
| Magnesium | mg/Kg | SB | 10200 | 13300 | 8750 | 6270 | 9760 | 3280 |
| Manganese | mg/Kg | SB | 226 | 176 | 231 | 207 | 328 | 247 |
| Mercury | mg/Kg | 0.1 | **0.222** | **0.213** | **0.206** | **0.162** | 0.091 | 0.033 |
| Nickel | mg/Kg | 13 OR sb | **18.2** | 12.6 | **15.2** | **14** | **19.7** | **15.6** |
| Potassium | mg/Kg | SB | 1780 | 1340 | 1930 | 1670 | 3750 | 3660 |
| Sodium | mg/Kg | SB | 461 | 245 | 356 | 384 | 247 | 140 |
| Vanadium | mg/Kg | 150 or SB | 37.3 | 29.4 | 33.4 | 38.5 | 38.1 | 25.2 |
| Zinc | mg/Kg | 20 or SB | **139** | **87.7** | **102** | **92.3** | **74.1** | **36.3** |

* ND = Non-detect

# Table 3 - SUMMARY OF GROUNDWATER SAMPLING
## Compounds Detected

| NYCDEC REGION 2 Dewatering Sampling & Testing Requirements | NYCDEP Bureau of Wastewater Treatment | | | Groundwater Results Sample Locations | |
|---|---|---|---|---|---|
| **PARAMETER** | **PARAMETER** | **DAILY LIMIT** | **UNITS** | **GW 33B-01** | **Units** |
| | Non-polar Material[2] | 50 | mg/1 | 5.2 | mg/l |
| pH | pH | 5-11 | SUs | 7.4 | SUs |
| | Flash Point | >140 | Degrees F | >100 | Degrees C |
| | Chromium (VI) | 5 | mg/1 | 23.00 | ug/l |
| | Copper | 5 | mg/1 | 2.00 | ug/l |
| | Lead | 2 | mg/1 | 2.00 | ug/l |
| | Nickel | 3 | mg/1 | 19.00 | ug/l |
| | Zinc | 5 | mg/1 | 60.00 | ug/l |
| | MTBE (Methyl-Tert-Butyl-Ether) | 50 | ppb | 21.00 | ug/l |
| | Napthalene | 47 | ppb | 2.00 | ug/l |
| | Tetrachloroethylene (Perc) | 20 | ppb | 0.67 | ug/l |
| | 1, 1, 1 Trichloroethane | ND | ND | 0.37 | ug/l |
| PCBs | PCBs (Total) | 1 | ppb | **5.50** | ug/l |
| Total Suspended Solids | Total Suspended Solids (TSS) | 350 | mg/1 | **8500** | mg/l |
| | CBOD[5] | NA | NA | 13 | mg/l |
| $BOD_6$ | | NA | NA | 16 | mg/l |
| Chloride[5] | Chloride[5] | NA | NA | 860 | mg/l |
| | Total Nitrogen[5] | NA | NA | 0.599 | mg/l |
| | Total Solids[5] | NA | NA | 8500.00 | mg/l |
| Fecal Coliform | | NA | NA | 30 | mg/l |
| Nitrate/Nitrite | | NA | NA | 1.49 | mg/l |
| Oil & Grease | | NA | NA | 5.4 | mg/l |
| Pesticides | | NA | NA | ND | mg/l |
| Settleable Solids | | NA | NA | 90 | mg/l/hr |

* NA = Not Available

# APPENDIX C

# LABORATORY CONTROL DATA

# APPENDIX C

The Laboratory Control Data is on file and available at Malcolm Pirnie Inc.'s New York City office:

Malcolm Pirnie Inc.
75-20 Astoria Boulevard, Suite 350,
Jackson Heights, New York 11370

# APPENDIX D

# WELL CONSTRUCTION DETAIL

By: Aquifer Drilling and Testing, Inc.
Under: Contract Bore-1

Date Started: 06/15/05
Date Completed: 06/15/05

# BORING NUMBER: E59 ST-E/W

LOCATION: 29.00 ft. North from the South fence and 9.50ft. East from West fence of DOT property at Northwest corner of E59 St. and 1st Ave., Manhattan.

Coordinates:
North: 277,006.197
East: 602,709.830

| Miscellaneous | Depth (feet) | Wt # | Rec % | SPT "N" | Description of Materials Encountered | |
|---|---|---|---|---|---|---|
| | ALL DESCRIPTIONS IN THIS LOG ARE BASED | | | | | **Surface Elevation: +55.30 ft.** |
| | ON FIELD INSPECTOR'S OBSERVATIONS AND NOTES. | | | | | **Rock Elevation: +33.30 ft.** |
| | | | | | | **Bottom Elevation: +33.30 ft.** |
| | | | | | | **Depth in Earth: 22.00 ft.** |
| | | | | | | **Depth in Rock: 0.00 ft.** |
| | | | | | | **TOTAL DEPTH: 22.00 ft.** |
| | | | | | Water Level reading taken 8/23/05 as 12.67 ft. depth (Elev.: +42.63 ft.). | |
| | | | | | | |
| | | | | | | |
| | 5 | | | | | |
| **Soil Sample No. 1** | | 140 | 21% | 4 | Fill material mostly composed of red brick and concrete; some medium | |
| Depth: 5.00 to 7.00 ft. | | | | | to coarse grain brown sand. Dry. | |
| **Soil Sample No. 2** | | 140 | 50% | 6 | Fill material mostly composed of red brick and concrete; fine grain | |
| Depth: 7.00 to 9.00 ft. | | | | | micaceous, yellowish brown clayey silt in the lower portion. Damp. | |
| **Soil Sample No. 3** | 10 | 140 | 75% | 9 | Fill material mostly composed of red brick and concrete; med. to coarse | |
| Depth: 9.00 to 11.00 ft. | | | | | grain micaceous yellowish brown sand with some fine gravel. Damp. | |
| **Soil Sample No. 4** | | 140 | 58% | 10 | Fine to coarse grain micaceous, grayish brown Sand; trace silt and fine | |
| Depth: 11.00 to 13.00 ft. | | | | | gravel. Damp. | |
| **Soil Sample No. 5** | | 140 | 50% | 12 | Medium to coarse grain micaceous, ferruginous, reddish brown to | |
| Depth: 13.00 to 15.00 ft. | 15 | | | | grayish Sand with some fine to medium gravel. Damp. | |
| **Soil Sample No. 6** | | 140 | 60% | 11 | Medium to coarse grain micaceous, ferruginous, reddish brown to light | |
| Depth: 15.00 to 17.00 ft. | | | | | brown Sand with some fine to medium gravel, fill and silt. Moist. | |
| **Soil Sample No. 7** | | 140 | 55% | 11 | Medium to coarse grain micaceous, ferruginous, brown Sand with some | |
| Depth: 17.00 to 19.00 ft. | | | | | fine gravel and highly weathered rock fragments. Wet. | |
| **Soil Sample No. 8** | 20 | 140 | 45% | 20 | Medium to coarse grain micaceous, ferruginous, reddish brown to | |
| Depth: 19.00 to 21.00 ft. | | | | | blackish Sand with some silt and fine to medium gravel. Wet. | |
| **Soil Sample No. 9** | | 140 | 45% | 20 | Mixed assemblages of medium to coarse grain micaceous, grayish brown | |
| Depth: 21.00 to 23.00 ft. | | | | | Sand and highly weathered rock fragments (musc.-biotite schist). Wet. | |
| | | | | | **TOP OF ROCK AT 22.00 ft. (Elev.: +33.30 ft.).** | |
| | 25 | | | | **Observation Well Construction Data** | |
| | | | | | Observation well constructed to 22.00 ft. depth. (Elev.: +33.30 ft.). | |
| | | | | | 2.0" inside diameter, schedule 40 PVC riser pipe installed | |
| | | | | | from: 0.20 to 11.20 ft. depth (Elev.: +55.10 to +44.10 ft.). | |
| | | | | | 2.0" inside diameter, schedule 40 PVC well screen, 20 slots per inch, | |
| | | | | | installed from 11.20 to 21.20 ft. depth (Elev.: +44.10 to +34.10 ft.). | |
| | | | | | Hole backfilled with #2 silica sand from 21.20 to 12.20 ft. depth | |
| | | | | | (Elev.: +34.10 ft. to +43.10 ). Bentonite pellet plug from 12.20 to 9.20 | |
| | | | | | ft. depth (Elev.: + 43.10 ft. to +46.10 ). Drill cutting backfilled into | |
| | | | | | borehole from 9.20 to 1.50 ft. depth (Elev.: +46.10 to +53.80 ft.). | |
| | | | | | Portland cement seal from 1.50 to 0.70 ft. depth (Elev.: +53.80 | |
| **Well Installation** | | | | | to +54.60 ft.). Flush mount monitoring well cap installed over well. | |
| Drill Rig: CME 55 Drill Rig | | | | | **BOTTOM OF WELL AT 21.20 ft. (Elev.: +34.10 ft.).** | |
| Drillers: Chris Capobianco, Janey Meyers | | | | | **BOTTOM OF BOREHOLE AT 22.00 ft. (Elev.: +33.30 ft.).** | |
| Inspector: B. Moon Yang | | | | | | |
| Reviewed By: C. Dozier | | | | | | |