# FINAL
# WORK PLAN

## REMEDIAL INVESTIGATION/FEASIBILITY STUDY
## ENVIRONMENTAL RESTORATION PROGRAM
## SITE 8 – OLD BASE SEPTIC SYSTEMS

**106TH RESCUE WING**
**NEW YORK AIR NATIONAL GUARD**
**FRANCIS S. GABRESKI AIRPORT**
**WESTHAMPTON BEACH, NEW YORK**

**DECEMBER 2004**

PEER
CONSULTANTS, P.C.
EST. 1978

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**DECEMBER 2004**

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Prepared for the

Air National Guard
Under National Guard Bureau Contract DAHA92-01-D-0004

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ABB-ES | ABB–Environmental Services, Inc. |
| ADD | Average Daily Dose |
| ANG | Air National Guard |
| ANG/CEVR | Air National Guard/Environmental Division |
| AOC | area of concern |
| ARAR | applicable or relevant and appropriate requirements |
| ASTM | American Society for Testing and Materials |
| AVGAS | Aviation gasoline |
| BGS | below ground surface |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| COC | contaminant of concern |
| COPC | contaminant of potential concern |
| DERP | Defense Environmental Restoration Program |
| DOD | Department of Defense |
| EM | Environmental Manager |
| EPA | Environmental Protection Agency |
| ERP | Environmental Restoration Program |
| FS | Feasibility Study |
| HASP | Health and Safety Plan |
| HAS | hollow stem auger |
| IDW | Investigation-Derived Waste |
| IRP | Installation Restoration Program |
| LNAPL | light non-aqueous phase liquid |
| MACTEC | MACTEC Engineering and Consulting, Inc. |
| MCL | Maximum Contaminant Level |
| MOGAS | automotive fuel (gasoline) |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| MSL | Mean Sea Level |
| NGB | National Guard Bureau |
| NOAA | National Oceanic and Atmospheric Agency |
| NYDOH | New York Department of Health |
| NYS | New York State |
| NYSDEC | New York State Department of Environmental Conservation |
| OBG | O'Brien and Gere Engineers, Inc. |
| PA | Preliminary Assessment |
| PAH | polynuclear aromatic hydrocarbons |
| PCE | tetrachloroethene (perchloroethene) |
| PEER | PEER Consultants, P.C. |
| PID | photoionization detector |
| POC | Principle Organic Contaminant |
| PVC | polyvinyl chloride |
| QA/QC | quality assurance/quality control |
| QAPP | Quality Assurance Program Plan |

## LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

| | |
|---|---|
| QAPjP | Quality Assurance Project Plan |
| RAGS | Risk Assessment Guidance for Superfund |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| RSCO | Recommended Soil Cleanup Objective |
| RQW | Rescue Wing |
| S&W | Stone & Webster Environmental and Technology Services |
| SARA | Superfund Amendments and Reauthorization Act |
| SCDHS | Suffolk County Department of Health Services |
| SI | Site Investigation |
| SOP | Standard Operating Procedure |
| TAGM | Technical and Administrative Guidance Memorandum (NYSDEC) |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TOGS | Technical and Operational Guidance Series |
| TCRA | Time Critical Removal Action |
| TRW | Technical Review Workgroup |
| ULBC | Upper Limit of Background Concentrations |
| ULV | Upper Limit Value |
| UST | Underground Storage Tank |

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**$106^{TH}$ RESCUE WING**
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**FRANCIS S. GABRESKI AIRPORT**
**WESTHAMPTON BEACH, NEW YORK**

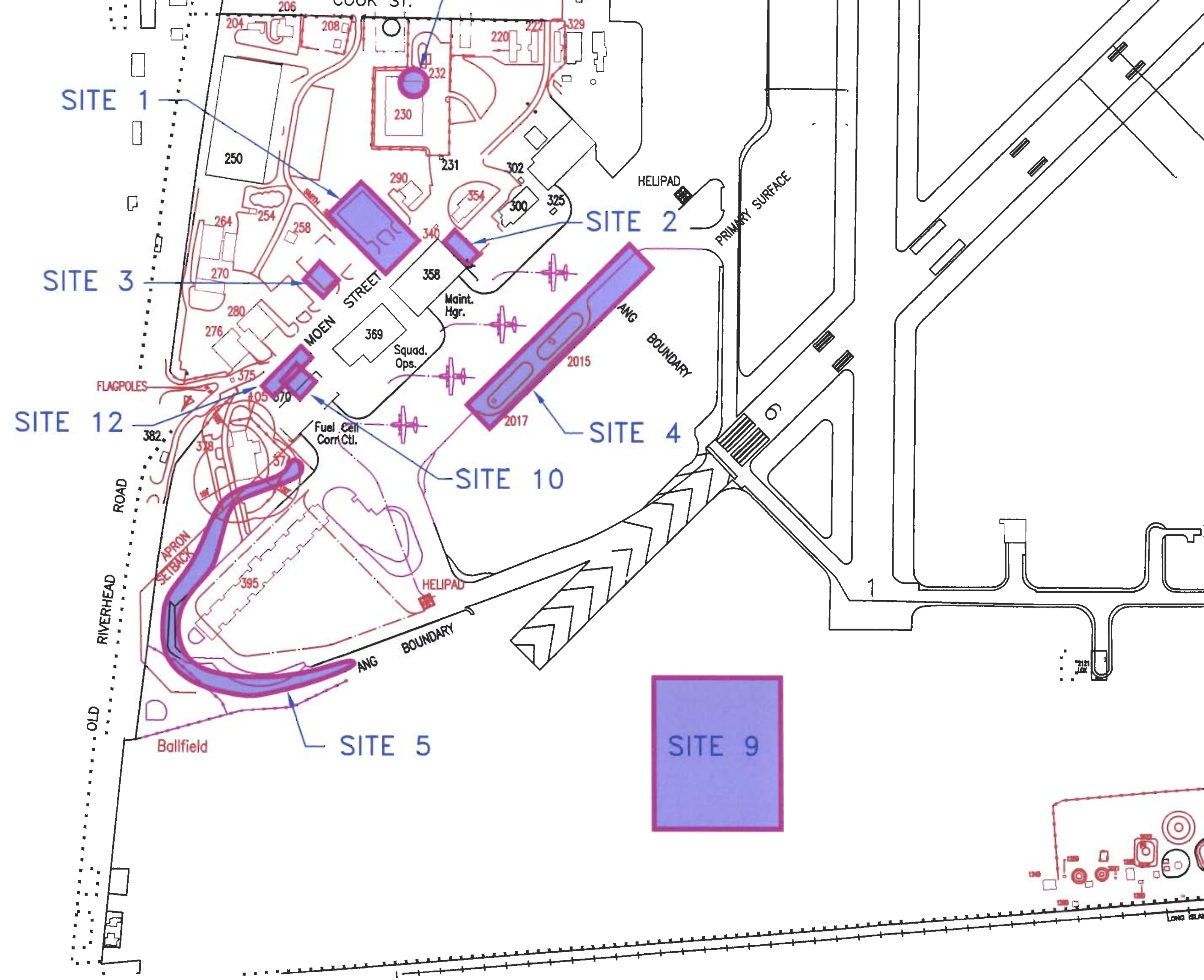
## 1.0 INTRODUCTION

A Remedial Investigation/Feasibility Study (RI/FS) will be conducted at Site 8 – Old Base Septic Systems, and the Bauman Bus Plume at the $106^{th}$ Rescue Wing (RQW), New York Air National Guard (ANG), located at Francis S. Gabreski Airport in Westhampton Beach, Suffolk County, New York. Figure 1.1 shows the regional location of the 106th RQW.

This RI/FS Work Plan has been prepared for Environmental Restoration Program (ERP) Site 8 as part of the ongoing ERP process at the $106^{th}$ RQW. The RI/FS is being conducted on behalf of the ANG/Environmental Restoration Branch (ANG/CEVR) by PEER Consultants, P.C. (PEER), under National Guard Bureau (NGB) Contract No. DAHA92-01-D-0004. This Work Plan was prepared under Delivery Order No. 0011, and follows the format set forth in the ANG Installation Restoration Program (IRP) Investigation Protocol (ANG Readiness Center 1998). Site 8 is listed on the New York State Registry of Inactive Hazardous Waste Sites, as a Class 2 Inactive Hazardous Waste Site, with Identification Number 152148.

Twelve ERP sites are currently defined at the $106^{th}$ RQW and the Francis S. Gabreski Airport. Eleven sites are currently the responsibility of the ANG/CEVR, as shown on Figure 1.2. These sites include:

- Site 1 – Aviation Gasoline (AVGAS) Spill Site
- Site 2 - Former Hazardous Waste Storage Area (1970 to 1982)
- Site 3 - Former Waste Storage Area (1984 to 1989)
- Site 4 – Aircraft Refueling Apron Spill Site

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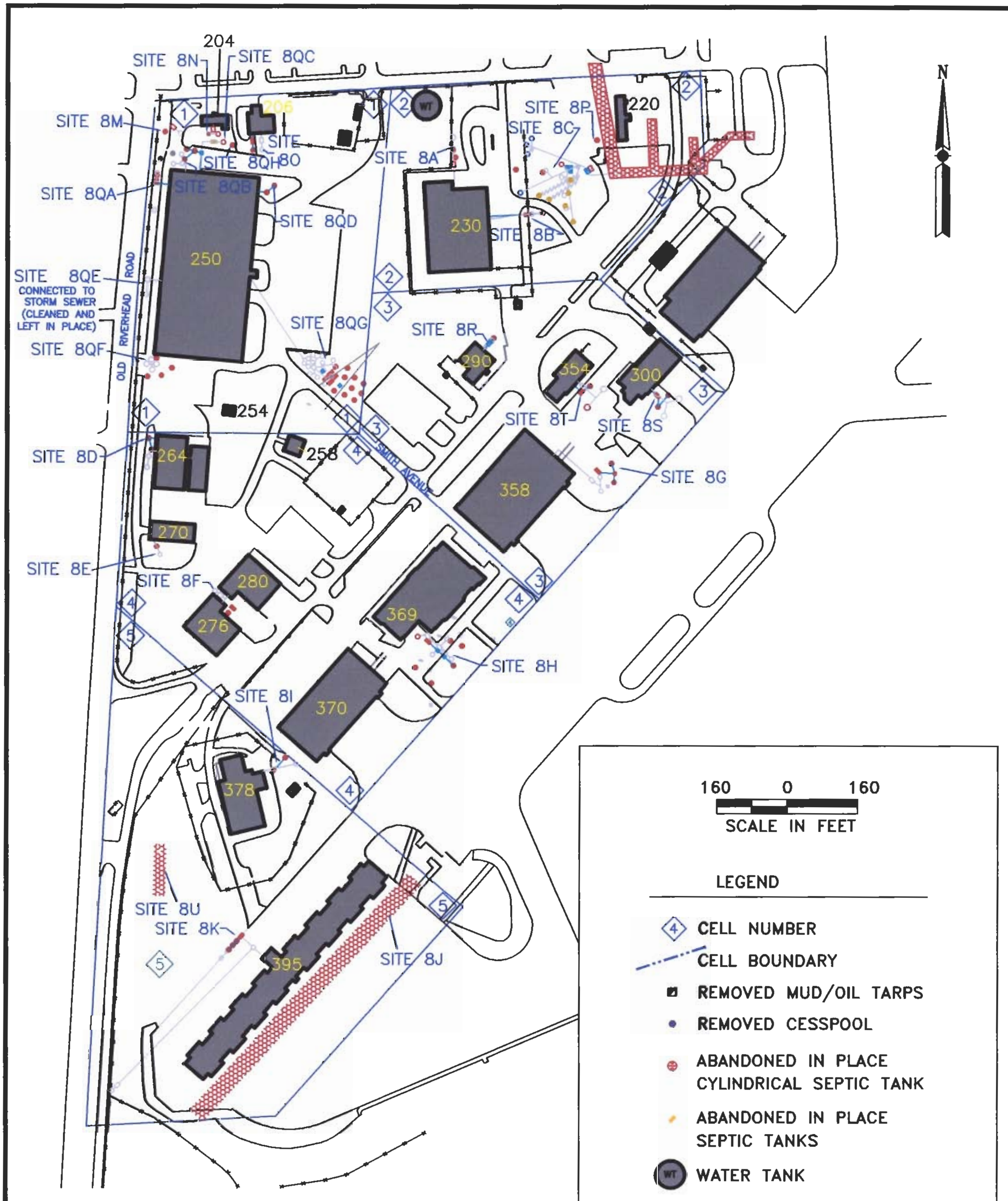
LOCATION OF ERP SITES 1, 2, 3, 4, 5, 7, 9, 10, 11, and 12

- Site 5 – Southwest Storm Drainage Ditch
- Site 7 - Former Fire Training Area (FTA)
- Site 8 – Old Base Septic Systems
- Site 9 – Ramp Drainage Outfall
- Site 10 - Waste Stripper Tank No. 370
- Site 11 - Trench Drain Sump
- Site 12 - Spill Site Northwest of Building 370

Site 8 – the Old Base Septic Systems is the subject of this work plan. ERP Site 6, is currently the responsibility of the US Army Corps of Engineers, under the Formerly Used Defense Sites Program, and is not shown on Figure 1.2 or discussed any further in this work plan.

Site 8 is a composite of underground structures including cesspools, septic tanks, distribution boxes, oil/mud traps, and dry wells at numerous locations throughout the base. Together, these individual structures make up the Old Base Septic System. Site 8 includes 16 subsites, designated as Subsites 8A through 8U, based on the individual structures and subsystems that were identified. Subsite 8Q was further subdivided into 7 additional subsites, referred to as 8QA through 8QG, all associated with Building 250. For purposes of previous investigations at Site 8, the various structures and subsystems were grouped into five contiguous cells. Referred to as Cells 1 through 5, the cell designations were assigned based on convenient geographic groupings of the various structures. For the purposes of this RI/FS, the geographic-based cell designations and subsite identification codes are retained. This maintains continuity with previous investigations performed during the RI/FS process. Figure 1.3 shows the base-wide locations of Subsites 8A through 8U, Subsites 8QA through 8QG, and the geographic boundaries of Cells 1 through 5, all of which make up Site 8.

This RI/FS also includes a limited investigation of a plume of fuel-related groundwater contamination which originates on the Airport Development District property, formerly a portion of Francis S. Gabreski Airport, owned by the Suffolk County Department of Public Works. The plume is migrating onto the property leased by the 106$^{th}$ RQW, and is historically referred to as the "Bauman Bus Plume."




SOURCE: Obrien & Gere Engineers, Inc. January 2004

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PROJ./3005-011

GAB3005-011/Final WP/FIG1.3

LOCATION MAP SHOWING SITE 8 SUBSITES
106th RESCUE WING, NEW YORK AIR NATIONAL GUARD
FRANCIS S. GABRESKI AIRPORT
WESTHAMPTON BEACH, NEW YORK

FIGURE 1.3

The Bauman Bus Plume originates to the north of the 106th RQW property, and is migrating southward onto the property. The plume crosses the base northern property line in an area which lies within Site 8 – Cell 2. The limited investigation of the Bauman Bus Plume is being performed to collect sufficient data to differentiate the contamination originating off site from any potential contamination that may originate from Site 8 – Cell 2. The investigation will characterize a cross-section of the Bauman Bus Plume parallel to the northern property line where it enters the 106th RQW property. It is the ANG/CEVR's position that any on-base delineation of the Bauman Bus Plume is the responsibility of, and should be performed by, the Principal Responsible Party or Parties.

Information and data obtained during previous investigations that were conducted at the 106th RQW were evaluated and incorporated into this RI/FS Work Plan. The sources of information include the following:

- *Site Investigation Report* ABB-Environmental Services (ABB-ES) 1997;
- *Revised Draft Remedial Investigation (RI), Sites 4, 5, 8, and 9*, by Stone & Webster Environmental Technology & Services (S&W) 1999;
- *Final RI Report for Sites 1, 2, 3, 4, 5, 7, 8, 9, 10, 11*, and *12*, by PEER (PEER 2004);
- *Technical Memorandum Site 8 Septic System Remediation Completion Report*, by MACTEC Engineering and Consulting, Inc (MACTEC) 2003; and
- *Site Investigation Report, Airport Development District, Francis S. Gabreski Airport, Westhampton, New York, prepared for Rebuild Now-NY Empire State Development*, by O'Brien and Gere Engineers, Inc. (OBG), 2004.

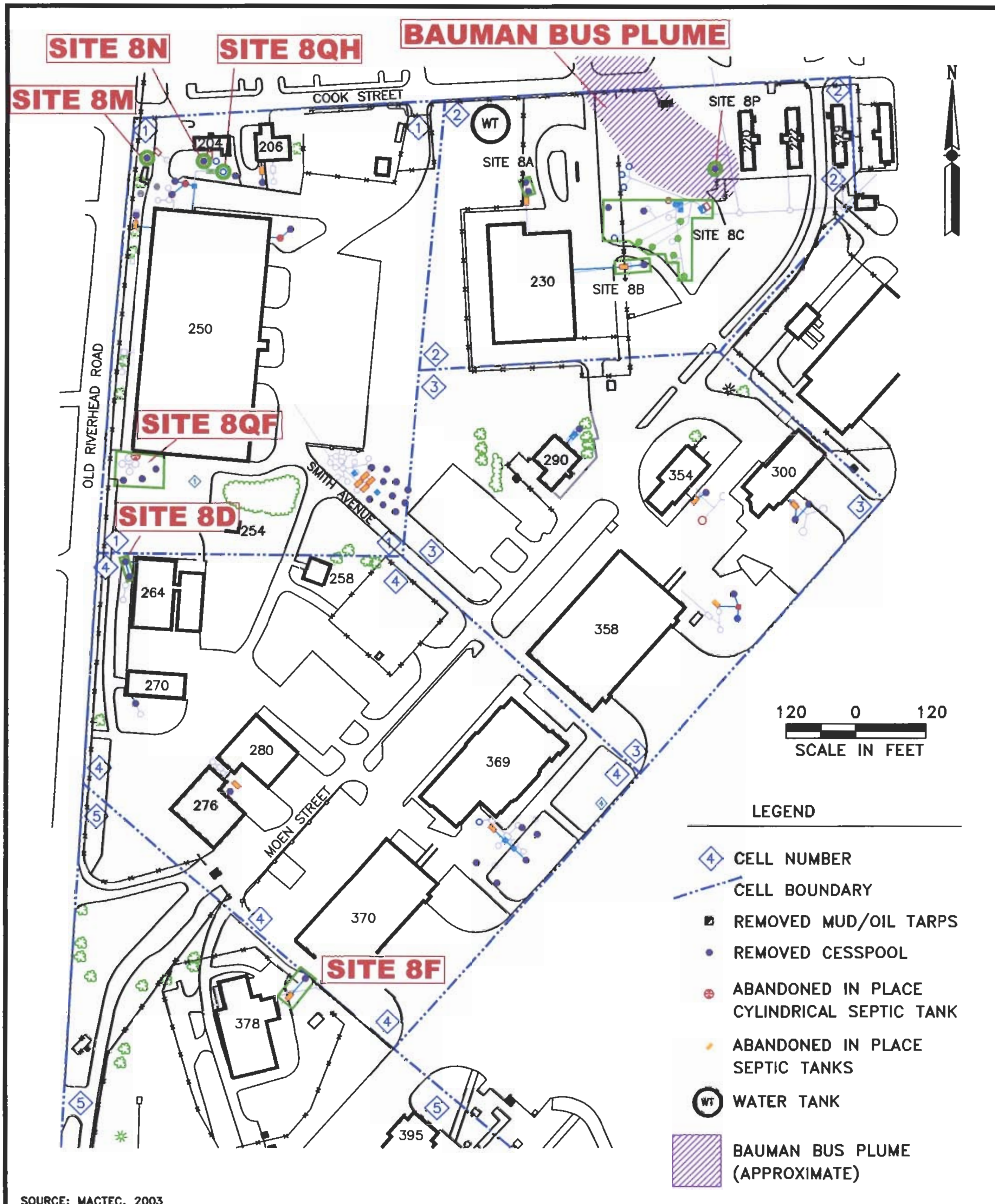
PEER has been tasked by the ANG/CEVR to conduct the RI/FS at Site 8 due to the potential for migration of contamination detected in soil and groundwater during the previous investigations. A kickoff/scoping meeting was held at the base on October 17, 2003. Representatives from the ANG/CEVR, the 106th RQW, the Suffolk County Department of Health Services (SCDHS), and PEER were present when the project objectives, scope, and investigatory approach were discussed (PEER 2003b).

on initial sampling performed at the start of the TCRA that indicated the presence of contamination. Subsite 8N is included due to an exceedance of action levels in one endpoint sample collected during the TCRA. Subsites associated with Site 8 that were either recommended for No Further Action by the TCRA, are currently in use, or are currently in the process of being closed, are not included in this RI/FS. The rationale for the RI at Subsites 8D, 8F, 8QF, 8M, 8N, and 8QH is discussed in Table 1.1. The locations of the sites are shown on Figure 1.4.

**Table 1.1**
**Rationales for Site 8 Subsite Remedial Investigations**
**And Contaminants of Potential Concern**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Subsite ID | Rationale for Investigating Subsite | COPCs |
|---|---|---|
| 8D | 1. Initial samples exceeded Action Levels<br>2. SCDHS requested further investigation. | 1,2-Dichlorobenzene<br>1,1-Dichloroethane<br>*cis*-1,2-Dichloroethene<br>Ethylbenzene<br>Toluene<br>1,2,4-Trichlorobenzene<br>1,1,1-Trichloroethane<br>Trichloroethene<br>1,2,4-Trimethylbenzene<br>1,3,5-Timethylbenzene<br>Xylenes(total)<br>Cadmium<br>Mercury |
| 8F | SCDHS requested further investigation, due to historically high levels of VOCs | VOCs |
| 8M | Initial samples exceeded Action Levels | Silver<br>Mercury |
| 8N | Exceedance of Action Levels in one endpoint sample. | 4-Chloroaniline |
| 8QH(1) | Initial samples exceeded Action Levels | Benzo(a)anthracene<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Benzo(k)fluoranthene<br>Chrysene<br>Dibenzofuran<br>Fluoranthene<br>Indeno(1,2,3-cd)pyrene<br>Phenanthrene<br>Pyrene |
| 8QF | 1. Initial samples exceeded Action Levels<br>2. SCDHS requested further investigation. | Cadmium<br>Silver<br>Mercury |

Source: MACTEC Engineering and Consulting, Inc., 2003.
Notes: 1. Subsite 8QH was initially misidentified as Subsite 8QC during the TCRA (MACTECH 2003).




| PEER | SITE 8 SUBSITES TO BE INVESTIGATED | FIGURE 1.4 |
|---|---|---|
| PROJ./3005-011 | 106th RESCUE WING, NEW YORK AIR NATIONAL GUARD | |
| GAB3005-011/Final WP/FIG1.4 | FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | |

The delineation of the Bauman Bus Plume will be limited to the cross-sectional area along the northern property boundary where the plume is migrating onto the 106$^{th}$ RQW property. The plume will be delineated and the contaminants will be characterized at that location. Any further delineation of the plume on the 106$^{th}$ RQW property will be the responsibility of the Principal Responsible Party or Parties.

## 1.2 ERP DESCRIPTION - ERP PROCESS AND FLOW CHART

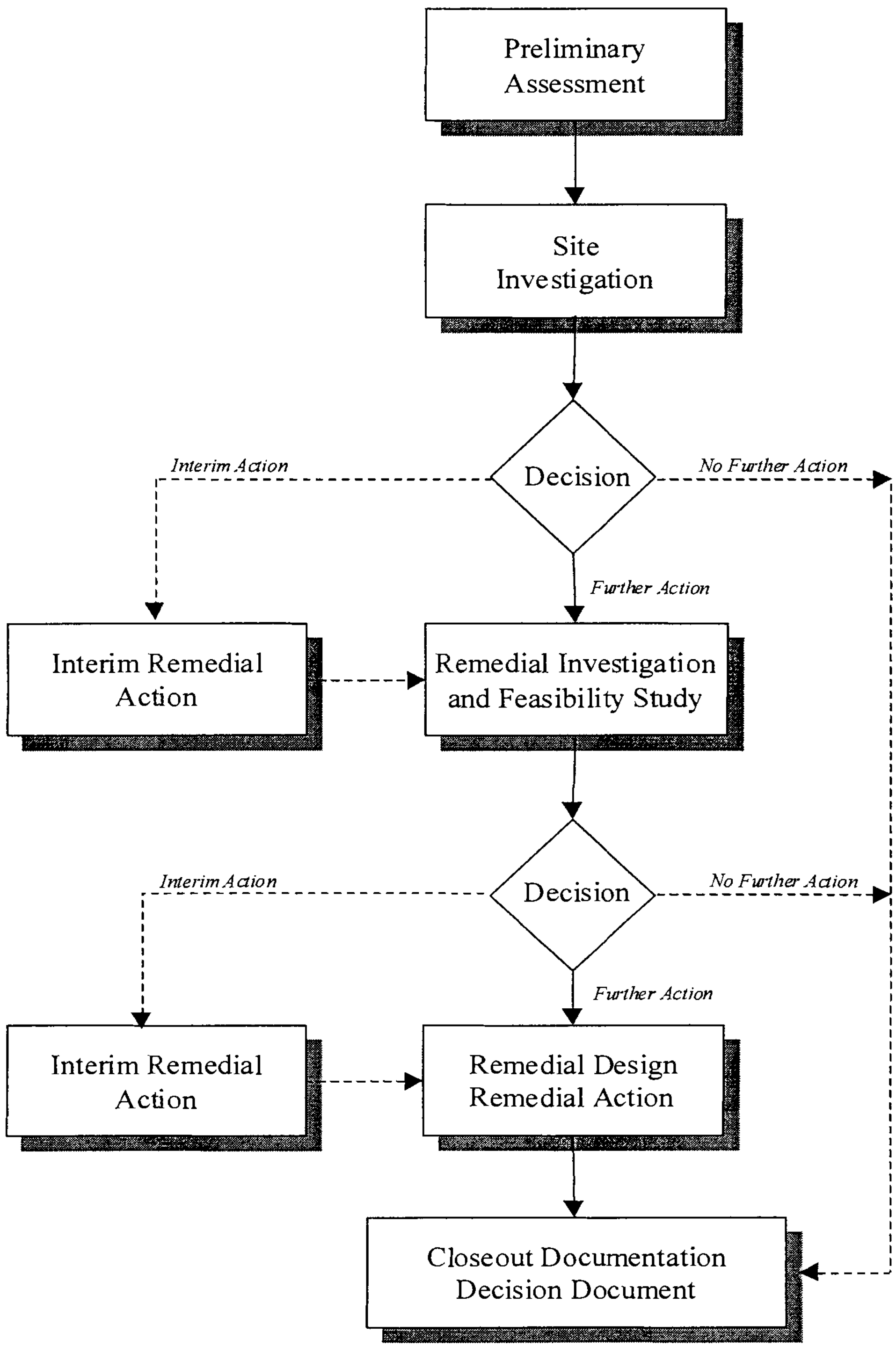
The Defense Environmental Restoration Program (DERP) was established in 1984 to promote and coordinate efforts for the evaluation and cleanup of contamination at Department of Defense (DoD) installations. On January 23, 1987, Presidential Executive Order 12580 was issued which assigned the responsibility to the Secretary of Defense for carrying out DERP within the overall framework of the Superfund Amendments and Reauthorization Act (SARA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The Installation Restoration Program (IRP) was established under DERP to identify, investigate, and clean up contamination at installations. The IRP focused on the cleanup of contamination associated with past DOD activities to ensure that threats to public health were eliminated, and to restore natural resources for future use (DOD 1991). The IRP has been renamed the ERP.

The ERP is divided into several phases, as illustrated on Figure 1.5. The major phases are briefly discussed in the following paragraphs.

**Preliminary Assessment** - The objective of the Preliminary Assessment (PA) is to identify and evaluate past disposal and/or spill sites that might pose a potential or actual hazard to public health, public welfare, or the environment. Activities performed during the PA include identification of areas of concern (AOCs) and identification of ARARs for site cleanup, if necessary (DOD 1991).

**Site Investigation** - The Site Investigation (referred to as a Site Inspection under CERCLA) is conducted to confirm the presence or absence of contamination at AOCs identified during the

**Figure 1.5 ERP Decision Flow Diagram**



PA, and to evaluate their potential for harm to human health or the environment from a worst-case scenario.

**<u>Remedial Investigation</u>** - The objectives of the RI are to determine the nature and extent of contamination at a site, assess the risks associated with any identified threat to human health or the environment, and provide a basis for determining the types of response actions to be considered [Environmental Protection Agency (EPA) 1988a)].

The RI includes field activities performed to quantify the contaminants, delineate the extent of contamination, evaluate contaminant migration pathways, and obtain the data necessary to support any remedial action decisions identified during the FS. Field activities may include the installation of soil borings and/or monitoring wells, and the collection and analysis of groundwater and soil samples.

A baseline risk assessment is performed for contaminants that cannot be eliminated as contaminants of concern using screening levels established by the EPA and/or NYSDEC. The baseline risk assessment is the basis for determining whether or not a remedial action is necessary (EPA 1988a).

The findings from the RI result in the selection of one of the following options:

- No Further Action: The results of the investigation indicate that contaminants do not pose a significant threat to human health or the environment. Therefore, no further action is warranted and a decision document will be prepared to close the site.

- Long-Term Monitoring: The results of the investigation indicate that contamination is present at the site, but off-site migration of contaminants has not occurred, or is expected to occur at a relatively slow rate, if at all. Long-term monitoring may be recommended to detect the possibility of future problems.

- Feasibility Study: The results of the investigation indicate the presence of contamination that may pose a threat to human health and the environment, and some sort of cleanup or remedial action is necessary.

**Feasibility Study** - Based on results of the RI and review of state and federal regulatory requirements, a FS is prepared to develop, screen, and evaluate alternatives for the remediation of contaminated media at a site.

**Remedial Design** - The remedial design involves the formulation and approval of the engineering designs required to implement the selected remedial action identified in the FS.

**Remedial Action** - The remedial action is the actual implementation of remedial measures to eliminate the hazard or, at a minimum, to reduce it to an acceptable limit.

**Interim Remedial Action Alternatives** - At any point, it may be determined that a site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminants. Interim remedial actions or other appropriate remedial actions may be implemented during any phase of an ERP project (EPA 1988b).

## 1.3 GENERAL INVESTIGATION APPROACH

The general approach for the RI/FS is to conduct soil and groundwater investigations at the site. Direct-push technology will be used to collect both confirmatory soil samples and groundwater screening samples. The groundwater screening sample results will be used to assist in placement of monitoring wells from which confirmatory groundwater samples will be collected.

Concentrations of analytes detected at the sites will be compared to NYSDEC Recommended Soil Cleanup Objectives, as listed in NYSDEC *Technical and Administrative Guidance Memorandum* (TAGM) # 4046, for soil and groundwater (NYSDEC 1994), and EPA Maximum Contaminant Levels (MCLs) for groundwater (EPA 1997). Background concentrations for several metals including arsenic, cadmium, chromium, lead, selenium, and silver were reviewed and revised based on the results of background sampling that was conducted during the 2000-2001 RI (PEER 2004).

## 1.4 WORK PLAN STRUCTURE

This work plan is organized into 19 sections.

- Section 1.0 presents the introduction to the work plan;
- Section 2.0 describes the project management approach;
- Sections 3.0 and 4.0 provide information on the facility background and environmental setting;
- Section 5.0 discusses any permits necessary to perform the RI;
- Sections 6.0, 7.0, and 8.0 provide the investigative approach, the field investigation procedures, and sample collection procedures;
- Section 9.0 outlines ARARs;
- Section 10.0 describes the data requirements and objectives necessary for assessing contaminant fate and transport;
- Section 11.0 describes the data requirements for conducting a baseline risk assessment and ecological evaluation;
- Section 12.0 discusses the key elements of the FS;
- Sections 13.0 and 14.0 discuss equipment decontamination and soil probe abandonment procedures, respectively;
- Section 15.0 contains the procedures for handling of investigation-derived waste (IDW);
- Section 16.0 discusses the project schedule and deliverables;
- Sections 17.0 and 18.0 discuss the purpose and format of the RI/FS Report;
- Section 19.0 provides the references;
- Appendix A contains the Site-Specific Health and Safety Plan (HASP); and
- Appendix B contains the Site-Specific Quality Assurance Project Plan (QAPjP).

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# 2.0 PROJECT MANAGEMENT APPROACH

The following sections describe the overall project management approach.

## 2.1 PROJECT MANAGEMENT ORGANIZATION

The RI/FS at Site 8 will be implemented through a Project Management Team that includes personnel from the base, the ANG/CEVR, and PEER. The team will also include representatives from the NYSDEC. The lines of communication that will be followed for this work are shown on Figure 2.1.

## 2.2 PROJECT PROCEDURES

The following sections define the procedures to be followed to ensure that the work is completed in a quality manner, record management requirements, and the methods of communication to report project status, issues and concerns.

### 2.2.1 Internal Quality Control

A QAPP has been developed for ANG work and will be followed when appropriate to ensure that quality is maintained on this project (PEER 1995a). A site-specific QAPjP is provided in Appendix B.

### 2.2.2 Maintenance of Records

A central project file has been established at PEER's Oak Ridge, Tennessee office and contains all project correspondence and documentation. Future correspondence, quality assurance/quality control (QA/QC) information and all project documents will be filed here. All incoming records are assigned a document file number, distributed and filed. Field records will be maintained by the Site Manager under the direction of the Project and Program Managers. Upon completion of the field work, field records will be transferred to the central project file.

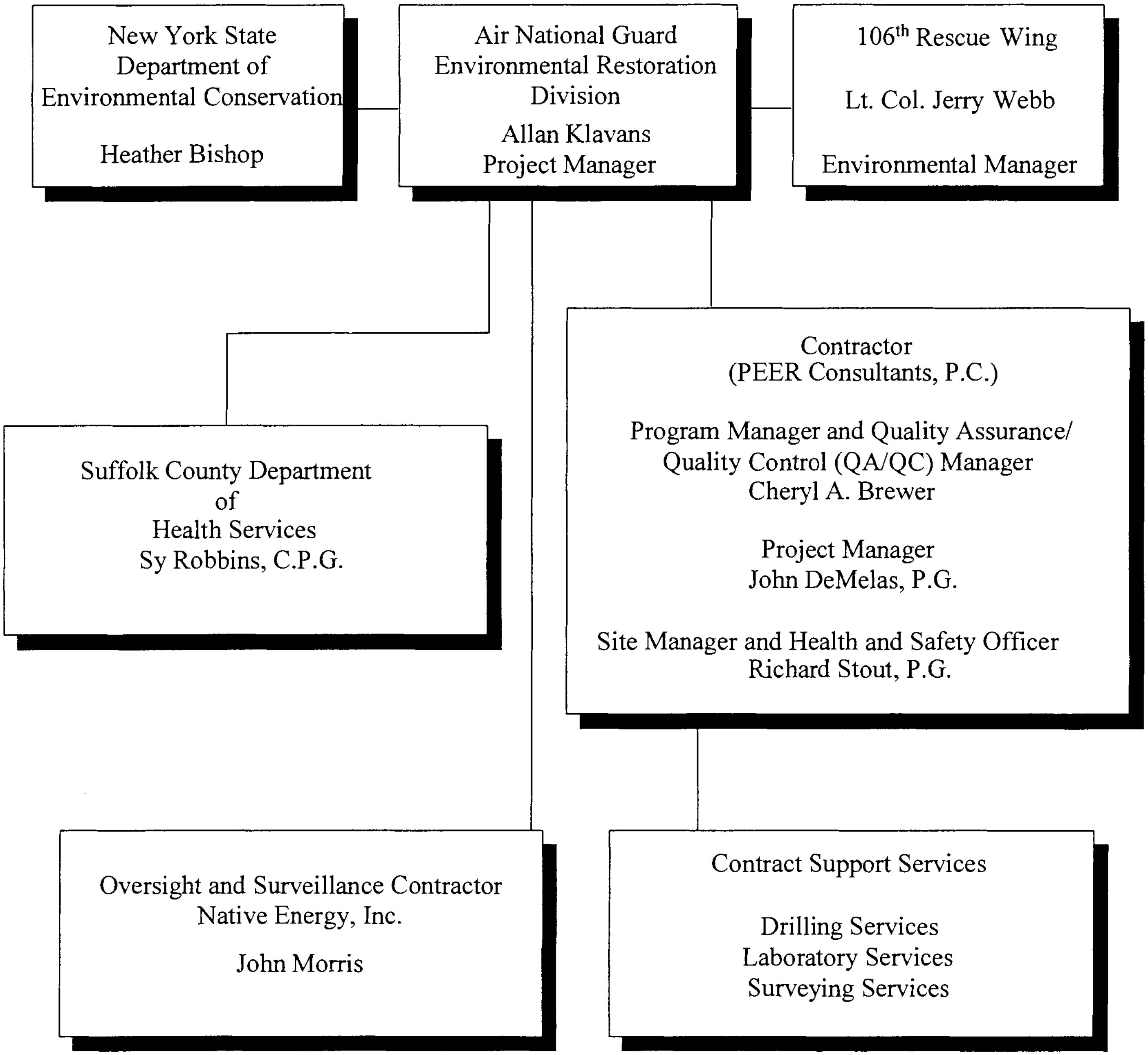



Figure 2.1 Project Management Organization Chart RI/FS at Site 8
106th Rescue Wing, New York ANG

### 2.2.3 Reporting

The PEER Program Manager will employ monthly progress reports and frequent telecommunication for briefing the ANG/CEVR Project Manager to ensure that technical project objectives are met, that the project is kept on schedule, and within budget. The monthly progress reports will address work performed during the month, problems encountered, schedule adherence, work planned for the next period, and budget status. An open line of communication will be maintained between the ANG/CEVR Project Manager and all members of the project team to ensure that all project objectives are met.

After the field activities are completed and the analytical results received, PEER will prepare an RI Report and an FS. Draft and draft-final versions of the RI report will be submitted to the ANG/CEVR, the NYSDEC, and the base for review. After comments are received and incorporated, a Final RI Report will be prepared and submitted to the ANG/CEVR, the NYSDEC and the base. Additionally, draft and draft-final versions of the FS will be submitted to the ANG/CEVR, the NYSDEC, and the base for review. The draft-final version of the FS will also be submitted for public review. After comments are received and incorporated, a Final FS will be prepared and submitted to the ANG/CEVR, the NYSDEC and the base. The Final FS will include a responsiveness summary with regard to any public comments.

## 2.3 QUALITY MANAGEMENT

All work to be performed under this project will be conducted in accordance with this work plan, and the programmatic QAPP and HASP (PEER 1995a and b). Site-specific health and safety requirements are provided in Appendix A of this work plan, and site-specific QA/QC requirements are provided in Appendix B. Verifiable sample custody will be an integral part of the field work and samples will be properly collected and identified. All information pertinent to field observations, screening, and sampling will be indelibly recorded in a field logbook.

## 2.4 SUBCONTRACT MANAGEMENT

PEER will utilize the services of three subcontractors in performance of the field activities including drilling services, analytical services and surveying services. The Project Manager will verify that the drilling subcontractor has applied for and obtained all necessary and sufficient permits and approvals prior to implementing drilling activities. The drilling subcontractor will apply for and obtain all licenses and pay all fees required for implementing drilling activities at the site. The Site Manger will coordinate with the Environmental Manager (EM) and the drilling subcontractor to ensure that all underground utilities are identified. Drilling or dig permits will be obtained from the base Civil Engineer. The Site Manager will ensure that the drilling subcontractor provides a daily report of materials and time used to complete the tasks described in this work plan. The daily report will be verified and signed by the drilling subcontractor and PEER on a daily basis.

It is the responsibility of the drilling subcontractor to ensure that all health and safety procedures, including medical monitoring, are followed. The Program Manager will ensure that the drilling subcontractor submits a letter documenting this condition prior to mobilization.

The Site Manager will coordinate sample shipping and receipt with the project laboratory. The laboratory will be notified of sample shipments and called to verify that shipments were received without breakage. The Site Manger will coordinate collection of additional samples when necessary to replace any that are broken during shipment.

The Site Manager will coordinate with the laboratory to ensure that sample holding times are met and that all requested analyses are completed. The Site Manager will be contact person for all laboratory analytical reports and completed Chain-of-Custody Forms.

# 3.0 FACILITY BACKGROUND

This section provides a description and history of the 106th RQW and the Francis S. Gabreski Airport, a description of Site 8 and the Bauman Bus Plume, and brief discussions of previous investigations.

## 3.1 FACILITY DESCRIPTION AND HISTORY

The 106th RQW of the New York ANG is located at the Francis S. Gabreski Airport in Suffolk County, New York, on the eastern end of Long Island. Francis S. Gabreski Airport, formerly known as Suffolk County Airport, is on Old Riverhead Road, approximately 2 miles north of the Atlantic Ocean shoreline in Westhampton Beach. The airport is owned by the Suffolk County Department of Public Works. The *Francis S. Gabreski Airport Master Plan* reports the current area of the airport as 1,486 acres (Latino 2002). The 106th RQW leases approximately 70 acres of runways, hangars, and maintenance/service facilities on the southwest side of the airport. The airport is bounded to the north by undeveloped land, to the east by the Quogue Wildlife Refuge, to the south by the Long Island Railroad, and to the west by Old Riverhead Road.

The airport property was acquired in 1942 by the Civil Aeronautics Authority and was used for military training, aircraft maintenance, and armed forces support until 1969. As of July 8, 1958, the airport occupied approximately 2500 acres of relatively flat terrain (Anthony J. Vasell, personal communication 2001). Since 1970, Suffolk County has leased portions of the airport to numerous tenants, including the New York ANG. In 1990, Suffolk County purchased the property and began operation of Suffolk County Airport. The airport was renamed to the Francis S. Gabreski Airport in 1999, in honor of the former base commander and World War II air ace.

## 3.2 SITE DESCRIPTION

The following subsections describe ERP Site 8 – the Old Base Septic Systems, and the Bauman Bus Plume.

### 3.2.1 Site 8 – Old Base Septic System

Site 8 is a composite of underground structures including cesspools, septic tanks, distribution boxes, oil/mud traps, and dry wells at numerous locations throughout the base. Together, these individual structures make up the Old Base Septic System. The various structures were each associated with a particular building, or buildings, and would have received wastes from various processes within the buildings. As a whole, the system was not contiguous, and consisted of many individual structures. Some structures were interconnected, making up small sub-systems. Site 8 was divided into 16 subsites, designated as Subsites 8A through 8U, based on the individual structures and sub-systems that were identified. Subsite 8Q was further subdivided into 7 additional subsites, referred to as 8QA through 8QG. Some individual subsites contained as few as two underground structures, while others included several interconnected structures or sub-systems. During the previous investigations at Site 8, the various structures and subsystems were grouped into five contiguous cells. Referred to as Cells 1 through 5, the cell designations were based on geographic groupings of the various structures.

For the purposes of this RI/FS at Site 8, and to maintain continuity with previous investigations, the geographic-based cell designations and the subsite identifications are retained. The distribution of the subsites within each cell is summarized on Table 3.1, including the structures associated with each subsite. The cell boundaries and subsite locations are presented on Figure 1.3 in Section 1.0.

### 3.2.2 Bauman Bus Plume

The Bauman Bus Plume originates to the north of the 106th RQW property, on the county-owned portion of Francis S. Gabreski Airport. The plume extends southward, following the hydrogeologic gradient onto the 106th RQW property along the northern property line in an area which is within Site 8 – Cell 2. The nature and extent of this plume has been delineated up to the 106th RQW property line. No specific investigations of the Bauman Bus Plume have been conducted on the 106th RQW property. However, the 1994 SI, 1998 RI, and the 2000 – 2001 RI all collected data within Site 8 – Cell 2 in the area impacted by the plume. The approximate extent of the Bauman Bus Plume is shown on Figure 1.4 in Section 1.0. The NYSDEC and Suffolk County have a Voluntary Cleanup Agreement for sites at the airport including the Bauman Bus Plume, Site Number V00576-1 (NYSDEC May 2004).

**Table 3.1**
**Distribution of Subsites in Cells 1 Through 5**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Cell ID | Subsite ID | Septic Tanks | Cesspools | Distribution Boxes |
|---|---|---|---|---|
| 1 | 8M | 1 | 1 | 0 |
| 1 | 8N | 1 | 2 | 0 |
| 1 | 8O | 1 | 1 | 0 |
| 1 | 8QA | 1 | 1 | 0 |
| 1 | 8QB | 0 | 3 | 0 |
| 1 | 8QC | 1 | 1 | 0 |
| 1 | 8QD | 1 | 1 | 0 |
| 1 | 8QE | Unknown | Unknown | Unknown |
| 1 | 8QF | 1 | 4 | 0 |
| 1 | 8QG | 0 | 15 | 1 |
| 2 | 8A | 0 | 2 | 1 |
| 2 | 8B | 1 | 1 | 0 |
| 2 | 8C | 1 | 2 | 0 |
| 2 | 8P | 1 | 2 | 0 |
| 3 | 8G | 1 | 2 | 1 |
| 3 | 8R | 1 | 1 | 0 |
| 3 | 8S | 1 | 2 | 0 |
| 3 | 8T | 1 | 2 | 0 |
| 4 | 8D | 0 | 2 | 0 |
| 4 | 8E | 0 | 1 | 0 |
| 4 | 8F | 1 | 1 | 0 |
| 4 | 8H | 1 | 5 | 2 |
| 5 | 8I | 1 | 1 | 0 |
| 5 | 8J | Currently Used for Storm Drainage[1] | | |
| 5 | 8K | 1 | 3 | 0 |
| 5 | 8L | Structures Abandoned Prior to TCRA[1] | | |
| 5 | 8U | Structures Currently in Use[1] | | |

Notes: 1. Harding ESE, Inc., 2001.

Background information for the Bauman Bus Plume has been synopsized from the available reports and information from interviews with SCDHS personnel. According to the SI Report, the property where the Bauman Bus Plume originates has been the location of several underground storage tanks (USTs), used for storage of fuel (heating) oil, waste oil, diesel fuel, automotive gas (MOGAS), and for temporary storage of jet-propulsion fuel no. 4 (JP-4). The property was known to be potentially impacted by subsurface petroleum product as early as 1984, when a 2,000-gallon tank failed a tightness test. In 1986, a free product plume was confirmed, and a signature compound analysis indicated that the light non-aqueous phase liquid (LNAPL) present at the top of the groundwater table consisted of predominantly jet fuel, with smaller fractions of diesel fuel, and possibly other petroleum products.

Several monitoring wells and piezometers installed at the plume site are monitored bi-monthly, and any free product is recovered by hand-bailing (Edward Olson personal communication, SCDHS 2004). A total of 9 gallons of product was removed from January 1997 to August 2002 (OBG 2004). Reportedly, no free product has been observed for the past year (Edward Olson personal communication, SCDHS 2004). Several of the piezometers for monitoring the product plume were removed or destroyed in May 1999 during grading (OBG 2004).

The SI Report concluded that the free product plume occupies an area of 70 ft wide by 170 ft long, oriented with the long axis approximately north-northwest by south-southeast, with observed thickness between 0.15 and 0.25 ft. These dimensions suggest that from 3,000 to 6,000 gallons of LNAPL product may have been present at the time of the SI. The downgradient extent of the LNAPL plume appears to extend beyond the Suffolk County property, and onto the 106$^{th}$ RQW property. It appears that natural attenuation processes are occurring within the plume area, based on the occurrence of lower dissolved oxygen concentrations observed within the plume (OBG 2004).

During the SI, groundwater samples were collected and the analytical results were compared to the New York State Class GA Groundwater action levels (NYSDEC TAGM 4046). Volatile and semivolatile organic compounds detected at concentrations exceeding the action levels, including:

- Benzene (exceed the MCL);
- Ethylbenzene;
- Isopropylbenzene;
- Toluene; and,
- Xylene (total).

During the 2000 – 2001 RI, several monitoring wells were sampled that can be associated with the Bauman Bus Plume due to their geographic locations. Analytical results from the monitoring wells that can be associated with the Bauman Bus Plume and were sampled during the 2000 – 2001 RI, found no exceedances of action levels by any analytes, as discussed further in Section 3.3.1.6. The available data from the 2000 – 2001 RI does not provide direct characterization of the plume, but does indicate that contaminants exceeding action levels had not migrated to the monitoring wells that were sampled.

## 3.3 PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

### 3.3.1 Environmental Restoration Program

The investigations conducted at Site 8 under the ERP (formerly known as the IRP) are summarized in Table 3.2, and are briefly discussed in this section. This RI is primarily concerned with subsites located within Cells 1, 2 and 4. The results from previous investigations conducted at Cells 3 and 5 are not discussed in detail in this Work Plan.

#### 3.3.1.2 Initial Site Survey – 1991

An initial site survey was conducted for Site 8 in August and September of 1991 in response to a request by the SCDHS (ABB-ES 1991). The initial site survey involved sampling and analyzing sludge and liquid from 29 structures at Site 8, including septic tanks, cesspools, distribution boxes, and an oil/mud trap. Several of the samples contained concentrations of volatile and semivolatile organic compounds.

#### 3.3.1.3 Survey and Source Characterization – 1994

Cells 1, 2, 3, 4 and 5 were investigated during the November 1994 *Survey and Source Characterization* of Site 8. Sludge samples were collected and submitted to a field-operated laboratory for analysis of volatile and semivolatile organic compounds and metals (ABB-ES 1995). The results of the survey and source characterization are summarized as follows:

- Cell 1: Chromium was detected at a concentration of 300 mg/kg in sludge from the septic system near the northwest corner of Building 250;

# Table 3.2
## Summary of Investigations Conducted at Site 8
## 106th Rescue Wing
### New York Air National Guard
### Francis S. Gabreski Airport
### Westhampton Beach, New York

| Investigation/ Remedial Action | Date Completed | Work Completed | Analysis Completed | | | Source Document | Recommendations |
|---|---|---|---|---|---|---|---|
| | | | Soil | GW | Sludge | | |
| Site 8 Survey | 1991 | Surveyed several cesspools and septic tanks that make up Site 8. Samples were collected and submitted for analysis. Some of the samples contained concentrations of volatile and semivolatile organic compounds. | Not sampled | Not sampled | Volatile and semivolatile organic compounds | Site Investigation Technical Memorandum (ABB-ES 1991) | Recommended that all remaining cesspool/septic tank systems at the base be added to Site 8. |
| Survey and Source Characterization | 1994 | Conducted an additional survey to locate cesspools and septic tanks that were inaccessible in the previous survey (ABB-ES 1991). Collected sludge samples from 24 locations. | Not sampled | Not sampled | Volatile and semivolatile organic compounds, metals | Source Characterization Report, Site 8 (ABB-ES 1995) | None available. |
| Site Investigation | 1994 to 1997 | Conducted investigations at nine sites (Sites 1, 2, 3, 4, 5, 8, 9, 10, and 11). Advanced seventy-four direct-push borings and collected soil and groundwater samples, installed twenty-four small diameter wells using cone penetrometer technology and collected groundwater samples from the wells. | Volatile and semivolatile organic compounds, metals | Volatile and semivolatile organic compounds, metals | Not sampled | Site Investigation Report (ABB-ES 1997) | For Site 8, recommended groundwater investigations at Cells 2, 3, 4 and 5, and recommended soil investigations at Cells 2 and 4. |
| Remedial Investigation | 1998 | Conducted an RI at Sites 4, 5, 8 and 9. Collected soil samples, advanced fifty-eight direct-push borings and collected soil and groundwater samples, installed ten 2-inch monitoring wells and obtained groundwater samples from the wells. | Volatile and semivolatile organic compounds. Metals analyses were site dependent | Volatile and semivolatile organic compounds. Metals analyses were site dependent | Not sampled | Revised Draft Remedial Investigation Report (S&W 1999) | Recommended further investigations at Site due to exceedances of NYSDEC screening levels. |
| Additional Remedial Investigation | 2000 to 2001 | Conducted an RI at Sites 1, 2, 3, 7, 10, 11 and 12 and evaluated four previously investigated sites including Sites 4, 5, 8, and 9. Sampling activities at Site 8 were limited to collection of groundwater samples from existing wells. | Volatile and semivolatile organic compounds, metals | Volatile and semivolatile organic compounds, metals | Not sampled | Final Remedial Investigation Report (PEER 2004) | For Site 8, recommended removal of sludge and abandonment of septic tank structures. |
| Septic System Remediation | 2002 | Conducted remedial actions at Site 8 of septic system structures (cesspools, septic tanks, etc.) which included conducting an initial Time Critical Removal Action at four of the sites. Activities included locating structures via ground penetrating radar, confirmatory soil sampling, and remediation of septic system structures by excavation and removal, and abandoning in place. | Volatile and semivolatile organic compounds. and metals | Not sampled | Not sampled | Technical Memorandum, Site 8 Septic System Remediation Completion Report (MACTEC 2003) | Recommended further groundwater sampling at Sites 8D, 8QF, and 8F. |

- Cell 2: Volatile organics including unspecified total chlorinated solvents were detected in sludge from the septic system north of Building 230, at 470 mg/kg;
- Cell 4: Concentrations of (unspecified) total volatile organics, including chlorinated solvents, were detected in sludge from septic systems south of Building 270 at 230 mg/kg, and between Buildings 280 and 276 at 4,240 mg/kg

#### 3.3.1.4 Site Investigation – 1994-1997

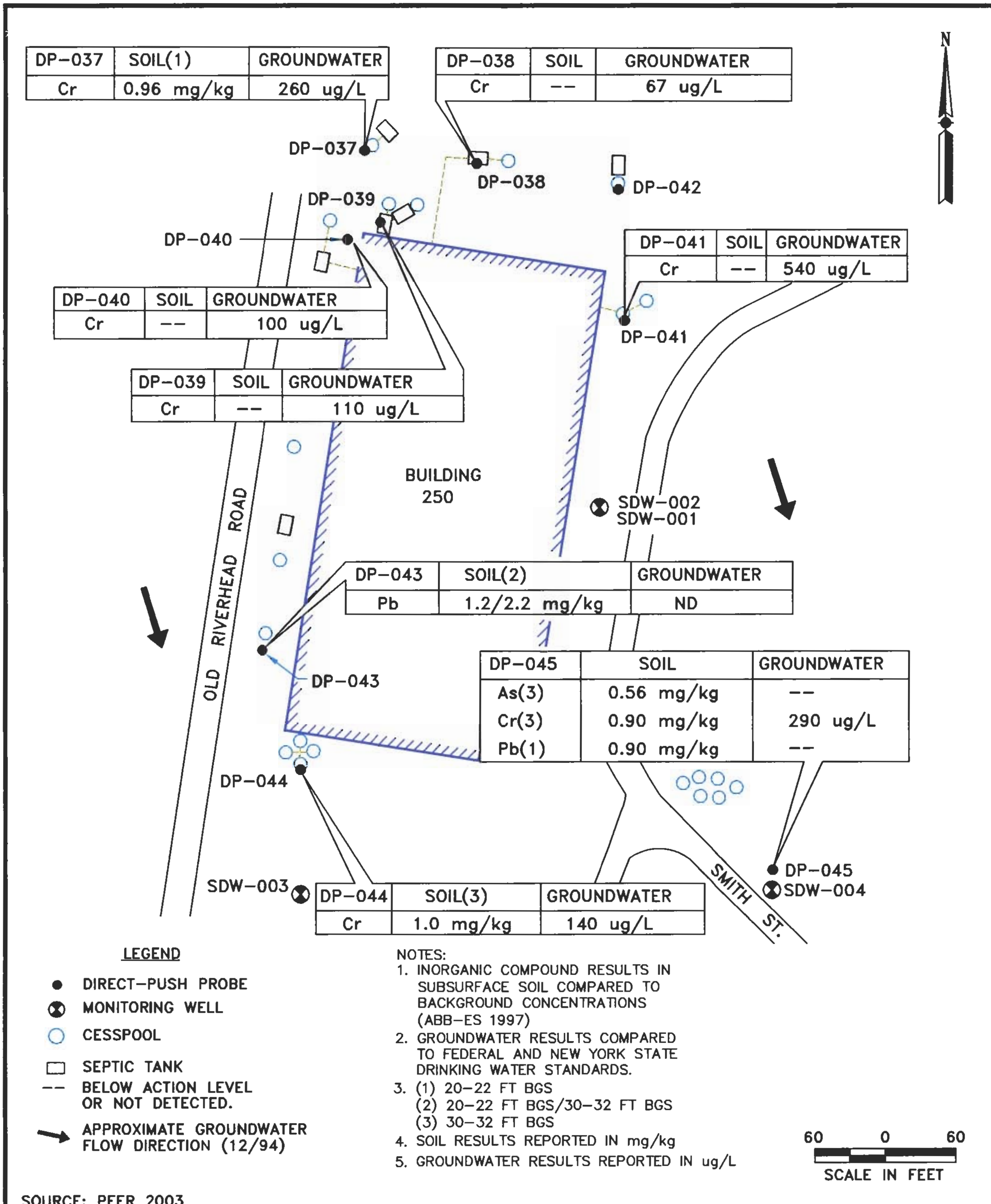
In 1994, a Site Investigation was conducted to determine if the contaminants detected in the septic systems had migrated to soil and/or groundwater in the vicinity of Cells 1, 2, 3, 4, and 5 (ABB-ES 1997). The Site Investigation results for Cells 1, 2, and 4 are discussed below.

**Site 8 - Cell 1**

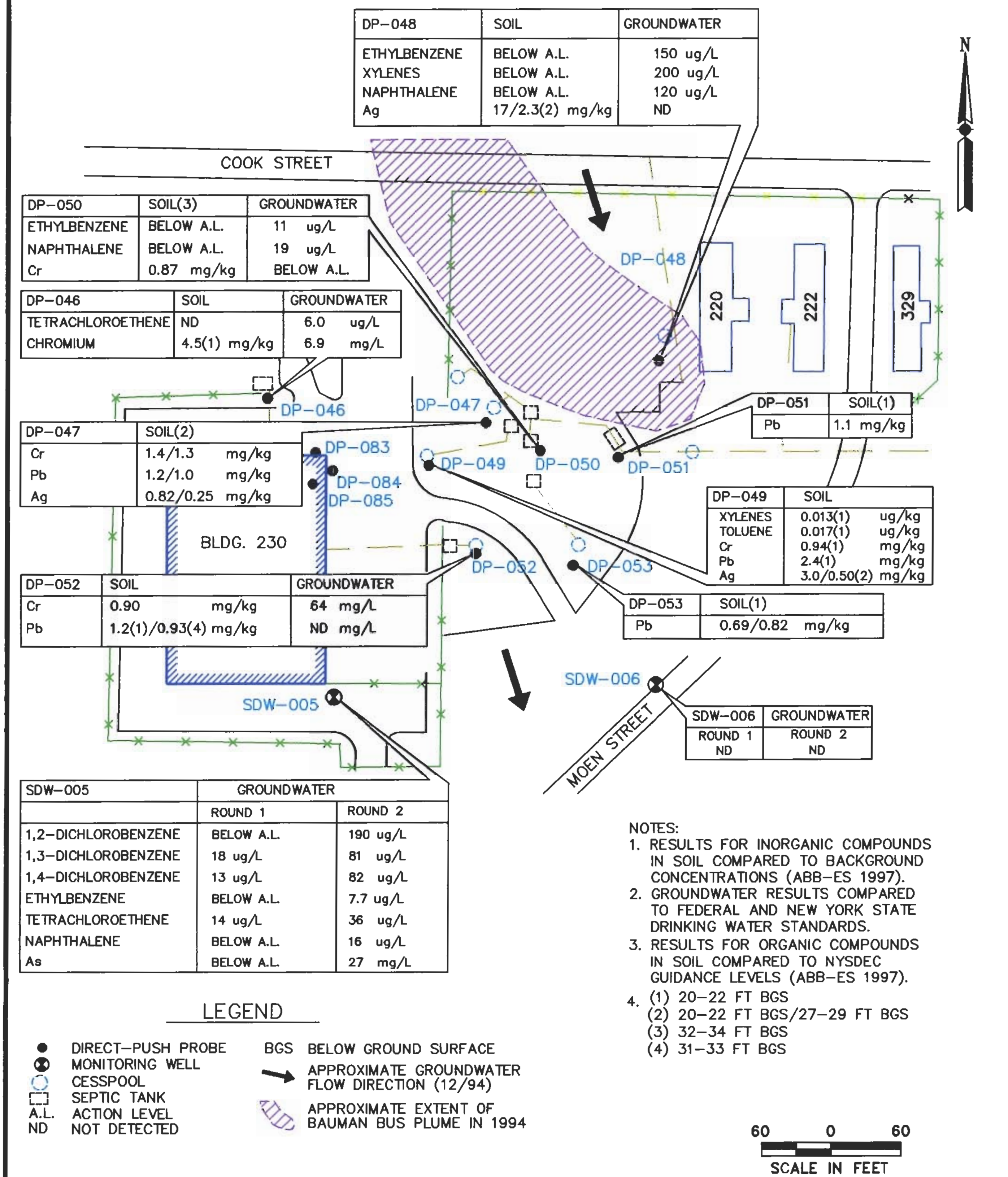
Toluene, trans-1,2-dichloroethene, and three metals were detected above reporting limits in subsurface soils, but below NYSDEC action levels. Chromium concentrations at Cell 1 exceeded action levels in direct-push groundwater samples, but not in groundwater samples obtained from monitoring wells. The sample results are shown on Figure 3.1. The elevated chromium concentrations in the direct-push groundwater samples were attributed to the sample collection methodology which caused elevated suspended sediment. The SI Report recommended that no further investigation be conducted at Site 8 - Cell 1 (ABB-ES 1997).

**Site 8 - Cell 2**

Tetrachloroethene [perchloroethene (PCE)] and fuel-related compounds exceeded NYSDEC action levels in direct-push groundwater samples collected north and south of Building 230. The sample results are shown on Figure 3.2. The source of this contamination was not identified, and the horizontal and vertical extent was not defined. PCE was not detected in downgradient Cell 3 monitoring wells SDW-007, SDW-008, or SDW-009. Metals were detected in subsurface soil samples at concentrations above action levels, but were within background levels for the eastern United States. No further investigation was recommended for metals at Cell 2 (ABB-ES 1997).




| | | |
|---|---|---|
| PEER<br>PROJ./3005-011<br>GAB3005/Final WP/FIG3.1 | SITE 8 – CELL 1 – 1994 DIRECT PUSH SOIL AND GROUNDWATER RESULTS<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 3.1 |




SOURCE: PEER 2003.

| PEER | SITE 8 – CELL 2 – 1994 DIRECT PUSH SOIL AND GROUNDWATER RESULTS<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 3.2 |
|---|---|---|
| PROJ./3005-011<br>GAB3005/Final WP/FIG 3.2 | | |

The SI suggested that contamination at Cell 2 was the result of two separate sources; wastewater discharges in the vicinity of Building 230, and migration of the Bauman Bus Plume from the county-operated portion of Suffolk County Airport located upgradient (north) of Cell 2. Site Investigation data suggested that the Bauman Bus Plume extended onto base property at least 220 ft, but the leading edge was not well defined. A county-initiated recovery system was developed to address this contamination (ABB-ES 1997).

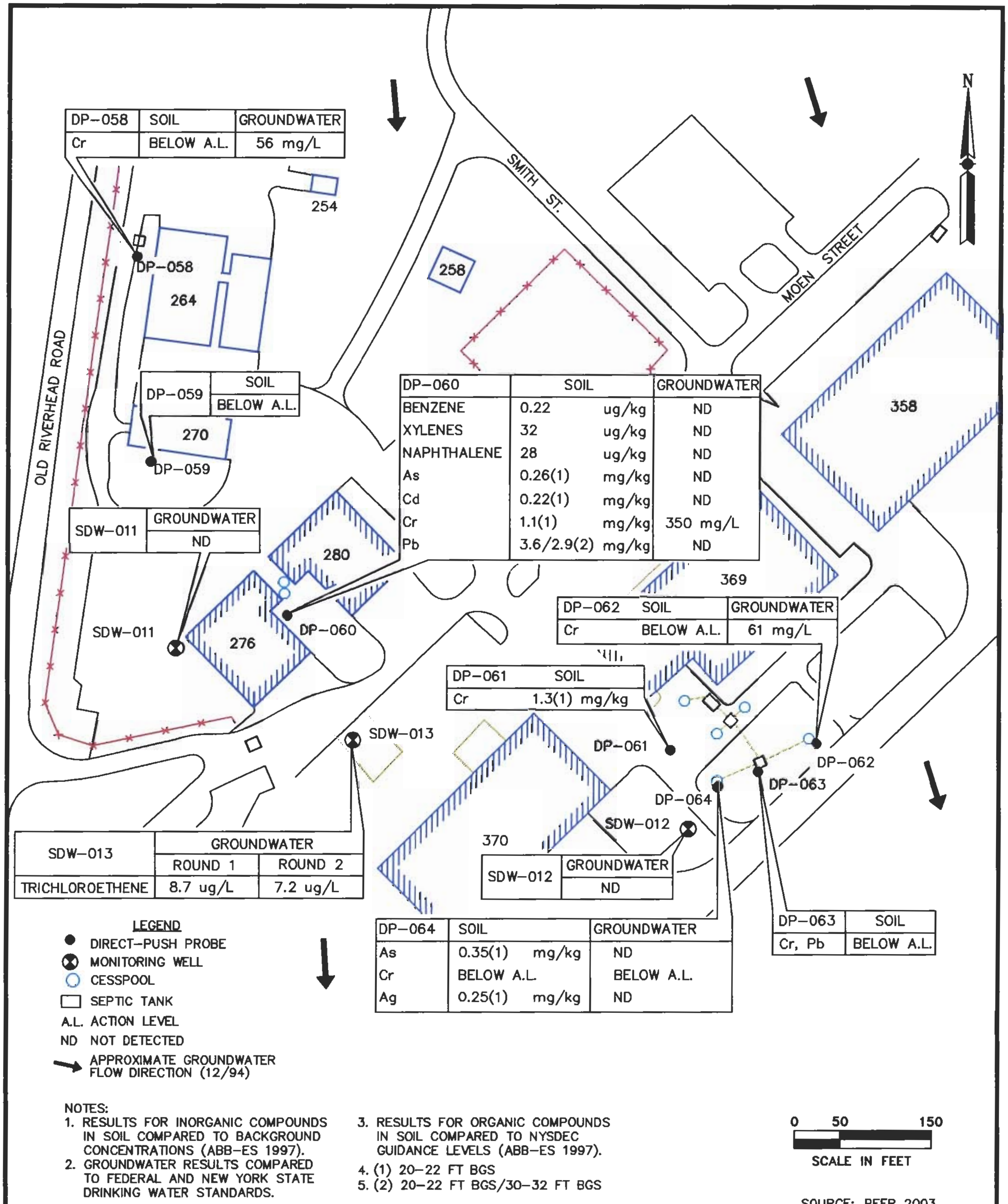
**Site 8 - Cell 4**

Trichloroethylene (TCE) was detected in groundwater from monitoring wells at Cell 4 at concentrations exceeding the NYSDEC action levels. Benzene was detected in groundwater at the NYSDEC action level. Chromium was detected in groundwater samples, but did not exceed action levels. Metals were detected in subsurface soil samples collected at Cell 4 at concentrations above NYSDEC action levels in effect at the time of the investigation, but were within eastern United States background levels. The contaminants detected in soil and groundwater at Site 4 are shown on Figure 3.3.

#### 3.3.1.5 1998 Remedial Investigation

In 1998, an initial RI was conducted at Sites 8 - Cells 2, 3, 4 and 5. Surface and subsurface soil and groundwater samples were collected using direct-push technology. The samples were analyzed for volatile and semivolatile organic compounds and metals. Cell 1 was not investigated during the 1998 RI. The following activities were conducted at Site 8 during the 1998 RI:

- Cell 2 was investigated to evaluate the nature and extent of contamination in surface and subsurface soils and groundwater. Metals contamination was not investigated as per the recommendation of the 1994 SI Report.




| | | |
|---|---|---|
| PEER<br>PROJ./3005-011<br>GAB 3005/Final WP/FIG 3.3 | SITE 8 – CELL 4 – 1994 DIRECT PUSH SOIL AND GROUNDWATER RESULTS<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 3.3 |

- Cell 4 was investigated for surface and subsurface soils and groundwater contamination by volatile and semivolatile organic compounds.

**Site 8 - Cell 2**

Three contaminants of potential concern (COPCs) were identified in surface soil at Cell 2. The COPCs consisted of three poly-nuclear aromatic hydrocarbons (PAHs) including benzo(a)anthracene, chrysene, and benzo(a)pyrene. Four COPCs were identified in direct-push groundwater including ethylbenzene, xylenes (total), phenol, and naphthalene. The COPCs were identified in the vicinity of Building 230, the Vehicle Maintenance Shop (S&W 1999). Exceedances of NYSDEC action levels for the direct-push soil and groundwater samples collected during the 1998 RI and are summarized on Tables 3.3 and 3.4, respectively, and are shown on Figure 3.4.

During base-wide groundwater monitoring, twelve monitoring wells in the vicinity of Cell 2 were sampled during Rounds 1 and 2, as summarized in Tables 3.5 and 3.6, respectively. As shown on Figure 3.5, several organics were identified at concentrations exceeding action levels in groundwater at Site 8 – Cell 2.

**Site 8 - Cell 4**

The Site Investigation Report stated that pyrene exceeded its NYSDEC action level in shallow surface soil at Cell 4. However, the reported concentration does not exceed the current NYSDEC action level, as shown on Table 3.7. Naphthalene exceeded the NYSDEC action level in one direct-push groundwater sample. No exceedances occurred in subsurface soils or in the single monitoring well groundwater sample. Reportedly, the presence of petroleum and other chemicals at the site may have resulted in the introduction of pyrene to the surface soil (S&W 1999). Exceedances of NYSDEC action levels groundwater are summarized on Table 3.8. The results for the soil and groundwater samples are shown on Figure 3.6.

**Table 3.3**
**Site 8 - Cell 2 - Shallow Surface Soil Contamination**
**1998 Remedial Investigation**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

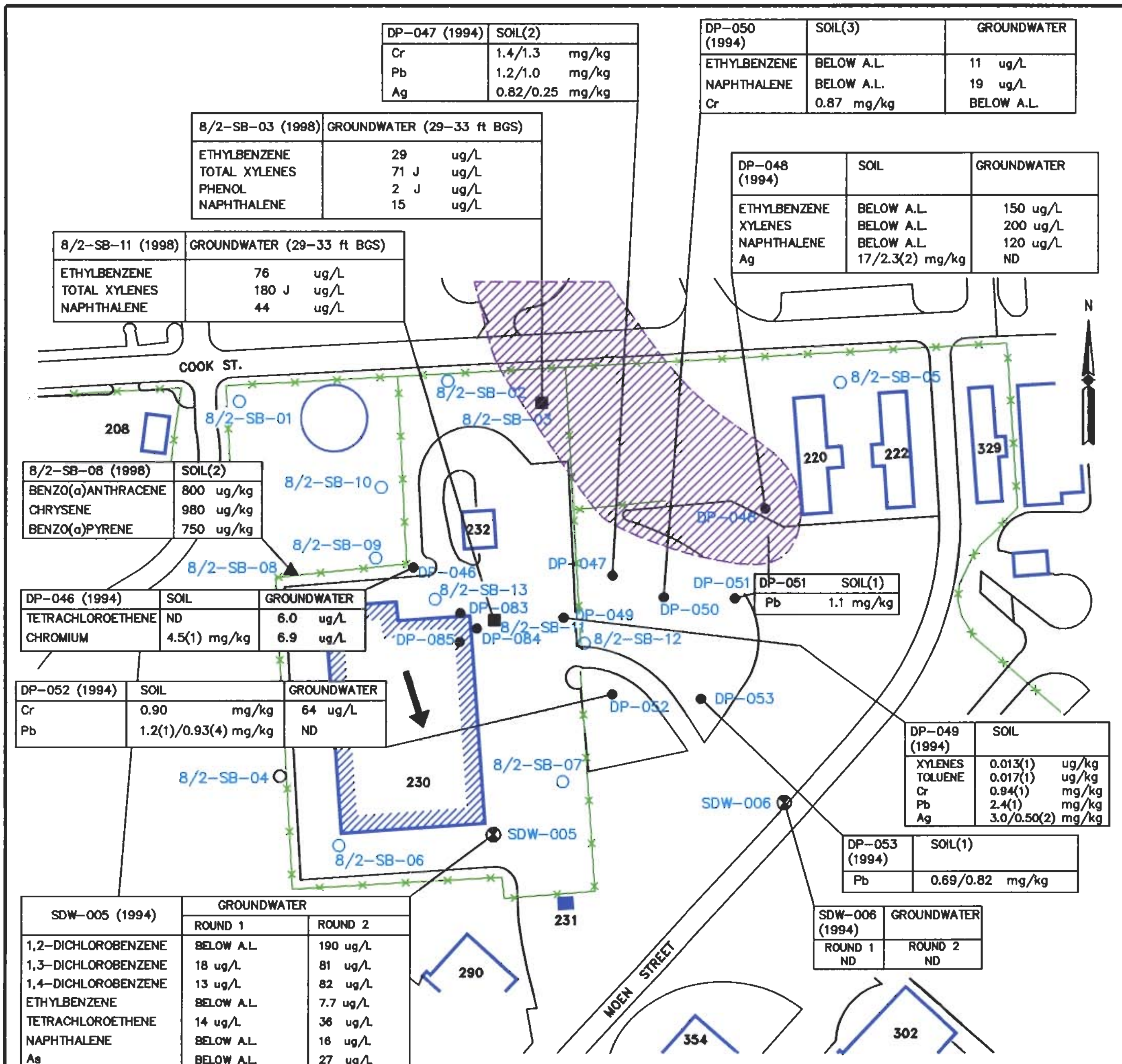
| Sample | Action Levels | | 8/2-SB-08 |
|---|---|---|---|
| Depth (BGS) | Saturated | Unsaturated | 0 - 3 in. |
| **Semivolatile Organic Compounds (µg/kg)** | | | |
| Benzo(a)anthracene | 330 | 300 | **800** |
| Chrysene | 400 | 400 | **980** |
| Benzo(a)pyrene | 0.33 | 330 | **750** |

Source: Revised Draft Remedial Investigation, Sites 4, 5, 8, and 9, S&W 1999, Volume II, Appendix C.
BGS Below ground surface.
Note: Action levels from ABB-ES 1997, and NYS-TAGM #4046.
Bolding and shading indicate an exceedance of action levels.

**Table 3.4**
**Site 8 - Cell 2 - Direct-Push Groundwater Contamination**
**1998 Remedial investigation**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Sample | Action Levels | | 8/2-SB-03 | 8/2-SB-11 |
|---|---|---|---|---|
| Depth BGS | NYS | MCL | 29 - 33 ft BGS | 29 - 33 ft BGS |
| **Volatile Organic Compounds (µg/L)** | | | | |
| Ethylbenzene | 5 | 700 | **29** | **76** |
| Total Xylenes | 5 | 10,000 | **71 J** | **180 J** |
| Phenol | 1 | NA | **2 J** | ND |
| **Semivolatile Organic Compounds (µg/L)** | | | | |
| Naphthalene | 10 | NA | **15** | **44** |

Source: Revised Draft Remedial Investigation, Sites 4, 5, 8, and 9, S&W 1999, Volume II, Appendix C.
BGS Below ground surface.
J Estimated value.
MCL U.S. EPA maximum contaminant level.
NA Not applicable.
ND Not detected.
NYS New York State, TAGM #4049.
Note: Action levels from ABB-ES 1997, and NYS-TAGM #4046
Bolding and shading indicate an exceedance of action levels..




LEGEND

| | |
|---|---|
| 8/2-SB-01 ▲ | 1998 DIRECT-PUSH LOCATION EXCEEDING ACTION LEVELS FOR SUBSURFACE SOILS |
| 8/2-SB-03 ■ | 1998 DIRECT-PUSH LOCATION EXCEEDING ACTION LEVELS FOR GROUNDWATER |
| 8/2-SB-02 ○ | 1998 DIRECT-PUSH LOCATION WITH NO DETECTED EXCEEDENCES |
| DP-006 | 1994 DIRECT-PUSH LOCATION |
| SDW-005 | 1984 GROUNDWATER MONITORING SAMPLE |
| (hatched) | APPROXIMATE EXTENT OF BAUMAN BUS PLUME IN 1998 |
| ● | DIRECT-PUSH PROBE |
| ⊗ | MONITORING WELL |
| ○ | CESSPOOL |
| □ | SEPTIC TANK |
| A.L. | ACTION LEVEL |
| ND | NOT DETECTED |
| BGS | BELOW GROUND SURFACE |
| J | ESTIMATED VALUE |
| → | APPROXIMATE GROUNDWATER FLOW DIRECTION (12/94) |

NOTES:
1. RESULTS FOR INORGANIC COMPOUNDS IN SOIL COMPARED TO BACKGROUND CONCENTRATIONS (ABB-ES 1997).
2. GROUNDWATER RESULTS COMPARED TO FEDERAL AND NEW YORK STATE DRINKING WATER STANDARDS.
3. RESULTS FOR ORGANIC COMPOUNDS IN SOIL COMPARED TO NYSDEC GUIDANCE LEVELS (ABB-ES 1997).
4. (1) 20-22 FT BGS
(2) 20-22 FT BGS/27-29 FT BGS
(3) 32-34 FT BGS
(4) 31-33 FT BGS

0 50 100
SCALE IN FEET

SOURCE: PEER 2003

PEER

PROJ./3005-011
GAB 3005/Final WP/FIG 3.4

SITE 8-CELL 2 1994 & 1998 DIRECT-PUSH SOIL AND GROUNDWATER RESULTS
106th RESCUE WING, NEW YORK AIR NATIONAL GUARD
FRANCIS S. GABRESKI AIRPORT
WESTHAMPTON BEACH, NEW YORK

FIGURE 3.4

**Table 3.5**
**Site 8 – Cell 2**
**1998 Remedial Investigation**
**Round 1 Groundwater Monitoring**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

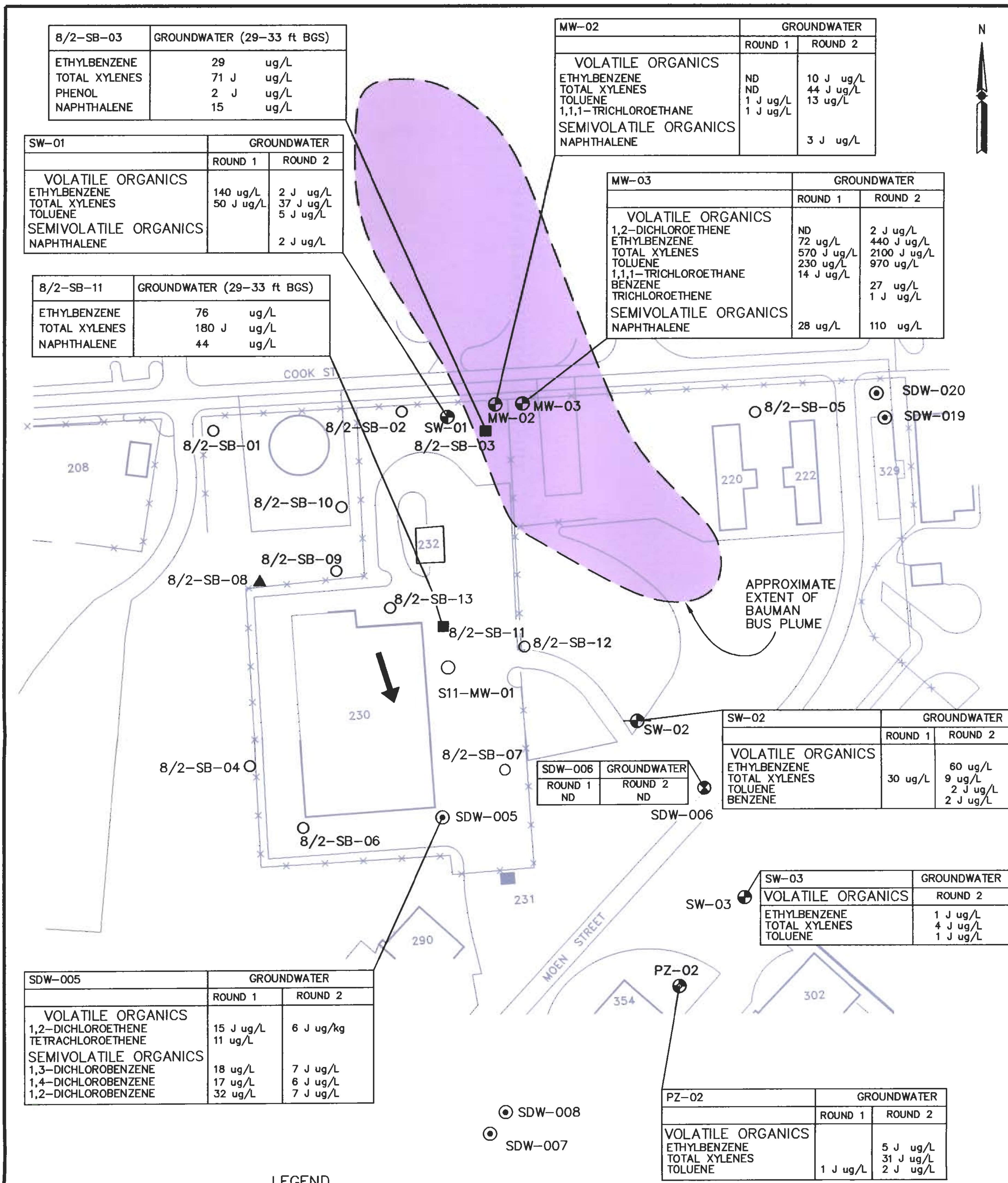
| Monitoring Well Sample Location | Action Levels | | SDW-005 | SDW-006 | SDW-007 | SDW-008 | SDW-019 | SDW-020 | MW-02 | MW-03 | PZ-02 | SW-01 | SW-02 | SW-03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NYS[a] | MCL[b] | | | | | | | | | | | | |
| **Volatile Organics (µg/L)** | | | | | | | | | | | | | | |
| 1,2-dichloroethene (Total) | 5 | 5 | **15 J** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Tetrachloroethene | 5 | 5 | **11** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Ethylbenzene | 5 | 700 | ND | ND | ND | ND | ND | ND | ND | **72** | ND | 140 | ND | ND |
| Total Xylenes | 5 | 10,000 | ND | ND | ND | ND | ND | ND | ND | **570 J** | ND | **50 J** | **30 J** | ND |
| Toluene | 5 | 1000 | ND | ND | ND | ND | ND | ND | 1 J | **230** | 1 J | ND | ND | ND |
| 1,1,1-Trichloroethane | 5 | 200 | ND | ND | ND | ND | ND | ND | 1 J | **14 J** | ND | ND | ND | ND |
| **Semivolatile Organics (µg/L)** | | | | | | | | | | | | | | |
| 1,3-Dichlorobenzene | 5 | 5 | **18** | ND | NR | NR | NR | NR | ND | ND | NR | ND | ND | NR |
| 1,4-Dichlorobenzene | 4.7 | 75 | **17** | ND | NR | NR | NR | NR | ND | ND | NR | ND | ND | NR |
| 1,2-Dichlorobenzene | 4.7 | 5 | **32** | ND | NR | NR | NR | NR | ND | ND | NR | ND | ND | NR |
| Bis(2-Ethylhexyl)phthalate | 50 | 6 | ND | ND | NR | NR | NR | NR | ND | ND | NR | ND | ND | NR |
| Naphthalene | 10 | NA | ND | ND | NR | NR | NR | NR | ND | **28** | NR | ND | ND | NR |

Notes: a) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
b) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.
BGS Below ground surface.
J Estimated value.
MCL Maximum contaminant level.
ND Not detected.
NR Not reported.
Action Levels from ABB-ES 1997, and NYSDEC TAGM #4046.
Shading and bolding indicate exceedances of Action Levels.
Source: S&W 1999, Volume II, Appendix C.

**Table 3.6**
**Site 8 – Cell 2**
**1998 Remedial Investigation**
**Round 2 Groundwater Monitoring**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Monitoring Well Sample Location | Action Levels | | SDW-005 | SDW-006 | SDW-007 | SDW-008 | SDW-019 | SDW-020 | MW-02 | MW-03 | PZ-02 | SW-01 | SW-02 | SW-03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NYS(a) | MCL(b) | | | | | | | | | | | | |
| **Volatile Organics (µg/L)** | | | | | | | | | | | | | | |
| 1,2-Dichloroethene (Total) | 5 | 5 | 6 J | ND | ND | ND | ND | ND | ND | 2 J | ND | ND | ND | ND |
| Benzene | 0.7 | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | **2 J** | ND |
| Ethylbenzene | 5 | 700 | ND | ND | ND | ND | ND | ND | 10 J | **440 J** | **5 J** | **2 J** | **60** | 1 J |
| Toluene | 5 | 1000 | ND | ND | ND | ND | ND | ND | **13** | **970** | 2 J | **5 J** | 2 J | 1 J |
| Total Xylenes | 5 | 10,000 | ND | ND | ND | ND | ND | ND | **44 J** | **2100 J** | **31 J** | **37 J** | **9 J** | 4 J |
| Trichloroethene | 5 | 5 | ND | ND | ND | ND | ND | ND | ND | 1J | ND | ND | ND | ND |
| **Semivolatile Organics (µg/L)** | | | | | | | | | | | | | | |
| 1,3-Dichlorobenzene | 5 | 5 | 7 J | ND | NR | NR | ND | ND | ND | ND | ND | ND | NR | NR |
| 1,4-Dichlorobenzene | 4.7 | 75 | 6 J | ND | NR | NR | ND | ND | ND | ND | ND | ND | NR | NR |
| 1,2-Dichlorobenzene | 4.7 | 5 | 7 J | 1 J | NR | NR | ND | ND | ND | ND | ND | ND | NR | NR |
| Naphthalene | 10 | NA | ND | ND | NR | NR | ND | ND | 3 J | 110 | ND | 2 J | NR | NR |

Notes: a) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
b) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.
BGS Below ground surface.
J Estimated value.
MCL Maximum contaminant level.
ND Not detected.
NYS New York State Class GA Groundwater.
Action Levels from ABB-ES 1997, and NYSDEC TAGM #4046.
Bolding and shading indicate concentrations at or above Action Levels.
Source: S&W 1999, Volume II, Appendix C.




| 8/2-SB-03 | GROUNDWATER (29-33 ft BGS) |
|---|---|
| ETHYLBENZENE | 29 ug/L |
| TOTAL XYLENES | 71 J ug/L |
| PHENOL | 2 J ug/L |
| NAPHTHALENE | 15 ug/L |

| SW-01 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| ETHYLBENZENE | 140 ug/L | 2 J ug/L |
| TOTAL XYLENES | 50 J ug/L | 37 J ug/L |
| TOLUENE | | 5 J ug/L |
| SEMIVOLATILE ORGANICS | | |
| NAPHTHALENE | | 2 J ug/L |

| 8/2-SB-11 | GROUNDWATER (29-33 ft BGS) |
|---|---|
| ETHYLBENZENE | 76 ug/L |
| TOTAL XYLENES | 180 J ug/L |
| NAPHTHALENE | 44 ug/L |

| MW-02 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| ETHYLBENZENE | ND | 10 J ug/L |
| TOTAL XYLENES | ND | 44 J ug/L |
| TOLUENE | 1 J ug/L | 13 ug/L |
| 1,1,1-TRICHLOROETHANE | 1 J ug/L | |
| SEMIVOLATILE ORGANICS | | |
| NAPHTHALENE | | 3 J ug/L |

| MW-03 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| 1,2-DICHLOROETHENE | ND | 2 J ug/L |
| ETHYLBENZENE | 72 ug/L | 440 J ug/L |
| TOTAL XYLENES | 570 J ug/L | 2100 J ug/L |
| TOLUENE | 230 ug/L | 970 ug/L |
| 1,1,1-TRICHLOROETHANE | 14 J ug/L | |
| BENZENE | | 27 ug/L |
| TRICHLOROETHENE | | 1 J ug/L |
| SEMIVOLATILE ORGANICS | | |
| NAPHTHALENE | 28 ug/L | 110 ug/L |

| SW-02 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| ETHYLBENZENE | | 60 ug/L |
| TOTAL XYLENES | 30 ug/L | 9 ug/L |
| TOLUENE | | 2 J ug/L |
| BENZENE | | 2 J ug/L |

| SDW-006 | GROUNDWATER |
|---|---|
| ROUND 1 | ROUND 2 |
| ND | ND |

| SW-03 | GROUNDWATER |
|---|---|
| VOLATILE ORGANICS | ROUND 2 |
| ETHYLBENZENE | 1 J ug/L |
| TOTAL XYLENES | 4 J ug/L |
| TOLUENE | 1 J ug/L |

| SDW-005 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| 1,2-DICHLOROETHENE | 15 J ug/L | 6 J ug/kg |
| TETRACHLOROETHENE | 11 ug/L | |
| SEMIVOLATILE ORGANICS | | |
| 1,3-DICHLOROBENZENE | 18 ug/L | 7 J ug/L |
| 1,4-DICHLOROBENZENE | 17 ug/L | 6 J ug/L |
| 1,2-DICHLOROBENZENE | 32 ug/L | 7 J ug/L |

| PZ-02 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| ETHYLBENZENE | | 5 J ug/L |
| TOTAL XYLENES | | 31 J ug/L |
| TOLUENE | 1 J ug/L | 2 J ug/L |

## LEGEND

- 8/2-SB-01 ▲ DIRECT PUSH LOCATION EXCEEDING ACTION LEVELS FOR SUBSURFACE SOILS
- 8/2-SB-03 ■ DIRECT PUSH LOCATION EXCEEDING ACTION LEVELS FOR GROUNDWATER
- 8/2-SB-02 ○ DIRECT PUSH LOCATION WITH NO DETECTED EXCEEDENCES
- → APPROXIMATE GROUNDWATER FLOW DIRECTION (12/94)
- APPROXIMATE EXTENT OF BAUMAN BUS PLUME
- ● DIRECT PUSH BORING
- MONITORING WELL
- ○ CESSPOOL
- □ SEPTIC TANK
- A.L. ACTION LEVEL
- ND NOT DETECTED
- BGS BELOW GROUND SURFACE
- J ESTIMATED VALUE

NOTES:

1. RESULTS FOR INORGANIC COMPOUNDS IN SOIL COMPARED TO BACKGROUND CONCENTRATIONS (ABB-ES 1997).
2. GROUNDWATER RESULTS COMPARED TO FEDERAL AND NEW YORK STATE DRINKING WATER STANDARDS.
3. RESULTS FOR ORGANIC COMPOUNDS IN SOIL COMPARED TO NYSDEC GUIDANCE LEVELS (ABB-ES 1997).
4. (1) 20-22 FT BGS
   (2) 20-22 FT BGS/27-29 FT BGS
   (3) 32-34 FT BGS
   (4) 31-33 FT BGS

0 50 100
SCALE IN FEET

SOURCES: S&W 1999, VOLUME I & ADAPTED FROM ABB-ES, 1997

PEER
PROJ./003005-011
GAB3005-011/Final WP/FIG 3.5

SITE 8 - CELL 2 1998 GROUNDWATER MONITORING RESULTS
106th RESCUE WING, NEW YORK AIR NATIONAL GUARD
FRANCIS S. GABRESKI AIRPORT
WESTHAMPTON BEACH, NEW YORK

FIGURE 3.5

**Table 3.7**
**Site 8 – Cell 4 - Shallow Surface Soil Contamination - 1998 RI**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Sample | Action Levels | | 8/4-SB-01 |
|---|---|---|---|
| Depth (BGS) | Saturated | Unsaturated | 0 - 3 in. |
| Semivolatile Organic Compounds (µg/kg) | | | |
| Pyrene | 6,650 | 50,000 | 210 J |

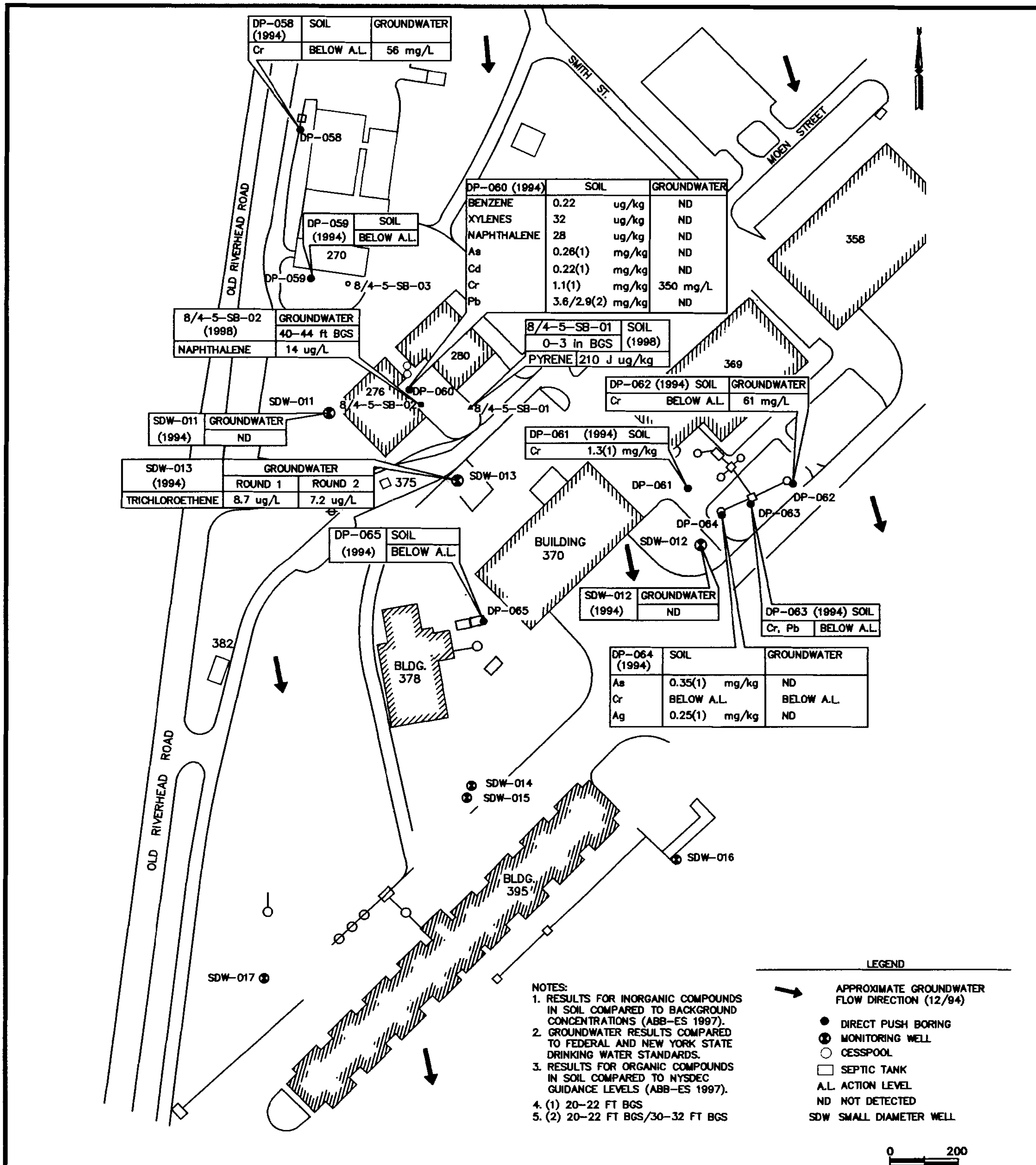
Source: Revised Draft Remedial Investigation, Sites 4, 5, 8, and 9, S&W 1999, Volume II, Appendix C.
BGS Below ground surface.
J Estimated value.

Note: Action levels from ABB-ES 1997, and NYS-TAGM #4046.

**Table 3.8**
**Site 8 - Cell 4 - Direct-Push Groundwater Contamination - 1998 RI**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Sample | Action Levels | | 8/4-SB-02 |
|---|---|---|---|
| Depth (BGS) | NYS | MCL | 40 - 44 ft BGS |
| Semivolatile Organic Compounds (µg/kg) | | | |
| Naphthalene | 10 | NA | **14** |

Source: Revised Draft Remedial Investigation, Sites 4, 5, 8, and 9, S&W 1999, Volume II, Appendix C.
BGS Below ground surface.
MCL US EPA maximum contaminant level.
NYS New York State, TAGM #4049.
Notes: 1. Action levels from ABB-ES 1997, and NYS TAGM #4046.
2. Bolding and shading indicate exceedance of action levels.




SOURCE: PEER 2003

| PEER | SITE 8 – CELL 4 1994 AND 1998 DIRECT PUSH SOIL AND GROUNDWATER RESULTS<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 3.6 |
|---|---|---|
| PROJ./3005-011<br>GAB 3005/Final WP/FIG 3.6 | | |

### 3.3.1.6 2000-2001 Remedial Investigation

The RI was completed at the base from 2000 to 2001. During the 2000 – 2001 RI, direct-push soil borings were performed, surface and subsurface soil samples were collected, groundwater-screening samples were collected, new monitoring wells were installed, and new and existing monitoring wells were sampled. ERP Sites 1, 2, 3, 10, 11, and 12 were investigated in the area of the base included within Site 8. Each of the sites was investigated by direct-push soil and groundwater sampling, by installation of new monitoring wells, and collection of two rounds of groundwater monitoring samples. Sites 2, 3, and 11 also included sampling from preexisting monitoring wells. In addition, a round of basewide ground water samples was collected during Round 2 activities, and two rounds of samples were collected from two wells considered to represent a background location. Table 3.9 summarizes the on-base portions of the 2000 – 2001 RI which occurred within the areas of Site 8 – Cells 1 through 5.

**Site 8 – Cell 1**

Four pre-existing, small-diameter (SDW) monitoring wells were sampled within Cell 4 during the 2000 – 2001 RI. Wells SDW-001, SDW-002, and SDW-018 were sampled once during the Round 2 basewide groundwater monitoring event, while SDW-004 was sampled during both Rounds 1 and 2 as part of the investigation of Site 3. No COPCs were identified in any of these wells.

**Site 8 - Cell 2**

A total of 6 monitoring wells were sampled within Site 8 – Cell 2 during the 2000 – 2001 RI. Five were pre-existing monitoring wells and one was newly installed for use in the investigation of Site 11. Monitoring wells SDW-005, SDW-006, and SW-01 were sampled during the Round 2 basewide groundwater monitoring. Monitoring wells SDW-019 and SDW-020 were sampled during Rounds 1 and 2 to collect background data.

**Table 3.9**
**Summary of 2000 – 2001 Remedial Investigation Activities**
**In The Area of Site 8**
**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Site 8 Cell No. | ERP Site ID or RI Activities | Monitoring Wells Sampled | Sampling Round(s) |
|---|---|---|---|
| Cell 1 | Basewide Sampling | SDW-001<br>SDW-002<br>SDW-018 | 2 |
| | Part of Site 3 | SDW-004 | 1 and 2 |
| Cell 2 | Site 11 | S11-MW01 | 1 and 2 |
| | Basewide Sampling | SDW-005<br>SDW-006<br>SW-01 | 2 |
| | Background | SDW-019<br>SDW-020 | 1 and 2 |
| Cell 3 | Site 1 | S1-MW01<br>S1-MW02 | 1 and 2 |
| | Site 2 | S2-MW01<br>S2-MW02<br>SDW-007<br>SDW-008<br>SDW-010<br>SW-04 | 1 and 2 |
| | Basewide Sampling | PZ-02<br>PZ-03 | 2 |
| Cell 4 | Most of Site 3 | S3-MW01 | 1 and 2 |
| | Site 10 | S10-MW01<br>S10-MW02 | 1 and 2 |
| | Site 12 | S12-MW01<br>S12-MW02 | 1 and 2 |
| | Basewide Sampling | SDW-011<br>SDW-013 | 2 |
| Cell 5 | Basewide Sampling (Site 5) | SDW-014<br>SDW-015<br>SDW-017<br>PZ-03<br>PZ-06 | 2 |

Monitoring well S11-MW01 was installed and sampled in Rounds 1 and 2 as part of the investigation of Site 11, the Trench Drain Sump. This site is located within the boundaries of Site 8 – Cell 2. Given its proximity to the Bauman Bus Plume, and its location within Site 8 – Cell 2, a summary of the investigation results at Site 11 are presented herein.

During the investigation of Site 11, three direct-push borings and one hollow stem auger boring were conducted, with collection of 14 soil samples and 2 groundwater screening samples, and one new monitoring well (S11-MW01) was installed and sampled. Table 3.10 summarizes the results of the direct-push groundwater screening samples collected at Site 11. 1,2-Dichlorobenzene (1,2-DCB)was detected in the direct-push groundwater screening sample from S11-DP02 at an estimated value of 5 J µg/L, which is above the NYSDEC action level, but below the MCL. The detection of 1,2-DCB was not confirmed by the monitoring well groundwater samples collected at Site 11, and it was not considered as a COPC. Tables 3.11 and 3.12 respectively summarize the results of the organics and metals analyses for the direct-push and hollow stem auger soil boring samples collected at Site 11 within the boundaries of Site 8 – Cell 2.

**Table 3.10**
**Site 11 - Direct-Push Groundwater Analytical Results**
**Volatile and Semivolatile Organic Compounds**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | Action Levels | | Sample ID (a) (depth BGS) | |
|---|---|---|---|---|
| | NYS (b) | MCL (c) | PW02-01 (34-38 ft) | PW03-01 (34-38 ft) |
| **Volatile Organic Compounds (µg/L)** | | | | |
| Carbon Disulfide | 50 | -- | 0.2 J | ND |
| **Semivolatile Organic Compounds (µg/L)** | | | | |
| 1,2-Dichlorobenzene | 4.7 | 600 | 5 J | ND |
| 1,3-Dichlorobenzene | 5 | 600 | 2 J | ND |
| 1,4-Dichlorobenzene | 5 | 75 | 2 J | ND |

Notes:
J Estimated value.
ND Not detected.
-- No applicable Action Level.
Shading and bolding indicate exceedance of Action Levels.
(a) Location "PW0X-0X" refers to sample number collected at location PW0X, at depth specified in ft BGS; PW01-01 is the first direct-push sample collected from location PW01 at a depth of 34-38 ft BGS
(b) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
(c) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.

# Table 3.11
## Site 11 - Soil Sample Analytical Results
## Volatile and Semivolatile Organic Compounds
## 106th Rescue Wing
## New York Air National Guard
## Westhampton Beach, New York

| Parameter | Action Levels (c) | | Sample ID(a), Depth, and Type(b) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Saturated(d) | Unsaturated(e) | DP01-01 (1-3 ft) -U | DP01-02 (13-15 ft) -U | DP01-03 (17-19 ft) -U | DP02-01 (0-2 ft) -U | DP02-02 (12-14 ft) -U | DP02-21 (12-14 ft) -U | DP02-03 (32-36 ft) -S |
| **Volatile Organic Compounds (µg/kg)** | | | | | | | | | |
| Ethylbenzene | 55 | 5500 | ND | ND | ND | ND | ND | 1 J | ND |
| Toluene | 15 | 1500 | 1 J | 1 J | ND | 3 J | 1 J | 3 J | ND |
| Total Xylenes | 12 | 1200 | ND | ND | ND | 2 J | 1 J | 5 J | 1 J |
| **Semivolatile Organic Compounds (µg/kg)** | | | | | | | | | |
| Benzo(a)anthracene | 330 | 330 | ND | ND | ND | ND | ND | ND | ND |
| Benzo(b)fluoranthene | 330 | 1100 | ND | ND | ND | ND | ND | 20 J | ND |
| Benzo(k)fluoranthene | 330 | 1100 | ND | ND | ND | 7 J | ND | 7 J | ND |
| Benzo(ghi)perylene | 8000 | 50,000 | ND | ND | ND | ND | ND | ND | ND |
| Benzo(a)pyrene | 330 | 330 | ND | ND | ND | 13 J | ND | 13 J | ND |
| Chrysene | 330 | 400 | 18 J | ND | ND | ND | ND | ND | ND |
| Fluoranthene | 19,000 | 50,000 | 23 J | ND | ND | ND | ND | ND | ND |
| Ideno(1,2,3-cd)pyrene | 330 | 3200 | ND | ND | ND | ND | ND | ND | ND |
| Phenanthrene | 22,000 | 50,000 | ND | ND | ND | ND | ND | ND | ND |
| Pyrene | 6650 | 50,000 | 34 J | ND | ND | ND | ND | ND | ND |
| **TPH-GRO (mg/kg)** | -- | -- | NA | 0.47 J | NA | NA | NA | NA | NA |
| **TPH-DRO (mg/kg)** | -- | -- | NA | ND | NA | NA | NA | NA | NA |
| **PCBs(f) (µg/kg)** | 1000 (Surface) | 10,000 (Subsurface) | ND | ND | ND | NA | NA | NA | NA |

B Analyte is also found in associated blank.
J Estimated value.
NA Not analyzed.
ND Not detected.
PCBs Polychlorinated biphenyls.
TPH-DRO Total petroleum hydrocarbons – diesel range organics.
TPH-GRO Total petroleum hydrocarbons – gasoline range organics.
-- No applicable Action Level.

Shading and bolding indicate exceedance of Action Levels.

Notes:
(a) Location "DP0X-0X" refers to sample number collected at location DP0X, at depth specified in ft BGS; DP02-03 is the third direct-push sample collected from location DP02 at a depth of 8-12 ft BGS.
(b) Type: S = Saturated; U = Unsaturated.
(c) Recommended Soil Cleanup Objectives, NYSDEC, TAGM #4046.
(d) Soil in direct contact with groundwater.
(e) Greater than 5 ft above the water table
(f) Recommended Cleanup Objectives for PCBs for Surface and Subsurface soils, NYSDEC, TAGM #4046.

**Table 3.11 (Continued)**
**Site 11 - Soil Sample Analytical Results**
**Volatile and Semivolatile Organic Compounds**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | Action Levels (c) | | Sample ID(a), Depth, and Type(b) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Saturated(d) | Unsaturated(e) | DP03-01 (0-2 ft) -U | DP03-02 (12-14 ft) -U | DP03-03 (32-34 ft) -S | SB01-01 (0-2 ft) -U | SB01-02 (8-10 ft) -U | SB01-03 (14-16 ft) -U | SB01-04 (32-34 ft) -S |
| **Volatile Organic Compounds (µg/kg)** | | | | | | | | | |
| Ethylbenzene | 55 | 5500 | ND | ND | ND | ND | ND | ND | ND |
| Toluene | 15 | 1500 | ND | ND | ND | ND | ND | 1 BJ | ND |
| Total Xylenes | 12 | 1200 | ND | ND | ND | ND | ND | ND | ND |
| **Semivolatile Organic Compounds (µg/kg)** | | | | | | | | | |
| Benzo(a)anthracene | 330 | 330 | **420 J** | ND | ND | ND | ND | ND | ND |
| Benzo(b)fluoranthene | 330 | 1100 | 530 J | ND | ND | ND | ND | ND | ND |
| Benzo(k)fluoranthene | 330 | 1100 | 280 J | ND | ND | ND | ND | ND | ND |
| Benzo(ghi)perylene | 8000 | 50,000 | 180 J | ND | ND | ND | ND | ND | ND |
| Benzo(a)pyrene | 330 | 330 | 310 J | ND | ND | ND | ND | ND | ND |
| Chrysene | 330 | 400 | **480 J** | ND | ND | ND | ND | ND | ND |
| Fluoranthene | 19,000 | 50,000 | 740 J | ND | ND | ND | ND | ND | ND |
| Ideno(1,2,3-cd)pyrene | 330 | 3200 | 170 J | ND | ND | ND | ND | ND | ND |
| Phenanthrene | 22,000 | 50,000 | 410 J | ND | ND | ND | ND | ND | ND |
| Pyrene | 6650 | 50,000 | 720 J | ND | ND | ND | ND | ND | ND |
| **TPH-GRO (mg/kg)** | -- | -- | NA | NA | NA | NA | NA | NA | NA |
| **TPH-DRO (mg/kg)** | -- | -- | NA | NA | NA | NA | NA | NA | NA |
| **PCBs(f) (µg/kg)** | 1000 (Surface) | 10,000 (Subsurface) | NA | NA | NA | NA | NA | NA | NA |

B — Analyte is also found in associated blank.
J — Estimated value.
NA — Not analyzed.
ND — Not detected.
PCBs — Polychlorinated biphenyls.
TPH-DRO — Total petroleum hydrocarbons - diesel range organics.
TPH-GRO — Total petroleum hydrocarbons - gasoline range organics.
-- — No applicable Action Level.
Shading and bolding indicate exceedance of Action Levels.

Notes:
(a) Location "DP0X-0X" refers to sample number collected at location DP0X, at depth specified in ft BGS.
(b) Type: S = Saturated; U = Unsaturated.
(c) Recommended Soil Cleanup Objectives, NYSDEC, TAGM #4046.
(d) Soil in direct contact with groundwater.
(e) Greater than 5 ft above the water table
(f) Recommended Cleanup Objectives for PCBs for Surface and Subsurface soils, NYSDEC, TAGM #4046.

# Table 3.12
## Site 11 - Soil Sample Analytical Results Metals
## 106th Rescue Wing
## New York Air National Guard
## Westhampton Beach, New York

| Parameter | Action Levels | | Sample ID and Depth [a] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NYSDEC [b] RSCO | BKG [c] or ULBC [d] | DP01-01 (1-3 ft) | DP01-02 (13-15 ft) | DP01-03 (17-19 ft) | DP02-01 (0-2 ft) | DP02-02 (12-14 ft) | DP02-21 (12-14 ft) | DP02-03 (32-36 ft) |
| **Metals (mg/kg)** | | | | | | | | | |
| Aluminum | SB | 33,000 | 1600 E | 1100 E | 3000 E | 2500 | 2400 | 2600 | 350 |
| Barium | 300 or SB | 15 – 600 | 3.1 | 3.8 | 2.4 | 11 | 5.0 | 9.9 | 1.6 |
| Calcium | SB | 130 – 35,000 | 140 | 200 | ND | 12,000 | 650 | 10,000 | ND |
| Chromium | 10 or SB | 6.1/0.84 [d] | 2.3 | **3.5** | **3.4** | 5.5 | **4.3** | 4.8 | ND |
| Copper | 25 or SB | 1 – 50 | ND | 2.3 | ND | 6.3 | 2.4 | 5.0 | ND |
| Iron | 2000 or SB | 2000 – 550,000 | 1800 E | 1300 E | 2200 E | 4500 E | 2600 E | 4400 E | 630 E |
| Lead | SB [e] | 4.4/2.7 [d, e] | ND | ND | ND | ND | ND | ND | ND |
| Magnesium | SB | 100 – 5000 | 120 | 81 | 68 | 540 | 170 | 460 | 63 |
| Manganese | SB | 50 – 5000 | 15 | 11 | 6.8 | 47 | 19 | 47 | 3.6 |
| Nickel | 13 or SB | 0.5 – 25 | ND | ND | ND | ND | ND | ND | ND |
| Sodium | SB | 6000 – 8000 | ND | ND | ND | 130 | 110 | 110 | ND |
| Vanadium | 150 or SB | 1 – 300 | 3.3 | 2.2 | 3.7 | 5.8 | 4.9 | 5.7 | 2.5 |
| Zinc | 20 or SB | 9 – 50 | 4.0 | 11 | 3.7 | 8.2 | 5.6 | 7.7 | 1.9 |

| Parameter | Action Levels | | Sample ID Depth [a] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NYSDEC [b] RSCO | BKG (c) or ULBC (d) | DP03-01 (0-2 ft) | DP03-02 (12-14 ft) | DP03-03 (32-34 ft) | SB01-01 (0-2 ft) | SB01-02 (8-10 ft) | SB01-03 (14-16 ft) | SB01-04 (32-34 ft) |
| **Metals (mg/kg)** | | | | | | | | | |
| Aluminum | SB | 33,000 | 1800 | 2000 | 270 | 1500 E | 4300 E | 3400 E | 250 E |
| Barium | 300 or SB | 15 - 600 | 5.0 | 6.0 | ND | 3.7 N | 7.4 N | 7.8 N | ND N |
| Calcium | SB | 130 - 35,000 | 950 | 230 | ND | 250 N | 190 N | 320 N | ND N |
| Chromium | 10 or SB | 6.1/0.84 [d] | 2.4 | **2.7** | ND | 2.9 N | 5.7 N | 5.9 N | ND N |
| Copper | 25 or SB | 1 - 50 | 3.3 | 2.9 | ND | 3.1 N | 2.5 N | 4.6 N | ND N |
| Iron | 2000 or SB | 2000 - 550,000 | 1800 | 1700 | 380 | 2300 E | 3800 E | 4100 E | 490 E |
| Lead | SB [e] | 4.4/2.7 [d, e] | **6.1** | **7.3** | ND | ND N | ND N | **14 N** | ND N |
| Magnesium | SB | 100 - 5000 | 170 | 105 | 44 | 310 NE | 210 N | 920 E | 53 NE |
| Manganese | SB | 50 - 5000 | 22 | 24 | 2.4 | 22 N | 14 N | 34 N | 5.4 N |
| Nickel | 13 or SB | 0.5 - 25 | ND | ND | ND | ND | ND | 4.0 | ND |
| Sodium | SB | 6000 - 8000 | ND | ND | ND | ND | 130 | ND | ND |
| Vanadium | 150 or SB | 1 - 300 | 3.7 | 3.7 | 1.4 | 5.2 | 7.3 | 8.6 | 1.4 |
| Zinc | 20 or SB | 9 - 50 | 6.2 | 91 | 1.8 | 6.1 NE | 60 NE | 110 NE | 2.8 NE |

E Estimated value or not reported due to the presence of interferences.
N Spike sample recovery is not within quality control limits.
NA Not analyzed.
ND Not detected.
SB Soil background.
Shading and bolding indicate exceedance of Action Levels.
Notes:
(a) Location "DP0X-0X" refers to sample number collected at location DP0X, at depth specified in ft BGS.
(b) New York State (NYS) Recommended Soil Cleanup Objectives, NYSDEC, TAGM #4046.
(c) Eastern USA Background, NYSDEC, TAGM #4046.
(d) Upper limits of background concentration for surface/subsurface metals in soils; see Section 6.0.
(e) Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4 to 61 ppm (mg/kg). Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200 to 500 ppm (mg/kg) (TAGM 4046).

A total of five groundwater-monitoring samples, three in Round 1 and two in Round 2, were collected from newly installed monitoring well S11-MW01, and analyzed for:

- volatile and semivolatile organic compounds;
- remediation parameters, including BTEX, TPH-GRO and DRO, methane, alkalinity, chloride, and sulfate, and
- TAL metals.

No volatile or semivolatile organic compounds were detected above NYSDEC action levels in the groundwater monitoring samples collected from S11-MW01. BTEX and TPH-GRO were not detected in any of the samples from S11MW01 during either round. TPH-DRO was detected at 0.73 mg/L in Round 1, and at 0.21 J in Round 2.

The TAL metal lead was detected in the initial groundwater sample collected at S11-MW01, which was one of five samples collected from S11-MW01. The detected concentration of 17 μg/L was above the MCL, but did not exceed the NYSDEC action level. Lead was not detected in any of the subsequent samples at S11-MW01. Since the initial detection was unconfirmed by the subsequent samples, lead was not considered to be a COPC in groundwater at Site 11.

In addition to the investigation of Site 11, three pre-existing monitoring wells located within Site 8 – Cell 2 were sampled during the Round 2 basewide sampling event, including SDW-005, SDW-006, and SW-01. Only SW-01 had a detection of an analyte that exceeded action limits, which was chromium at 71 μg/L. Chromium was determined during the 2000 - 2001 RI to be naturally occurring in soil and groundwater at the base, and is not considered a COPC. Tables 3.13 and 3.14 summarize the analytical results from the monitoring wells sampled during the 2000 – 2001 RI within Site 8 – Cell 2, including S11-MW01. Figure 3.7 shows the locations of the monitoring wells sampled, with the corresponding analytical results, and includes metals exceedances for soil samples.

**Table 3.13**
**Site 8 – Cell 2**
**2000 – 2001 Remedial Investigation**
**Rounds 1 & 2 Groundwater Monitoring - Organics**
**106th Rescue Wing New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Monitoring Well Sample Location (a) | NYS (b) | MCL (c) | SDW-005-02 | SDW-005-22 Dup | SDW-006-02 | SDW-019-01 | SDW-019-02 | SDW-020-01 | SDW-020-02 |
|---|---|---|---|---|---|---|---|---|---|
| **BTEX (µg/L)** | | | | | | | | | |
| Toluene | 5 | 1000 | NA | NA | NA | ND | ND | ND | ND |
| m/p-Xylenes | 5 | 10,000 | NA | NA | NA | ND | ND | ND | ND |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | |
| Carbon Disulfide | 50 | -- | ND | ND | ND | ND | ND | 13 | ND |
| Chloroform | 7 | 80 | ND | ND | ND | ND | ND | ND | ND |
| Tetrachloroethene | 5 | 5 | 0.4 J | 0.4 J | ND | 1B | ND | 0.7 J | ND |
| Toluene | 5 | 1000 | ND | ND | ND | 0.4 BJ | ND | 0.6 BJ | ND |
| 1,1,1-Trichloroethane | 5 | 200 | 0.5 J | 0.5 J | ND | ND | ND | ND | ND |
| Trichloroethene | 5 | 5 | ND | ND | ND | ND | ND | ND | ND |
| Total Xylenes | 5 | 10,000 | ND | ND | ND | ND | ND | ND | ND |
| **Semivolatile Organic Compounds (µg/L)** | | | | | | | | | |
| 1,2-Dichlorobenzene | 4.7 | 75 | 0.5 J | ND | ND | ND | ND | ND | ND |
| 1,4-Dichlorobenzene | 4.7 | 75 | ND | ND | ND | ND | ND | ND | ND |
| Diethyl Phthalate | 50 (d) | -- | ND | ND | ND | ND | ND | ND | ND |
| Di-n-octyl phthalate | 50 (d) | -- | ND | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trichlorobenzene | 50 (e) | 70 | ND | ND | ND | ND | ND | ND | ND |
| **TPH-GRO (µg/L)** | -- | -- | NA | NA | NA | ND | ND | ND | ND |
| **TPH-DRO (mg/L)** | -- | -- | NA | NA | NA | ND | ND | ND | ND |

Notes:
B Analyte is also detected in method blank.
BTEX Benzene, toluene, ethylbenzene, and xylenes.
Dup Duplicate.
J Estimated value.
NA Not analyzed.
ND Not detected.
TPH-DRO Total petroleum hydrocarbons - diesel range organics.
TPH-GRO Total petroleum hydrocarbons - gasoline range organics.
-- No applicable action level.
Shading and bolding indicate exceedance of action levels.

(a) "SDW" refers to small-diameter well; "SW" refers to Stone & Webster well; "MW" refers to monitoring well; "-01" refers to Round 1 sampling, February - March 2001; "-02" refers to Round 2 sampling, May - June 2001; "R" refers to replicate sample collected at top of well screen.
(b) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
(c) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.
(d) Guidance value.
(e) Compound is a Principal Organic Compound (POC). Under New York State Drinking Water Standards, a general standard of 5 µg/L applies to all POCs unless a more stringent compound specific standard has been set (ABB-ES 1994).

**Table 3.13 (Continued)**
**Site 8 – Cell 2**
**2000 – 2001 Remedial Investigation**
**Rounds 1 & 2 Groundwater Monitoring - Organics**
**106th Rescue Wing New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

| Monitoring Well Sample Location (a) | NYS (b) | MCL (c) | S11MW-01-01 | S11MW-01-01R | S11MW-01-01R Dup | S11MW-01-02 | S11MW-01-02 Dup | SW-01-02 | PZ-02-02(f) |
|---|---|---|---|---|---|---|---|---|---|
| **BTEX (µg/L)** | | | | | | | | | |
| Toluene | 5 | 1000 | ND | NA | NA | ND | NA | NA | NA |
| m/p-Xylenes | 5 | 10,000 | ND | NA | NA | ND | NA | NA | NA |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | |
| Carbon Disulfide | 50 | -- | 2 | 0.2 J | 0.4 J | ND | ND | ND | ND |
| Chloroform | 7 | 80 | ND | ND | ND | ND | ND | 0.9 J | ND |
| Tetrachloroethene | 5 | 5 | ND | ND | ND | ND | ND | 3.0 | ND |
| Toluene | 5 | 1000 | ND | ND | ND | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 5 | 200 | ND | ND | ND | ND | ND | ND | ND |
| Trichloroethene | 5 | 5 | ND | ND | ND | ND | ND | ND | ND |
| Total Xylenes | 5 | 10,000 | ND | ND | ND | ND | ND | 1.0 J | ND |
| **Semivolatile Organic Compounds (µg/L)** | | | | | | | | | |
| 1,4-Dichlorobenzene | 4.7 | 75 | ND | ND | ND | ND | ND | ND | ND |
| Diethyl Phthalate | 50 (d) | -- | ND | ND | ND | ND | ND | ND | ND |
| Di-n-octyl phthalate | 50 (d) | -- | ND | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trichlorobenzene | 50 (e) | 70 | ND | ND | ND | ND | ND | ND | ND |
| **TPH-GRO (µg/L)** | -- | -- | ND | NA | NA | ND | NA | NA | NA |
| **TPH-DRO (mg/L)** | -- | -- | ND | NA | NA | ND | NA | NA | NA |

Notes:
B Analyte is also detected in method blank.
BTEX Benzene, toluene, ethylbenzene, and xylenes.
Dup Duplicate.
J Estimated value.
NA Not analyzed.
ND Not detected.
TPH-DRO Total petroleum hydrocarbons - diesel range organics.
TPH-GRO Total petroleum hydrocarbons - gasoline range organics.
-- No applicable action level.
Shading and bolding indicate exceedance of action levels.

(a) "SDW" refers to small-diameter well; "SW" refers to Stone & Webster well; "MW" refers to monitoring well; "-01" refers to Round 1 sampling, February - March 2001; "-02" refers to Round 2 sampling, May - June 2001; "R" refers to replicate sample collected at top of well screen.
(b) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
(c) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.
(d) Guidance value.
(e) Compound is a Principal Organic Compound (POC). Under New York State Drinking Water Standards, a general standard of 5 µg/L applies to all POCs unless a more stringent compound specific standard has been set (ABB-ES 1994).
(f) PZ-02 is located in Cell 3, but is included herein since it is associated with the Bauman Bus Plume.

**Table 3.14**
**Site 8 - Cell 2**
**2000 – 2001 Remedial Investigation**
**Rounds 1 & 2 Groundwater Monitoring - Metals**
**106th Rescue Wing New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

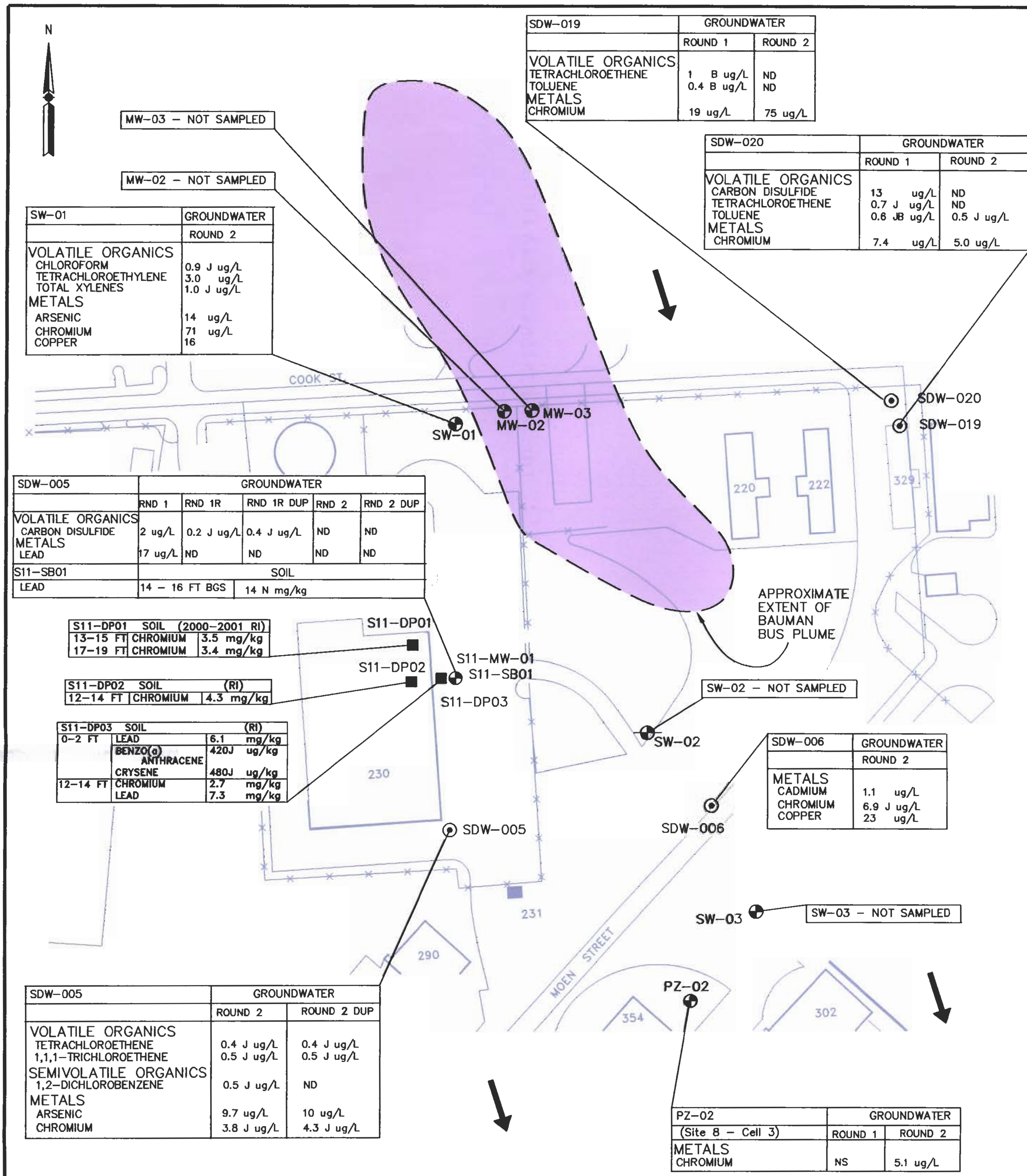
| Monitoring Well Sample Location (a) | NYS (b) | MCL (c) | SDW-005-02 | SDW-005-22 DUP | SDW-006-02 | SDW-019-01 | SDW-019-02 | SDW-020-01 | SDW-020-02 |
|---|---|---|---|---|---|---|---|---|---|
| **Metals (µg/L)** | | | | | | | | | |
| Arsenic | 25 | 50 (d) | 9.7 | 10 | ND | ND | ND | ND | ND |
| Cadmium | 10 | 5.0 | ND | ND | 1.1 | ND | ND | ND | ND |
| Chromium | 50 | 100 | 3.8 | 4.3 | 6.9 | 19 | **75** | 7.4 | 5.0 |
| Copper | -- | 1300 (e) | ND | 13 | 23 | ND | ND | ND | ND |
| Lead | 25 | 15 (e) | ND | ND | ND | ND | ND | ND | ND |
| Silver | 50 | 100 (f) | ND | ND | ND | ND | ND | ND | ND |

| Parameter | NYS (b) | MCL (c) | S11MW-01-01 | S11MW-01-01R | S1MW01-01R Dup | S11MW-01-02 | S11MW-01-02 Dup | SW-01-02 | PZ-02-02(f) |
|---|---|---|---|---|---|---|---|---|---|
| **Metals (µg/L)** | | | | | | | | | |
| Arsenic | 25 | 50 (d) | 13 | ND | ND | ND | ND | 14 | ND |
| Cadmium | 10 | 5.0 | ND | ND | ND | ND | ND | ND | ND |
| Chromium | 50 | 100 | 22 | 2.8 | 3.8 | 4.4 | 3.6 | **71** | 5.1 |
| Copper | -- | 1300 (e) | 15 | ND | ND | ND | ND | 16 | ND |
| Lead | 25 | 15 (e) | **17** | ND | ND | ND | ND | ND | ND |
| Silver | 50 | 100 (f) | ND | ND | ND | ND | ND | ND | ND |

Notes:
Dup Duplicate sample.
E Estimated value or not reported due to the presence of interferences.
N Spike sample recovery is not within quality control limits.
ND Not detected.
-- No applicable action level.

Shading and bolding indicates exceedance of action level.

(a) "SDW" refers to small-diameter well; "MW" refers to monitoring well; "SW" refers to Stone & Webster well; "R" refers to replicate sample collected at the top of the well screen; "-01" Refers to Round 1 sampling, February - March 2001; "-02" Refers to Round 2 sampling, May - June 2001.
(b) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
(c) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.
(d) Federal MCL is under review.
(e) Treatment Technique Action Level. Federal MCL is concentration in water collected from tap.
(f) Secondary Federal MCL.




| SDW-019 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| TETRACHLOROETHENE | 1 B ug/L | ND |
| TOLUENE | 0.4 B ug/L | ND |
| METALS | | |
| CHROMIUM | 19 ug/L | 75 ug/L |

| SDW-020 | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| VOLATILE ORGANICS | | |
| CARBON DISULFIDE | 13 ug/L | ND |
| TETRACHLOROETHENE | 0.7 J ug/L | ND |
| TOLUENE | 0.6 JB ug/L | 0.5 J ug/L |
| METALS | | |
| CHROMIUM | 7.4 ug/L | 5.0 ug/L |

| SW-01 | GROUNDWATER |
|---|---|
| | ROUND 2 |
| VOLATILE ORGANICS | |
| CHLOROFORM | 0.9 J ug/L |
| TETRACHLOROETHYLENE | 3.0 ug/L |
| TOTAL XYLENES | 1.0 J ug/L |
| METALS | |
| ARSENIC | 14 ug/L |
| CHROMIUM | 71 ug/L |
| COPPER | 16 |

| SDW-005 | GROUNDWATER | | | | |
|---|---|---|---|---|---|
| | RND 1 | RND 1R | RND 1R DUP | RND 2 | RND 2 DUP |
| VOLATILE ORGANICS | | | | | |
| CARBON DISULFIDE | 2 ug/L | 0.2 J ug/L | 0.4 J ug/L | ND | ND |
| METALS | | | | | |
| LEAD | 17 ug/L | ND | ND | ND | ND |
| S11-SB01 | SOIL | | | | |
| LEAD | 14 – 16 FT BGS | 14 N mg/kg | | | |

| S11-DP01 | SOIL | (2000-2001 RI) |
|---|---|---|
| 13-15 FT | CHROMIUM | 3.5 mg/kg |
| 17-19 FT | CHROMIUM | 3.4 mg/kg |

| S11-DP02 | SOIL | (RI) |
|---|---|---|
| 12-14 FT | CHROMIUM | 4.3 mg/kg |

| S11-DP03 | SOIL | (RI) |
|---|---|---|
| 0-2 FT | LEAD | 6.1 mg/kg |
| | BENZO(a) ANTHRACENE | 420J ug/kg |
| | CRYSENE | 480J ug/kg |
| 12-14 FT | CHROMIUM | 2.7 mg/kg |
| | LEAD | 7.3 mg/kg |

| SDW-006 | GROUNDWATER |
|---|---|
| | ROUND 2 |
| METALS | |
| CADMIUM | 1.1 ug/L |
| CHROMIUM | 6.9 J ug/L |
| COPPER | 23 ug/L |

| SDW-005 | GROUNDWATER | |
|---|---|---|
| | ROUND 2 | ROUND 2 DUP |
| VOLATILE ORGANICS | | |
| TETRACHLOROETHENE | 0.4 J ug/L | 0.4 J ug/L |
| 1,1,1-TRICHLOROETHENE | 0.5 J ug/L | 0.5 J ug/L |
| SEMIVOLATILE ORGANICS | | |
| 1,2-DICHLOROBENZENE | 0.5 J ug/L | ND |
| METALS | | |
| ARSENIC | 9.7 ug/L | 10 ug/L |
| CHROMIUM | 3.8 J ug/L | 4.3 J ug/L |

| PZ-02 (Site 8 – Cell 3) | GROUNDWATER | |
|---|---|---|
| | ROUND 1 | ROUND 2 |
| METALS | | |
| CHROMIUM | NS | 5.1 ug/L |

LEGEND

- S11-DP01 ■ DIRECT PUSH SOIL BORING LOCATION
- → APPROXIMATE GROUNDWATER FLOW DIRECTION (12/94)
- APPROXIMATE EXTENT OF BAUMAN BUS PLUME
- SDW-005 ⊙ SMALL DIAMETER WELL
- S11-MW01 ⊕ STANDARD MONITORING WELL
- ND NOT DETECTED
- BGS BELOW GROUND SURFACE
- J ESTIMATED VALUE

NOTES:
1. RESULTS FOR INORGANIC COMPOUNDS IN SOIL COMPARED TO BACKGROUND CONCENTRATIONS (ABB-ES 1997).
2. GROUNDWATER RESULTS COMPARED TO FEDERAL AND NEW YORK STATE DRINKING WATER STANDARDS.
3. RESULTS FOR ORGANIC COMPOUNDS IN SOIL COMPARED TO NYSDEC GUIDANCE LEVELS (ABB-ES 1997).

0 50 100
SCALE IN FEET

SOURCES: S&W 1999
ABB-ES, 1997
PEER 2004

PEER
PROJ./003005-011
GAB3005-011/Final WP/FIG 3.7

SITE 8 – CELL 2 2000-2001 RI SUBSURFACE SOIL AND GROUNDWATER MONITORING RESULTS
106th RESCUE WING, NEW YORK AIR NATIONAL GUARD
FRANCIS S. GABRESKI AIRPORT
WESTHAMPTON BEACH, NEW YORK

FIGURE 3.7

**Site 8 - Cell 3**

A total of nine new and pre-existing monitoring wells were sampled within Cell 3 during the 2000 – 2001 RI. Newly installed monitoring wells were sampled for two rounds at Site 1 (S1-MW01 and S1-MW02) and at Site 2 (S2-MW01 and S2-MW02). A total of four pre-existing wells were also sampled for 2 rounds at Site 2, including SDW-007, SDW-008, SDW-010, and SW-04. Pre-existing monitoring wells PZ-02 and PZ-03 were also sampled at Cell 3, during the Round 2 basewide sampling. None of the groundwater monitoring samples collected at Cell 3 had any analytes detected that exceeded action levels, and no COPCs were identified.

**Site 8 – Cell 4**

A total of seven monitoring wells were sampled within Site 8 – Cell 4. Newly installed monitoring wells were sampled at Site 3 (S3-MW01), Site 10 (S10-MW01 and S10-MW02), and Site 12 (S12MW-01 and S12-MW02). Additionally, pre-existing monitoring wells SDW-011 and SDW-013 were sampled during Round 2. Tables 3.15 and 3.16 summarize the analytical results for organics and metals analyses, and Figure 2.8 shows the locations of the Site 8 – Cell 4 monitoring wells sampled during the 2000 – 2001 RI. Only two wells had detections of analytes that exceeded action levels. SDW-011 had cadmium detected at 26 μg/L, which exceeded both the NYSDEC action level and the MCL. During the risk assessment, cadmium in groundwater was eliminated as a COPC since there was no existing pathway by which potential receptors could be impacted. SDW-013 had a detection of bis(2-ethylhexyl)phthalate (BEHP) at 8.0 J μg/L. BEHP was determined to be due to sample contamination, and was not considered as a COPC. There were no other COPCs identified in Site 8 – Cell 4 groundwater.

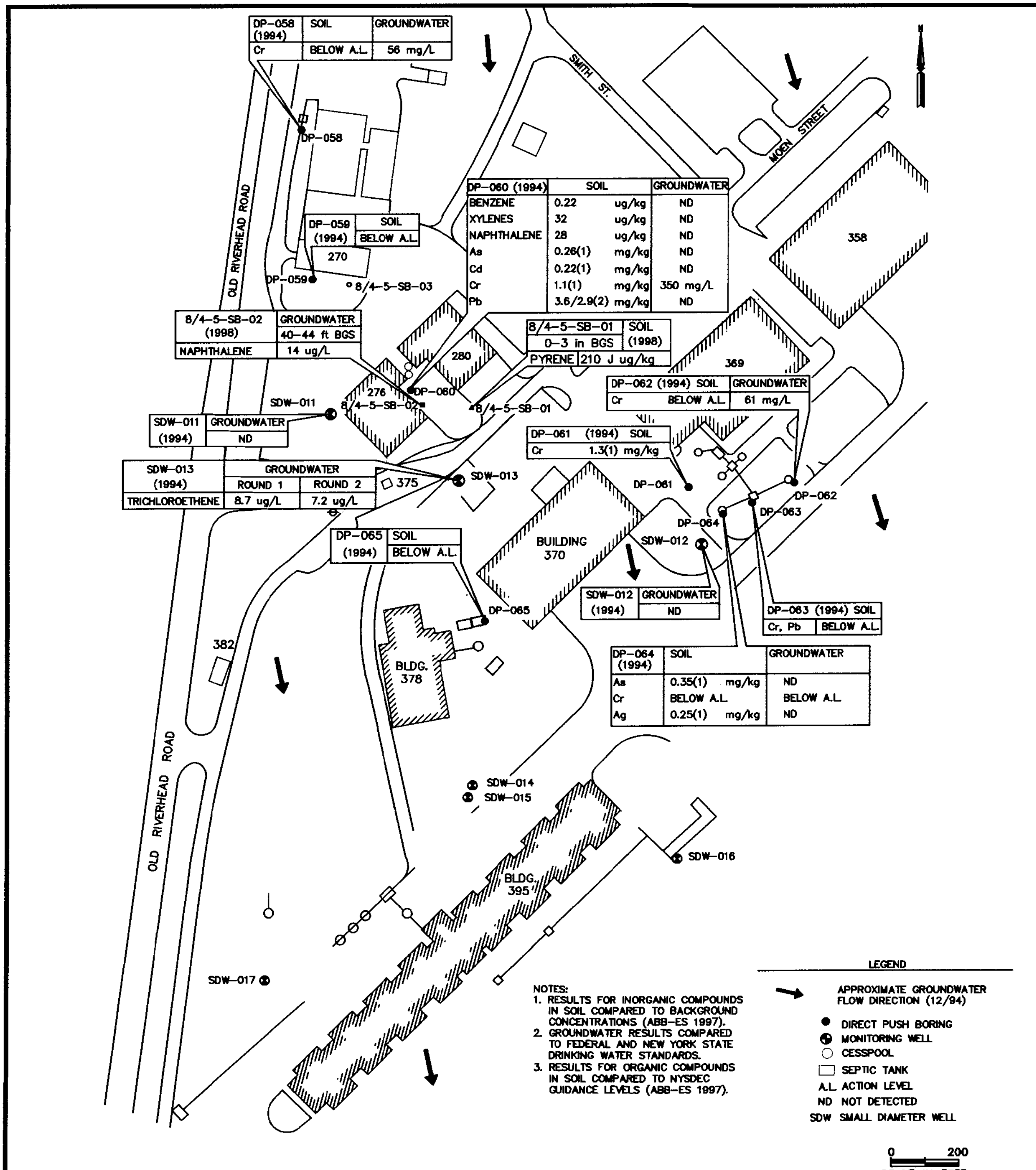
**Site 8 – Cell 5**

A total of five pre-exiting monitoring wells were sampled within Site 8 – Cell 5, during the Round 2 basewide sampling event. These wells included SDW-014, SDW-015, SDW-017, PZ-03, and PZ-06. None of the wells sampled within Site 8 – Cell 5 had any analytes detected that exceeded action levels, and no COPCs were identified.

**Table 3.15 (Continued)**
**Site 8 – Cell 4**
**2000 – 2001 Remedial Investigation**
**Rounds 1 & 2 Groundwater Monitoring - Organics**
**106th Rescue Wing New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

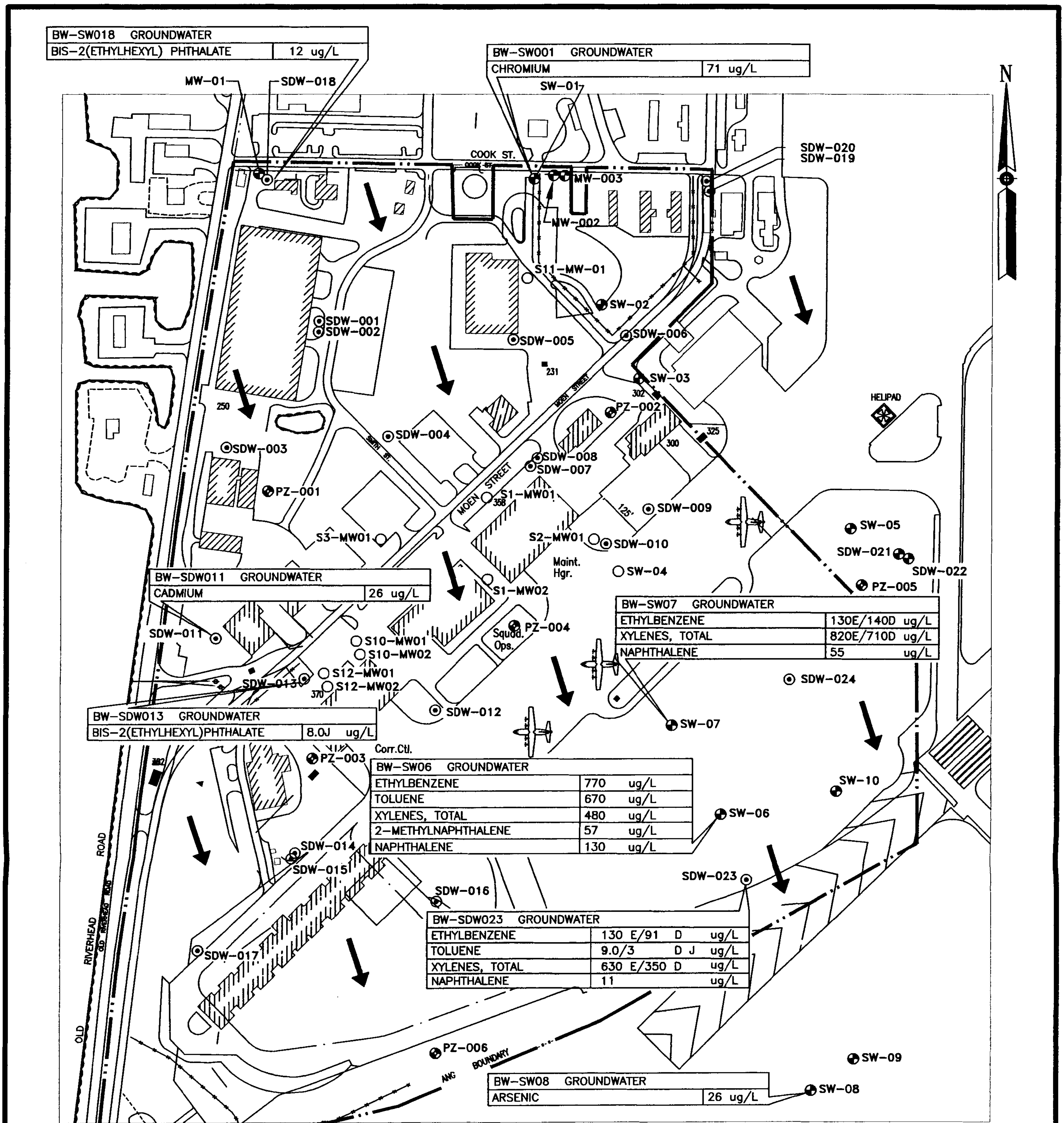
| Monitoring Well Sample Location (a) | NYS (b) | MCL (c) | S10MW-02-02 | S10MW-02-22-Dup | S12-MW01-01 | S12-MW01-21-Dup | S12-MW01-02 | S12-MW02-01 | S12-MW02-02 | S12-MW02-02-Dup |
|---|---|---|---|---|---|---|---|---|---|---|
| **BTEX (µg/L)** | | | | | | | | | | |
| Toluene | 5 | 1000 | NA | NA | ND | ND | ND | NA | NA | NA |
| m/p-Xylenes | 5 | 10,000 | NA | NA | ND | ND | ND | NA | NA | NA |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | | |
| Carbon Disulfide | 50 | -- | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloroform | 7 | 80 | ND | 0.2 J | ND | 0.3 J | ND | ND | ND | 0.6 J |
| Tetrachloroethene | 5 | 5 | ND | ND | ND | ND | ND | ND | ND | ND |
| Toluene | 5 | 1000 | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 5 | 200 | ND | ND | ND | ND | ND | ND | ND | ND |
| Trichloroethene | 5 | 5 | ND | ND | ND | 0.3 J | ND | ND | ND | ND |
| Total Xylenes | 5 | 10,000 | ND | ND | ND | ND | ND | ND | ND | ND |
| **Semivolatile Organic Compounds (µg/L)** | | | | | | | | | | |
| All Analytes | -- | -- | ND | ND | ND | ND | ND | ND | ND | ND |
| **TPH-GRO (µg/L)** | -- | -- | NA | NA | ND | ND | ND | NA | NA | NA |
| **TPH-DRO (mg/L)** | -- | -- | NA | NA | 1.9 | 2.1 | 0.21 J | NA | NA | NA |

Notes:
B Analyte is also detected in method blank.
BTEX Benzene, toluene, ethylbenzene, and xylenes.
Dup Duplicate.
J Estimated value.
NA Not analyzed.
ND Not detected.
TPH-DRO Total petroleum hydrocarbons - diesel range organics.
TPH-GRO Total petroleum hydrocarbons - gasoline range organics.
-- No applicable action level.
Shading and bolding indicate exceedance of action levels.
(a) "SDW" refers to small-diameter well; "SW" refers to Stone & Webster well; "MW" refers to monitoring well; "-01" refers to Round 1 sampling, February - March 2001; "-02" refers to Round 2 sampling, May - June 2001; "R" refers to replicate sample collected at top of well screen.
(b) New York State (NYS), Class GA Groundwater; NYSDEC TAGM #4046.
(c) Maximum Contaminant Level (MCL), United States Environmental Protection Agency.




SOURCE: PEER 2003

| PEER | SITE 8 – CELL 4 2000-2001 RI SUBSURFACE SOIL AND GROUNDWATER MONITORING RESULTS<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 3.8 |
|---|---|---|
| PROJ./3005-011<br>GAB 3005/Final WP/FIG 3.8 | | |




## LEGEND

| | |
|---|---|
| ⊙ | PRE-EXISTING SMALL DIAMETER WELL |
| ● | PRE-EXISTING WELL |
| ● | PRE-EXISTING PIEZOMETER |
| ○ | NEW MONITORING WELL (RI, 2000–2001) |
| → | APPROXIMATE GROUNDWATER FLOW DIRECTION (05/01) |
| D | SECONDARY DILUTION FACTOR |
| E | ESTIMATED VALUE OR NOT REPORTED DUE TO INTERFERENCES |
| J | ESTIMATED CONCENTRATION BELOW DETECTION LIMIT |

0 200 400
SCALE IN FEET

NOTE: WELL LOCATIONS APPROXIMATE

SOURCE: BASE MAP AND ABB-ES, 1997

| | | |
|---|---|---|
| PEER<br>PROJ./003005-011<br>GAB/Final WP/FIG 3.9 | 2000 – 2001 REMEDIAL INVESTIGATION<br>BASEWIDE GROUNDWATER MONITORING<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 3.9 |

**2000 – 2001 RI Summary**

As such, the available data from the 2000 – 2001 RI does not offer any additional characterization of the plume, but does indicate that contaminants exceeding action levels had not migrated to the monitoring wells that were sampled at that time. The specific recommendations of the 2000 – 2001 RI Report for Site 8 are summarized as follows:

- In order to eliminate the potential for the septic system structures to be further sources of contamination to the soil and groundwater, it was recommended that remaining sludge should be removed, and the structures should be abandoned in-place.
- No further action was recommended for surface soils, subsurface soils, or groundwater.
- Pending completion of abandonment of the septic system structures, preparation of a NFRAP DD for Site 8 - Cells 1, 2, 3, 4, and 5 was recommended.

### 3.3.2 Time Critical Removal Action

Based on the recommendations made in the 2000-2001 RI Report, a Time Critical Removal Action (TCRA) was conducted at Site 8. The TCRA was performed in the summer of 2002 (MACTEC 2003). The objectives of the TCRA were to:

- reach attainment of soil cleanup objectives;
- remove solids and liquids from septic system structures;
- minimize the possibility for migration of potential sources of contamination;
- eliminate (as practical) the potential for exposure to contaminated site soils; and
- contain and/or dispose of contaminated soil (including buried debris).

During the TCRA, 23 subsites were remediated including 20 septic tanks, 49 cesspools, and 10 distribution boxes. Approximately 44,000 gallons of water, 158 cubic yards of sludge and 840 cubic yards of construction debris were removed and transported for disposal (MACTEC 2003). The report for the TCRA recommended further groundwater sampling at Subsites 8D and 8QF (MACTEC 2003). The SCDHS requested that a groundwater sample be collected from Subsite

# Table 3.17
# Summary of Site 8 Septic System Remedial Actions
# 106th Rescue Wing
# New York Air National Guard
# Francis S. Gabreski Airport
# Westhampton Beach, New York

| Subsite ID | Septic Tanks | Cesspools | Distribution Boxes | Remedial Action (1) |
|---|---|---|---|---|
| 8A | 0 | 2 | 1 | Abandoned in place |
| 8B | 1 | 1 | 0 | Removed to depth of about 10 ft |
| 8C | 1 | 2 | 0 | Traps removed; 1 cesspool; excavated to 15 ft and abandoned in place |
| 8D | 0 | 2 | 0 | Abandoned in place following further excavation to reach endpoint |
| 8E | 0 | 1 | 0 | Abandoned in place |
| 8F | 1 | 1 | 0 | Abandoned in place |
| 8G | 1 | 2 | 1 | Abandoned in place |
| 8H | 1 | 5 | 2 | Abandoned in place; septic tank left intact due to large size and slurry filled |
| 8I | 1 | 1 | 0 | Abandoned in place |
| 8J | Unknown | Unknown | Unknown | Currently Used for Storm Drainage (2) |
| 8K | 1 | 3 | 0 | Abandoned in place |
| 8L | Unknown | Unknown | Unknown | Structures Abandoned Prior to TCRA |
| 8M | 1 | 1 | 0 | Septic tank previously abandoned; cesspool abandoned in place following additional cleaning and excavation |
| 8N | 1 | 2 | 0 | 1 Septic tank and 1 cesspool assumed previously abandoned; cesspool abandoned in place following additional cleaning and excavation |
| 8O | 1 | 1 | 0 | Abandoned in place |
| 8P | 1 | 2 | 0 | Removed |
| 8QA | 1 | 1 | 0 | Abandoned in place |
| 8QB | 0 | 3 | 0 | Distribution box removed, septic tank and 2 cesspools abandoned in place |
| 8QC | 1 | 1 | 0 | Previously abandoned |
| 8QD | 1 | 1 | 0 | Abandoned in place |
| 8QE | Unknown | Unknown | Unknown | Currently Used for Storm Drainage (2) |
| 8QF | 1 | 4 | 0 | 1 Septic tank and 2 cesspools abandoned in place, 1 cesspool abandoned in place after additional cleaning and excavation |
| 8QG | 0 | 15 | 1 | Septic tanks and cesspools abandoned in place, distribution box removed |
| 8QH (3) | Unknown | Unknown | Unknown | Abandoned in place following cleaning and excavation |
| 8R | 1 | 1 | 0 | Septic tank removed; cesspool abandoned in place |
| 8S | 1 | 2 | 0 | Abandoned in place |
| 8T | 1 | 2 | 0 | Abandoned in place |
| 8U | Unknown | Unknown | Unknown | Structures Currently in Use (2) |

Notes:
1) MACTEC Engineering and Consulting, Inc., 2003.
2) Harding ESE, Inc., 2001.
3) During the TCRA, Subsite 8QH was initially misidentified as Subsite 8QC. The correct subsite designations are used herein.

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# 4.0 ENVIRONMENTAL SETTING

This section discusses the environmental setting in the vicinity of Francis S. Gabreski Airport, which includes the 106th RQW. Specifically, the climate, topography, geology, soils, surface water hydrology, hydrogeology, critical environments, and threatened and endangered species in the surrounding area are briefly discussed in this section.

## 4.1 CLIMATE

The climate of the area surrounding Francis S. Gabreski Airport is humid-continental with a maritime influence characterized by periods of freeze-free temperatures, a reduced range in diurnal and annual temperature, and heavy precipitation in winter relative to that in summer. The winter season lasts about three months with the coolest temperatures generally ranging from 0°F to 10°F (ABB-ES 1997). Average temperatures during the winter months (December through February) range from approximately 26°F to 39°F (S&W 1999). Temperatures 90°F or higher occur on average 4 to 6 days per year during summer (ABB-ES 1997). Average temperatures during the summer months (June through August) range from approximately 62°F to 81°F (S&W 1999).

The freeze-free growing season is about 200 to 210 days per year in much of Suffolk County (ABB-ES 1997). Precipitation averages approximately 43 in. per year, and dry periods during June and July are common. Average snowfall is approximately 26-in. (S&W 1999). Net precipitation at the base is 14.5 in. per year, and dry periods during June and July are common (Dames & Moore 1986). The 2-year, 24-hour rainfall total for the installation is 3.5 in. (Department of Commerce 1963). Local climatological data for January through May 2001 show that an individual rain event totaling 3.58 in. in 24 hours occurred on March 30, 2001 [National Oceanic and Atmospheric Agency (NOAA) 2001].

## 4.2 TOPOGRAPHY

Francis S. Gabreski Airport is situated on a glacial outwash plain south of the Ronkonkoma terminal moraine, which formed during the Wisconsin Glaciation. The outwash plain slopes southward from the terminal moraine to the bays and barrier islands along the Atlantic Ocean shoreline. Relief is characteristically flat with subtle rolling terrain and steeper stream channels (ABB-ES 1997). Figure 4.1 shows the basewide topography.

## 4.3 GEOLOGY

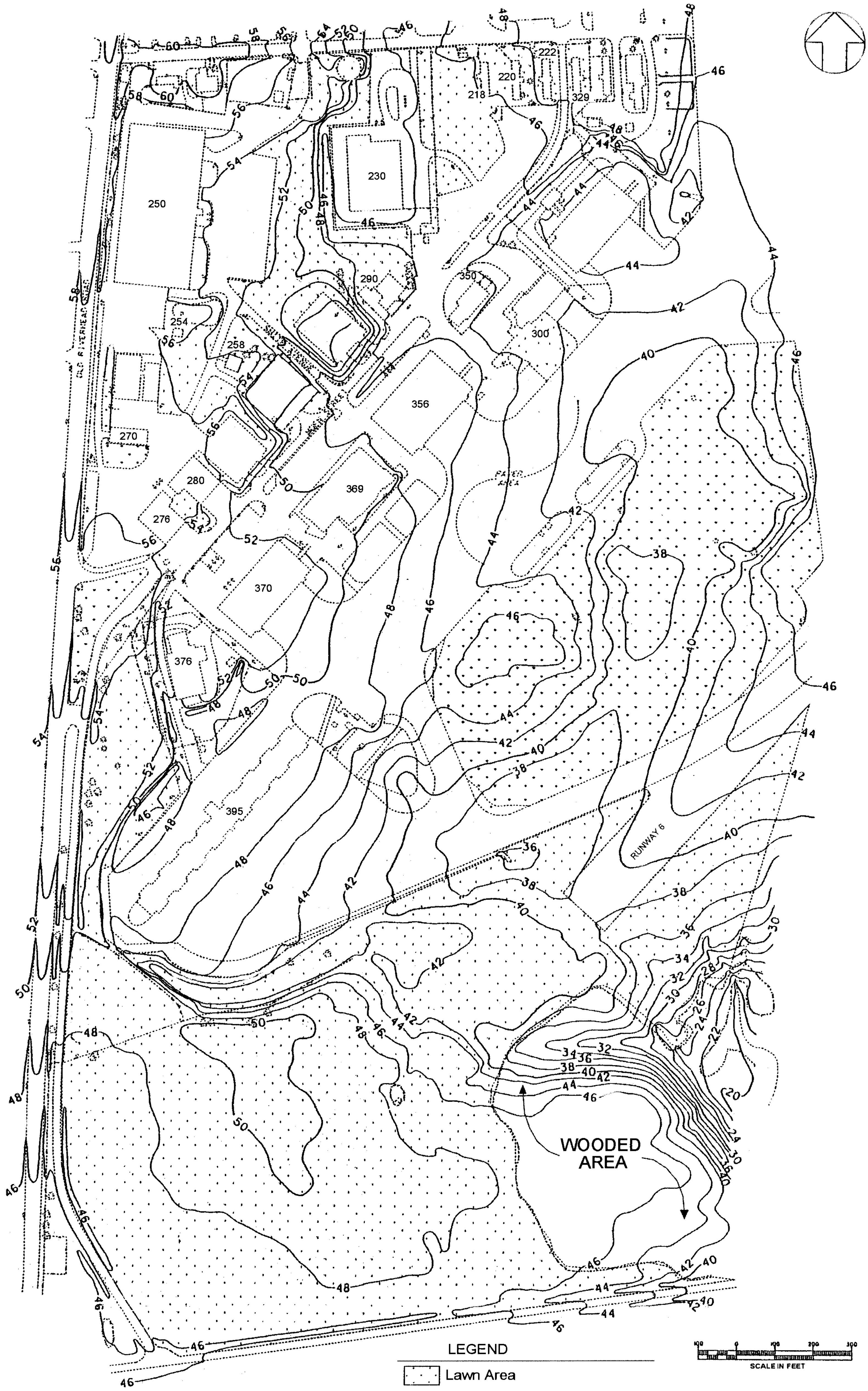
Five unconsolidated formations are found below (or near) Francis S. Gabreski Airport. These units dip generally to the south with the thicker units very widespread and underlying most of Suffolk County. Figure 4.2 depicts the north-south-trending cross-section of the geologic formations present in the region. The cross-section location is shown in Figure 1.1. Figure 4.3 shows a generalized stratigraphic column of the regional geology (S&W 1999).

**Bedrock**

The bedrock that underlies the unconsolidated deposits includes hard, dense schist, gneiss, and granite similar in character to that which underlies much of the mainland in nearby parts of New York and Connecticut. Elevation of the bedrock is approximately 1600 ft below mean sea level (MSL). The surface of the bedrock in the region around the airport dips almost directly southward with an average gradient of 1% (Dames & Moore 1986).

**Raritan Formation**

The Raritan formation rests directly on highly to slightly weathered bedrock. On Long Island, the formation has two fairly distinct members which include the Lloyd sand member below, and a clay member above. The formation probably occurs beneath all of central Suffolk County.




LEGEND

- Lawn Area
- Paved Area

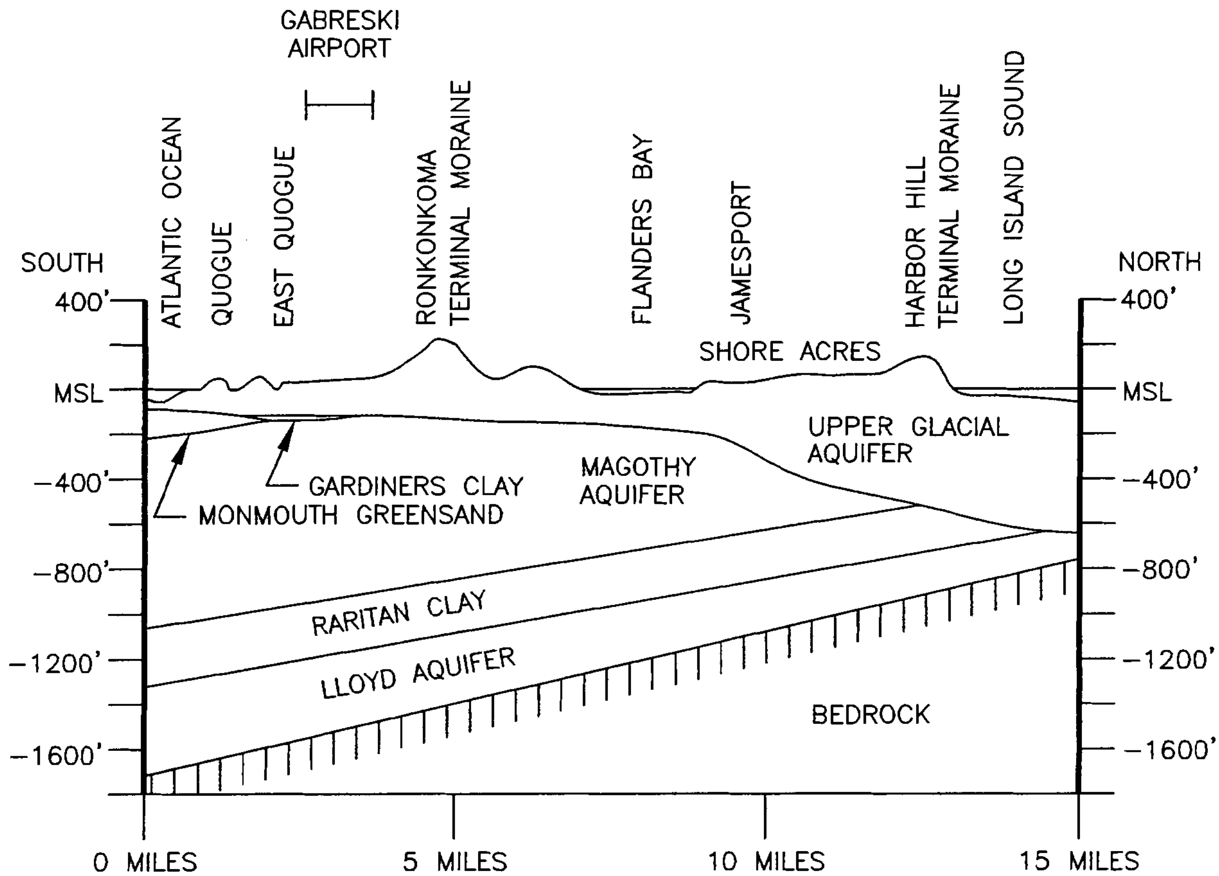
Vertical Datum: NGVD 1929

Elevations in ft. Above Mean Sea Level

Source: S&W, 1999

2-Ft. Contour Intervals

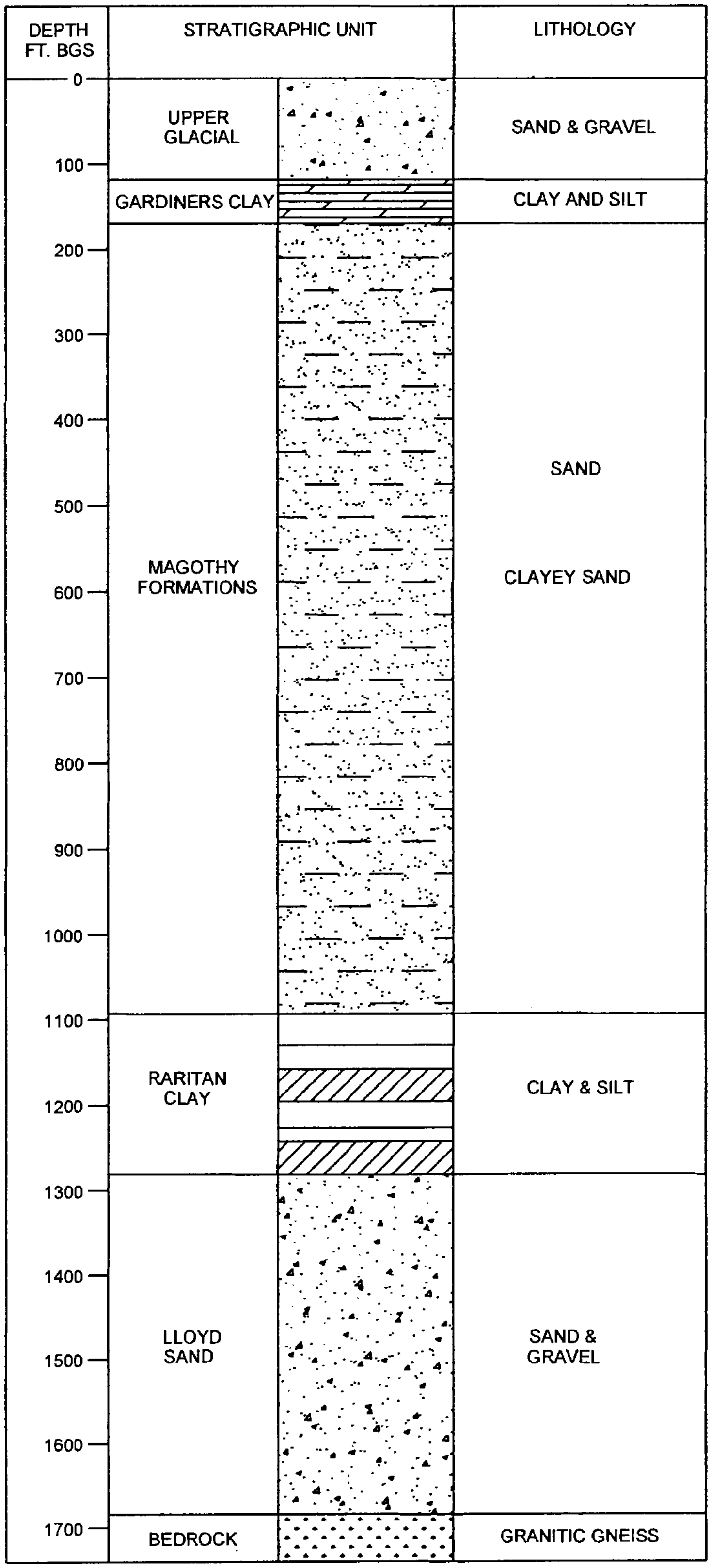
| PEER | BASEWIDE TOPOGRAPHY<br>106 th RESCUE WING, NEW YORK ANG<br>FRANCIS S. GABRESKI<br>WESTHAMPTON BEACH, NEW YORK | FIGURE<br>4.1 |
|---|---|---|
| PROJ./003005-011<br>GAB3005/D-F WorkPlan/FIG4.1 | | |




SOURCE: ABB-ES 1997

SCALE: 1 IN = APPROXIMATELY 3 MILES

| PEER | REGIONAL STRATIGRAPHY AND HYDROGEOLOGY<br>106th RESCUE WING, NEW YORK ANG<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE<br>4.2 |
|---|---|---|
| PROJ./003005-011<br>GAB3005/Final WP/FIG4.2 | | |




SOURCE: ABB-ES (1998)

| | | |
|---|---|---|
| PEER<br>PROJ./3005-011<br>GAB 3005/Final WP/FIG 4.3 | GENERALIZED STRATIGRAPHIC COLUMN<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 4.3 |

Northward, the Lloyd sand thins and probably pinches out beneath Long Island Sound, and the clay member may do likewise. Southward, the formation extends a considerable distance offshore, possibly as far as 100 miles on the continental shelf (Dames & Moore 1986).

**Magothy Formation**

The Magothy formation is a thick body of continental deposits composed of lenses of sand, sandy clay, clay, and some gravel. It rests on the Raritan formation and is in turn unconformably overlain by upper Pleistocene deposits. The greatest thickness revealed by drilling is about 1000 ft. The present upper surface of the Magothy on Long Island is an erosional surface, and the original thickness is not known. The Magothy formation underlies most of Long Island except for some western areas where it was removed by erosion.

The Magothy is composed of beds of poorly sorted quartzose sand mixed with and interbedded with silt and clay, and locally it contains pebbles or small lenses of gravel. Sandy clay and clayey sand make up most of the fine beds, but there are also several thick beds of clay. These clay beds probably do not constitute as effective a barrier to the movement of groundwater as the clay member of the Raritan formation (Dames & Moore 1986).

**Monmouth Greensand**

Unconformably overlying the Magothy formation is the Monmouth Greensand. This unit is not present beneath the airport or to the north but is present 3,000 ft to the south. This unit extends southward and forms a wedge-like layer which thickens towards the south. It is approximately 50 ft thick beneath the barrier beach. The Monmouth Greensand consists of interbedded marine deposits of dark-gray, olive-green, dark-greenish-gray, and greenish-black glauconitic and lignitic clay, silt, and clayey and silty sand. This layer has a low hydraulic conductivity and tends to confine the water of the underlying aquifer (Dames & Moore 1986).

### Gardiners Clay

An approximately 40 ft-thick clay bed lies above the Magothy formation and below the glacial deposits below the airport. This clay is present at about 100 ft below MSL at the airport and extends southward where it overlaps the Monmouth Greensand. The Gardiners clay pinches out just north of the airport, but equivalent clay bodies can be found locally at various locations on Long Island. This unit is made up of green and gray clay, silt, and clayey and silty sand including some interbedded clayey and silty gravel. This layer as a whole has low hydraulic conductivity and tends to confine water in the underlying aquifer (Dames & Moore 1986).

### Glacial Deposits

These upper Pleistocene sediments are composed of glacial outwash deposits; lacustrine and marine deposits; and terminal, ground, and ablation-moraine till deposits. The sediments below the airport are mostly outwash deposits consisting of stratified fine to coarse sand and gravel of light- to dark-brown, tan, and yellowish-brown color. Approximately 100 to 120 ft of these sediments are found below the airport and above the underlying Gardiners clay. Till deposits known as the Ronkonkoma Terminal Moraine are expressed as hills approximately 2 miles north of the airport. Lacustrine and marine deposits are usually thin and discontinuous and are found locally throughout Long Island (ABB-ES 1997).

## 4.4 SOILS

Surface soils in the vicinity of the airport belong to either the Riverhead-Plymouth-Carver Association or the Plymouth-Carver Association. As the names suggest, both soil associations are characteristically similar, with only subtle variations between them. The former occurs over 95% of the installation, and is characterized by deep, nearly level to gently sloping, well-drained to excessively drained, moderately coarse textured and coarse-textured soils. The latter is generally rolling and hilly, with deep excessively well drained, coarse-textured soils on moraines. These glacially derived soils have characteristically low soil moisture content which are not suitable for most agricultural purposes and support only limited types of native vegetation (Dames & Moore 1986).

## 4.5 SURFACE WATER HYDROLOGY

The topography of the Francis S. Gabreski Airport area is such that surface water runoff flows in a southerly and southeasterly direction. Precipitation at the airport mainly percolates into the soil and moves in the subsurface aquifers although some may move short distances as runoff. The airport drains to Aspatuck Creek located near the southeast corner of the installation. This creek flows into Quantuck Bay, which is separated from the Atlantic Ocean by a narrow barrier island (S&W 1997).

## 4.6 HYDROGEOLOGY

Three aquifers and two aquitards are present in the region around the Francis S. Gabreski Airport. Overlying the bedrock is the Lloyd Aquifer. The Lloyd Aquifer correlates to the Lloyd sand member of the Raritan formation. Overlying the Lloyd is the Raritan clay member, an aquitard which is the upper member of the Raritan formation. Overlying the Raritan clay is the Magothy aquifer, a water-bearing unit which correlates to the Magothy formation. Overlying the Magothy is the Gardiners clay, an aquitard present beneath and south of the airport.

Overlying the Gardiners clay at the airport and overlying the Magothy north of the airport is the upper glacial aquifer, a predominantly sand and gravel unit deposited during the Wisconsin glaciation (Dames & Moore 1986). The general characteristics of each aquifer and aquitard including hydrologic properties are presented below, and summarized on Table 4.

**Lloyd Aquifer**

The Lloyd sand is one of the most important aquifers on Long Island largely because it yields adequate supplies of good water in areas, generally beneath the margins of Long Island, where supplies from overlying formations are inadequate or are contaminated by or readily subject to contamination by seawater. The Lloyd can supply water under these circumstances because it is overlain by the relatively impermeable and virtually continuous blanket of the clay member (Dames & Moore 1987).

**Table 4.1**
**Hydrologic Properties of Regional Aquifers**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Unit | Texture | Thickness (ft) | Hydraulic Conductivity (gpd/ft$^2$) (cm/s) | Estimated Transmissivity (gpd/ft) (cm$^2$/s) |
|---|---|---|---|---|
| Upper Glacial | Sand and gravel | 120 | 2,000 (9.4 x $10^{-2}$) | 200 (2.9 x $10^{-1}$) |
| Gardiners Clay | Clay and silt | 40 | Aquitard | Aquitard |
| Magothy Formations | Sand, clayey sand | 930 | 380 (1.8 x $10^{-2}$) | 300 (4.5 x $10^{-1}$) |
| Raritan Clay | Clay and silt | 200 | Aquitard | Aquitard |
| Lloyd Sand | Sand and gravel | 400 | 300 (1.4 x $10^{-2}$) | 75 (1.1 x $10^{-1}$) |
| Bedrock | Granitic gneiss | -- | Aquiclude | Aquiclude |

-- Measurement not available.

The hydraulic conductivity of the Lloyd around the airport was estimated to be 300 gpd/ft$^2$ (1.4 x $10^{-2}$ cm/s), and transmissivity was estimated as 75 gpd/ft (1.1 x $10^{-1}$ cm$^2$/s) (Dames & Moore 1987). The Lloyd aquifer as of 1974 was not used as a water source at or near the Suffolk County Airport. In 1982, 0.19 million gallons per day (MGD) was withdrawn from the Lloyd in the east central area of Long Island (Dames & Moore 1986).

## Magothy Aquifer

Although it consists in part of beds of dense clay and layers or coarse sand and gravel, by far the greater part of the Magothy formation is made up of sandy clay and clayey sand. The formation as a whole, because of this thickness, can transmit and store large amounts of groundwater. There are no effective barriers to the movement of water through the formation except locally.

Hydraulic conductivity of the Magothy below the airport was estimated to be 380 gpd/ft$^2$ (1.8 x $10^{-2}$ cm/s), and transmissivity was at least 300 gpd/ft (4.5 x $10^{-1}$ cm$^2$/ft) with a saturated thickness of approximately 930 ft. Below the airport, the top of the Magothy aquifer is about 150 ft below MSL. The potentiometric surface of this aquifer is approximately 15 ft above MSL. This confined, artesian nature of the Magothy would cause an upward flow of water through the overlying Gardiners clay (Dames & Moore 1986).

**Upper Glacial Aquifer**

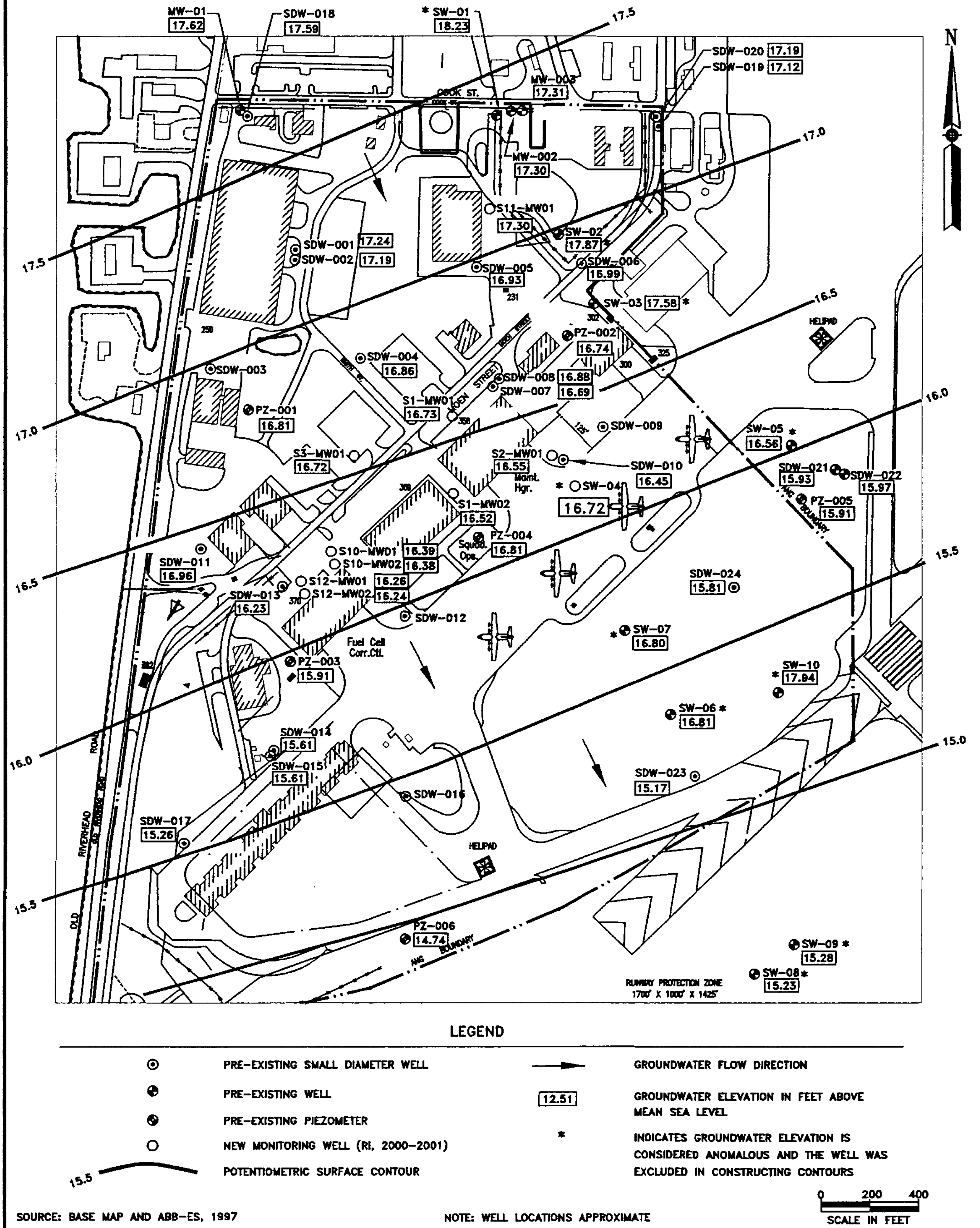
This aquifer correlates to the saturated interval of the glacial outwash deposits of the Wisconsin glaciation. This water-bearing unit is an unconfined aquifer present directly below the airport. Groundwater elevations are approximately 15 to 19 ft above the National Geodetic Vertical Datum, but may be less or more due to seasonal variations.

The clean, coarse sand and gravel is very porous and highly permeable. It makes a porous soil, so that a high proportion of rainfall infiltrates where it falls. There is virtually no surface runoff. The glacial deposits store large quantities of water and, due to their high porosity and permeability, yield large quantities of water to wells.

Hydraulic conductivity of the outwash deposits was estimated to be about 2000 gpd/ft$^2$ (9.4 x $10^{-2}$ cm/s) (ABB-ES 1997), and transmissivity is approximately 200 gpd/ft (2.9 x $10^{-1}$ cm$^2$/s) (Dames & Moore 1987). The direction of groundwater movement beneath the Francis S. Gabreski Airport (i.e., in the upper glacial aquifer) is toward the south-southeast. Depth to groundwater averages 35 to 40 ft BGS. Slug tests performed on installation monitoring wells and piezometers (screened in the upper glacial aquifer) produced hydraulic conductivities ranging from 1.6 x $10^{-2}$ to 5.2 x $10^{-2}$ cm/sec (Dames & Moore 1986). A potentiometric surface map for the area of the ANG base, based on measurements recorded by ABB-ES, is shown on Figure 4.4.

The upward movement of water from the Magothy Aquifer would cause the upper glacial water to flow horizontally toward surface water discharge points. Migration of contaminants downward into lower aquifers is very unlikely (Dames & Moore 1986).

Groundwater is the only water supply source for Suffolk County. Most of the water in the vicinity of the Francis S. Gabreski Airport is obtained from the upper glacial aquifer; the rest is obtained from the Magothy and Lloyd aquifers. At present, Suffolk County Water Authority supplies the majority of the water in the area; the rest is supplied by several smaller companies.




SOURCE: BASE MAP AND ABB-ES, 1997

NOTE: WELL LOCATIONS APPROXIMATE

| PEER | BASEWIDE POTENTIOMETRIC SURFACE MAP, MAY 15-16, 2001<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 4.4 |
|---|---|---|
| PROJ./003005-011<br>GAB3005/Final WP/FIG 4.4 | | |

Suffolk County Water Authority operates 18 wells in 4 well fields within a 4-mile radius of the site, and their nearest public supply well field is located approximately 0.6 miles southeast of Francis S. Gabreski Airport. Table 4.2 provides information pertaining to the public drinking water supply wells. Figure 4.5 shows the location of identified public drinking water supply wells.

**Table 4.2**
**Public Drinking Water Supply Well Information**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Well Field Name. | Distance From Base (miles) | Aquifer Tapped | Well Number | Screened Interval (ft BGS) | Total Depth (ft BGS) | Population Served (1994) |
|---|---|---|---|---|---|---|
| Meeting House Road | 0.61 | Upper Glacial | Well #20 | 55-75 | 78 | 6,538 |
| | | | Well #22 | 74-104 | 104 | |
| | | | Well #15A | 31-51 | 53 | |
| Quogue-Riverhead Road | 1.16 | Magothy | Well #1 | 386-447 | 449 | 1,189 |
| Spinny Road | 1.7 | Upper Glacial | Well #1 | 85-1158 | 118 | 189 |
| | | | Well #2 | 118-15 | 163 | |
| Old Country Road | 2.18 | Upper Glacial | Well #1 | 60-75 | 76 | 1,783 |
| | | | Well #2 | NA | 70 | |
| | | | Well #3 | 128-157 | 161 | |

Source: ABB-ES 1997

## 4.7 CRITICAL HABITATS AND ENDANGERED/THREATENED SPECIES

The Francis S. Gabreski Airport is located within the Long Island Pine Barrens. The Pine Barrens are characterized by open, sunlit woodlands dominated by pitch pine interspersed with white and scarlet oak (Dames & Moore 1987). In the immediate area of the airport, the Pine Barrens are characterized by a transition from 33 to 83 ft tall pitch pines. The nearby Quogue Wildlife Refuge is characterized by dwarf pitch pines ranging from 3 to 6 ft tall (Dames & Moore 1987). The airport itself is characterized by surrounding wooded areas consisting of 25 ft pitch pines and scattered scrub oak (Dames & Moore 1987).

Of the wildlife, birds are the most abundant in the area. Few mammals inhabit the region. Of those that do, the most common are the whitetail deer and red fox. Large animals generally do not inhabit the airport but may pass through.


SOURCE: USGS 7.5 minute series quadrangle maps for Eastport and Quogue, New York dated 1956

| PEER | PUBLIC DRINKING WATER SUPPLY WELL LOCATIONS<br>106th RESCUE WING, NEW YORK ANG<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE<br>4.5 |
|---|---|---|
| PROJ./003005-011<br>GAB3005/Final WP/FIG 4.5 | | |

The following are the Threatened and Endangered species potentially located within a 4-mile radius of the site (ABB-ES 1995).

- Northern Harrier (*Circus cyaneus*)
- Osprey (*Pandion haliaetus*)
- Tiger Salamander (*Ambystoma tigrinum tigrinum*)
- Eastern Mud Turtle (*Kinosteron subrabrum subrubum*)

A more detailed description of the vegetation and animal life in the area is provided in the Phase I Records Search (Dames & Moore 1986).

## 5.0 PERMITS

The NYSDEC does not require permits for drilling well borings intended for installation of monitoring wells or for borings that are part of an ongoing investigation under CERCLA and SARA. PEER will assist the $106^{th}$ RQW EM in obtaining digging permits from the base Civil Engineer for well boring and soil probe advancement and monitoring well installation, as necessary. In addition, utility clearances will be obtained from the base Civil Engineer and New York State One Call prior to any drilling activities.

# 6.0 INVESTIGATIVE APPROACH

This section describes the objectives of the planned fieldwork, the general approach to achieve these objectives, and the site-specific activities to be conducted.

## 6.1 WORK PLAN OBJECTIVES

The objective of this work plan is to provide the strategy, rationale, sequence and methodology for the proposed activities designed to meet the objectives of the RI/FS, as stated previously in Section 1.1.

## 6.2 GENERAL APPROACH

The major activities to be conducted during the RI are summarized in Table 6.1. For the purposes of this work plan, the sites (except 8F) have been grouped into three general areas due to their proximities to one another. One of the general areas includes 8M, 8N, and 8QH; the second area includes Subsites 8D and 8QF and the third area is the Bauman Bus Plume. Subsite 8F is not located near any of the other sites, and will be investigated independently.

The investigation will be performed by advancing direct-push probes and installing monitoring wells. Soil samples and/or groundwater screening samples will be obtained from the direct-push probes. Soil samples will be collected to provide data for use in delineating the extent of soil contamination at the sites, and groundwater screening samples will be obtained to assist in placement of the proposed monitoring wells. Depending on the results of the groundwater screening samples, the number and locations of new monitoring wells may be modified from those proposed herein. Confirmatory groundwater samples will be collected from the newly installed wells and selected existing wells at the sites. Groundwater samples collected from the newly installed and existing monitoring wells will be used to confirm the groundwater screening data and to assist in delineating the extent of groundwater contamination at the sites.

**Table 6.1**
**Planned RI Activities at Site 8**
**106th Rescue Wing New York Air National Guard**
**Westhampton Beach, New York**

| Location | Activity | Round | Quantity | Analytical Parameters | Rationale |
|---|---|---|---|---|---|
| Sites 8M, 8N and 8QH[1] (Cell 1) | Direct-Push Soil Sampling And Groundwater Screening | Round 1 | 11 Probes @ 42 ft BGS<br>Up to 3 Additional Probes @ 42 ft BGS<br>• 2 Soil Samples per Probe | • TAGM Metals<br>• Semivolatile Organics | To delineate the extent of soil contamination |
| | | | • 1 Groundwater screening sample per probe | • Semivolatile Organics | To screen for semivolatiles in groundwater and evaluate placement of new monitoring wells |
| | Monitoring Well Installation | Round 1 | 5 Wells at approximately 48 ft BGS | N/A | For groundwater monitoring |
| | Groundwater Monitoring | Rounds 1 and 2 | 5 New Wells<br>2 Existing Wells | • TAGM Metals<br>• Semivolatile Organics<br>• Biological Parameters | To delineate the extent of groundwater contamination, and to evaluate biological activities in the vicinity of 8M, 8N, and 8QH |
| | Shelby Tube Sampling | Round 1 | 1 Sample | Grain Size, Permeability, Bulk Density, Specific Gravity, Porosity and Moisture Content | For soil characterization |
| Sites 8D and 8QF (Cells 1 and 4) | Direct-Push Soil Sampling and Groundwater Screening | Round 1 | 11 Probes @ 42 ft BGS<br>Up to 5 Additional Probes @ 42 ft BGS<br>• 2 Soil Samples per Probe | • Volatile Organics<br>• TAGM Metals: | To delineate the extent of soil contamination |
| | | | • 1 GW Screening Sample per Probe | • Volatile Organics | To screen for volatiles in groundwater and evaluate placement of new monitoring wells |
| | Monitoring Well Installation | Round 1 | 6 Wells at approximately 48 ft BGS | N/A | For groundwater monitoring |
| | Groundwater Monitoring | Rounds 1 and 2 | 6 New Wells<br>1 Existing Well | • Volatile Organics<br>• TAGM Metals<br>• Biological Parameters | To delineate the extent of groundwater contamination, and to evaluate biological activities in the vicinity of 8D and 8QF |
| | Shelby Tube Sampling | Round 1 | 1 Sample | Grain Size, Permeability, Bulk Density, Specific Gravity, Porosity and Moisture Content | For soil characterization |
| Bauman Bus Plume (Cell 2) | Direct-Push Groundwater Screening | Round 1 | 6 Probes @ 38 ft BGS<br>Up to 3 Additional Probes @ 38 ft BGS<br>• 1 GW Screening Sample per Probe | • Volatile Organics (24-hr TAT) | Groundwater screening to differentiate upgradient contamination originating in the plume area from groundwater at Cell 2 |
| | Monitoring Well Installation | Round 1 | 3 Wells at approximately 48 ft BGS<br>2 Wells at approximately 68 ft BGS | N/A | For groundwater monitoring |
| | Groundwater Monitoring | Rounds 1 and 2 | 5 New Wells<br>7 Existing Wells | • Volatile Organics<br>• Semivolatile Organics | To confirm the groundwater screening results and to delineate the extent of groundwater contamination at the property line |
| | Shelby Tube Sampling | Round 1 | 1 Sample | Grain Size, Permeability, Bulk Density, Specific Gravity, Porosity and Moisture Content | For soil characterization |
| Site 8F (Cell 4) | Direct-Push Groundwater Screening | Round 1 | 1 Probe @ 42 ft BGS<br>• 1 Groundwater Screening Sample | • Volatile Organics | Groundwater screening to evaluate volatile organic groundwater contamination at the site |
| | Groundwater Monitoring | Rounds 1 and 2 | 1 existing well | • Volatile Organics | To confirm the groundwater screening results and to evaluate potential volatile organic groundwater contamination |

Notes:
1. Subsite 8QH was initially misidentified as Subsite 8QC during the TCRA (MACTECH 2003).
BGS Below ground surface
N/A Not applicable
TAT Turn around time

If significant volatile organic contamination is detected during field PID screening, and/or in soil or groundwater analyses at Site 8, the potential need for a soil vapor survey will be determined. If a soil vapor survey is required, one will be planned and performed as an addendum investigation. Since delineation of the Bauman Bus Plume is not the responsibility of the NYANG or ANG/CEVR, any soil vapor survey performed during the RI will be limited in extent to the northern property boundary.

The general approach planned for the RI at Site 8 is based on consideration of the available data, which incorporates site conditions, geology/hydrogeology, contaminant characteristics, pathway dynamics, and remedial alternatives. This approach will maximize the use of available data. Additional information gained from the RI activities will be incorporated into the conceptual models to refine understanding of the sites. This will limit additional costs and schedule which will result in remedial decisions that are realistic and timely.

### 6.2.1 Direct-Push Soil Sampling and Groundwater Screening

Up to forty direct-push probes are planned to be installed at the sites. Up to 14 probes are planned in the vicinity of 8M, 8N and 8QH, and up to 16 are planned at 8D and 8QF. Up to 9 probes are planned along the northern base property boundary, where it is intersected by the Bauman Bus Plume, and one probe is planned at 8F. Soil samples and/or groundwater screening samples will be obtained from each of the probes to delineate the extent of contaminants in site soils, and for groundwater screening purposes. Depending on the initial results from the direct-push probes, the number and locations of subsequent planned probes and monitoring wells may be modified to ensure the most efficient use of investigatory resources.

If field PID screening, or sample analyses indicate contamination is present in subsurface soils or groundwater at Site 8, surface soil sampling will be performed. Soil samples will be collected at the corresponding surface soil locations and analyzed for the corresponding contaminant(s). Surface soil sampling will be planned and performed as an addendum to the RI. No surface or subsurface soil sampling is planned for Subsite 8F or the Bauman Bus plume.

### 6.2.2 Monitoring Well Installation

A total of sixteen groundwater monitoring wells are planned to be installed at the sites. Five wells are planned in the vicinity of 8M, 8N and 8QH, and six wells are planned at 8D and 8QF. Five wells are planned in the vicinity of the Bauman Bus Plume. No new monitoring wells are planned for 8F. The monitoring wells will be installed to allow collection of confirmatory groundwater monitoring samples in the vicinity of the sites. Proposed monitoring well locations will be evaluated and modified based on the results of the groundwater screening samples.

### 6.2.3 Water Level Measurements and Headspace Readings

Water level measurements will be obtained from the newly installed wells and from selected existing wells to determine purge volumes prior to sampling. The water level measurements will be obtained using an electronic water level indicator.

### 6.2.4 Groundwater Confirmatory Sampling

Groundwater confirmatory samples will be collected from the up to 16 newly installed monitoring wells and up to 11 existing monitoring wells at the subsites and Bauman Bus Plume, and will be submitted to a state-certified laboratory for analysis.

### 6.2.5 Slug Tests

Given the ample hydrogeologic data that exists for the base, and the homogeneous nature of the Upper Glacial Aquifer, the ANG/CEVR has waived slug testing of newly installed wells, which is a requirement of the ANG IRP Investigation Protocol (ANG 1998).

### 6.2.5 Soil Testing

During drilling for well installation, Shelby tube samples will be collected from three of the well borings for analysis of geophysical characteristics. The sampling intervals and locations are discussed in Section 7.0.

### 6.2.6 Analytical Methods

Laboratory analysis will be conducted by a state-certified laboratory. Depending upon the site, soil and groundwater samples will be analyzed for volatile and semivolatile organics and TAGM metals. TAGM metals consist of cadmium, chromium, copper, arsenic, lead, mercury, nickel, silver, and beryllium. Additionally, selected groundwater samples will be analyzed for biological indicator parameters. Three soil samples (Shelby tube samples) will be analyzed for geophysical characteristics. Investigation-derived waste (IDW) consisting of both soil and water will be analyzed using the Toxicity Characteristic Leachate Procedure (TCLP) for volatiles, semivolatiles, herbicides, pesticides and metals.

A summary of the proposed number of samples, sample containers and analytical methods to be conducted are presented in Table 6.2. Analysis of volatile organics will be conducted using Environmental Protection Agency (EPA) Method 8260B, and semivolatile organics analysis will be conducted using EPA Method 8270C. TAGM metals analysis will be conducted using EPA Method 6010B. IDW samples will be analyzed using TCLP by EPA Method 1311. Samples for biological parameters will be analyzed for ammonia using EPA Method 350.1, alkalinity using Method 310.2, chloride, Iron II and sulfate using Method 300, methane using Method 272, nitrate using Method 353.3, nitrite using Method 354.1, phosphorus and *ortho*-phosphate using Method 365.2, total organic carbon using Method 415.1, and sulfide using Method 376.1. Shelby tube samples will be analyzed for grain size using American Society for Testing and Materials (ASTM) D422, for dry bulk density and moisture content using ASTM D2937, for permeability using ASTM D2434-68, for porosity using ASTM D4404-84 and for specific gravity using ASTM D854-02.

**Table 6.2**
**Summary of Proposed Number of Samples, Analytical Methods, Container Types, and Preservatives**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Round 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Subsites** | **Sample Type** | **Parameter** | **Analytical Method** | **No. of Samples** | **QA/QC Duplicates** | **QA/QC MS/MSD** | **Container** | **Preservative** |
| 8M, 8N and 8QH | Direct-Push Soil | Semivolatile Organics | 8270C | 28 | 3 | 2/2 | (1) 4-oz. Glass | Cool 4°C |
| | | TAGM Metals | 6010B | 28 | 3 | 2/2 | (1) 4-oz. Glass | Cool 4°C |
| | Direct-Push Groundwater Screening | Semivolatile Organics | 8270C | 14 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | Groundwater Monitoring | TAGM Metals | 6010B | 7 | 1 | 1/1 | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | | Semivolatile Organics | 8270C | 7 | 1 | 1/1 | (2) 1-L Amber | Cool 4°C |
| | | Biological Parameters | See Note 1 | 3 | N/A | N/A | See Note 1 | See Note 1 |
| | Geotechnical | See Note 2 | See Note 2 | 1 | N/A | N/A | Shelby tube | N/A |
| 8D and 8QF | Direct-Push Soil | Volatile Organics | 8260B | 32 | 3 | 2/20 | (3) 40-mL vials | HCl, Cool 4°C |
| | | TAGM Metals | 6010B | 32 | 3 | 2/2 | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | Direct-Push Groundwater Screening | Volatile Organics | 8260B | 16 | N/A | N/A | (2) 40-mL vials | HCl, Cool 4°C |
| | Groundwater Monitoring | TAGM Metals | 6010B | 7 | 1 | 1/1 | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | | Biological Parameters | See Note 1 | 2 | N/A | N/A | See Note 1 | See Note 1 |
| | Geotechnical | See Note 1 | See Note 2 | 1 | N/A | N/A | Shelby tube | N/A |
| 8F | Direct-Push Groundwater | Volatile Organics | 8260B | 1 | N/A | N/A | (2) 40-mL vials | Cool 4°C |
| | Groundwater Monitoring | Volatile Organics | 8260B | 1 | 0 | 0 | (3) 40-mL vials | HCl, Cool 4°C |
| 8M, 8N, 8QH and 8D, 8QF | Rinsate for Soil | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | Rinsate for Groundwater | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| Bauman Bus Plume | Direct-Push Groundwater | Volatile Organics | 8260B (24-hr TAT) | 9 | N/A | N/A | (2) 40-mL vials | Cool 4°C |
| | Groundwater Monitoring | Volatile Organics | 8260B | 12 | 2 | 1/1 | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 12 | 2 | 1/1 | (2) 1-L Amber | Cool 4°C |
| | | Biological Parameters | See Note 1 | 2 | N/A | N/A | See Note 1 | See Note 1 |
| | Geotechnical | See Note 2 | See Note 2 | 1 | N/A | N/A | Shelby tube | N/A |
| | Rinsate for Groundwater | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| All Subsites | Field Blank-ASTM Water | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |

**Table 6.2 (Continued)**
**Summary of Analytical Methods, Proposed Number of Samples Container Types and Preservatives**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Subsites | Sample Type | Parameter | Analytical Method | No. of Samples | QA/QC Duplicates | QA/QC MS/MSD | Container | Preservative |
|---|---|---|---|---|---|---|---|---|
| **Round 1 (Continued)** | | | | | | | | |
| All Sites (Continued) | Field Blank-Tap Water | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | Trip Blanks (8D, 8F, and8QF) | Volatile Organics | 8260B | 7 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| **Round 2** | | | | | | | | |
| 8M, 8N and 8QH | Groundwater Monitoring | Semivolatile Organics | 8270C | 7 | 1 | 1 | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 7 | 1 | 1/1 | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | | Biological Parameters | See Note 1 | 3 | N/A | N/A | See Note 1 | See Note 1 |
| 8D and 8QF | Groundwater Monitoring | Volatile Organics | 8260B | 7 | 1 | 1 | (3) 40-mL vials | HCl, Cool 4°C |
| | | TAGM Metals | 6010B | 7 | 1 | 1/1 | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | | Biological Parameters | See Note 1 | 2 | N/A | N/A | See Note 1 | See Note 1 |
| 8F | Groundwater Monitoring | Volatile Organics | 8260B | 1 | 0 | 0 | (3) 40-mL vials | HCl, Cool 4°C |
| 8F, 8M, 8N, 8QH and 8D, 8QF | Rinsate for Groundwater Monitoring | Volatile Organics | 8260B | 1 | 2 | 1/1 | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | 2 | 1/1 | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| Bauman Bus Plume | Groundwater Monitoring | Volatile Organics | 8260B | 12 | 2 | 1/1 | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 12 | 2 | 1/1 | (2) 1-L Amber | Cool 4°C |
| | | Biological Parameters | See Note 1 | 2 | N/A | N/A | See Note 1 | See Note 1 |
| | Rinsate for Groundwater | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| All Subsites | Field Blank-ASTM Water | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | Field Blank-Tap Water | Volatile Organics | 8260B | 1 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | | Semivolatile Organics | 8270C | 1 | N/A | N/A | (2) 1-L Amber | Cool 4°C |
| | | TAGM Metals | 6010B | 1 | N/A | N/A | (1) 100 mL poly | $HNO_3$, Cool 4°C |
| | Trip Blanks | Volatiles | 8260B | 5 | N/A | N/A | (3) 40-mL vials | HCl, Cool 4°C |
| | IDW Water | TCLP | 1311 | 1 | N/A | N/A | See Note 3 | See Note 3 |
| | IDW Soil | TCLP | 1311 | 1 | N/A | N/A | See Note 3 | See Note 3 |

Notes:

1 Biological parameters will include ammonia (EPA Method 350.1), alkalinity (310.2), chloride (300), iron (II) (300), methane (272), nitrate (353.3), nitrite (354.1), phosphorus, and ortho-phosphate (365.2), total organic carbon (415.1), sulfide (376.1) and sulfate (300). Biological parameters will be collected in three pre-preserved polyethylene bottles.

2 Geotechnical samples will be analyzed for grain size (ASTM D422), dry bulk density and moisture content (D2937), permeability (D2434-68), porosity (D4404-84) and specific gravity (D854-02).

3 Sample containers for TCLP water analysis include 2, 40-mL vials (w/HCl) for volatiles; 2, 1-Lamber glass jars for semivolatiles; 2, 1-L amber glass jars for pesticides; 2, 1-L amber glass jars for herbicides; and 1-L polyethylene bottle (w/HNO3) for metals. Sample containers for TCLP soil analysis include 2 wide mouth 8-oz glass jars. All samples cooled to 4°

## 6.3 REMEDIAL INVESTIGATION ACTIVITIES

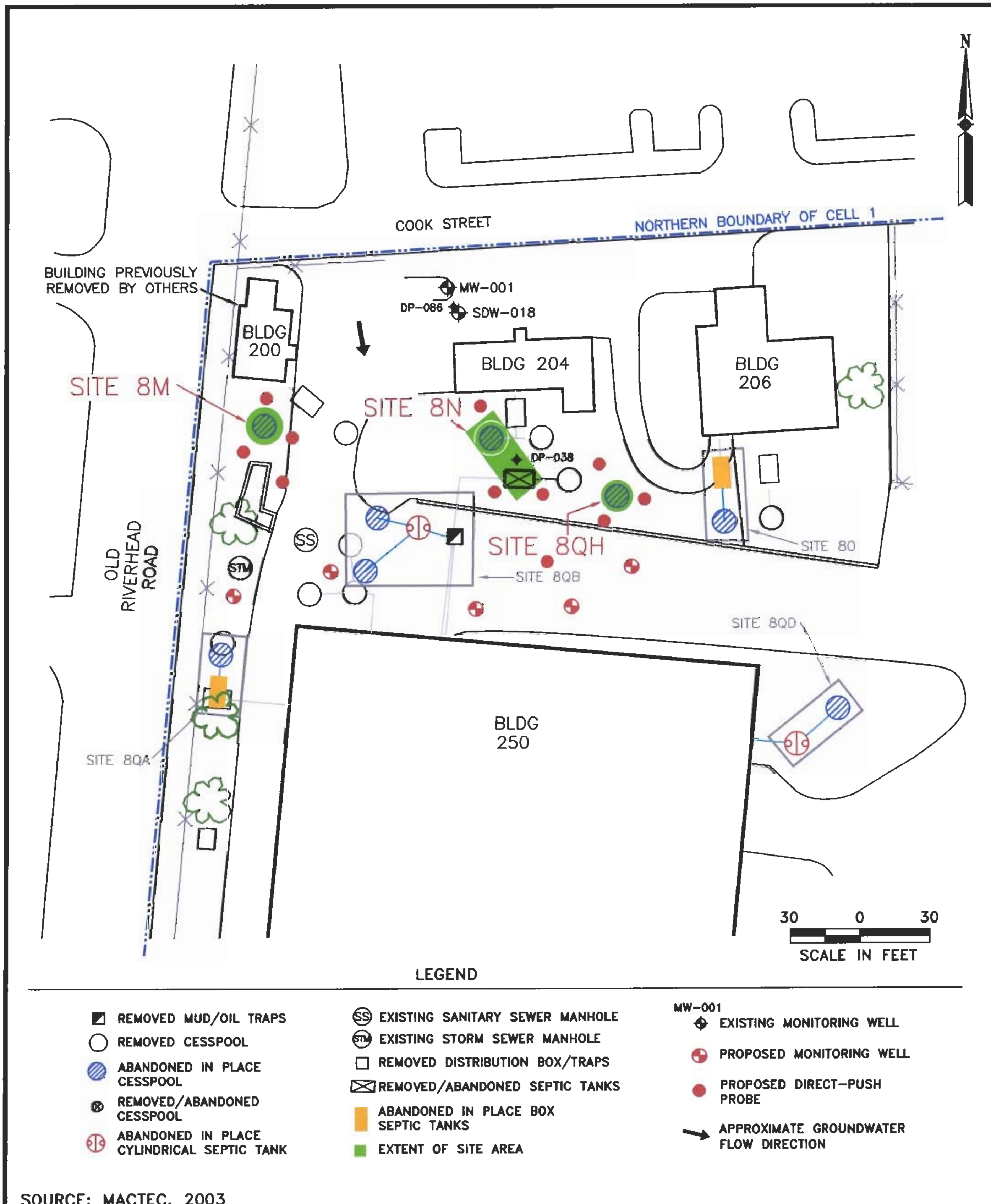
The field activities to be conducted during the RI are discussed in this section.

### 6.3.1 Sites 8M, 8N and 8QH

The proposed sample locations for 8M, 8N and 8QH are shown on Figure 6.1. Up to 14 direct-push probes will be advanced to an approximate depth of 42 ft BGS at 8M, 8N and 8QH. Currently, eleven of the probes are depicted on Figure 6.1. The three remaining probes will be reserved and not advanced until the other probes are completed. They will be advanced based on the photoionization detector (PID) readings and field observations obtained from the initial probes. Soil contamination was not encountered between the groundwater surface and 10 ft BGS during the previous investigations. Therefore, soil samples will be collected at 5 ft intervals, beginning at 10 ft BGS, to the total depth of the probes, planned at the top of the groundwater.

The soils will be screened for detectable organic vapors on site using a calibrated PID and classified by the Project Geologist. Two soil samples from each soil probe will be submitted to the laboratory for analysis. Based on previous investigations, primarily the TCRA (MACTECH 2003), soil samples will be analyzed for semivolatile organics and TAGM metals. Groundwater screening samples will be collected from all probes that reach the groundwater. Previous investigations at the base have shown that groundwater-screening samples will yield false positive results for metals. Volatile organics were not previously identified at Subsites 8M, 8M, and 8QF. Therefore, the groundwater screening samples will be analyzed for semivolatile organics only, and will not be collected for metals or volatile organics.

Five new monitoring wells are planned for installation in locations that are hydraulically downgradient of 8M, 8N and Subsite 8QH as shown on Figure 6.1. The final locations of the new wells may be altered based on the results of the groundwater screening samples. The wells will be installed to a depth of approximately 48 ft BGS. A Shelby tube sample will be collected from one of the well borings and submitted for analysis of soil physical parameters.




PEER

PROJ./3005-011

GAB 3005/Final WP/FIG6.1

PROPOSED SAMPLE LOCATIONS AT 8M, 8N, AND 8QH
106th RESCUE WING, NEW YORK AIR NATIONAL GUARD
FRANCIS S. GABRESKI AIRPORT
WESTHAMPTON BEACH, NEW YORK

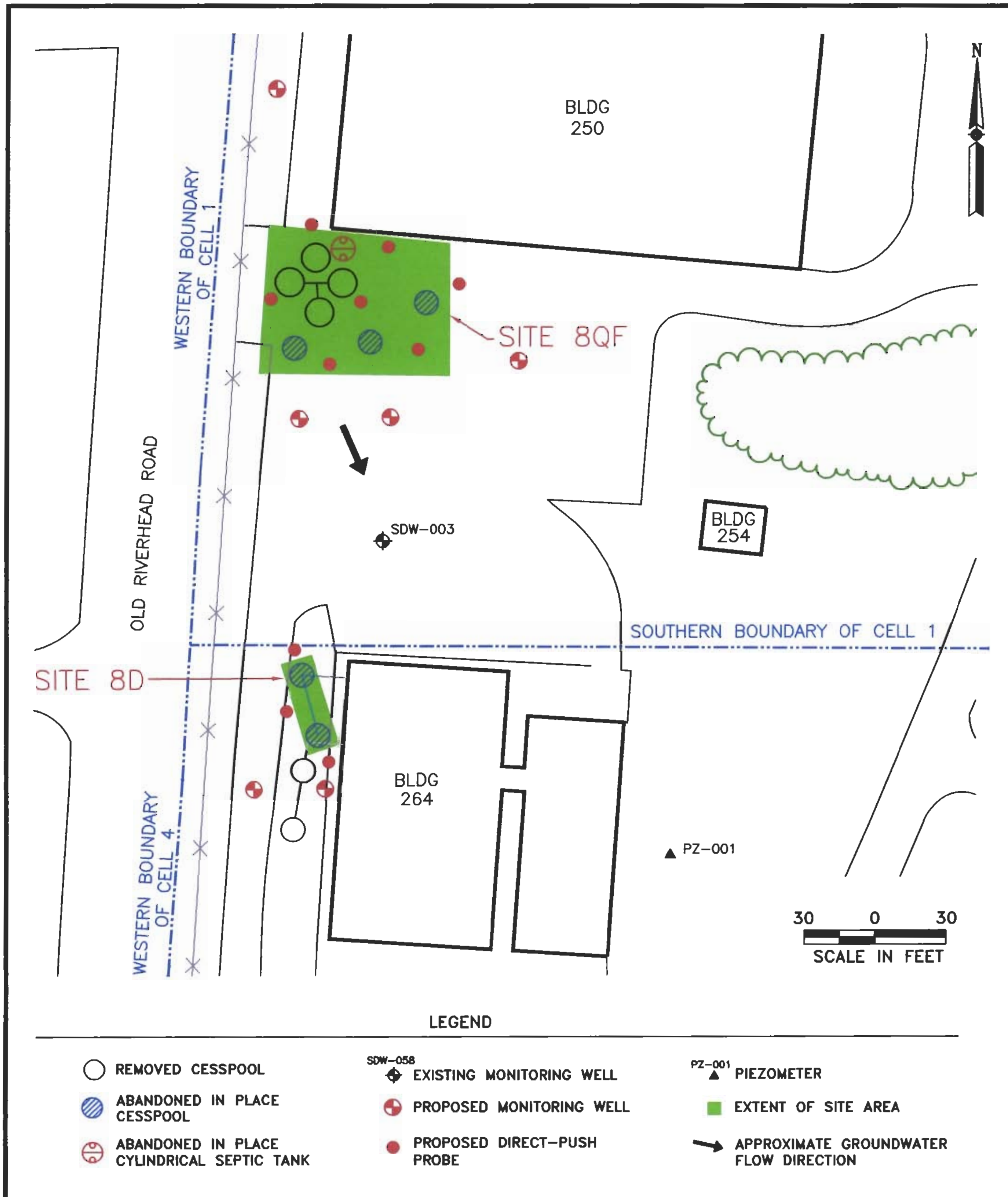
FIGURE 6.1

Groundwater monitoring samples will be collected from the five newly installed monitoring wells and two existing monitoring wells (MW-001 and SDW-018). The groundwater monitoring will be conducted in two rounds. All wells will be sampled for semivolatile organics and TAGM metals. One well at each subsite will be sampled for biological remediation parameters.

Contingency surface soil sampling will be conducted at 8M, 8N and 8QH on an as-needed basis. Should soil vapor screening or confirmatory sample analyses indicate significant contamination is present in subsurface soils; surface soil samples will be collected at the corresponding surface locations, and analyzed for the corresponding contaminants. Since it is not feasible at this time to determine the number of surface soil samples or analyses that may be required, contingency surface soil samples are not included in Table 6.2. If surface soil samples are found necessary, an addendum work plan will be prepared describing sample locations and analyses.

### 6.3.2 Sites 8D and 8QF

The proposed sample locations for 8D and 8QF are shown on Figure 6.2. Up to sixteen direct-push probes will be advanced to an approximate depth of 42 ft BGS at 8D and 8QF. Eleven of the probes are depicted on Figure 6.2. The four remaining probes will be advanced based on the PID readings and field observations obtained from the initial probes. Soil contamination was not encountered between the ground surface and 10 ft BGS during the previous investigations. Therefore, soil samples will be collected at 5 ft intervals, beginning at 10 ft BGS, to the total depth of the probes, which is planned to be at the top of the groundwater. The soils will be screened for detectable organic vapors on site using a calibrated PID, and classified by the Project Geologist. Two soil samples from each probe will be submitted to the laboratory for analysis. Based on previous investigations, primarily the TCRA (MACTECH 2003), soil samples will be analyzed for volatile organics and TAGM metals. Groundwater-screening samples will be collected from each probe that successfully reaches groundwater. The groundwater screening samples will be analyzed for volatile organics only, since semivolatile organics have not been identified at these subsites, and groundwater-screening samples are known to show false positives for metals.




SOURCE: MACTEC, 2003

| PEER | PROPOSED SAMPLE LOCATIONS AT 8D AND 8QF<br>106th RESCUE WING, NEW YORK AIR NATIONAL GUARD<br>FRANCIS S. GABRESKI AIRPORT<br>WESTHAMPTON BEACH, NEW YORK | FIGURE 6.2 |
|---|---|---|
| PROJ./3005-011<br>GAB 3005/Final WP/FIG 6.2 | | |

In addition to the direct-push probes, six monitoring wells are planned in the vicinity of Subsites 8QF and 8D. One of the wells will be located hydraulically upgradient of Subsite 8QF, three of the wells will be located hydraulically downgradient of Subsite 8QF, and the two remaining wells will be located hydraulically downgradient of Subsite 8D as shown on Figure 6.2.

The locations of the new wells may be altered based on the results of the groundwater screening samples. The wells are planned for a depth of approximately 48 ft BGS. A Shelby tube sample will be collected from one of the well borings and submitted to a laboratory for analysis of geophysical parameters. Groundwater samples will be collected from the four newly installed wells and one existing well (SDW-003). The groundwater samples will be collected from the monitoring wells in two rounds, and analyzed for volatile organics and TAGM metals. One well associated with each subsite will be sampled for biological remediation parameters.

Contingency surface soil sampling will be conducted at 8D and 8QF on an as-needed basis. If soil vapor screening, or confirmatory sample analyses indicate significant contamination is present in subsurface soils or groundwater, surface soil samples will be collected at the corresponding surface locations, and analyzed for the corresponding contaminants. Since it is not feasible at this time to determine the number of surface soil samples or analyses that may be required, contingency surface soil samples are not included in Table 6.2. If surface soil samples are required, an addendum work plan will be prepared describing sample locations and analyses.

### 6.3.3 Bauman Bus Plume

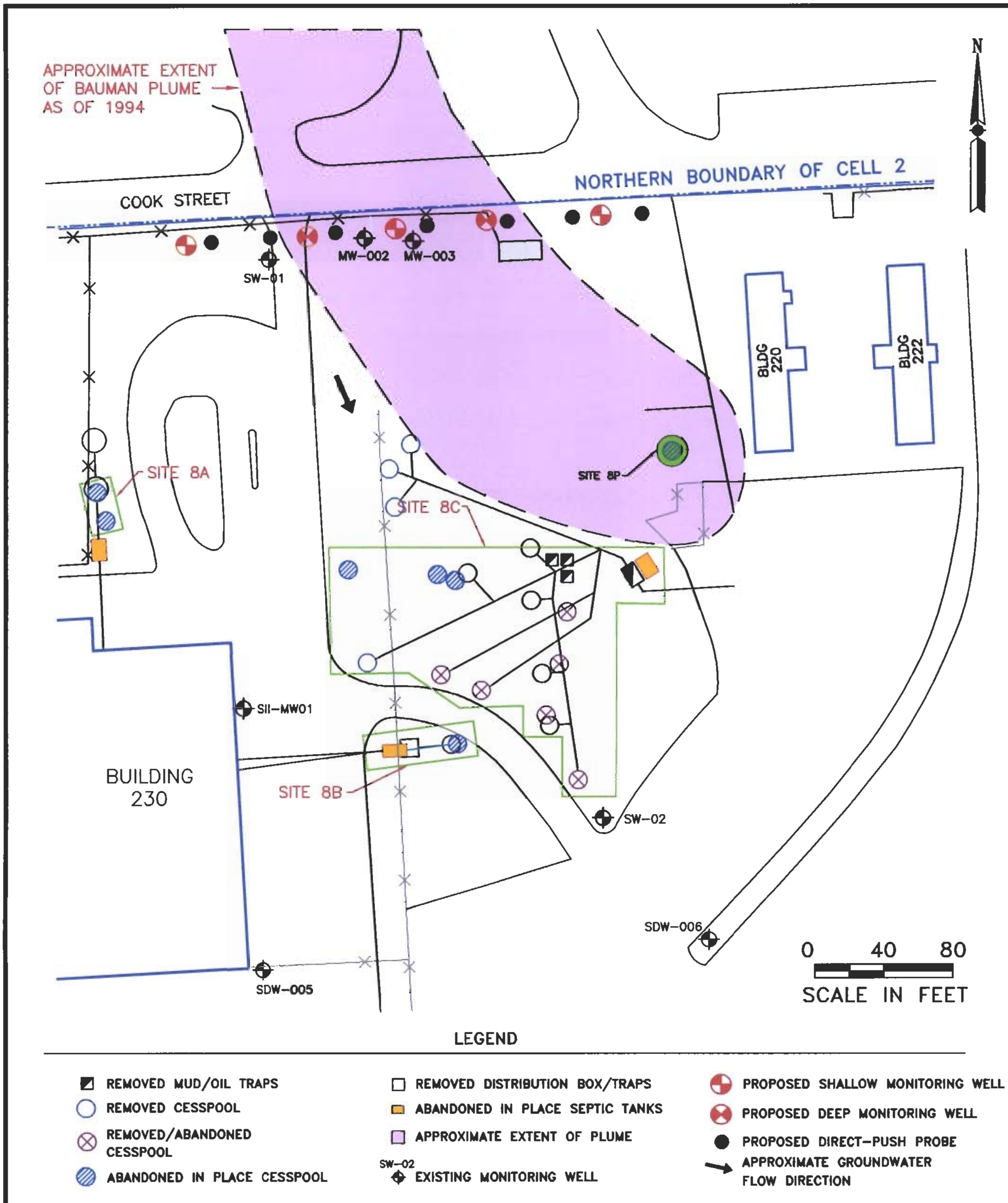
The proposed sample locations for the Bauman Bus Plume are shown on Figure 6.3. Up to 9 direct-push probes will be advanced to an approximate depth of 38 ft BGS at the Bauman Bus Plume. One groundwater-screening sample will be collected from each direct-push probe and submitted to the laboratory for expedited analysis of volatile organics. Once 6 probes are advanced, the remaining 3 probes will be advanced at locations selected based on the PID readings, field observations obtained from the initial probes, and the results of the 24-hr volatile organics analysis of the groundwater screening samples. No subsurface or surface soil samples will be collected for laboratory analysis.

After completion of the direct-push probes, up to five monitoring wells are planned to be installed along the northern base boundary where the Bauman Bus Plume enters the property, as shown on Figure 6.3. The number and location of the new wells may be altered based on the results of the groundwater screening samples. Three wells are planned to be equipped with 15 ft screens at total depths of approximately 48 ft BGS, so that their screens monitor the top of the groundwater, which is anticipated approximately 38 ft BGS. Two wells are planned to be equipped with 10 ft screens, installed 10 to 15 ft below the top of the water table, so as to monitor groundwater below the vertical extent of the plume. The required installation depth will be determined by field screening and observation as drilling proceeds.

One Shelby tube sample will be collected from one of the well borings and submitted to a laboratory for analysis of geophysical parameters. Groundwater samples will be collected from the five newly installed wells and seven existing wells (MW-002, MW-003, SW-01, S11-MW01, SDW-005, SDW-006, and SW-02), which are located within Site 8 – Cell 2 and can be associated with the Bauman Bus Plume. The groundwater samples will be collected from the monitoring wells in two rounds. Groundwater monitoring samples will be collected and analyzed for volatile and semivolatile organics from all 12 wells. Biological remediation parameter samples are not planned for the Bauman Bus Plume investigation.

### 6.3.4 Site 8F

The proposed sample location for Site 8F is depicted on Figure 6.4. One direct-push probe will be advanced to an approximate depth of 42 ft BGS at Site 8F. One groundwater-screening sample will be collected from the probe and submitted to the laboratory for volatile organics analysis. One existing monitoring well (SDW-013) will be sampled for two rounds. The groundwater monitoring samples will be analyzed for volatile organics. No soil samples, surface or subsurface, are planned for Site 8F.




SOURCE: MACTEC, 2003

| PEER | PROPOSED SAMPLE LOCATIONS IN THE VICINITY OF THE BAUMAN BUS PLUME | FIGURE 6.3 |
|---|---|---|
| PROJ./3005-011 | 106th RESCUE WING, NEW YORK AIR NATIONAL GUARD | |
| GAB 3005/Final WP/FIG6.3 | FRANCIS S. GABRESKI AIRPORT WESTHAMPTON BEACH, NEW YORK | |

| **FORM 001G-1**<br>**FIELD CHANGE REQUEST** | FIELD CHANGE NO. _____<br>PAGE _____ OF _____ |
|---|---|
| **PROJECT:** | |
| **PROJECT NO.:** | |
| **APPLICABLE DOCUMENT:** | |
| **REQUESTED CHANGE:** ________________ | |
| ☐ MAJOR CHANGE<br>☐ MINOR CHANGE | |
| **REASON FOR CHANGE:** ________________ | |
| **RECOMMENDED DISPOSITION:** ________________ | |
| **IMPACT ON PRESENT AND COMPLETED WORK:** ________________ | |
| **FINAL DISPOSITION:** ________________ | |
| **REQUESTED BY:** ________________<br>NAME AND TITLE | SIGNATURE AND DATE |
| **APPROVALS:**<br>ACCEPT REJECT<br>☐ ☐ PROJECT/SITE MANAGER: ________ DATE: _____<br>☐ ☐ DELIVERY ORDER MANAGER: ________ DATE: _____<br>☐ ☐ PROGRAM MANAGER: ________ DATE: _____<br>☐ ☐ CLIENT PROJECT MANAGER: ________ DATE: _____ | |
| CC: QAS<br>QA/QC MANAGER | |

Figure 6.5. Field Change Request Form

# 7.0 FIELD INVESTIGATION PROCEDURES

Field activities to be conducted during the RI include advancing direct-push probes and collecting soil samples and/or groundwater screening samples from the probes, and installing monitoring wells and collecting groundwater samples from the wells. The activities will be conducted in accordance with this work plan, the Statement of Work dated September 18, 2003 and the ANG IRP Investigation Protocol (ANG 1998).

## 7.1 FIELD SCREENING

Soil samples obtained using direct-push technology will be collected in samplers lined with acetate sleeves. After being extruded from the sampler, the acetate sleeves will be opened and a portion of soil in the top section of the sleeve will be used for screening with a PID and geologic logging.

During drilling for well installation, soil cuttings will be periodically screened using a PID. Split-spoon samples collected from the well borings will be opened to expose the soil core. Once exposed, the soil core will be screened using the PID. A portion of soil from the split-spoon will be placed into a sealable plastic bag with a minimum of disturbance. Once sealed, the soil in the baggie will be allowed to equilibrate to ambient temperature. A headspace reading will then be taken by inserting the tip of the PID probe into the baggie. Samples selected for laboratory analysis will be packaged and labeled as discussed in Section 8.4.5.

Action levels for PID readings and emergency response information are outlined in the programmatic Health and Safety Plan (HASP) (PEER 1995b). PID calibration will be checked on a daily basis in accordance with the manufacturer's instructions. All PID screening and headspace readings will be documented in the field logbook.

## 7.2 DIRECT-PUSH PROBES

During the RI, up to forty direct-push probes will be advanced in the vicinity of the subsites. The direct-push activities will be conducted by a drilling company certified in the state of New York. Soil and/or groundwater screening samples will be collected from each of the probes. Direct-push soil and groundwater screening sampling are briefly discussed in the following sections.

### 7.2.1 Direct-Push Soil Sampling

Direct-push probes will be advanced to a depth of 42 ft BGS at 8M, 8N, 8QH, 8D, and 8QF for soil sampling. Soil samples will not be collected at Site 8F or the Bauman Bus Plume.

Soil contamination was not encountered between the ground surface and 10 ft BGS during the previous investigations. Therefore, soil samples will be collected at 5 ft intervals from approximately 10 ft BGS to total depth using decontaminated stainless-steel samplers lined with acetate sleeves. Upon retrieval, a portion of soil from the top section of the acetate sleeve will be screened with a PID, lithologically classified, and examined for visual signs of contamination by the Project Geologist. Selected samples from the direct-push probes (two from each probe) will be submitted to the laboratory for analysis. The Project Geologist will record sample depths, soil classification, corresponding field observations, and PID data in the field logbook. Boring logs will be prepared for the direct-push probes upon completion of the field activities.

### 7.2.2 Direct-Push Groundwater Screening Sampling

A groundwater screening sample will be collected at the water table (at 38 to 42 ft BGS) from each of the forty direct-push probes that are to be advanced at the sites. The direct-push rig will be equipped with a stainless-steel screen point sampler which will be pushed to the desired depth. The screen will be sheathed and protected inside the direct-push tool string until reaching the water table.

Data from the groundwater screening samples will be used in determining the locations of the proposed monitoring wells. The groundwater screening samples will be collected and submitted to the laboratory for analysis with standard turnaround, except for those collected at the Bauman Bus plume, which will have expedited (24 hr) turnaround. The Project Geologist will record sample depths, corresponding observations, parameters, and PID data in the field logbook.

### 7.2.3 Contingency Surface Soil Sampling

If significant contamination is detected during PID field screening, screening sample analyses, or confirmatory sample analyses, surface soil samples will be collected from the corresponding surface locations and analyzed for the corresponding contaminants. Since it is not possible at this time to determine if surface soil samples will be required, any surface soil investigation will be planned and performed as an addendum to the RI.

## 7.3 MONITORING WELL INSTALLATION

A total of sixteen monitoring wells are planned to be installed during this RI. Three wells are planned in the vicinity of 8M, 8N and 8QH, four wells are planned in the vicinity of 8D and 8QF, and five wells are planned in the vicinity of the Bauman Bus Plume. No new well installations are planned for 8F. All drilling and well installation activities will be performed by a drilling company certified by the state of New York. The requirements for monitoring well construction and development are briefly discussed in the following sections.

### 7.3.1 Monitoring Well Construction

Monitoring wells will be installed using a drill rig with 8 1/4–in. outside diameter hollow-stem augers (HSAs). This technique, which is compatible with the base soils, will ensure the integrity of the borehole, allow for proper casing alignment, sand packing, and grouting of the annular space. The maximum depth is assumed to be 48 ft for the shallow wells and 68 ft for the deep wells. The total borehole depth will be adjusted based on the required screen depth and the depth at which groundwater is encountered in the boreholes.

A total of three Shelby tube samples will be obtained from selected well borings in the vicinity of 8M, 8N, 8QH, 8D and 8QF, and the Bauman Bus Plume. Two of the Shelby tube samples will be collected from the vadose zone with the specific interval being based on field observations (i.e. soil types and textures). The third will be collected from the soil/groundwater interface in one of the well borings. The Shelby tube samples will be submitted to a laboratory for analysis of geotechnical parameters.

Split-spoon samples will be collected every 5 ft during HSA drilling activities (well boring installation) beginning at 10 ft BGS. The geologist will describe the recovered soil samples, and record the observations in the field logbook. The split-spoon samples will be field screened using a PID to ensure that monitoring wells are not installed in contaminated areas. Representative samples from the split-spoons will be placed in a sealing plastic bag and headspace readings will be taken. Results will be recorded in the field logbook. No laboratory analytical samples are planned from the monitoring well boreholes.

Results from previously conducted direct-push groundwater screening will be evaluated to ensure that monitoring wells are not installed in contaminated areas. If volatile organic compounds are detected in the direct-push groundwater screening samples at concentrations exceeding action levels, then the PEER Program Manager and the ANG Project Manager will be notified to discuss whether an alternate location for the well installation should be selected.

Following borehole installation, precleaned, 2-in. diameter, Schedule 40 polyvinyl chloride (PVC) casing and screen will be installed along with threaded PVC end caps and 0.01-in. slotted screens, with 15 ft screens for shallow wells and 10 ft screens for deep wells. Shallow well screens will be positioned to have a minimum of 3 ft of screen above the static water level at the time of installation. The well will be constructed by suspending the casing and screen assembly inside the HSAs and slowly adding the sand filter pack through a 1-in. tremie pipe. The sand pack will consist of washed and bagged rounded silica sand, sized appropriately for a 0.01-in. screen. If necessary, another more appropriate sand pack and screen slot size will be selected so that the screen does not become plugged and is open to the water-bearing formation, producing a sand-free well. The sand pack will be placed around the screen from approximately 1 ft below the bottom of the end cap to a minimum of 2 ft above the screen. A minimum of 2 ft of bentonite pellets will be placed above the filter pack by the tremie method. Clean potable water will be added to the bentonite and will be allowed to hydrate for at least 1 hr. A bentonite-cement grout will be tremied into the annular space to the top of the borehole and allowed to settle. The grout will have a density of 13.5 to 14.1 lb/gal. Other grout types may be employed if conditions so require, but all grout types and installations will conform to ANG and NYSDEC requirements. The grout will be allowed to set for more than 24 hours before well development. Monitoring wells will be completed as flush-mounted wells with 8-inch, watertight, load-bearing, locking manholes and 2 ft by 2 ft by 4-in. concrete pads. The newly installed wells will be locked and keyed alike. Well logs and construction diagrams will be completed by the Project Geologist for newly installed wells, and submitted along with the final report.

### 7.3.2 Monitoring Well Development

Well development will be conducted to clean up the filter pack material and to ensure that fresh formation water will be sampled. A minimum of 24 hours from grouting the wells will elapse prior to well development.

After determining the depth to the bottom of the casing, well development will proceed using the indicator method in accordance with QAPP SOP F-15 "Well Installation, Development, and Abandonment" (PEER 1995a) using either bailers and/or pumps.

If a bailer is used, it will be placed in the well and allowed to sink to the bottom of the casing. Then, the bailer will be slowly withdrawn while being simultaneously raised and lowered (surged) throughout the screened interval of the well. Once the bailer reaches the ground surface, it will be emptied, and the process will be repeated. If a pump is used for development, then it will be slowly lowered in the well until it reaches the bottom of the screen. The pump will be turned on, and will be simultaneously raised and lowered (surged) throughout the screened interval of the well. This process with the pump will be repeated until development is complete.

Parameters including pH, conductivity, temperature, and turbidity will be recorded in the field logbook initially and after each well volume removed. Well development will continue until the water is relatively free and clear of sediment.

The volume of water removed during development will be recorded in the field logbook. Development water will be containerized on site in 55-gal drums. Pumps and non-disposable bailers will be decontaminated before using and between wells in accordance with the equipment decontamination procedures discussed in Section 13.0.

## 7.4 GROUNDWATER CONFIRMATION SAMPLING

Groundwater monitoring samples will be collected from twenty-six monitoring wells at the sites to confirm the results obtained from the groundwater screening samples obtained during the direct-push activities. The groundwater monitoring wells to be sampled during the RI will include both newly installed wells and selected existing wells. These wells and the corresponding site locations are summarized in Table 7.1. Monitoring well purging and sampling are briefly discussed in the following sections. Groundwater sampling procedures are presented in Section 8.0.

### 7.4.1 Monitoring Well Purging

After determining the depth to static water, purging will proceed using a submersible pump in accordance with QAPP, SOP F-16 "Guidelines for Well Purging." Purging will begin after determining the total volume of water in the well. A minimum of three well volumes will be purged from the well. If the well is bailed to dryness before three volumes are obtained, no further purging will be conducted, and the well will be allowed to recover.

If the pump is powered using a gasoline-powered generator, it will be place at least 30 ft from the well. The pump will be tuned on and the pumping rate will be adjusted until the flow from the discharge tube is uniform. The following indicator parameters will be monitored using a water quality indicator and for every well volume of water removed: pH, temperature, specific conductivity, dissolved oxygen, and oxidation-reduction potential (eH).

**Table 7.1**
**Summary of Wells to be Sampled During the RI**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Well Location | Newly Installed Wells | Existing Well(s) |
|---|---|---|
| Sites 8M, 8N and 8QH | 3 | MW-001 and SDW-018 |
| Sites 8D and 8QF | 4 | SDW-003 |
| Bauman Bus Plume | 5 | SW-01, MW-002, MW-003, S11-MW01, SDW-005, SDW-006, SW-02 |
| Site 8F | None | SDW-013 |

Purging will be considered complete and sampling may begin when the purge water is relatively free of sediment and when indicator parameters have stabilized for three consecutive readings. Stabilization is defined as follows:

- specific conductivity (± 10%);
- temperature (± 1°C);
- pH (± 0.1 unit).

If a well is purged dry during the purging process, the well should be sampled as soon as the water level in the well has sufficiently recovered to allow collection of the samples. The volume of water removed during purging will be recorded in the field logbook. Purge water will be containerized on site in 55-gal drums.

### 7.4.2 Monitoring Well Sampling

During the RI, groundwater samples will be collected from sixteen newly installed wells and ten existing wells (including any authorized optional wells). Upon collection, the samples will be submitted to a state-certified laboratory for analysis.

# 8.0 SAMPLE COLLECTION PROCEDURES

The following sections discuss soil and groundwater sampling procedures that will be employed during this RI. Samples will be shipped to the laboratory via overnight service (Federal Express). Chain-of-Custody will be maintained on all samples from the time of collection through laboratory analysis. The required sample container types, sizes, and preservatives were previously presented in Table 6.2.

## 8.1 SOIL SAMPLING PROCEDURES

Direct-push probes will be advanced at Subsites 8D, 8M, 8N, 8QF, and 8QH to allow collection of soil samples. Soil samples will not be collected from probes advanced in the vicinity of the Bauman Bus Plume or at Subsite 8F. In addition, Shelby tube samples will be collected from three of the well borings. Should it be determined that contingency surface soil samples are required, an addendum work plan will be prepared describing sample collection techniques and analyses.

### 8.1.1 Direct-Push Soil Samples

Two soil samples will be collected from selected direct-push probes and submitted to the laboratory for analysis. The first sample will be collected from between 10 ft BGS and the capillary fringe, and the second sample will be collected immediately at the capillary fringe. The sample to be obtained between 10 ft BGS and the capillary fringe will be collected from an interval to be determined in the field by the Project Geologist. In general, samples from the interval with the highest PID reading will be designated for analysis as the first sample from the probe. If no evidence of contamination is present based on field observations or screening, the sample from the 10 to 12 ft interval will be submitted to the laboratory for analysis as the first sample.

Samples will be obtained at 5 ft intervals in samplers lined with acetate sleeves from approximately 10 ft BGS to total depth in each of the probes. Once the sampler has been brought to the surface, the acetate sleeves will be extruded and cut open. The soil core will be scanned using a PID, and a portion of the top section will be used for headspace screening and geologic logging.

Samples collected for analysis of volatile organics will be collected first from the approximate center of the soil core. Samples for analysis of semivolatiles and metals will be collected next. The samples will be placed into 4-oz glass bottles using decontaminated stainless-steel spoons. Sample jars for volatile organics analysis will be filled as completely as possible with soil to prevent air space. Samples will be free of grass, twigs, and large gravel. Sample containers will be wiped to remove any debris, labeled, and placed in a cooler with water ice.

### 8.1.2 Surface Soil Samples

Surface soil samples will be collected on a contingency basis should subsurface samples indicate that contamination may be present. Surface soil samples will be collected from 0 to 2-inches BGS at the location where the subsurface soil samples were collected. Surface soil samples will be collected using a decontaminated steel spoon, from an undisturbed location (if available). Samples for volatile organics analysis will be collected directly into the appropriate sample container. Samples for semivolatiles and metals will be mixed in a decontaminated stainless steel mixing bowl before being collected in the appropriate sample containers..

## 8.2 GROUNDWATER SAMPLING PROCEDURES

Groundwater samples will be obtained from newly installed and selected existing monitoring wells. In addition, groundwater-screening samples will be obtained from each of the probes advanced at the sites.

### 8.2.1Monitoring Well Samples

The monitoring wells will be sampled in accordance with the ANG IRP Investigation Protocol (ANG 1998) and the procedures in this work plan. After the parameters have stabilized and purging is complete, the pump will be removed from the well, and the samples will be collected using a new disposable bailer.

Samples to be analyzed for volatile organics will be collected first in two 40-ml amber-glass vials. To reduce volatilization, the volatile organics samples will be collected into pre-preserved sample containers which will be filled with minimal disturbance. In order to ensure that no airspace or bubbles are present, each vial will be slowly filled until a meniscus is formed over each rim. Caps will then be place on the vials, and the vials will be inverted, lightly tapped, and checked for the presence of air bubbles. Samples for semivolatile analysis will be obtained after collection of the volatile samples. Semivolatile samples will be collected in two 1-L amber jars. The jars will be slowly filled leaving some air space in the container. Samples to be analyzed for biological indicator parameters will be collected last into three pre-preserved, 250-mL polyethylene bottles. Samples for analysis of biological indicator parameters will be collected from seven selected wells during both rounds of sampling activities. After collection, each sample container will be labeled, wiped clean with a paper towel, packed in a cooler with double-bagged water ice, and cooled to 4°C. The samples will be shipped to the laboratory via overnight service, delivered to the laboratory by the field crew, or picked up by a laboratory courier. Chain-of-Custody will be maintained on all samples from the time of collection through laboratory analysis. The required sample container types, sizes, and preservatives are presented in Table 6.2.

Monitoring well sampling will be conducted in tow rounds (Rounds 1 and 2). The second round of groundwater sampling will occur within 4 weeks after the initial sampling round.

### 8.2.2 Groundwater Screening Samples

Groundwater screening samples will be obtained from each of the direct-push probes using stainless-steel screen point samplers. The screen point sampler consists of a wire-wrapped stainless-steel screen and a carbon steel drive point. The stainless-steel screen is protected inside the tool string of the direct-push rig while advancing the probes.

The groundwater samples will either be collected from the stainless-steel screen of the probes using either disposable Teflon® tubing or a decontaminated mini-bailer. Upon reaching the water table, extension rods will be passed down through the tool string to the bottom of the screen to hold it in place while the tool string is being retracted. Once the tool string is retracted and the screen is exposed, the screen will begin filling with water. After the screen is sufficiently filled with water, Teflon® tubing equipped with a check valve will be inserted down the tool string and into the screen. Upon reaching the screen, the tubing will be oscillated up and down to bring groundwater to the surface. A small quantity of water (approximately ½ liter) will be purged from the screen (if sufficient water is present) and the groundwater screening sample will obtained by collecting the water directly from the tubing into two 40-mL vials. If a mini-bailer is used to collect the groundwater-screening sample, it will be slowly lowered into the screen in such a way as to avoid or minimize agitation of the water column. When the mini-bailer is filled it will be slowly lifted to the ground surface and poured directly into the sample containers.

## 8.3 LAND SURVEYING

The sites will be surveyed by a New York-registered land surveyor following installation of all probes and wells. The survey will include:

- A limited general civil survey for the sites to determine surface elevations, locations and elevations of any structures and site utilities; and
- A post-installation survey for location, ground surface elevation, and top-of-casing elevations for the monitoring wells, and ground surface elevations and locations of all probes.

All plane and vertical surveys will be of third-order accuracy (vertical control 0.01 ft and horizontal control 0.1 ft) and all elevations will be referenced to the National Geodetic Vertical Datum (i.e., MSL).

## 8.4 FIELD QUALITY CONTROL

To enhance the reliability of field sampling procedures and materials, field quality control (QC) samples will be collected or prepared as described in the Site-Specific QAPJP in Appendix B. The actual numbers and types of QC samples to be collected were previously presented in Table 6.2.

### 8.4.1 Field Documentation Procedures

All documentation will take place on either appropriate file forms or in a site logbook. All writing instruments will contain black permanent ink only. Pencils, erasers, correction fluid or correction tape will not be used for this effort. Errors in field documentation will be lined through, initialed, dated, and corrected. All forms will be kept on site in a central location during the field activities.

All field activities will be documented in the field logbook. The logbook will contain waterproof pages that are consecutively numbered, and be permanently bound with a hard cover. Upon completion of daily activities, any unused portions of pages will be lined-through and initialed. Field team members will review logbooks on a daily basis and sign off on each page individually upon approval.

### 8.4.2 Field Logbook

The field logbook will chronicle all field activities in accordance with QAPP SOP F-1 "Field Logbook" (PEER 1995), and in accordance with the Site-Specific QAPJP (Appendix B). The primary purpose of the field logbook is to contain the daily field activities and to provide descriptions of each activity. All entries in the field logbook will be recorded and dated by person making the entry.

### 8.4.3 Field Equipment

The logbook will document the calibration of field equipment. All equipment will be inspected and approved by the Site Manager before being used. All field instruments will be calibrated daily.

### 8.4.4 Field Data Forms

Field data forms will be competed and maintained for selected field activities. The field data forms that may be used on this project are subsurface boring logs, well development logs, and well sampling/purging logs.

### 8.4.5 Sample Handling Procedures

All samples will be handled in accordance with the Site-Specific QAPJP (Appendix B). Additional information is provided in the following subsections.

#### 8.4.5.1 Sample Identification

All samples collected during the field activities will be placed in an appropriate sample container (cooler) for shipment to the laboratory. Each sample container will be identified with a waterproof label. Any errors will be crossed-out with a single line, and initialed. Each securely affixed label will include the following information:

- Sample identification;
- Sampler's name or initials;
- Preservative added;
- Date and time sample was collected; and
- Type of analysis to be conducted.

#### 8.4.5.2 Sample Numbering System

All samples collected will be assigned a unique sample number according to QAPP SOP F-2 "Sample Identification," and as described in the Site-Specific QAPJP (Appendix B).

#### 8.4.5.3 Sample Containers and Labels

A summary of sampling requirements was previously presented in Table 6.2. Additional requirements are provided in the QAPJP (Appendix B). Field personnel will collect a sufficient volume of each sample in the appropriate containers to allow for all the analyses that are scheduled to be performed. If sufficient material can not be collected to allow for all analyses, the field project manager will note the circumstances in the logbook, and consult with the ANG project manager to determine which analyses to perform.

The sample labels will be supplied along with the bottles. The labels will be placed upon the containers prior to sample collection, and a unique sample number will be assigned to each sample in waterproof ink as described in the Site-Specific QAPJP (Appendix B).

# 9.0 ARARs – SOIL AND GROUNDWATER ACTION LEVELS

This section identifies the ARARs that will be applied with respect to analytes detected in site soils and groundwater in accordance with NYSDEC recommendations.

## 9.1 GROUNDWATER

Action levels for groundwater constituents are selected by determining the applicability of the principle organic contaminant (POC) groundwater standard. This procedure consists of five steps which are outlined in the Division of Water Technical and Operational Guidance Series (TOGS) guidance document (NYSDEC 1991).

The first step in determining an action level requires finding the constituent of concern in one of three tables present in the TOGS guidance document. If the constituent of concern is not listed in TOGS Table 1; then values listed in Table 2 or Table 3 of the TOGS guidance document are used. These tables are summarized below. If the constituent of concern is not included in any of the three TOGS tables, then the following definitions apply:

- NYS Ambient Water Quality Standards and Guidance Values (TOGS Table 1)
- Partial List of Substances Regulated by the POC Groundwater Standard of 5 µg/L (TOGS Table 2)
- Partial List of Substances Not Regulated by the POC Groundwater Standard (TOGS, Table 3)
- Definitions of POC Class 1 (halogenated alkanes) and Class 2 (halogenated ether) (TOGS, page 9)

If the constituent of concern is not found during these four steps, then NYSDEC assistance is required to determine an appropriate action level (Step 5). Table 9.1 presents action levels for groundwater relative to NYS guidance and federal MCLs. If standards or guidance values are less than laboratory reporting limits, the reporting limits will be used as action levels (ABB-ES 1997).

**Table 9.1**
**Action Levels for Groundwater**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | MCL (µg/L) | NYSDEC Class GA Groundwater (µg/L) | Reporting Limit (µg/L) |
|---|---|---|---|
| **Volatile Organic Compounds** | | | |
| Acetone | - | **50** | 10 |
| Methylene chloride | - | **5** | 5 |
| 2-Butanone | - | **50** | 5 |
| Benzene | **5** | 0.7 | 5 |
| Carbon Disulfide | - | **50** | 5 |
| Chlorobenzene | - | **5** | 5 |
| Chloroform | 100 | **7** | 5 |
| 1,1-Dichloroethane | - | **5** | 5 |
| 1,1-Dichloroethene | 7 | 5 | **10** |
| cis-1,2-Dichloroethene | 70 | **5**[1] | 5 |
| trans-1,2-Dichloroethene | 100 | **5** | 5 |
| Ethylbenzene | 700 | **5** | 5 |
| 4-Methyl-2-Pentanone | - | **50 G** | 10 |
| Tetrachloroethene | 5 | **5** | 5 |
| Toluene | 1,000 | **5** | 5 |
| 1,1,1-Trichloroethane | 200 | **5** | 5 |
| Trichloroethene | 5 | **5** | 5 |
| o-Xylene[2] | 10,000 | **5** | 5 |
| m/p-Xylenes[2] | 10,000 | **5** | 10 |
| **Semivolatile Organic Compounds** | | | |
| Acenaphthene | - | **20 G** | 20 |
| Acenaphthylene | - | **50**[3] | 20 |
| Anthracene | - | **50 G** | 20 |
| Benzo(a)anthracene | 0.1 P | 0.0002 G | **20** |
| Benzo(a)pyrene | 0.2 | ND | **20** |
| Benzo(b)fluoranthene | 0.2 P | 0.002 G | **20** |
| Benzo(g,h,i)perylene | - | **50**[3] | 20 |
| Benzo(k)fluoranthene | 0.2 P | 0.002 G | **20** |
| bis(2-ethylhexyl)phthalate[4] | 6 | **50** | 20 |
| Butylbenzylphthalate | 100 P | **50 G** | 20 |
| Benzyl Alcohol | - | 50[3] | **20** |
| 4-Chloro-3-methylphenol | - | 1[5] | **20** |
| 2-Chloronaphthalene | - | 10 G | **20** |
| 2-Chlorophenol | - | 1[5] | **20** |
| Chrysene | 0.2 P | 0.002 G | **20** |
| Dibenzofuran | - | **50**[3] | 20 |
| Dibenz(a,h)anthracene | 0.3 P | **50**[3] | 20 |
| 1,2-Dichlorobenzene | 600 | 4.7 | **5** |
| 1,3-Dichlorobenzene | 600 | **5** | 5 |

**Table 9.1 (Continued)**
**Action Levels for Groundwater**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | MCL (µg/L) | NYSDEC Class GA Groundwater (µg/L) | Reporting Limit (µg/L) |
|---|---|---|---|
| **Semivolatile Organic Compounds** | | | |
| 1,4-Dichlorobenzene | 75 | 4.7 | **5** |
| 2,4-Dichlorophenol | - | 1[5] | **20** |
| Diethylphthalate | - | **50 G** | 20 |
| Dimethylphthalate | - | **50 G** | 20 |
| 2,4-Dimethylphenol | - | 1[5] | **20** |
| Di-n-butylphthalate | - | **50[3]** | 20 |
| Di-n-octylphthalate | - | **50 G** | 20 |
| 2,4-Dinitrophenol | - | 1[5] | **20** |
| 2,4-Dinitrotoluene | - | 5[1] | **20** |
| 2,6-Dinitrotoluene | - | 5 | **20** |
| 4,6-Dinitro-2-methylphenol | - | 1[5] | **20** |
| Fluoranthene | - | **50 G** | 20 |
| Fluorene | - | **50 G** | 20 |
| Hexachlorobenzene | 1 | 0.35 | **20** |
| Hexachlorobutadiene | - | 5 | **20** |
| Hexachlorocyclopentadiene | 50 | 5 | **20** |
| Hexachloroethane | - | 5[1] | **20** |
| Indeno(1,2,3-c,d)pyrene | 0.4 P | 0.002 G | **20** |
| Isophorone | - | **50 G** | 20 |
| 2-Methylnaphthalene | - | **50[3]** | 20 |
| 2-Methylphenol | - | 1[5] | **20** |
| 4-Methylphenol | - | 1[5] | **20** |
| Naphthalene | - | **10 G** | 10 |
| Nitrobenzene | - | 5 | **20** |
| 2-Nitrophenol | - | 1[5] | **20** |
| 4-Nitrophenol | - | 1[5] | **50** |
| 2,2-oxybis(1-chloropropane) | - | **50[3]** | 20 |
| Pentachlorophenol | 1 | 1[5] | **20** |
| Phenanthrene | - | **50 G** | 20 |
| Phenol | - | 1[5] | **50** |
| Pyrene | - | **50 G** | 20 |
| 1,2,4-Trichlorobenzene | 70 | 5[1] | **20** |
| 2,4,5-Trichlorophenol | - | 1[5] | **20** |
| 2,4,6-Trichlorophenol | - | 1[5] | **20** |

**Table 9.1 (Continued)**
**Action Levels for Groundwater**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | MCL (µg/L) | NYSDEC Class GA Groundwater (µg/L) | Reporting Limit (µg/L) |
|---|---|---|---|
| **Inorganic Constituents** | | | |
| Arsenic | 50[6] | **25** | 10 |
| Cadmium | 5 | **10** | 10 |
| Chromium | 100 | **50** | 10 |
| Lead | TT 15[7] | **25** | 10 |
| Selenium | 50 | **10** | 10 |
| Silver | 100 S | **50** | 10 |

| | |
|---|---|
| - | No promulgated standard or guidance value available. |
| G | Guidance values taken from Zambrano, J., 1991. |
| MCL | Maximum Contaminant Level. |
| ND | Non-detectable concentration. |
| NYS | New York State |
| P | Standard is proposed. |
| S | Secondary Federal Maximum Contaminant Level. |
| TT | Treatment Technique Action Level. |
| U.S. EPA | United States Environmental Protection Agency. |

Notes:

Action levels are bolded and shaded.

1 Compound is a Principal Organic Contaminant (POC). Under New York Department of Health (NYDOH) Drinking Water Standards (10 NYCRR Subpart 5-1), a general standard of 5 µg/L applies to all POCs unless a more stringent, compound-specific standard has been set (ABB-ES 1994).
2 Total xylene standard is applied to each isomer, equally, based upon toxicity profile data.
3 Compound is an Unspecified Organic Contaminant (UOC). Under NYDOH Drinking Water Standards (10 NYCRR Subpart 5-1), a general standard of 50 µg/L applies (ABB-ES 1994).
4 Bis(2-ethylhexyl)phthalate is listed as diethylhexylphthalate under 6 NYCRR 700-705 (ABB-ES 1994), and U.S. EPA Drinking Water Regulations and Health Advisories, November 1994.
5 NYS groundwater phenol standard of 1.0 µg/L is for total phenolic compounds.
6 Federal MCL for arsenic is under review.
7 Federal MCL and MCLG for lead is concentration in water collected from the tap.

References:

U.S. EPA, 1992, Drinking Water Regulations and Health Advisories: U.S. EPA Office of Water, Washington, D.C.

New York State Department of Environmental Conservation, “Ambient Water Quality Standards and Guidance Values, Division of Water, Technical and Operational Guidance Series (1.1.1),” 1991.

State of New York, 1993, New York Public Water Supply Regulations, Title 10, Code of Rules and Regulations, Subpart 5-1.

ABB-ES, 1997, “Site Investigation Report,” Volume I.

## 9.2 SOIL

This section briefly discusses and presents the action levels to be used for constituents detected in soils during this RI.

### 9.2.1 Organic Compounds

Action levels for volatile and semivolatile organic compounds were developed from NYSDEC guidance for determination of soil cleanup objectives (O'Toole 1994). These levels reflect the most stringent value obtained from the following alternative criteria:

- Human health-based levels that correspond to excess lifetime cancer risks of one in 1,000,000 for Class A and B carcinogens, or one in 100,000 for Class C carcinogens. These levels are calculated by NYSDEC using U.S. EPA cancer slope factors and exposure scenarios which ensure acceptable risk. Class A carcinogens are proven human carcinogens; Class B are probable human carcinogens; and Class C are possible human carcinogens.

- Human health-based levels for systemic toxicants, calculated from Reference Doses (RfDs). RfDs represent an estimate of daily exposure an individual can experience without appreciable risk of health effects during a lifetime.

- Environmental concentrations protective of groundwater/drinking water quality. These concentrations are based on the Water-Soil Equilibrium Partition Theory which assumes that organic matter present in soils will adsorb organic compounds and attenuate continued migration. The concentrations are dependent on the amount of carbon present in the soil and whether or not the soil is in contact with groundwater. This approach predicts a maximum, estimated soil concentration which does not generate a leachate likely to impact groundwater quality above applicable standards.

Human health-based criteria were compiled from EPA Health Effects Assessment Summary data (O'Toole 1994). Environmental concentrations protective of groundwater/drinking water quality are based on NYSDEC calculations which assume 1% total organic carbon and a correction factor of 100 for saturated soils. Soils located within 5 ft of the water table were considered saturated (ABB-ES 1997).

Action levels are summarized relative to NYS guidance and reporting limits in Table 9.2. Reporting limits which exceed NYS guidance will be used as action levels. Site background data from the Site Investigation Report are included in this table for comparison because background concentrations which exceed health-based levels can be used as action levels. Soils with a discernible odor of a particular chemical or substance will be considered indicative of a release, regardless of contaminant concentration(s) (ABB-ES 1997).

### 9.2.2 Inorganic Compounds

Action levels for inorganic constituents were developed from NYSDEC guidance for determination of soil cleanup objectives (NYSDEC 1994). The levels are based on the upper limit value (ULV) of site background concentrations, excluding outliers, as recommended by NYSDEC (ABB-ES 1997). The ULV was calculated from the mean of background constituent concentrations plus three standard deviations.

**Table 9.2**
**Action Levels for Organic Compounds in Soil and Sediment**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | U.S. EPA Health-Based Levels | | Range of Background Concentrations (mg/kg) | Environmental Concentrations Protective of Groundwater Quality | | Reporting Limit (mg/kg |
|---|---|---|---|---|---|---|
| | Carcinogens (mg/kg) | Systemic Toxicants (mg/kg) | | Saturated [1] Soil (mg/kg) | Unsaturated [2] Soil (mg/kg) | |
| **Volatile Organic Compounds [3]** | | | | | | |
| Acetone | NA | 8000 | ND | **0.0011** | **0.2** | 0.010 |
| Benzene | 24 | NA | ND – 0.8 | 0.0006 | **0.06** | **0.005** |
| 2-Butanone | NA | 4000 | ND | **0.003** | **0.3** | 0.010 |
| Chlorobenzene | NA | 2,000 | ND | **0.017** | **1.7** | 0.005 |
| Chloroform | 114 | 800 | ND | 0.003 | **0.3** | **0.005** |
| 1,1-Dichloroethane | NA | NA | ND | 0.002 | **0.2** | **0.005** |
| 1,1-Dichloroethene | 12 | 700 | ND | 0.004 | **0.4** | **0.005** |
| cis-1,2-Dichloroethene | NA | NA | ND | NA | NA | **0.005** |
| trans-1,2-Dichloroethene | NA | 2,000 | ND | 0.003 | **0.3** | **0.005** |
| Ethylbenzene | NA | 8,000 | ND – 0.032 | **0.055** | **5.5** | 0.005 |
| Methylene Chloride | 93 | 5000 | ND | **0.001** | **0.1** | 0.005 |
| 4-Methyl-2-Pentanone | NA | NA | ND | **0.01** | **1.0** | 10 |
| Tetrachloroethene | 14 | 800 | ND | **0.014** | **1.4** | 0.005 |
| Toluene | NA | 20,000 | ND | **0.015** | **1.5** | 0.005 |
| 1,1,1-Trichloroethane | NA | 7,000 | ND – 0.16 | **0.0076** | **0.8** | 0.005 |
| Trichloroethene | 64 | NA | ND | **0.007** | **0.7** | 0.005 |
| Xylene[4] (Total) | NA | 200,000 | ND | **0.012** | **1.2** | 0.005 |
| **Semivolatile Organic Compounds [5]** | | | | | | |
| Acenaphthene | NA | 5,000 | ND | 0.9 | **50.0[6]** | **0.330** |
| Acenaphthylene | NA | NA | ND | 0.41 | **41.0** | **0.330** |
| Anthracene | NA | 20,000 | ND | **7.0** | **50.0[6]** | 0.330 |
| Benzo(a)anthracene | 0.224 | NA | ND | 0.03 | 0.224 or CRQL [7] | **0.330** |
| Benzo(a)pyrene | 0.0609 | NA | ND | 0.110 | 0.0609 or CRQL [7] | **0.330** |
| Benzo(b)fluoranthene | NA | NA | ND | 0.011 | **1.1** | **0.330** |
| Benzo(g,h,i)perylene | NA | NA | ND | **8.0** | **50.0[6]** | 0.330 |
| Benzo(k)fluoranthene | NA | NA | ND | 0.011 | **1.1** | **0.330** |
| bis(2-ethylhexyl)phthalate | 50 | 2,000 | ND | **4.35** | **50.0[6]** | 0.330 |
| Butylbenzylphthalate | NA | 20,000 | ND | **1.215** | **50.0[6]** | 0.330 |
| 4-Chloro-3-methylphenol | NA | NA | ND | 0.0024 | **0.24** | **0.330** |
| 2-Chloronaphthalene | NA | NA | ND | NA | NA | **0.330** |
| 2-Chlorophenol | NA | 400 | ND | 0.008 | **0.8** | **0.330** |
| Chrysene | NA | NA | ND | 0.004 | **0.4** | **0.330** |
| Dibenzofuran | NA | NA | ND | 0.062 | **6.2** | **0.330** |
| Dibenz(a,h)anthracene | 0.0143 | NA | ND | 1650 | 0.014 or CRQL [7] | **0.330** |
| 1,2-Dichlorobenzene | NA | NA | ND | **0.079** | **7.9** | **0.005** |
| 1,3-Dichlorobenzene | NA | NA | ND | **0.0155** | **1.6** | **0.005** |

**Table 9.2 (Continued)**
**Action Levels for Organic Compounds in Soil and Sediment**
**106th Rescue Wing New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | U.S. EPA Health-Based Levels | | Range of Background Concentrations (mg/kg) | Environmental Concentrations Protective of Groundwater Quality | | Reporting Limit (mg/kg |
|---|---|---|---|---|---|---|
| | Carcinogens (mg/kg) | Systemic Toxicants (mg/kg) | | Saturated [1] Soil (mg/kg) | Unsaturated [2] Soil (mg/kg) | |
| **Semivolatile Organic Compounds [3]** | | | | | | |
| 1,4-Dichlorobenzene | NA | NA | ND | **0.085** | **8.5** | 0.330 |
| 2,4-Dichlorophenol | NA | 200 | ND | 0.004 | 0.4 | **0.330** |
| Diethylphthalate | NA | 60,000 | ND | 0.071 | **7.1** | **0.330** |
| Dimethylphthalate | NA | 80,000 | ND | 0.02 | **2** | **0.330** |
| 2,4-Dimethylphenol | NA | NA | ND | NA | NA | **0.330** |
| Di-n-butylphthalate | NA | 8,000 | ND | 0.081 | **8.1** | **0.330** |
| Di-n-octylphthalate | NA | 2,000 | ND | **1.2** | **50.0[6]** | 0.330 |
| 2,4-Dinitrophenol | NA | 200 | ND | 0.002 | 0.2 or CRQL | **1600** |
| 2,4-Dinitrotoluene | NA | NA | ND | NA | NA | **0.330** |
| 2,6-Dinitrotoluene | 1.03 | NA | ND | 0.01 | **1** | **1.0** |
| 4,6-Dinitro-2-methylphenol | NA | NA | ND | NA | NA | **0.330** |
| Fluoranthene | NA | 3,000 | ND | **19** | **50.0[6]** | 0.330 |
| Fluorene | NA | 3,000 | ND | **3.5** | **50.0[6]** | 0.330 |
| Hexachlorobenzene | 0.41 | 60 | ND | 0.014 | 0.41[7] | **0.330** |
| Hexachlorobutadiene | NA | NA | ND | NA | NA | **1.0** |
| Hexachlorocyclopentadiene | NA | NA | ND | NA | NA | **1.0** |
| Hexachloroethane | NA | NA | ND | NA | NA | **1.0** |
| Indeno(1,2,3-cd)pyrene | NA | NA | ND | **0.032** | **3.20** | 0.330 |
| Isophorone | 1,707 | 20,000 | ND | **0.044** | **4.40** | **0.330** |
| 2-Methylnaphthalene | NA | NA | ND | **0.364** | **36.4** | 0.330 |
| 2-Methylphenol | NA | NA | ND | 0.001 | 0.1 or RL | **0.330** |
| 4-Methylphenol | NA | 4,000 | ND | 0.009 | 0.9 | **0.330** |
| Naphthalene | NA | 300 | ND – 4.6 | 0.13 | **13** | **0.330** |
| Nitrobenzene | NA | 40 | ND | 0.002 | 0.2 or CRQL | **0.330** |
| 2-Nitrophenol | NA | NA | ND | 0.0033 | 0.33 or CRQL | **0.330** |
| 4-Nitrophenol | NA | NA | ND | 0.001 | 0.1 or CRQL | **0.330** |
| Pentachlorophenol | NA | 2,000 | ND | 0.01 | 1 or CRQL | **1600** |
| Phenanthrene | NA | NA | ND | **2.2** | **50.0[6]** | 0.330 |
| Phenol | NA | 50,000 | ND | 0.0003 | 0.03 or CRQL | **0.330** |
| Pyrene | NA | 2,000 | ND | **6.65** | **50.0[6]** | 0.330 |
| 1,2,4-Trichlorobenzene | NA | NA | ND | 0.034 | 3.4 | **0.330** |
| 2,4,5-Trichlorophenol | NA | 8,000 | ND | 0.001 | 0.1 | **0.330** |
| 2,4,6-Trichlorophenol | NA | NA | ND | NA | NA | **1.0** |
| Polychlorinated Biphenyls[8] | | | ND | **10.0 (Subsurface)** | **1.0 (Surface)** | 0.160 |

CRQL Contract Required Quantitation Limit.
NA Not available.
ND Non-detectable concentration.
U.S. EPA United States Environmental Protection Agency

Notes:

Action levels are bolded and shaded.

1 Soil in direct contact with groundwater.
2 Greater than 5 ft above the water table.
3 Maximum allowable total volatile organic compounds ≤ 10 mg/kg based on soil cleanup objectives.
4 Total xylene standard is applied to each isomer, equally, based upon toxicity profile data.
5 Maximum allowable total semivolatile organic compounds ≤ 500 mg/kg based on soil cleanup objectives.
6 Per the Technical and Administrative Guidance Memorandum (NYSDEC, TAGM #4046), the Action Level of an individual semivolatile organic compound is 50 mg/kg.
7 Recommendation from U.S. EPA Health Board.
8 NYS Recommended Cleanup Objectives for polychlorinated biphenyls (PCBs) for Surface and Subsurface Soils, NYSDEC, TAGM #4046.

References:

New York State Department of Environmental Conservation, "Division of Environmental Remediation Guidance Document; Technical and Administrative Guidance Memorandum #4046; Determination of Soil Cleanup Objectives and Cleanup Levels," January 24, 1994.
ABB-ES, 1997, "Site Investigation Report," Volume I.

The Coefficient of Variation Test, presented below, was used to evaluate data distribution.

$$X_b = \frac{X1 + X2 + \ldots X_n}{n}$$

$$S_b^2 = \frac{(\overline{X}_1 - \overline{X}_b)^2 + (X_2 - \overline{X}_b)^2 \ldots (X_n - \overline{X}_b)^2}{n-1}, \quad CV = S_b / X_b,$$

Where:

| | | |
|---|---|---|
| $X_b$ | = | background mean |
| X | = | concentration of individual concentrations |
| n | = | total number of background readings. |
| $S_b^2$ | = | background variance |
| n-1 | = | degrees of freedom |
| $S_b$ | = | background standard deviation |
| CV | = | coefficient of variance |

Background data for which CV was greater than 0.50 were reevaluated without outliers and the maximum allowable concentration or ULV for individual constituents was calculated again by adding the new background ($X_b$) mean to 3 times the standard deviation ($S_b$). Outliers which do not exceed this upper limit are not considered indicative of a release. Calculations can be found in Appendix K of the ABB-ES 1997 Site Investigation Report.

NYSDEC action levels for the metals arsenic, cadmium, chromium, lead, selenium, and silver in surface soils, sediment, and subsurface soils are summarized in Tables 9.3 and 9.4. Using the results of the soil analyses from the Background Site (PEER 2002), new ULVs were calculated for these metals. The new ULVs were evaluated using the CV test, and those with their CV < 0.50 have been adopted for use in this RI. Metals failing the CV test for their new ULVs were chromium and lead in surface soils and sediment, and chromium in subsurface soils. In the current RI, the new ULVs are adopted as "revised action levels" for evaluating the above metals in soil. Calculations for the revised ULVs can be found in Appendix I of the Draft Final RI Report (PEER 2004). Action levels for the remaining metals are provided in Table 9.5. These action levels are based on NYSDEC TAGM #4046. Eastern United States or NYS background concentrations are provided for comparison.

**Table 9.3**
**Action Levels for Inorganic Compounds in Surface Soil and Sediment**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | Eastern United States or NYS Background Concentrations (mg/kg) | Range of Site Background Concentrations (mg/kg) (1) | NYSDEC Recommended Soil Cleanup Objectives (mg/kg) | Previous Upper Limit of Background Concentrations (mg/kg) (2) | Revised Upper Limit of Background Concentrations (mg/kg) (3) | Reporting Limit (mg/kg) |
|---|---|---|---|---|---|---|
| **Inorganic Constituents** | | | | | | |
| Arsenic | 3 – 12 | ND | 7.5 or SB | 0.10 | **7.7** | 0.10 |
| Cadmium | 0.1 – 1 | ND | 1 or SB | 0.10 | **0.39** | 0.05 |
| Chromium | 1.5 – 40 | 0.53 – 3.8 | 10 or SB | **6.1** | NS | 0.10 |
| Lead | 4 – 500[2] | 0.46 – 2.4 | SB | **4.4** | NS | 0.03 |
| Selenium | 0.1 – 3.9 | ND | 2 or SB | 0.10 | **2.3** | 0.05 |
| Silver | NA | ND | SB | 0.10 | **0.76** | 0.10 |

NA Not available.
ND Non-detectable concentration.
NS Upper Limit Value not supported by Coefficient of Variance Test.
NYS New York State.
SB Site background.
USA United States of America.

Notes:

Action levels are shaded and bolded.

1 Average concentrations in rural or undeveloped areas may range from 4 to 61 mg/kg. Average background concentrations in metropolitan or suburban areas or near highways are much higher and typically range from 200 to 500 mg/kg.
2 Upper limit of background concentrations are based on the mean concentration of site background constituents found during ABB-ES's SI, plus 3 times the standard deviation, excluding outliers.
3 Upper Limit Values for background concentrations are based on the mean concentration of background site analytes found during this RI, plus 3 times the standard deviation, as confirmed by the Coefficient of Variance Test. Calculations are provided in Appendix L.

References:

New York State Department of Environmental Conservation, "Division of Environmental Remediation Guidance Document; Technical and Administrative Guidance Memorandum #4046; Determination of Soil Cleanup Objectives and Cleanup Levels," January 24, 1994.

ABB-ES, 1997, "Site Investigation Report," Volume I.

# Table 9.4
# Action Levels for Inorganic Compounds in Subsurface Soil
# 106th Rescue Wing
# New York Air National Guard
# Westhampton Beach, New York

| Parameter | Eastern United States or NYS Background Concentrations (mg/kg) | Range of Site Background Concentrations (mg/kg) (1) | NYSDEC Recommended Soil Cleanup Objectives (mg/kg) | Previous Upper Limit of Background Concentrations (mg/kg) (2) | Revised Upper Limit of Background Concentrations (mg/kg) (3) | Reporting Limit (mg/kg) |
|---|---|---|---|---|---|---|
| **Inorganic Constituents** | | | | | | |
| Arsenic | 3 – 12 | ND 0.22 | 7.5 or SB | 0.10 | **5.5** | 0.20 |
| Cadmium | 0.1 – 1 | ND | 1 or SB | 0.10 | **0.27** | 0.20 |
| Chromium | 1.5 – 40 | ND | 10 or SB | **0.84** | NS | 0.20 |
| Lead | 4 – 500[2] | ND – 0.6 | SB | 0.65 | **2.7** | 0.20 |
| Selenium | 0.1 – 3.9 | ND | 2 or SB | 0.10 | **1.7** | 0.20 |
| Silver | NA | ND | SB | 0.10 | **0.60** | 0.20 |

NA Not available.
ND Non-detectable concentration.
NS Upper Limit Value not supported by Coefficient of Variance Test.
NYS New York State.
SB Site background.
USA United States of America.

Notes:

Action levels are shaded and bolded.

1 Average concentrations in rural or undeveloped areas may range from 4 to 61 mg/kg. Average background concentrations in metropolitan or suburban areas or near highways are much higher and typically range from 200 to 500 mg/kg.
2 Upper limit of background concentrations are based on the mean concentration of site background constituents found during ABB-ES's SI, plus 3 times the standard deviation, excluding outliers.
3 Upper Limit Values for background concentrations are based on the mean concentration of background site analytes found during this RI, plus 3 times the Standard Deviation, as confirmed by the Coefficient of Variance Test. Calculations are provided in Appendix L.

References:

New York State Department of Environmental Conservation, "Division of Environmental Remediation Guidance Document; Technical and Administrative Guidance Memorandum #4046; Determination of Soil Cleanup Objectives and Cleanup Levels," January 24, 1994.

ABB-ES, 1997, "Site Investigation Report," Volume I.

**Table 9.5**
**Action Levels for Inorganic Compounds in Soil and Sediment**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Parameter | NYSDEC Recommended Soil Cleanup Objectives[a] | Eastern United States or New York State Background Concentrations[b] |
|---|---|---|
| **Metals (mg/kg)** | | |
| Aluminum | Site Background | 33,000 |
| Barium | 300 or Site Background | 15 – 600 |
| Beryllium | 0.16 or Site Background | 0 – 1.75 |
| Calcium | Site Background | 130 – 35,000 |
| Cobalt | 30 or Site Background | 2.5 – 60 |
| Copper | 25 or Site Background | 1 – 50 |
| Iron | 2000 or Site Background | 2000 – 550,000 |
| Magnesium | Site Background | 100 - 5000 |
| Manganese | Site Background | 50 – 5000 |
| Mercury | 0.1 | 0.001 – 0.2 |
| Nickel | 13 or Site Background | 0.5 – 25 |
| Potassium | Site Background | 8500 – 43,000 |
| Sodium | Site Background | 6000 – 8000 |
| Vanadium | 150 or Site Background | 1 – 300 |
| Zinc | 20 or Site Background | 9 - 50 |

Notes:
(a) New York State Department of Environmental Control (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) # 4046
(b) Eastern United States Background, NYSDEC TAGM # 4046

# 10.0 CONTAMINANT FATE AND TRANSPORT

The analytical results will be compared to the action levels (as discussed in Section 9.0). A Risk Assessment will be required for those contaminants of concern not eliminated during the screening process.

Data collected during the investigation regarding the physical characteristic of the site, and contaminant source characteristics of the chemicals of concern not eliminated by the screening process, will be combined when evaluating contaminant fate and transport. The objective of assessing contaminant fate and transport is to evaluate the possibility for contaminant contact with potential receptors, such as station personnel.

The fate and transport of contaminants identified at the station will be evaluated by qualitatively assessing the following aspects:

- Potential routes of migration;
- Contaminant persistence;
- Contaminant mobility and the potential for migration of contaminants in soil, sediment, surface water, and groundwater; and
- Location and characteristics of potential receptors.

Contaminant persistence and the potential for migration will be evaluated using studies published in scientific literature based on the environmental conditions at the station, and the soil, sediment, surface water, and groundwater data obtained during the investigation.

# 11.0 BASELINE RISK ASSESSMENT

Analytical results from the RI will be compared to the NYSDEC screening values. Potential chemicals of concern for each site will be identified and a determination made if human health and ecological risk evaluations will be required for each sites. These evaluations will be used to establish any potential risks to human and ecological receptors. Based on the results, one of the following recommendations can be made for each site:

- take no further action;
- initiate immediate removal or interim action; or
- prepare an FS.

If the evaluations are required, they will be conducted in accordance with EPA guidance for conducting risk assessments for Superfund sites, including Risk Assessment Guidance for Superfund (RAGS) (EPA 1991), and supplemental bulletins.

## 11.1 HUMAN HEALTH RISK ASSESSMENT

The objective of the risk assessment is to evaluate potential risks to individuals under both current and future potential site conditions at each of the sites. The results of the assessment provide the basis for determining whether remediation is warranted for each site, and identify which media and constituents contribute significantly to potential risk so that remediation efforts can be focused on effectively reducing potential risk

### 11.1.1 <u>Identification of Contaminants of Potential Concern</u>

The analytical results from the RI, as well as other site-specific information, will be reviewed to identify COPCs for detailed study in the risk assessment. Factors considered in selecting a COPC include the concentration of the constituent, the suspected source, past activities at each site, and site-specific background or upgradient levels of concern.

Before COPCs are selected, the data collected during the RI will be summarized by environmental medium, that is, groundwater and soil. Each chemical detected for a given medium will be summarized by frequency of detection and range of detected concentrations.

Inorganic chemicals, in this case metals, at naturally occurring levels may be eliminated from the risk assessment based on comparison to background concentrations (Section 9.0). Inorganic chemicals that remain after the comparison to background will be selected and evaluated in the risk assessment (EPA 1989).

### 11.1.2 Human Exposure Assessment

The exposure assessment is used to characterize the route, frequency, duration, and magnitude of exposure to chemicals related to each site. The exposure assessment will be conducted in a series of three steps:

- receptor characterization;
- exposure pathway identification; and
- exposure quantification.

Exposure will be evaluated assuming that land use does not change in the future and that all sites will continue to support ANG activities.

**Receptor Characterization.** Potentially exposed populations (receptors) will be identified for each site. Assuming that the current and future land use will remain constant, human receptors will be limited to installation personnel and other on-site workers.

**Identification of Exposure Pathways.** The exposure pathways associated with each site are identified and are based on consideration of the sources, releases, types and location of chemicals at each site; the probable fate and transport of the chemicals; and the location and activity of receptor populations. Each exposure pathway includes: a source; a transport medium; a point of potential exposure with the contaminated medium; and a route of exposure, that is, direct contact with soil or ingestion of groundwater. A discussion will be provided in the risk assessment justifying the inclusion or exclusion of pathways from evaluation.

**Quantification of Exposure.** For each exposure pathway selected for quantitative evaluation, concentrations at the exposure point will use the RI data.

### 11.1.3 Toxicity Assessment

Contaminants of potential concern will be characterized with respect to their toxic effects in humans.

### 11.1.4 Risk Characterization

Potential human health impacts will be evaluated by comparing levels associated with estimated exposures to appropriate U.S. EPA acceptable risk ranges.

## 11.2 ECOLOGICAL RISK EVALUATION

The Ecological Risk Evaluation, if required, will use existing literature to evaluate the site for the presence of any threatened and endangered species, wetlands, and sensitive habitats.

# 12.0 FEASIBILITY STUDY

The following sections summarize the basic content of an FS, as described in the EPA guidance document "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988).

## 12.1 PURPOSE AND ORGANIZATION

The purpose of the FS is to develop and screen remedial alternatives for contaminated media identified during the investigation.

## 12.2 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

The screening criteria used to assess the remedial alternatives will include effectiveness, implementability, and relative cost. Remedial technologies will be evaluated in a two-step process. The first step will assess the applicability of a particular remedial technology and process options based on site conditions. Each alternative will be evaluated based on the physiographic, geologic, and hydrogeologic conditions at each site. Any remedial technologies and process options that cannot be accomplished at the site will be eliminated as not applicable. The second step involves further assessing the remedial technologies and process options that are potentially applicable to the site in terms of their effectiveness in achieving the remedial action objectives, ease of implementation, relative capital costs, and operation and maintenance.

The category of "effectiveness" will address the effectiveness of the remedial technologies and process options in achieving the remedial action objectives. The category of "implementability" will address the ability of the process option to be implemented based on factors such as institutional restraints, site conditions, the types of contaminants at the site, and the degree of difficulty in designing a viable process. The categories of "capital" and "operation and maintenance costs" will address the overall costs which will be categorized as low, moderate, or high within each type of remedial technology.

## 12.3 DEVELOPMENT AND SCREENING OF ALTERNATIVES

The primary objective of this phase of the FS is to develop an appropriate range of waste management options that will be analyzed fully in the detailed and comparative analysis phase of the FS. Potentially applicable treatment technologies and process options for site remediation will be identified for both soil and groundwater. Potential remedial technologies will be gathered from EPA documents, various research documents, and private industry documents.

## 12.4 DETAILED ANALYSIS OF ALTERNATIVES

Detailed analysis of alternatives will follow the development and screening of alternatives and will precede the actual selection of a remedy. The National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR 300.430 (iii), sets forth nine criteria to be used for a detailed and comparative analysis of the alternatives retained after the screening portion of the FS. The nine criteria which will be used for detailed and comparative analysis of the remedial alternatives are as follows:

- Overall protection of human health and the environment;
- Compliance with ARARs:
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume through treatment;
- Short-term effectiveness;
- Implementability;
- Cost;
- State acceptance; and
- Community acceptance.

## 12.5 RECOMMENDATIONS

Based on the results of the RI, an FS Report will be prepared, if necessary, to document the development and analysis of alternatives. It will include background information about the site based on the RI Report; the remedial action objectives for soil and/or groundwater; the estimated volume or area of soil and/or groundwater to which remedial alternatives will be applied; and the description of development, screening, and detailed and comparative analysis process of remedial alternatives and process options.

## 13.0 EQUIPMENT DECONTAMINATION PROCEDURES

Decontamination procedures for all sampling and drilling activities will be in accordance with QAPP SOP-Q3, "Decontamination-Field Equipment," or SOP-Q4, "Decontamination-Heavy Equipment" (PEER 1995), with respect to the type of equipment being decontaminated. All decontamination procedures performed during the field investigation will be documented in the field logbook. Any variances from the procedures will be noted on either a field change form or in the site logbook. Decontamination activities will take place either on a temporary decontamination pad or within the specific work area. All decontamination activities will be approved by the base EM prior to initiation.

### 13.1 SAMPLING EQUIPMENT

All tools used for sampling will be decontaminated before each use in accordance with QAPP SOP-Q3, "Decontamination-Field Equipment" (PEER 1995a). Tools not used immediately will be wrapped in aluminum foil or plastic sheets.

All sampling equipment which is not pre-cleaned and disposable (stainless steel scoops, split-spoons, etc.) and all monitoring equipment will be properly decontaminated before each use by the following procedure:

1. cleaned with a laboratory grade detergent;
2. rinsed with potable water;
3. rinsed with laboratory grade 2-propanol;
4. rinsed with ASTM Type II water; and
5. allowed to air dry.

Sampling equipment will be dried with paper towels if needed for immediate use after decontamination. No sampling equipment will be placed directly on the ground or any other potentially contaminated surface prior to use. A clean plastic sheet or other appropriate material will be placed by each sample location for all sampling equipment.

## 13.2 DRILLING EQUIPMENT DECONTAMINATION

The drilling and soil boring equipment will be thoroughly cleaned prior to drilling or soil boring activities. The split spoons and direct-push samplers used to collect soil samples during installation of the monitoring wells and soil borings will be decontaminated according to Section 13.1. Decontamination of other drilling equipment, such as rods, hollow-stem auger, bits, etc., will take place upon completion of work activities at each designated soil boring/monitoring well location, as described below.

All drilling equipment decontamination will take place in a temporary decontamination pad constructed for this field effort. The location of the decontamination pad where drilling equipment decontamination will take place will be approved by the base EM prior to construction. All drilling or soil boring equipment decontamination activities will be conducted in accordance with QAPP SOP-Q4, "Decontamination-Heavy Equipment" (PEER 1995a).

Prior to starting any work, the Drilling Subcontractor will construct a temporary pad on site for decontamination of equipment, primarily augers, using a steam cleaner. The pad will be large enough to collect and hold all decontamination materials, including decontamination water, and prevent both spillage and overspray of liquids. The pad will have a sump or low area to collect liquids. The Drilling Subcontractor will be responsible for removal of the pad after the work has been completed, and for containerization of decontamination materials.

The drill rig and associated downhole equipment will be decontaminated by steam cleaning prior to beginning any drilling activities. Thereafter, all downhole drilling equipment will be steam cleaned between each drilling location. Dirty augers will not be allowed to contact the ground surface, but instead will be placed on plastic. All augers will be cleaned and readied for work prior to leaving the site for the day. Clean augers will be stored on plastic.

Prior to work commencing, the drill rigs and other equipment will be inspected for lubricant or fluid leaks which could be a potential contaminant to soil or groundwater. Any leaks will be adequately repaired by the drillers prior to beginning work. All over-the-hole portions of the drilling equipment will be steam cleaned prior to use and as necessary between boring locations. All downhole equipment (augers, drill rods, tools, etc.) will be steam cleaned prior to use and between all subsequent boring locations.

## 14.0 BOREHOLE ABANDONMENT PROCEDURES

Direct-push probes and any well borings that are not used for well installation will be abandoned by backfilling with bentonite-cement grout according to NYSDEC requirements. Grout will be tremied in-place where applicable. After abandonment, temporary makers will be left in place so that locations can be identified during the civil survey.

# 15.0 INVESTIGATION-DERIVED WASTE MANAGEMENT

Waste materials generated from the field operations will consist of soil cuttings, purge water, decontamination fluids, and miscellaneous solid materials such as personal protective equipment (PPE) and supplies. The base is responsible for the disposition of all investigation-derived waste (IDW) generated during the field operations. If necessary, PEER will assist the base with manifesting or other paperwork.

## 15.1 SOILS

Soil cuttings generated from the direct-push and well installation activities will be stored in 55-gal drums. The drums will be labeled to indicate the source of the soil and will be stored in a designated area on site. Soil cores and soil cuttings will be field screened using a PID While performing drilling operations,. Drummed soils will be sampled for waste characterization purposes using TCLP. Following receipt of the analytical results, recommendations for disposition of the drummed soil will be provided to the EM.

## 15.2 FLUIDS

Development and purge water and decontamination water generated during the field activities will be stored in 55-gal drums. The drums will be labeled to indicate the source of the fluid and will be stored in a designated area on site. Composite samples will be collected and submitted for analysis for waste characteristics using TCLP. Following receipt of the analytical results, recommendations for disposition of the wastewater will be provided to the EM.

## 16.0 PROJECT SCHEDULES AND DELIVERABLES

The baseline project schedule is shown on Figure 16.1. The key project milestones and deliverables are shown on Table 16.1.

**Table 16.1**
**Project Milestones and Deliverables**
**106th Rescue Wing**
**New York Air National Guard**
**Westhampton Beach, New York**

| Milestone/Deliverable | Date |
|---|---|
| Final Kickoff Meeting Minutes | November 14, 2003 |
| Draft RI/FS Work Plan | January 28, 2004 |
| Draft Final RI/FS Work Plan | April 16, 2004 |
| Final RI/FS Work Plan | December 15, 2004 |
| Field Work: | |
| Direct-Push Soil and Groundwater | March 7, 2005 |
| Round 1 Groundwater Monitoring | April 22, 2004 |
| Round 2 Groundwater Monitoring | June 10, 2005 |
| Draft RI Report | September 22, 2005 |
| Draft Final RI Report | January 5, 2006 |
| Final RI Report | March 30, 2006 |
| Draft FS | March 3, 2006 |
| Draft Final FS | July 14, 2006 |
| Final FS | October 6, 2006 |

## Figure 16.1

| ID | | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|---|
| 1 | ✓ | **Task 1 Kickoff Meetings** | **30 days** | **10/6/03** | **11/14/03** | |
| 2 | ✓ | 1A: Scoping Meeting | 30 days | 10/6/03 | 11/14/03 | |
| 3 | ✓ | 1B: Regulatory Meeting | 30 days | 10/6/03 | 11/14/03 | |
| 4 | | **Task 2: NFRAP DDs for ERP Sites 1, 2, 10, 11, & 12** | **321 days** | **11/17/03** | **2/7/05** | |
| 5 | ✓ | 1A: Draft NFRAPP DDs | 63 days | 11/17/03 | 2/11/04 | 2 |
| 6 | ✓ | *ANG Review & Comments* | 50 days | 2/12/04 | 4/21/04 | 5 |
| 7 | ✓ | 1B: Draft-Final NFRAPP DDs | 17 days | 4/22/04 | 5/14/04 | 6 |
| 8 | | *ANG, NYSDEC Review & Comments* | 170 days | 5/17/04 | 1/7/05 | 7 |
| 9 | | 1C: Final NFRAPP DDS | 21 days | 1/10/05 | 2/7/05 | 8 |
| 10 | ✓ | **Task 3: RI/FS Work Plan** | **283 days** | **11/17/03** | **12/15/04** | |
| 11 | ✓ | 3A: Draft RI/FS Work Plan | 53 days | 11/17/03 | 1/28/04 | 2,3 |
| 12 | ✓ | *ANG Review & Comments* | 14 days | 2/2/04 | 2/19/04 | 11 |
| 13 | ✓ | 3B: Draft-Final RI/FS Work Plan | 41 days | 2/20/04 | 4/16/04 | 12 |
| 14 | ✓ | *ANG Review & Comments* | 15 days | 4/19/04 | 5/7/04 | 13 |
| 15 | ✓ | *PEERR RTC from ANG* | 8 days | 5/10/04 | 5/19/04 | 14 |
| 16 | ✓ | *NYSDEC Review and Comments* | 27 days | 4/19/04 | 5/25/04 | 13 |
| 17 | ✓ | *ANG RTC from NYSDEC* | 80 days | 5/26/04 | 9/14/04 | 16 |
| 18 | ✓ | *NYSDEC Final Comments* | 18 days | 9/15/04 | 10/8/04 | 17 |
| 19 | ✓ | *ANG Final OK* | 17 days | 10/11/04 | 11/2/04 | 18 |
| 20 | ✓ | 3C: Final RI/FS Work Plan | 32 days | 11/2/04 | 12/15/04 | 19 |
| 21 | | **Task 4: RI Field Work** | **84 days** | **3/7/05** | **6/30/05** | |
| 22 | | 4A: Direct-Push Soil Sampling and Groundwater Screening | 27 days | 3/7/05 | 4/12/05 | 20 |
| 23 | | *Non-Working Time* | 7 days | 4/13/05 | 4/21/05 | 22 |
| 24 | | 4B: Monitoring Well Installation and Round 1 Groundwater Monitoring | 28 days | 4/22/05 | 5/31/05 | 23 |
| 25 | | *Non-Working Time* | 7 days | 6/1/05 | 6/9/05 | 24 |
| 26 | | 4C: Round 2 Groundwater Monitoring | 15 days | 6/10/05 | 6/30/05 | 25 |
| 27 | | **Task 5: Remedial Investigation Report** | **195 days** | **7/1/05** | **3/30/06** | 21 |
| 28 | | 5A: Draft Remedial Investigation Report | 60 days | 7/1/05 | 9/22/05 | 24 |
| 29 | | *ANG Review & Comments* | 30 days | 9/23/05 | 11/3/05 | 28 |
| 30 | | 5B: Draft-Final Remedial Investigation Report | 45 days | 11/4/05 | 1/5/06 | 29 |
| 31 | | *ANG, NYSDEC Review & Comments* | 30 days | 1/6/06 | 2/16/06 | 30 |
| 32 | | 5:C Final Remedial Investigation Report | 30 days | 2/17/06 | 3/30/06 | 31 |
| 33 | | **Task 6: Feasibility Report** | **196 days** | **1/6/06** | **10/6/06** | 30 |
| 34 | | 6A: Draft Feasibility Study Report | 60 days | 1/6/06 | 3/30/06 | 30 |
| 35 | | *ANG Review & Comments* | 30 days | 3/31/06 | 5/11/06 | 34 |
| 36 | | 6B: Draft-Final Feasibility Study Rep | 46 days | 5/12/06 | 7/14/06 | 35 |
| 37 | | *ANG, NYSDEC Review & Comments* | 30 days | 7/17/06 | 8/25/06 | 36 |
| 38 | | 6C: Final Feasibility Report | 30 days | 8/28/06 | 10/6/06 | 37,32 |
| 39 | | **Task 7: Monthly Progress Reports** | **784 days** | **1/5/04** | **1/4/07** | |

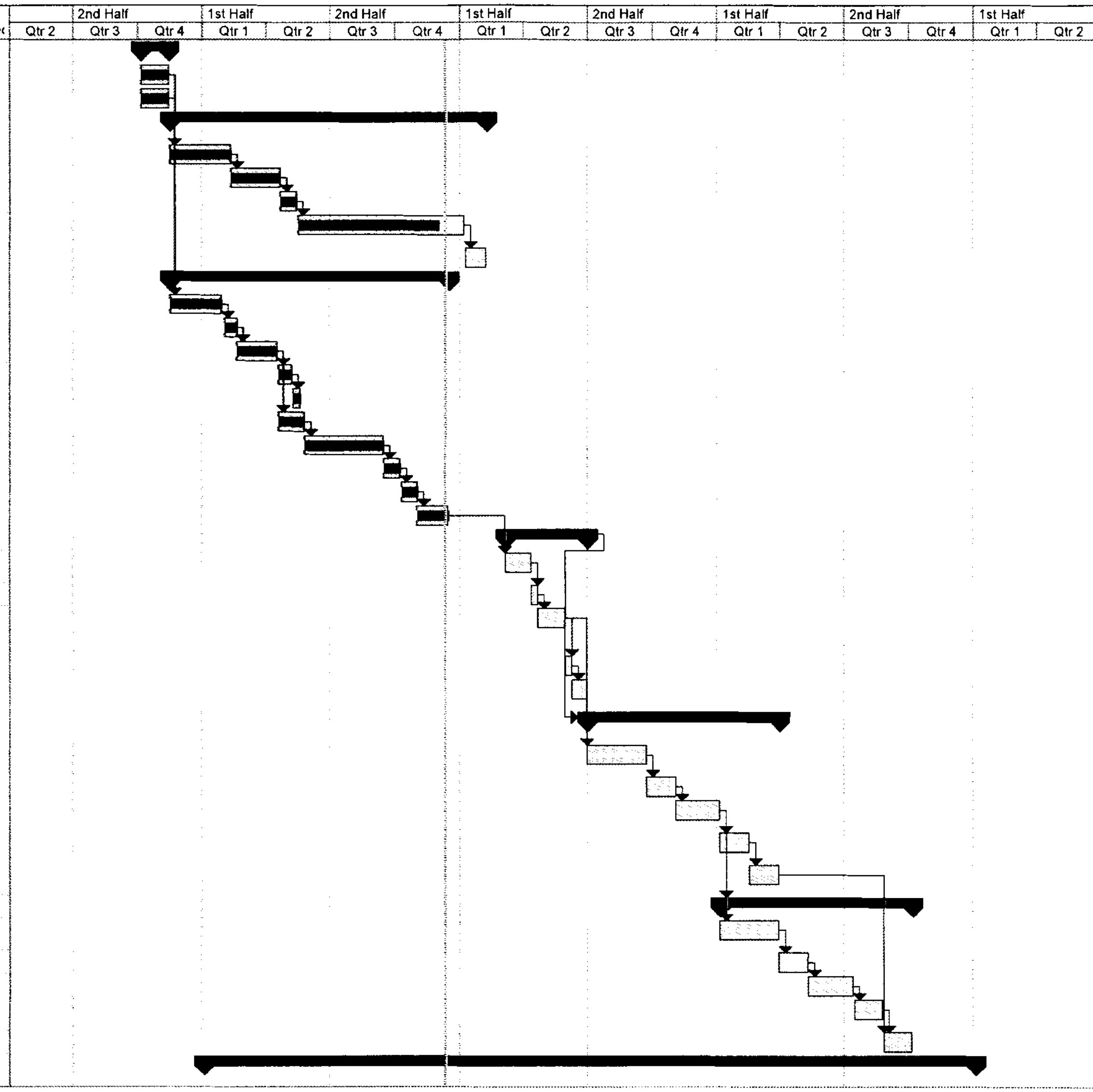



Figure 16.1 Planned Schedule for RI/FS at Site 8 and Bauman Bus Plume and NFRAPP-DDs at Sites 1, 2, 10, 11, and 12

| | | | | | |
|---|---|---|---|---|---|
| Task | | Milestone | ◆ | External Tasks | |
| Split | | Summary | | External Milestone | |
| Progress | | Project Summary | | Deadline | ⇩ |

# 17.0 RI REPORT

## 17.1 RI REPORT PURPOSE

The purpose of an RI Report is to document and discuss the investigation findings concerning the nature and extent of groundwater contamination, the rates and routes of contamination migration, any potential receptors, and all other data.

## 17.2 RI REPORT FORMAT

The RI Report format will be prepared in accordance with the ANG sample outline presented in Figure 17.1.

**RI Report Sample Outline**



EXECUTIVE SUMMARY: This is a short synopsis of activities performed, findings, conclusions, and recommendations reached. This should be done for each site. Each site discussion should be limited to one or two paragraphs. The total Executive Summary should be no more than two or three pages.

1.0 INTRODUCTION: This should include a discussion of the IRP process. The purpose of the Remedial Investigation (RI) should be discussed in more detail than other phases of the IRP including how the RI relates to other phases and possible further actions (RA, DD, etc.). The IRP flow chart should be included in this section.

2.0 FACILITY BACKGROUND:

2.1 FACILITY HISTORY: Overall base history should be discussed, including mission (past and present) and aircraft operations (past and present). Provide any other events in the history of the facility that could relate to environmental studies. Provide a map showing the location of the base within the state. Prior investigations should be discussed in this section. In most cases, the only prior investigations will be the PA and SI. List sites that were recommended for DDs. Defer discussions of sites under study (RI) until the next section.

2.2 SITE DESCRIPTIONS: Provide a map showing the IRP sites on the base. This is a site-by-site description of, and discussion of why, each site was selected for study in the RI. This should include findings from the SI and history of sites.

3.0 ENVIRONMENTAL SETTING: Provide topographic information, regional and local geology, soils, groundwater, and surface water hydrology. Maps and figures should include soils map, geology maps, stratigraphic column, and surface drainage map.

4.0 FIELD PROGRAM: Site-specific information should be avoided in this section. This section is intended to summarize the methods used in the field program.

4.1 SUMMARY: Discuss overall approach, such as screening versus confirmation sampling activities and locations.

4.2 DEVIATIONS FROM THE WORK PLAN: This is a discussion of base-wide deviations from the Work Plan, such as substituting one drilling method for another due to unexpected conditions, changing sampling protocols, or changing lab methods, etc. If extra sampling is required at a site, or there is a change in the sampling locations at a site, then supply information in the discussion for that particular site under Investigation Findings (Section 5.0). If there are no significant base-wide deviations, then this section may be omitted.

4.3 FIELD SCREENING ACTIVITIES: Discuss only the screening methods employed in the field program. Avoid site specifics. Discuss the methods and uses of the various techniques employed, including:

4.3.1 Geophysics
4.3.2 Soil Gas Survey
4.3.3 Hydropunch
4.3.4 Piezometer Installation

Figure 17.1. RI Report Format

4.4 CONFIRMATION ACTIVITIES: Avoid site specifics (Section 5.0 will address). Include discussion of the following:

4.4.1 Soil Borings
4.4.2 Surface Sampling
4.4.3 Monitoring Well Installation
4.4.4 Specific Media Sampling (List analytical methods for the different media. A table may also be provided to summarize activities.)

4.5 INVESTIGATION-DERIVED WASTE Discuss the methods used to handle drill cuttings, wastewater, decontamination, etc. State how they were disposed of, or if they remain, recommend how they should be disposed of.

5.0 INVESTIGATION FINDINGS

5.1 BASEWIDE GEOLOGIC AND HYDROGEOLOGIC INVESTIGATION RESULTS: Discuss overall geology/hydrogeology as determined through the field effort. Provide basewide potentiometric map along with a table displaying dates, elevations and depths to groundwater, etc. Discuss also any geologic conditions that may affect contaminant migration, such as confining layers, perched groundwater, etc. Cross-sections may also be provided to aid in describing the local conditions.

5.2 BACKGROUND SAMPLING RESULTS: Discuss background sampling locations, analytical results, constituents that exceed ARARs/MCLs, etc.

5.3 SITE FINDINGS (Site 1 - Site X site by site presentation): Section 5.3 = Site 1, Section 5.4 = Site 2, etc. Maps and other figures displayed in this section should show all pertinent details referred to in the text, including sample locations, USTs with associated piping and pumps, oil/water separators, ditches, etc. Show paved and unpaved areas, building titles, and other pertinent information as appropriate.

5.3.1 Geologic and Hydrologic Investigation Results

5.3.2 Screening Results: This section is intended to discuss soil gas survey results. If a soil gas survey (or similar systematic data collection technique) is performed at the site, a map of the results should be displayed in this section. However, borehole screening results should be included in the appropriate appendix. Screening results should be discussed in this section as they pertain to selection of samples for laboratory analyses and comparison of results with samples analyzed.

5.3.3 Soils: Discuss soil study findings, including surface and subsurface. Provide maps of borehole locations, contoured to show distribution of contaminants (one map for each significant contaminant). Cross-sections should be provided showing distribution of contaminants and lithologies. Show the water table on the cross-sections. Data tables should be organized to clearly show analytical methods, the boring number and elevation from which the samples were collected, contaminant levels, and detection limits for non-detects. Duplicates (and other appropriate QC samples) should be displayed on the table next to the samples for which they were duplicated. All other QC samples associated with the site should be displayed in table form also.

Any anomalous results should be discussed. Comparisons with background should be made during these discussions.

Figure 17.1 (Continued)

5.3.4 Groundwater: The layout for groundwater findings should be similar to the section on soils. Provide a potentiometric map for the base showing piezometer and monitoring well locations and water level data. In addition, contour contaminant levels.

5.3.5 Conclusions: Compare results to background, ARARs/MCLs, etc. Include any immediate response actions taken. Data gaps (site-specific) should also be discussed.

6.0 DISCUSSION OF ARARs

7.0 CONTAMINANT FATE AND TRANSPORT

7.1 POTENTIAL ROUTES OF MIGRATION
7.2 CONTAMINANT PERSISTENCE
7.3 CONTAMINANT MIGRATION

8.0 BASELINE RISK ASSESSMENT

8.1 CHEMICAL AND PHYSICAL PROPERTIES OF CONTAMINANT OF CONCERN
8.2 HUMAN HEALTH EVALUATION
8.3 ECOLOGICAL EVALUATION

9.0 CONCLUSIONS

10.0 RECOMMENDATIONS

11.0 REFERENCES

APPENDICES:

TECHNICAL MEMORANDA ON FIELD ACTIVITIES
FIELD CHANGE REQUEST FORMS
SCREENING RESULTS
PIEZOMETER/MONITORING WELL CONSTRUCTION DIAGRAMS
BORING/WELL LOGS
AQUIFER TESTING RESULTS
CHAIN-OF-CUSTODY
ANALYTICAL DATA AND QA/QC EVALUATION RESULTS (Include data validation reports)
INVESTIGATION-DERIVED WASTE MANAGEMENT (Data tables, correspondence)

Figure 17.1 (Continued)

# 18.0 FS REPORT

## 18.1 FS REPORT PURPOSE

The purpose of a FS Report is to document and evaluate the types of response actions being considered at the site, the potential remedial alternatives being considered, and to recommend the most cost-effective remedial alternatives that will adequately protect human health, welfare, and the environment.

## 18.2 FS REPORT FORMAT

The FS Report (if required) will be prepared in accordance with the suggested ANG report outline, as presented in Figure 18.1.

**Feasibility Study Report Format**

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LIST OF FIGURES
LIST OF TABLES
ACRONYM LIST

EXECUTIVE SUMMARY

1.0 INTRODUCTION
- 1.1 Purpose and Organization of Report
- 1.2 Background Information (Summarized from RI Report)
  - 1.2.1 Site Description
  - 1.2.2 Site History
  - 1.2.3 Nature and Extent of Contamination
  - 1.2.4 Contamination Fate and Transport
  - 1.2.5 Baseline Risk Assessment

2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES
- 2.1 Introduction
- 2.2 Remedial Action Objectives - Present the development of remedial action objectives for each medium of interest (i.e., groundwater, soil, surface water, air, etc.). For each medium, the following should be discussed:
  - Contaminants of Interest
  - Allowable exposure based on risk assessment (including ARARs)
  - Development of remediation goals
- 2.3 General Response Actions - For each medium of interest, describe and estimate the areas or volumes to which treatment, contaminant, or exposure technologies may be applied.
- 2.4 Identification and Screening of Technology Types and Process Options - For each medium of interest, describe:
  - 2.4.1 Identification and Screening Technologies
  - 2.4.2 Evaluation of Technologies and Selection of Representative Technologies

3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES
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- 3.2 SCREENING OF ALTERNATIVES
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  - 3.2.2 "No Action" Alternative
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Figure 18.1. Feasibility Study Report Format

**Feasibility Study Report Format (Continued)**

4.0 DETAILED ANALYSIS OF ALTERNATIVES
- 4.1 INTRODUCTION
- 4.2 ASSESSMENT CRITERIA
  - 4.2.1 Overall Protection of Human Health and the Environment
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APPENDICES

Figure 18.1 (Continued)

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# APPENDIX A

# HEALTH AND SAFETY PLAN

FINAL

# SITE HEALTH AND SAFETY PLAN

## 106TH RESCUE WING
## NEW YORK AIR NATIONAL GUARD
## FRANCIS S. GABRESKI AIRPORT
## WESTHAMPTON BEACH, NEW YORK

NOVEMBER 2004

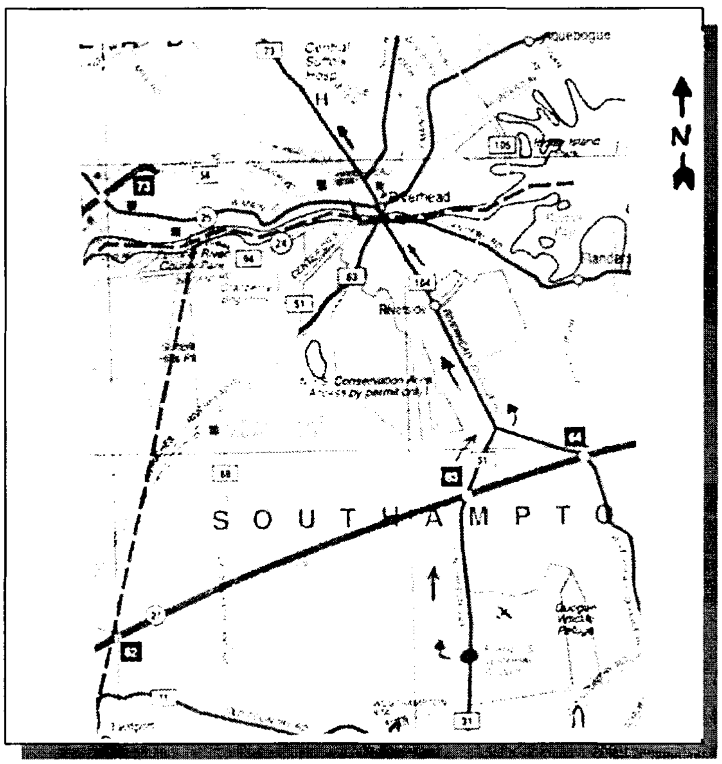
## EMERGENCY RESPONSE PLAN

| | | |
|---|---|---|
| Emergency Number | Dispatcher | 911 |
| Base Environmental Manager | Lt. Col. J. Webb | (631) 288-7349 |
| PEER Health and Safety Officer | C. A. Brewer | (865) 483-3191 |
| PEER Program Manager | C. A. Brewer | (865) 483-3191 |
| Central Suffolk Hospital | Main Number | (631) 548-6000 |
| | Emergency Dept. | (631) 548-6200 |

Directions to Hospital from Gabreski ANG Front Gate:

- Turn right (north) onto Old Riverhead Road North County Road (CR) - 31 (2.9 miles)
- Turn left (north) on to Riverhead-Quogue Road CR-104 (2.8 miles)
- Enter traffic circle, take second exit right (north) onto Peconic Avenue (0.2 miles)
- Turn right (east) onto West. Main Street (0.0 miles)
- Immediately turn left (north) onto Roanoke Avenue (1.0 miles)
- Proceed to traffic circle, take second exit right (north) (0.1 miles)
- Hospital on immediate right

**Map to Suffolk Central Hospital**




Source: Long Island Road Map, Hagstrom Map Co., Inc., 2000

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# SITE HEALTH AND SAFETY PLAN

# 106TH RESCUE WING
# NEW YORK AIR NATIONAL GUARD
# FRANCIS S. GABRESKI AIRPORT
# WESTHAMPTON BEACH, NEW YORK

## 1.0 INTRODUCTION

## 1.1 PURPOSE AND POLICY

This Health and Safety Plan (HASP) covers the health and safety practices, procedures, and policies that will be followed during the field activities at Site 8 and the Bauman Bus Plume at the 106th Rescue Wing, New York Air National Guard, Francis S. Gabreski Airport, Westhampton Beach, New York. The "HEALTH AND SAFETY PLAN FOR THE AIR NATIONAL GUARD READINESS CENTER," prepared by PEER (February 1995b) will be kept on-site at all times by the Site Manager. This site-specific HASP also covers personnel responsibilities, personal air monitoring, site air monitoring, personal protective equipment (PPE), and contingency plans.

## 1.2 APPLICABILITY

### 1.2.1 <u>Modification of Plan</u>

Any changes to this plan must be approved by the PEER Program Manager and the ANG/CEVR Project Manager.

### 1.2.2 <u>Contractor Responsibilities</u>

The PEER Project Manager shall be the designated incident manager and site safety and health officer (SHSO) whose responsibility shall be to implement, monitor, and enforce the HASP. The

SHSO shall have a sound working knowledge of federal and state occupational safety and health regulations.

## 1.3 SITE LOCATION

106th Rescue Wing, New York Air National Guard, Francis S. Gabreski Airport, Westhampton Beach, New York.

## 1.4 SCOPE OF WORK

Six sites associated with Site 8 (Sites 8D, 8F, 8M, 8N, 8QF, 8QH) and the Bauman Bus Plume are to be investigated. Some of the investigation tasks may result in the release of airborne hazardous contaminants. The major tasks to be conducted are:

- installation of direct-push probes and monitoring wells;
- collection of groundwater and soil samples; and
- obtaining groundwater level measurements.

## 1.5 HEALTH AND SAFETY PLANNING

This project may involve releases of volatile and semivolatile organics, and metals. Field personnel will be working with soil and groundwater known to be contaminated with metals and potentially volatile and semivolatile organics. The work will involve sampling, conducting field screening, and other activities. Known risks to the health and safety of personnel include contamination by metals, fire, explosion, electrocution, and crushing. All underground utilities (including water, gas, electric, sewer, and telephone) will be located and marked prior to drilling. All overhead utilities will be clearly noted.

## 1.6 RESPONSIBILITIES

In general, supervisory personnel are directly responsible for the health and safety of individuals under their direction by ensuring that HASP provisions are adhered to and that all operations are performed with the utmost regard for the health and safety of all personnel involved. Supervisors are required to ensure that all employees are properly trained, are provided with appropriate health and safety equipment, are medically qualified, and are made aware of any potential hazards associated with the work.

Field team members are also responsible for the prevention of accidents by following all health and safety procedures necessary to perform the assigned work without injury. All field team members are required to follow the provisions of the HASP.

## 1.7 PROJECT TEAM ORGANIZATION

### 1.7.1 Site Manager

The Site Manager is directly responsible for ensuring that all requirements of the HASP and the site-specific HASP are adhered to and that all PEER field team members, PEER field support personnel, and PEER subcontractors exercise their particular duties safely.

### 1.7.2 Site Safety Officer

The PEER SHSO will be assigned to the site by the PEER Program Manager. The SHSO will likely be selected from the personnel assigned to the field team. The SHSO will have the following responsibilities:

- selects PPE;
- periodically inspects PPE;
- monitors PPE storage;

- coordinates entry and exit at any control points;
- confirms each team member's suitability;
- helps monitor the team members for signs of stress, such as cold exposure, heat stress, and fatigue;
- monitors on-site hazards and changing conditions;
- determines if site-specific HASP is being followed;
- Maintains and provides MSDSs on-site, for workers inspection;
- knows emergency procedures, evacuation routes, and emergency telephone numbers; and
- coordinates emergency medical care.

### 1.7.3 Field Team

All field team members, support personnel and subcontractors are individually responsible for complying with the HASP. Prior to the start of field activities, all field personnel will read and sign a log that they have read and will comply with the HASP. In addition, each individual working on-site must notify the PEER SHSO of any unsafe conditions.

## 1.8 SUBCONTRACTOR'S SAFETY REPRESENTATIVE

The Subcontractor's Safety Representative will ensure that all of their personnel comply with the HASP, and that they will also sign a log that they have read and will comply with the HASP.

## 2.0 SAFETY AND HEALTH RISK ANALYSIS

## 2.1 CHEMICAL HAZARDS

All of the tasks to be conducted will involve chemical hazards. These chemicals include organic compounds and metals. The important chemical hazard data are listed in Table A-1 in

Attachment 1. Several of the chemicals are eye and skin irritants. Any eye discomfort or skin disorders should be reported to the PEER SHSO immediately.

## 2.2 PHYSICAL HAZARDS

### 2.2.1 Construction Hazards

Not applicable.

### 2.2.2 Heavy Equipment

Motor vehicles and heavy equipment such as drilling rigs will be in use at the site. The SHSO will ensure that vehicles are operated in compliance, and that safety measures are followed. All components of the drilling rigs must have at least a 10-ft clearance from overhead electrical lines. No drilling activities will be allowed during thunderstorms.

### 2.2.3 Noise Hazards

Hearing protection will be used by all field personnel when the drilling rigs or other machinery are operating.

### 2.2.4 Fire/Explosion

All underground utilities will be clearly marked before drilling activities begin. Ambient air at the site will be monitored for organic vapors. Ignition sources will be kept from all work areas. Smoking will not be allowed in proximity to any fuel storage, or within the immediate work zone. In case where ignition sources are required to perform site work, e.g., welding or cutting metal, a fire extinguisher will be immediately available.

### 2.2.5 Oxygen Deficient Atmospheres

All work is anticipated to occur outdoors and above grade. An oxygen-deficient atmosphere is not anticipated to occur and routine air monitoring for oxygen levels will not be conducted. Should work elements or field conditions change, the SHSO will evaluate the need for appropriate monitoring.

### 2.2.6 Heat/Cold Related Stress/Illness

The field work is scheduled for fall and winter, therefore, it is unlikely that heat stress would be a factor, although afternoons may be warmer. However, it is unlikely that high ambient temperatures could occur and therefore heat stress conditions will not result. The following are typical symptoms of cold stress:

- fatigue or drowsiness;
- clumsy movements;
- uncontrolled shivering;
- cool bluish skin; and
- irritable, irrational or confused behavior.

### 2.2.7 Prevention of Cold Related Stress/Illness

Prevention to heat stress are as follows:

- routinely observe workers for signs of cold stress;
- select proper clothing for cold, wet or windy conditions;
- avoid caffeine and drink warm, sweet beverages; and
- take frequent short breaks in warm, dry areas.

# 3.0 PERSONNEL PROTECTION AND MONITORING

## 3.1 MEDICAL SURVEILLANCE

The PEER medical surveillance program meets, at a minimum, the requirements specified in Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120.

## 3.2 SITE-SPECIFIC TRAINING

To maintain a high level of health and safety awareness on the part of all field team members, daily tailgate health and safety training sessions shall be conducted on site by the PEER SHSO. A safety briefing will be held prior to planning of each day's activities. Topics to be discussed during the safety briefing include: the location of the nearest telephone, locations of fire extinguishers, location of the nearest hospital, and safety procedures pertinent to the day's planned activities.

## 3.3 PERSONAL PROTECTIVE EQUIPMENT AND ACTION LEVELS

All PEER and Subcontractor personnel will wear a minimum of Level D protective equipment at all times when drilling is in progress. Level D protective equipment consists of:

- Hard Hats;
- Steel-toed shoes or boots;
- Safety glasses or goggles; and
- Work gloves (as needed).

Higher levels of protection might be needed under certain conditions. These higher levels will be used if air monitoring or site conditions indicate the need for them. The selection for levels of protection are specified in the "HEALTH AND SAFETY PLAN FOR THE AIR NATIONAL GUARD READINESS CENTER," (PEER 1995b).

## 3.4 MONITORING REQUIREMENTS

### 3.4.1 Routine Monitoring for Organic Vapors

The background levels of photoionizable hydrocarbons will be determined by the PEER SHSO taking periodic organic vapor detector (OVD) readings in the breathing zone with an HNu Model 101 photoionization detector (PID) fitted with a 10.2 eV lamp, or equivalent device. The background level of hydrocarbons will be determined by taking OVD readings prior to beginning work, and at periodic intervals away from the areas of suspected contamination.

Subsequent OVD readings will be taken in the breathing zone where work is being conducted. An OVD reading above 10 ppmv will be cause to stop work, depart the immediate area, utilize engineering controls, or don Level C protective equipment until the OVD readings drop below 10 ppmv, or a determination is made as to the source, and personnel health considerations. The PEER SHSO shall make that determination.

### 3.4.2 Routine Monitoring for Explosive Environments

All work is anticipated to occur outdoors or above grade, and contaminants present are not anticipated to occur at concentrations likely to produce explosive environments. Should work elements of field activities change, the SHSO will monitor the environment for explosive environments with an MSA combustible gas indicator (CGI). All site work will be halted if the combustible gas content exceeds 20% lower explosive limit (LEL) and will not resume until the combustible gas content is less than 20% LEL. No heat-producing equipment (i.e., welders, lighters) will be permitted in the work zone. No welding or other work requiring a heat source will be conducted anywhere on site until the work area has been screened for combustible gases, and the PEER SHSO has given express approval for the work be conducted. When the combustible gas content reaches 10% LEL, monitoring will no longer be routine, but will be increased in frequency.

#### 3.4.3 Oxygen Monitoring

A combination CGI/Oxygen Meter will be used to monitor oxygen-deficient atmospheres, if required by the SHSO. If the environment becomes oxygen deficient (< 19.5% $O_2$), air purifying respirators (Level C) will be prohibited. Work will be ceased under this condition.

#### 3.4.4 Monitoring for Heat/Cold Stress/Illness

The PEER SHSO will frequently emphasize the dangers of cold stress to workers and train them to recognize the symptoms in themselves and their coworkers.

### 3.5 BACKGROUND READINGS

The PEER SHSO will be responsible for taking background readings with the OVA prior to the beginning of daily activities.

### 3.6 DATA LOGGING

Any unusual occurrences, such as injuries requiring first aid, or the field determination that Level C protection is required, will be documented in the field logbook.

### 3.7 DUST CONTROL

Drilling activities may cause high dust levels. The PEER SHSO will be responsible for noting high levels of dust and requiring the use of dust masks or PPE Level upgrade.

## 3.8 PERSONAL PROTECTIVE EQUIPMENT

All field personnel will be in Level D PPE. Any upgrades required by the SHSO will follow the guidelines in the "HEALTH AND SAFETY PLAN FOR THE AIR NATIONAL GUARD READINESS CENTER" (PEER 1995b). Upgrading from Level D PPE to Level C PPE will be required if PID readings exceed 5 ppmv above background levels in the breathing zone. If PID readings are in excess of 10 ppmv above background levels for longer than 15 minutes, the Exclusion Zone will be evacuated until the vapor levels have subsided. If elevated organic levels do not dissipate, the SHSO will notify the PEER Program Manager and the ANG Project Manager for assistance in determining a course of action that will allow safe operations.

## 4.0 SITE CONTROLS, MEASURES, ACCIDENT PREVENTION, AND CONTINGENCY PLAN

## 4.1 SITE CONTROL MEASURES

If necessary sites, may have controlled access during field activities to prevent access by unauthorized personnel. Currently, the entire base where the activities will be conducted is surrounded by a fence and access is limited to authorized visitors and personnel only.

## 4.2 SITE ORGANIZATION-OPERATION ZONE

If necessary work zones will be designated to delineate the areas of sites where certain levels of PPE must be worn, confine certain types of work activities and contamination to discrete areas, and support the location and evacuation of workers during emergencies.

## 4.3 WORK ZONES

Designated work zones delineate the areas of sites where certain levels of PPE must be worn, confine certain types of work activities and contamination to discrete areas, and support the location and evacuation of workers during emergencies. Work zones will be designated at sites in accordance with the levels of PPE required to perform work at those sites. Sites requiring PPE above Level D will be subdivided into three designated work zones, which is usually the maximum number for a site. These are the exclusion zone, the contamination reduction zone, and the support zone.

### 4.3.1 Exclusion Zone (Contamination Zone)

The exclusion zone is the area where hazardous contaminants have been identified and where physical hazards demand special precaution. No one will be allowed in this zone without proper PPE. Eating, smoking, drinking, and chewing tobacco or gum will be prohibited in the exclusion zone.

Around each operating drill rig, an exclusion zone with a 50-ft radius will be established. Because of the physical hazards and splash hazards associated with groundwater monitoring well installation, this will be done even when drilling activities are conducted in Level D PPE. At a minimum, all persons who enter such exclusion zones will be required to wear safety boots, safety glasses, and a hard hat.

## 4.4 SAFE WORK PRACTICES

All field personnel will be responsible for practicing safe work.

## 4.5 HEALTH AND SAFETY EQUIPMENT CHECKLIST

The PEER SHSO and Site Manager will be responsible for checking and maintaining safety equipment.

## 4.6 ACCIDENT PREVENTION

### 4.6.1 Heavy Equipment Operation

All field personnel around the drilling rig will exercise precautions and will note and remove any hazards. The drill rig will have a working emergency shutoff (kill switch) installed, which will be tested at the beginning of the field work.

### 4.6.2 Sampling Practices

All field personnel will exercise safe procedures during sampling soil and groundwater, and purging/developing of monitoring wells.

## 4.7 SITE SECURITY

The entire base is fenced and all personnel must enter through guard station.

## 4.8 COMMUNICATION

The Site Manager will be responsible for communicating with base personnel, PEER management, and ANG personnel.

## 4.9 CONTINGENCY PLAN

The location of the next nearest telephone will be determined prior to beginning work, and will be posted along with the site map.

A first aid kit and fire extinguisher will be maintained at the site during the investigation. The locations of the first aid kit and fire extinguisher will be discussed during the daily safety briefing.

The telephone numbers of emergency response personnel and the location of the hospital are provided on the inside cover of this HASP.

### 4.9.1 Chemical Exposure

Any worker exposed to chemicals will be removed from the work zone. The PEER SHSO will determine proper decontamination procedures prior to removing the worker.

### 4.9.2 Personal Injury

The SHSO will be responsible for determining the need for calling medical personnel to the site, or for removing personnel to a medical facility.

### 4.9.3 Evacuation Procedures

The PEER SHSO and Project/Site Manager will determine evacuation routes prior to work. The presence of harmful and/or hazardous concentrations of petroleum vapors may be encountered. If such concentrations do occur, (as indicated by the environmental surveillance program) the site will be evacuated, or Level C protective clothing will be donned. Workers affected by petroleum vapors will be removed from the work area into fresh air, and medical treatment will be obtained as necessary.

## 4.10 DECONTAMINATION PROCEDURES

Decontamination of personnel is done to protect workers from hazardous contaminants, and to prevent the spread of hazardous contaminants to clean areas on or around the site. The complexity of the decontamination process at a particular site will hinge primarily on the types of contaminants encountered and their concentrations.

All personnel will be in a minimum of Level D PPE at all times during drilling, with upgrades to be determined by the SHSO. Prior to leaving the exclusion area, workers will conduct a visual examination of their boots and, if necessary, use a scrub brush to clean them. If an upgraded level of PPE is required by the SHSO, decontamination procedures in the "Health and Safety Plan for the Air National Guard Readiness Center" (PEER 1995b) shall be followed. This procedure may be modified by the SHSO based on effectiveness and applicability measured by visual observation and monitoring with the PID.

### 4.10.1 Decontamination-Medical Emergencies

If a worker dressed in PPE has certain types of illnesses or injuries, the decontamination process may exacerbate their seriousness. In deciding the aid to be delivered to the worker, it is important to weigh the risk of exposure to contaminants against the risks of proceeding through decontamination. **Generally, if immediate, life-saving first aid and emergency medical services are necessary, the decontamination process should be passed over to allow prompt treatment of the worker**. Appropriate site personnel should be able to provide attending medical personnel with any needed information on contaminant exposure, personal protection, and decontamination.

#### Physical Injury

Physical injuries can range from minor cuts to massive trauma. Many minor injuries can be treated on-site by properly trained personnel. Serious or critical injuries may require emergency medical assistance at the site and transportation of the victim to the nearest emergency medical facility. When a person appears to be seriously or critically injured, life-saving actions must be taken immediately without decontamination. Respiratory equipment should be removed immediately, as long as removal will not further endanger the victim's life or health. This might require moving the injured person to a safer area. Normally, it is unwise to move an injured person, and such a decision should be made only when it is clear that not moving the victim presents a greater danger to their life or health. Unless a worker is contaminated with an extremely toxic or corrosive material that threatens them with severe injury or death, no attempt should be made to wash or rinse the victim on-site. If necessary, protective clothing may be cut from the victim. When it is not possible or advisable to removal protective clothing, the victim should be wrapped in plastic, rubber, or blankets to prevent contamination of other site workers, emergency medical personnel, and emergency vehicles. Personnel at the emergency medical facility will then remove the protective clothing. Workers with minor injuries and illnesses will go through normal decontamination procedures.

**Exposure to Hazardous Chemicals**

Although properly dressed in protective clothing and equipment, workers may still have accidents that would expose them to hazardous chemicals. In such an accident, protective clothing that is heavily contaminated with hazardous chemicals may pose a risk of severe injury or death to the victim and attending personnel. In such instances, protective clothing should be quickly washed and carefully removed before transporting the exposed worker to an emergency medical facility.

**Cold Stress**

Cold injuries can cause severe personal injury and death. Victims must be treated immediately. Therefore, decontamination should be bypassed or held to an absolute minimum. A possible exception requiring the best judgment of the SHSO would be a situation in which contamination of the victim's clothing presents a similar threat of injury or death.

### 4.10.2 Decontamination of Tools

Decontamination of sampling equipment is addressed in the Work Plan, Section 13.0.

### 4.10.3 Heavy Equipment Decontamination

Decontamination of drilling equipment is addressed in the Work Plan, Section 13.0.

## 4.11 PLACES OF REFUGE

The PEER SHSO and Project/Site Manager will determine a safe place of refuge based on recommendations from the Base Environmental Manager (EM).

## 4.12 FIRE

Work shall be performed in a fire-safe manner. All work areas shall be equipped with ABC-type dry chemical fire extinguishers placed at readily accessible locations.

## 4.13 SAFETY EYEWASH

A portable safety eyewash kit will be maintained on-site by PEER.

## 4.14 INCIDENT REPORT

Any unusual events will be recorded in the logbook and entered on an incident form.

## 4.15 OPERATION SHUTDOWN

The Site Manager will make the determination for work shutdown.

## 4.16 SPILL OR HAZARDOUS MATERIALS RELEASE

Any spill or release of a hazardous chemical will cause work to stop and the Base EM or Base Civil Engineer to be immediately notified.

## 4.17 COMMUNITY SAFETY

The Site Manager will immediately notify the Base EM or Base Civil Engineer of any conditions that may put the safety of all base personnel or the general public in jeopardy.

## 4.18 TRAINING AND MEDICAL SURVEILLANCE

All PEER field team members and subcontractors will have completed 40-hours of training as required by OSHA 29 CFR 1910.120, with annual updates, and be part of an approved occupational medical surveillance program. Subcontractors will be required to provide a letter of certification that all employees to work on-site will have completed 40-hours of training as required by OSHA 29 CFR 1910.120, with annual updates, and be part of an approved occupational medical surveillance program.

## 4.19 RECORD KEEPING

### 4.19.1 Medical and Training Records

PEER training records are maintained in the PEER personnel files. Field team individuals are issued 40-hour OSHA cards (and updates), which are to be carried when in the field. Subcontractors will be required to provide a letter of certification that all employees to work on-site will have completed 40-hours of training as required by OSHA 29 CFR 1910.120, with annual updates, and be part of an approved occupational medical surveillance program.

### 4.19.2 Project Health and Safety Plan Acceptance Form and Accident and/or Injury Form

These forms are provided in Attachment 2.

### 4.19.3 Material Safety Data Sheets

Material Safety data Sheets (MSDSs) are provided as Attachment 3, in a separate binder, to be maintained on-site by the SHO, and are incorporated by reference into this plan. The SHO will maintain and make available MSDSs for all chemicals expected to be used during the course of normal activities, such as fuels, cleaning solutions, solvents, and chemical preservatives. Additionally, MSDSs will be maintained for all contaminants of potential concern, as listed in Table A-1. MSDSs will be readily available at all times for workers reference.

# ATTACHMENT 1

# TABLES

**Table A-1**
**Health Hazards of Potential Contaminants**

| Compound/Element | PEL (ppm) | TLV-TWA (ppm) | STEL (ppm) | IDLH (ppm) | Chemical Properties | Health Effects/ Symptoms |
|---|---|---|---|---|---|---|
| 2-Methylphenol (ortho-cresol) | 5 | 2.3 | * | 250 | IP = 8.93 eV<br>FP = 178°F<br>VP = 1 mm | CNS effects: confusion, depression, respiratory failure; dyspepsia, irregular rapid respiration, weak pulse; skin, eye burns, dermatitis; lung, liver, kidney damage |
| 2,4-Dimethyl-phenol (Xylenol) | * | * | * | * | IP = *<br>FP = *<br>VP = * | Toxic by ingestion and skin absorption |
| Arsenic | 0.010 mg/m$^3$ | 0.002 mg/m$^3$ (Ceiling) | * | Ca | IP = None<br>FP = None<br>VP = 0 mm Hg | Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentosis of skin, carcinogen |
| Benzene | 1 | 10 | None | 2000 | IP = 9.25 eV<br>FP = 12°F<br>VP = 75 mm Hg | Eye and respiratory irritant; headache; nausea; CNS depressant; carcinogenic |
| Bromomethane | 5 | Ca | * | Ca (2,000) | IP = 10.54 eV<br>FP = None<br>VP = > 1 atm | Headache; visual disturbances; vertigo; nausea, vomiting; malaise; hand tremor; convulsions; dyspepsia; irritated eyes, skin; vesiculation, carcinogen |
| Chlorobenzene | 75 | * | * | 2,400 | IP = 9.07 eV<br>FP = 85°F<br>VP = 12 mm | Irritated skin, eyes, nose; drowsiness, incoherence |
| Chloroform | 2 | Ca | 2 | Ca (1,000) | IP = 11.42 eV<br>FP = None<br>VP = 160 mm | Dizziness, mental dullness, nausea, dissorientation; headache, fatigue; anesthesia; hepatomegaly; irritated eyes, skin; carcinogen |
| Chromium (as Cr) | 1 mg/m$^3$ | 0.5 mg/m$^3$ | * | * | IP = None<br>FP = None<br>VP = 0 mm Hg | Histolic fibrosis of lungs |
| Coal Tar Pitch Volatiles (PAHs) | 0.2 mg/m$^3$ | Ca | 0.1 mg/m$^3$ | Ca (700 mg/m$^3$) | Properties vary | Dermatitis, bronchitis, carcinogen |
| Ethylbenzene | 100 | 100 | 125 | 2000 | IP = 8.76 eV<br>FP = 59°F<br>VP = 7.1 mm HG | Eye and mucous membrane irritant; headaches; dermatitis; narcosis; coma |
| Lead | 0.05 mg/m$^3$ | 0.15 mg/m$^3$ | None | * | IP = None<br>FP = None<br>VP = * | Lassitude; insomnia; pallor constipation; abdominal pain; colic; hypotension; anemic. |
| Petroleum distillates (naphtha) | 400 | 300 | None | 10,000 | IP = *<br>FP = 40 - 56°F<br>VP = About 40 mm Hg | Eye, nose, throat irritant; dizziness; headaches; nausea; drowsiness |
| Silver | 0.01 mg/m$^3$ | 0.01 mg/m$^3$ | * | * | IP = None<br>FP = None<br>VP = 0 mm | Blue-gray eyes, nasal septum, throat, skin; irritated skin, ulceration; GI disturbance. |
| Sulfuric acid | 1.0 mg/m$^3$ | 1.0 mg/m$^3$ | 3 mg/m$^3$ | 80 mg/m$^3$ | IP = *<br>FP = None<br>VP = <0.001 mm Hg | Eye, nose, throat irritant; burns eyes and skin; dermatitis; bronchial emphysema; pulmonary edema |

**Table A-1 (Continued)**
**Health Hazards of Potential Contaminants**

| Compound/ Element | PEL (ppm) | TLV-TWA (ppm) | STEL (ppm) | IDLH (ppm) | Chemical Properties | Health Effects/ Symptoms |
|---|---|---|---|---|---|---|
| Tetrachloroethene (PCE) | 25 | Ca | * | Ca (500) | IP = 9.32 eV<br>FP = None<br>VP = 14 mm | Irritated eyes, nose, throat; nausea; flushed face, neck; vertigo, dizziness, incoherence; headache, somnolence; skin erythema; liver damage, carcinogen |
| Toluene | 100 | 100 | None | 2000 | IP = 8.82 eV<br>FP = 40°F<br>VP = 22 mm Hg | Fatigue; confusion; dizziness; headaches; dilated pupils; nervousness; dermatitis; paresthesia |
| Trichloroethylene | 50 | 50 | 100 | * | IP = 9.47 eV<br>FP = None<br>VP = 58 mm Hg | Headaches; vertigo; visual disturbance; tremors; nausea; vomiting; eye irritant; dermatitis; cardiac arrhythmia; carcinogenic |
| Xylene (o-, m-, and p-isomers) | 100 | 100 | 150 | 1000 | IP = 8.56/8/56/8.44 eV<br>FP = 90/84/81°F<br>VP = 7/9/9 mm Hg | Eye, nose, throat irritant; dizziness; excitement; staggering gate; anorexia; nausea; vomiting; abdominal pain; dermatitis |

<u>KEY</u>:

| | |
|---|---|
| Ca | NIOSH Carcinogen |
| CNS | Central nervous system. |
| PEL | Permissible Exposure Limit - OSHA maximum average concentration of an airborne chemical to which a worker may be exposed for an 8-hour workday without harm. |
| TLV-TWA | Threshold Limit Value - Time-weighted average concentration for a normal 8-hour workday and a 40-hour work week to which nearly all workers may be exposed day after day without adverse effect. |
| IDLH | Immediately Dangerous to Life or Health - Maximum airborne chemical concentration from which a person could escape at the time of respirator failure without impairment or irreversible health effects. |
| STEL | Short-term exposure limit. |
| ppm | Parts per million. |
| IP | Ionization potential. |
| VP | Vapor pressure at 68°F. |
| FP | Flash point. |
| eV | Electron volt. |
| * | No data available. |

Source: National Safety Council, 1979; NIOSH and OSHA, 1981; NIOSH 1985; Sittig 1995; Sax and Lewis 1987; ACGIH 1989a; ACGIH 1989b; Federal Register 1989a; Federal Register 1988b; Federal Register 1989c.

**Table A-2**

**Summary of Potential Exposure Routes and Protective Measures**

| Exposure Route | Potential Contaminants | Source | Protective Measures |
|---|---|---|---|
| Inhalation | Volatile organics | Potential site contaminant | Breathing zone monitoring; evacuate or upgrade to Level C with air-purifying respirators if concentration is > 10 ppmv |
| Dermal Contact/ Adsorption | Metals | Potential site contaminant | Gloves<br>Safety Glasses<br>Protective Clothing<br>Safe Work Practices |
| | Acid | Sample Preservative | |

# ATTACHMENT 2

# HEALTH AND SAFETY FORMS

# PROJECT HEALTH AND SAFETY PLAN ACCEPTANCE FORM

The undersigned has read and has agreed to abide by the requirements as described in this Health and Safety Plan for all site investigation activities at the following project area:

**106th Rescue Wing**
**New York Air National Guard**
**Francis S. Gabreski Airport**
**Westhampton Beach, New York**

________________________________
Name (Please Print)

________________________________
Signature

________________________________
Date

This signed and dated acceptance form must be returned to the site Health and Safety Officer **BEFORE** entering any work areas.

# ACCIDENT AND/OR INJURY REPORT FORM

PLEASE PRINT

Project: ______________________________

## ILL OR INJURED EMPLOYEE

Name: ______________________________

Mail Address: ______________________________
No. and Street City State Zip

Street Address, if different from mailing address: ______________________________

Social Security No.: ____________ Age: ________ Sex: Male/Female (*circle one*)

Occupation or job title: ______________________________

Department: ______________________________
Enter only the name of the department in which the injured person is employed.

## EMPLOYER

Name: ______________________________

Mail Address: ______________________________
No. and Street City State Zip

Street Address, if different from mailing address: ______________________________

## THE ACCIDENT OF EXPOSURE TO OCCUPATIONAL ILLNESS

Address where accident occurred: ______________________________
No. and Street City State Zip

Did the accident occur on employer's premises? Yes/No (*circle one*)

What was the employee doing when injured or exposed to illness? ______________________________

How did the accident or exposure to illness occur? ______________________________
Describe fully the events leading up to the accident or injury. Give precise details. A separate sheet may be used for additional space.

______________________________

______________________________

**ACCIDENT AND/OR INJURY REPORT FORM (Continued)**

Time of accident or illness: ______________________________

Witnesses to accident or illness:

| Name | Affiliation | Phone No. |
|---|---|---|
| Name | Affiliation | Phone No. |
| Name | Affiliation | Phone No. |

**INJURY OR OCCUPATIONAL ILLNESS**

Describe the injury or illness in complete detail and indicate the affected body part(s).

______________________________

______________________________

______________________________

Identify the object or substance that directly injured the employee (i.e., vapor or poison inhaled or swallowed; object that struck or fell on employee; or the object the employee was lifting, pulling, etc., when the injury occurred). ______________________________

______________________________

______________________________

Date of injury or initial diagnosis of occupational illness: ______________________________

Did the accident or occupational illness result in employee fatality? Yes/No (*circle one*)

**OTHER**

Name and address of physician: ______________________________
Hospital name and address, if hospitalized: ______________________________

______________________________

Prepared by: ______________________________ Official Position ______________________________
Date: ______________________________

# ATTACHMENT 3

# MATERIAL SAFETY DATA SHEETS

# (IN SEPARATE BINDER)

# APPENDIX B

# QUALITY ASSURANCE PROJECT PLAN

FINAL

# SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN

## 106$^{TH}$ RESCUE WING
## NEW YORK AIR NATIONAL GUARD
## FRANCIS S. GABRESKI AIRPORT
## WESTHAMPTON BEACH, NEW YORK

JANUARY 2004

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# SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN

## 106TH RESCUE WING
## NEW YORK AIR NATIONAL GUARD
## FRANCIS S. GABRESKI AIRPORT
## WESTHAMPTON BEACH, NEW YORK

## 1.0 INTRODUCTION

This Site-Specific Quality Assurance Project Plan (QAPjP) presents specific requirements for quality control (QC) of the field activities, quality assurance (QA) samples, and sample custody. This Site-specific QAPjP, in conjunction with PEER's programmatic QAPP for the ANG (PEER 1995a) provides a comprehensive QA/QC program.

## 2.0 FIELD QUALITY CONTROL

### 2.1 SAMPLE NUMBERING SYSTEM

All samples collected will be assigned a unique sample number according to QAPP SOP F-2, "Sample Identification," and as described below:

- a 3-character code representing the PEER project name (GAB for Gabreski ANG);
- a 2-character code representing the site number (8D for Site 8D; for Site 8M; 8N for Site 8N; QH for Site 8QH; QF for Site 8QF, 8F for Site 8F, BP for the Bauman Bus Plume).
- a 2-character code representing the sample type (SP = direct-push probe, MW = groundwater from a monitor well, SW = surface water, GP = groundwater from a direct-push probe, FB = field blank, RS = rinsate, and TB = trip blank);
- for monitoring wells, a 2- or 3-character and 2 or 3-digit code representing the well location (MW-01 = monitoring well -01, SDW-018 = monitoring well -018);
- for soil probes, a 2-digit location identifier (SP-01 = direct-push soil boring No. 01); and
- for soil probe samples, a second 2-digit number representing the sample interval (01 = the first interval sampled; 02 for the second interval sampled.

For example, GAB-8N-MW-SDW-018 represents the groundwater sample obtained from monitoring well SDW-018 in the vicinity of Site 8N. GAB-QH-SP-01-02 represents soil probe sample collected from the second interval sampled in SP-01 in the vicinity of Site 8QH.

## 2.2 INSTRUMENT CALIBRATION

The portable photoionization detector (PID) used for screening for the presence of photoionizable organic compounds will be calibrated daily according to the manufacturer's instructions. The calibration will be accomplished using isobutylene gas and will be documented in the field logbook. The instrument will be zeroed using ambient air in an area away from the work zone which is representative of background conditions.

## 2.3 SAMPLE CONTAINERS AND LABELS

Sample containers will be purchased new and precleaned from the designated analytical laboratory. Sample volume requirements, preservation techniques, maximum holding times, and container material requirements are dictated by the medium being sampled and the analyses to be performed. A summary of these requirements is provided in Table 6.2 in the Work Plan. Field personnel will collect a sufficient volume of each sample in appropriate containers, properly preserved, to allow for all the analyses that are scheduled to be performed.

The sample labels will be supplied along with the bottles. The labels will be placed upon the containers prior to sample collection, and immediately upon collection, a unique sample number will be assigned to each sample in waterproof ink as described in Section 2.1 of this QAPjP.

## 2.4 FIELD LOGBOOK

During the RI, a field logbook will be maintained to record field data and observations of both PEER and Subcontractor activities. The logbook will be maintained in accordance with PEER Standard Operating Procedure (SOP) F-1, "Field Logbook" (PEER 1994).

The field logbook shall be bound and contain sequentially numbered pages, and all entries will be written in waterproof black ink. The following information will be included in the field logbook:

1. date and time task started; weather conditions; names, and organizations of PEER personnel and subcontractor personnel performing the task;

2. name of drilling company, type of drill rig, drilling equipment, equipment condition, decontamination pad construction, names of drillers;

3. a description of site activities as they occur in specific detail including date, time, name of any visitors, phone calls to PEER, and results, soil boring and well installation procedures, well development, and sampling;

4. a description of field screening activities in detail, including instrument calibration;

5. a description in specific detail of samples collected, including soil classifications, blow counts, (if appropriate), moisture, color, percent recovery, odor, and date and time collected, sample identification numbers, and airbill number or other shipping identification number for samples shipped;

6. a list of the time, equipment type, and decontamination procedures followed;

7. documentation of equipment failures or breakdowns, reasons, time resolved, and description of repairs;

8. any field changes made to the Work Plan; and

9. a list of investigation derived wastes, each container identification number, contents, volume, location stored.

Each page shall be dated and signed by the person making the entry. Incorrect entries will be corrected by drawing a single line through the error, and initialing it.

## 2.5 SAMPLE PACKAGING AND SHIPMENT

Samples will be packed and shipped, as necessary, in accordance with PEER SOP F-3, "Packaging and Shipment of Environmental Samples" (PEER 1994), within 24 hours of collection. Immediately upon collection, samples will be placed in a shipping container at the point of collection and surrounded with double-bagged water ice (or blue ice) so that the temperature of the samples is maintained at 4°C. Packing material will be used to secure the samples in the shipping container to help prevent breakage of glass containers. Enough packing material shall be placed in the cooler so that the samples do not rattle or shake inside the shipping container. When the samples are deemed secure from breakage and properly iced, the chain-of-custody form (Figure B.1) will be placed in a plastic cover and taped inside the lid of the shipping container. The lid of the container will then be closed, secured using clear or nylon strapping tape, and custody sealed to ensure that samples will not be disturbed during shipment.

Coolers or other shipping containers will be either shipped by a next-day delivery service to the laboratory or hand-delivered to the laboratory by PEER personnel. Notification of shipment, including airbill number, will be telephoned to the laboratory the day of sample collection. Receipt of the previous day's shipment will be confirmed daily. All sample containers, preservatives, and shipping crates/coolers will be supplied by the designated analytical laboratory.

PEER CONSULTANTS, P.C.

# CHAIN-OF-CUSTODY RECORD

COC # ____________

| PROJECT NO. | | | | | PROJECT NAME | | NUMBER, TYPE, AND VOLUME OF CONTAINERS | ANALYSES | PRESERVATIVES |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLERS (SIGNATURE) | | | | | | | | | |
| ITEM NO. | DATE (MM/DD/YY) | TIME (MILITARY) | COMP | GRAB | SAMPLE NUMBER | MATRIX (1) | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

| Relinquished By: (Signature) | Date/Time | Received By: (Signature) | Analytical Laboratory: ____________ | Send results to: |
|---|---|---|---|---|
| Relinquished By: (Signature) | Date/Time | Received By: (Signature) | ____________ | PEER CONSULTANTS, P.C.<br>575 Oak Ridge Turnpike<br>Oak Ridge, TN 37830<br>Attn: ____________<br>(615) 483-3191 |
| Relinquished By: (Signature) | Date/Time | Received By: (Signature) | Contact: ____________<br>Phone No: ____________ | Distribution:<br>White Copy Accompanies Shipment<br>Yellow Copy to Project Manager<br>Pink Copy for Field Files |

(1) S - Soil SD - Sediment SL - Sludge SO - Solid Waste
GW - Ground Water SW - Surface Water LW - Liquid Waste

Figure B.1 Example Chain-of-Custody Form

## 2.6 CHAIN-OF-CUSTODY

Chain-of-custody shall be maintained from the time of sample collection through analysis. All samples collected for laboratory analyses will be documented on a Chain-of-Custody Form (Figure B.1). The original chain-of-custody form will accompany all samples from the time of collection through laboratory receipt. Copies of the chain-of-custody forms will be maintained by the PEER Site Manager. Each custody transfer by hand delivery will be documented by signature of the relinquishing and receiving individuals and the date and time of transfer. The chain-of-custody form for samples to be shipped will be placed in a sealing plastic bag inside the coder or shipping container; the airbill number (or other shipment identification number) will be entered on the chain-of-custody form.

The chain-of-custody form will document the following information: project name, signature of sampler, sampling location, sample number, date and time of sample collection, grab or composite designation, matrix, preservatives, analyses requested, and signatures of individuals involved in sample transfer.

Samples are considered to be under custody if:

- they are in the sampler's possession, or
- they are in the sampler's line of sight after being in possession,
- they are locked or sealed so that no one can tamper with it after having been in physical custody, or
- they are in a designated controlled secure area.

The Site Manager will have overall responsibility for ensuring the care and custody of the samples collected is maintained until they are transferred or properly dispatched to the laboratory. Each individual who collects a sample is responsible for sample custody until transferred to someone else via the chain-of-custody form.

## 2.7 PREVENTION OF CROSS-CONTAMINATION

Cross-contamination will be prevented by decontaminating all reusable sampling, development and measurement equipment before each use. Additionally, during sampling events, personnel will wear new disposable gloves which will be changed between sampling points. Sampling equipment will not be placed directly on the ground, but will be placed on clean plastic sheeting. Further, activities will begin in areas least likely to be contaminated and end where the higher levels of contamination are expected to exist.

## 2.8 FIELD QUALITY CONTROL SAMPLES

To enhance the reliability of field sampling procedures and materials, field QC samples will be collected or prepared during each round of sampling as described in the following sections and as shown on Table B.1. A summary of analytical methods and collection requirements is provided in Table 6.2 in the Work Plan.

Duplicates. Duplicate groundwater and soil samples will be obtained at a frequency of 10% and analyzed for volatile and semivolatile organics, and metals (metals will not be sampled at the Bauman Bus Plume).

Trip Blank. A trip blank will accompany each shipping container containing samples that are to be analyzed for volatile organics at the off-site laboratory. The trip blanks will be supplied by the laboratory and will be analyzed for volatile organics.

Equipment Rinsate. One decontamination rinsate sample will be collected per site for each media sampled (soil and groundwater). Rinsate samples will be collected by rinsing decontaminated or disposable sampling equipment with ASTM Type II water and collecting the water used for rinsing. Rinsate samples will be analyzed for volatile and semivolatile organics, and metals. (Metals will not be sampled at the Bauman Bus Plume).

Field Blank Samples. Two field blank samples will be collected during the field activities from the water sources used for decontamination during each sampling round. One sample will be collected from the potable (tap) water used for decontamination, and a second will be collected from the ASTM Type II final rinse water. Field blank samples will be analyzed for volatile and semivolatile organics and metals.

Matrix Spike/Matrix Spike Duplicate. Additional volume of sample will be collected from soil and groundwater samples at a frequency of 5% and submitted to the analytical laboratory for analysis for volatile and semivolatile organics, and metals.

**Table B.1**
**Summary of Quality Control Samples**

| Sample Type | Sample Frequency | Estimated Number of Samples | Analyses |
|---|---|---|---|
| Groundwater Duplicate | 10% | Round 1 = 4<br>Round 2 = 4 | As shown on Table 6.2 |
| Groundwater MS/MSD | 20% | Round 1 = 3/3<br>Round 2 = 3/3 | As shown on Table 6.2 |
| Soil Duplicate | 10% | 5 | As shown on Table 6.2 |
| Soil MS/MSD | 20% | 3/3 | As shown on Table 6.2 |
| Trip Blank | 1/cooler w/volatiles | Round 1 = 22<br>Round 2 = 5 | Volatiles |
| Equipment Rinsate | See Note | Round 1 = 3<br>Round 2 = 2 | Volatile and, Semivolatile Organic Compounds, Metals |
| Field Blanks<br>(Potable and ASTM Type II Water) | 2/Round | Round 1 = 2<br>Round 2 = 2 | Volatile and Semivolatile Organic Compounds, Metals |

MS/MSD Matrix Spike/Matrix Spike duplicate
NOTE: One (1) equipment rinsate sample will be collected for each media sampled at Site 8 and the Bauman Bus Plume during each round.