Final
Record of Decision
for the On-base Groundwater
AOC (SD-52) at the
Former Griffiss Air Force Base
Rome, New York

April 2009

AIR FORCE REAL PROPERTY AGENCY

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DEPARTMENT OF THE AIR FORCE
AIR FORCE REAL PROPERTY AGENCY

April 16, 2009

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153 Brooks Road
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1. Enclosed please find the signed final Record of Decision (ROD) for On Base Groundwater Areas of Concern dated April 2009.

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MICHAEL F. MCDERMOTT
BRAC Environmental Coordinator

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List of Abbreviations and Acronyms

AFB	Air Force Base
AFRPA	Air Force Real Property Agency
Air Force	United States Air Force
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BGS	below ground surface
BFSA	Bulk Fuel Storage Area
BRAC	Base Closure and Realignment Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
COPC	chemical of potential concern
DCE	dichloroethylene
DFAS	Defense Finance and Accounting Services
EPA	United States Environmental Protection Agency
ESD	explanation of significant difference
ESI	expanded site investigation
FFA	Federal Facility Agreement
FS	Feasibility Study
ft/ft	feet per foot
GPR	ground-penetrating radar
HI	Hazard Index
IRP	Installation Restoration Program
µg/L	micrograms per liter
MNA	monitored natural attenuation
MTBE	methyl tert-butyl ether
MVE	Mohawk Valley EDGE
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEADS	Northeast Air Defense Sector
NPL	National Priorities List
NRC	United States Nuclear Regulatory Commission
NYANG	New York Air National Guard
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	operation and maintenance
OBGW	On-base Groundwater
ORC	oxygen releasing compound

List of Abbreviations and Acronyms (cont.)

OWS	oil/water separator
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
ppb	parts per billion
PRB	permeable reactive barrier
RAO	remedial action objective
RI	remedial investigation
ROD	Record of Decision
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SI	Supplemental Investigation
SPDES	State Pollutant Discharge Elimination System
SVOC	semivolatile organic compound
TAPP	Technical Assistance for Public Participation
TBC	to-be-considered
TCE	trichloroethene
TRPH	total recoverable petroleum hydrocarbon
UST	underground storage tank
VOC	volatile organic compound
WSA	Weapons Storage Area

1 Declaration

1.1 On-Base Groundwater AOC Site Names and Locations

The On-base Groundwater (OBGW) Area of Concern (AOC) (site identification designation SD-52) included in this Record of Decision (ROD) is the groundwater associated with Landfill 6, Building 775, Building 817/Weapons Storage Area (WSA), and the Nosedocks/Apron 2 sites, which are located at the former Griffiss Air Force Base (AFB) in Rome, Oneida County, New York.

1.2 Statement of Basis and Purpose

This ROD presents the remedies for four OBGW AOC sites at the former Griffiss AFB. The selected remedy for each site is presented in Table 1-1. These remedies have been chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The remedies have been selected by the United States Air Force (Air Force) in conjunction with the United States Environmental Protection Agency (EPA) and with the concurrence of the New York State Department of Environmental Conservation (NYSDEC) pursuant to the Federal Facility Agreement (FFA) among the parties under Section 120 of CERCLA. This decision is based on the administrative record file for this AOC (including four sites).

TABLE 1-1 SUMMARY OF SITES INCLUDED IN OBGW AOC		
Site Designation	**Site Name**	**Selected Remedy**
SD-52, Landfill 6 Operable Unit	Landfill 6	*Groundwater:* Enhanced bioremediation, groundwater extraction and recirculation (if necessary), and institutional controls in the form of deed restrictions. Long-term monitoring of the groundwater plume and treatment performance monitoring during full-scale implementation will also be performed. *Soil:* No further action. *Soil Vapor Intrusion:* No further action.
SD-52, Building 775 Operable Unit	Building 775 Groundwater	*Groundwater:* Groundwater extraction, treatment, and discharge as well as institutional controls in the form of deed restrictions. Long-term monitoring of the groundwater plume and treatment performance monitoring during full-scale implementation will also be performed. *Soil:* No further action. *Soil Vapor Intrusion:* To be addressed under a separate operable unit.
SD-52, Building 817/WSA Operable Unit	Building 817/Weapons Storage Area (WSA)	*Groundwater:* Enhanced bioremediation and air sparge wall (wall to be installed if necessary), and institutional controls in the form of deed restrictions. Long-term monitoring of the groundwater plume and treatment performance monitoring during full-scale implementation will also be performed. *Soil:* No further action. *Soil Vapor Intrusion:* To be addressed under a separate operable unit.
SD-52, Apron 2 Operable Unit	Nosedocks/Apron 2 Groundwater	*Groundwater:* Monitored natural attenuation and air sparge barrier (barrier to be installed if necessary), institutional controls, and long-term monitoring. *Soil:* No further action. *Soil Vapor Intrusion:* To be addressed under a separate operable unit.

1.3 Assessment of the Site

The remedial actions selected in this ROD are necessary to protect the public health or welfare, or the environment, from actual or threatened releases of hazardous substances from the AOC into the environment.

1.4 Description of Selected Remedy

1.4.1 Landfill 6

The selected remedy for the Landfill 6 OBGW site includes:

- Bioremediation of the plume in the area exhibiting the highest concentration of contaminants of concern (COCs).
- Installation of recovery wells to extract groundwater for recirculation, if necessary, based on review of the treatment system performance data. The remedy at the Landfill 6 OBGW site will be implemented in a phased approach.

First, bioremediation will occur and then groundwater extraction and recirculation will be implemented, if needed.

- Implementation of a contingency plan including an in-situ air sparge wall (or other action agreed upon by the Air Force, EPA, and NYSDEC), if elevated levels of dichloroethylene (DCE) and/or vinyl chloride attributable to site groundwater are detected in Three Mile Creek.

- Treatment performance monitoring during full-scale implementation.

- Implementation of institutional controls in the form of deed restrictions within the main landfill boundary and for affected groundwater (see Section 3.1.12).

The selected remedy is expected to reduce the levels of groundwater contamination at the Landfill 6 OBGW site. The selected remedy will result in the reduction of the highest concentrations of volatile organic compounds (VOCs) in site groundwater. Monitoring wells will be in place during implementation of the selected remedy to determine whether COCs remain above proposed cleanup goals (monitoring described in this ROD is in addition to Part 360 long-term monitoring currently performed for Landfill 6 proper). Monitoring is currently assumed to be required for 20 years. The number and location of the wells in the network will be finalized during the design stage. The remaining on-site VOC contamination is anticipated to attenuate naturally to achieve groundwater standards.

Executive Order 11990 Finding of No Practicable Alternative – Wetlands

There may be a disturbance of wetlands if one of the contingency plans is implemented. In that case, the Air Force will take all practicable measures to minimize harm to the wetlands and will restore the wetlands in accordance with the Basewide Wetlands Management Plan (E & E 2003).

1.4.2 Building 775

The selected remedy for the Building 775 OBGW site includes:

- Installation of recovery wells to extract the groundwater from the Building 775 plume.

- The groundwater will then be discharged to a sanitary sewer for off-site treatment at a wastewater treatment facility or treated on site and discharged to Three Mile Creek.

- Long-term maintenance of the treatment system that will require sampling of the influent and effluent VOC concentrations prior to discharge.

- Treatment performance monitoring during full-scale implementation.

- Institutional controls in the form of deed restrictions for affected groundwater have been/will be implemented (see Section 3.2.12).

The selected remedy is expected to reduce the levels of groundwater contamination at the Building 775 OBGW site. The selected remedy will result in the reduction of the highest concentrations of VOCs in groundwater at this site. Monitoring wells will be in place during implementation of the selected remedy to determine whether COCs remain above proposed cleanup goals. Monitoring is currently assumed to be required for 20 years (10 years during operation and maintenance [O&M] of the extraction and treatment system and 10 years of long-term monitoring). The number and location of the wells in the network will be finalized during the design stage. The remaining on-site VOC contamination is anticipated to attenuate naturally to achieve groundwater standards.

1.4.3 Building 817/WSA

The selected remedy for the Building 817/WSA OBGW site includes:

- Enhanced bioremediation to remove VOCs from Building 817/WSA site groundwater.

- Implementation of the contingency air sparge wall (or other action agreed upon by the Air Force, EPA, and NYSDEC) will be completed if surface water samples from the culverted section of Six Mile Creek contain elevated concentrations of DCE and/or vinyl chloride that could be attributed to site groundwater.

- Institutional controls in the form of deed restrictions for affected groundwater will also be implemented (see Section 3.3.12).

The selected remedy is expected to reduce the levels of groundwater contamination at the Building 817/WSA site. The selected remedy will result in the reduction of the highest concentrations of VOCs in groundwater at this site. Monitoring wells will be in place during implementation of the selected remedy to determine whether COCs remain above proposed cleanup goals. Monitoring is currently assumed to be required for 15 years. The number and location of wells in the network will be finalized during the design stage. Remaining on-site VOC contamination is anticipated to attenuate naturally to achieve groundwater standards.

1.4.4 Nosedocks/Apron 2

The selected remedy for the Nosedocks/Apron 2 OBGW site includes:

- Monitored Natural Attenuation (MNA) including groundwater and surface water monitoring to verify that human health and the environment are protected.
- Implementation of the contingency alternative, such as a horizontal air sparging barrier (or other action agreed upon by the Air Force, EPA, and NYSDEC), if surface water samples from Six Mile Creek contain elevated concentrations of vinyl chloride that could be attributed to site groundwater.
- Long-term monitoring of the groundwater plume will be performed. The contaminant level variations will be monitored with quarterly monitoring of VOCs for the first year and semi-annually thereafter. A higher monitoring frequency is selected for the first year to identify seasonal fluctuations and uncertainties within the plume.
- Institutional controls in the form of deed restrictions for affected groundwater will also be implemented (see Section 3.4.12).

The selected remedy is expected to reduce the levels of groundwater contamination at the Nosedocks/Apron 2 site. The selected remedy will result in the reduction of VOC concentrations in groundwater to achieve groundwater standards.

1.5 Statutory Determinations

The Air Force Real Property Agency (AFRPA) (formerly Air Force Base Conversion Agency) and EPA, with concurrence from NYSDEC, have determined that remedial actions as described in Table 1-1 are warranted for these four OBGW sites. The selected

remedies are protective of human health and the environment, comply with federal and New York State (NYS) standards that are applicable or relevant and appropriate to the remedial action, are cost effective, and utilize permanent solutions to the extent possible. The remedies for Landfill 6, Building 775, and Building 817 also satisfy the statutory preference for treatment as a principal element of the remedies. Although the remedy for the Nosedocks/Apron 2 does not use treatment as a principal element of the remedy, it accomplishes the required end result of protection of human health and the environment.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy for each site is still performing as planned and is protective of public health and the environment.

1.6 Authorizing Signatures

1.6.1 Authorizing Signatures Landfill 6 and Building 775

On the basis of the remedial investigations performed at the OBGW AOC sites (inclusive of groundwater associated with Landfill 6 and Building 775 OBGW sites) and respective baseline risk assessments, the selected remedies for the OBGW AOC sites are listed in Table 1-1. The selected remedies meet the requirements for remedial action set forth in CERCLA, Section 121. The NYSDEC has concurred with the selected remedies presented in this ROD.

Robert M. Moore — Date: 1/26/09

Robert M. Moore
Director
Air Force Real Property Agency

Walter E. Mugdan — Date: 3/6/09

Walter E. Mugdan
Director, Emergency and Remedial Response Division
United States Environmental Protection Agency, Region 2

1.6.2 Authorizing Signatures Building 817/WSA

On the basis of the remedial investigations performed at the Building 817/WSA OBGW AOC site and respective baseline risk assessment, the selected remedy for the OBGW AOC site is listed in Table 1-1. The selected remedy meets the requirements for remedial action set forth in CERCLA, Section 121. The NYSDEC has concurred with the selected remedy presented in this ROD.

Robert M. Moore — Date: 1/26/09

Robert M. Moore
Director
Air Force Real Property Agency

Walter E. Mugdan — Date: 3/6/09

Walter E. Mugdan
Director, Emergency and Remedial Response Division
United States Environmental Protection Agency, Region 2

1.6.3 Authorizing Signatures Nosedocks/Apron 2

On the basis of the remedial investigations performed at the Nosedocks/Apron 2 OBGW AOC site and respective baseline risk assessment, the selected remedy for the OBGW AOC site is listed in Table 1-1. The selected remedy meets the requirements for remedial action set forth in CERCLA, Section 121. The NYSDEC has concurred with the selected remedy presented in this ROD.

Robert M. Moore — Date 1/26/09
Director
Air Force Real Property Agency

Walter E. Mugdan — Date 3/6/09
Director, Emergency and Remedial Response Division
United States Environmental Protection Agency, Region 2

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2 On-base Groundwater AOC Background Information

The OBGW AOC was originally developed to address groundwater contamination encompassing more than one AOC, groundwater contamination at sites that were not addressed under a remedial investigation (RI), or groundwater at source removal sites where only soils were being addressed. However, as site investigations continued, groundwater contamination was addressed for individual sites, including the source removal sites, rather than being deferred to the OBGW AOC. The exceptions included the four sites addressed in this ROD and the Tin City sites, which were later addressed in a post-ROD explanation of significant difference (ESD). The evaluations of the four sites currently comprising the OBGW AOC included a determination that a plume existed at all of these sites and various treatability and feasibility studies were undertaken to evaluate potential remedies.

2.1 Former Griffiss AFB History and Enforcement Activities

2.1.1 Operational History

The mission of the former Griffiss AFB varied over the years. The base was activated on February 1, 1942, as Rome Air Depot, with the mission of storage, maintenance, and shipment of material for the U.S. Army Air Corps. Upon creation of the Air Force in 1947, the depot was renamed Griffiss AFB. The base became an electronics center in 1950, with the transfer of Watson Laboratory Complex (later Rome Air Development Center [1951], Rome Laboratory, and then the Air Force Research Laboratory Information Directorate, established with the mission of accomplishing applied research, devel-

opment, and testing of electronic air-ground systems). The 49th Fighter Interceptor Squadron was also added. The Headquarters of the Ground Electronics Engineering Installations Agency was added in June 1958 to engineer and install ground communications equipment throughout the world. On July 1, 1970, the 416th Bombardment Wing of the Strategic Air Command (SAC) was activated with the mission of maintenance and implementation of both effective air refueling operations and long-range bombardment capability. Griffiss AFB was designated for realignment under the Base Realignment and Closure Act in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. The Air Force Research Laboratory Information Directorate and the Northeast Air Defense Sector (NEADS) will continue to operate at their current locations; the New York Air National Guard (NYANG) operated the runway for the 10th Mountain Division deployments until October 1998, when they were relocated to Fort Drum; and the Defense Finance and Accounting Services (DFAS) established their present operating location at the former Griffiss AFB.

2.1.2 Environmental Background

As a result of the various national defense missions carried out at the former Griffiss AFB since 1942, hazardous and toxic substances were used and hazardous wastes were generated, stored, or disposed of at sites on the installation. The defense missions involved, among others, procurement, storage, maintenance, and shipping of war materiel; research and development; and aircraft operations and maintenance.

Studies and investigations under the U.S. Department of Defense Installation Restoration Program have been carried out to locate, assess, and quantify the past toxic and hazardous waste storage, disposal, and spill sites. These investigations included a records search in 1981 (Engineering Sciences 1981), interviews with base personnel, a field inspection, compilation of an inventory of wastes, evaluation of disposal practices, and an assessment to determine the nature and extent of site contamination; Problem Confirmation and Quantification studies (similar to what is now designated a Site Investigation) in 1982 and 1985; soil and groundwater analyses in 1986; a basewide health assessment in 1988 by the U.S. Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR); base-specific hydrology investigations in 1989 and 1990; a groundwater investigation in 1991; and site-specific investigations between 1989 and 1993. The

ATSDR issued a Public Health Assessment for Griffiss AFB, dated October 23, 1995, and an addendum, dated September 9, 1996.

Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the National Priorities List on July 15, 1987. On August 21, 1990, the agencies entered into an FFA under Section 120 of CERCLA.

The Air Force provided a number of reports to NYSDEC and EPA for review and comment. These reports address remedial and related activities that the Air Force is required to undertake under CERCLA and include identification of AOCs on base; a scope of work for a Remedial Investigation; a work plan for the RI, including a sampling and analysis plan and a quality assurance project plan; a baseline risk assessment; a community relations plan; multiple RI reports; work plans and the reports for supplemental investigations (SIs); and a Landfill Cover Investigation Report. The Air Force delivered the draft-final RI report covering 31 AOCs to the EPA and NYSDEC on December 20, 1996. The final SI Report was delivered on July 24, 1998.

Additional site-specific reports for the OBGW sites included: the final RI for Nosedocks/Apron 2 Chlorinated Plume (April 2004), the final Feasibility Study (FS) for Nosedocks/Apron 2 (August 2006), and the final FS for Landfill 6, Building 775, and Building 817 (April 2005). The final FS Addendums/Supplement for Landfill 6 Groundwater, Building 775 Groundwater, and Building 817 Groundwater were delivered in September 2006.

2.2 Risk Assessment Process

Baseline risk assessments were performed at Landfill 6, Building 775, and Nosedocks/Apron 2 to evaluate current and future potential risks to human health and the environment associated with contaminants found in the groundwater at these sites. The risk assessments for Landfill 6 and Building 775 were performed as part of the 1994 RI and prior to collection of groundwater samples during the SIs (a risk assessment was not performed on the SI sample results). The risk assessment for Nosedocks/Apron 2 was performed during a subsequent RI in 2002. A site-specific risk assessment for Building 817/WSA was not performed because it was determined during the SIs that remedial action would be performed and there is no current human exposure to groundwater.

Results of the site-specific risk assessments are summarized in Sections 3.1.7, 3.2.7, 3.3.7, and 3.4.7 of this ROD. A general description of the risk assessment process is provided below.

2.2.1 Human Health Risk Assessment Background Information

Baseline human health risk assessments were conducted to determine whether chemicals detected at the sites could pose health risks to individuals under current and proposed future land uses if no remediation occurs. As part of the baseline risk assessment, the following four-step process was used to assess site-related human health risks for a reasonable maximum exposure scenario: hazard identification—identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration; exposure assessment—estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathway (e.g., ingestion of contaminated groundwater) by which humans are potentially exposed; toxicity assessment—determines the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and risk characterization—summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., one-in-a-million excess carcinogenic risk and noncarcinogenic Hazard Index [HI] value) assessment of site-related risks and a discussion of uncertainties associated with the evaluation of the risks and hazards for the site.

COPCs were identified based on the analytical results and data quality evaluation from the RI. All contaminants detected in the groundwater samples from the site were considered COPCs with the exception of inorganics detected at concentrations less than twice the mean background concentrations; elements considered to be essential human nutrients (iron, magnesium, calcium, potassium, and sodium); and chemicals detected in less than 5% of the total samples and at concentrations below Applicable or Relevant and Appropriate Requirements (ARARs) and to-be-considered (TBCs). As a class, petroleum hydrocarbons were not selected as a chemical of concern; but the individual toxic constituents (e.g., benzene, toluene, ethylbenzene) were evaluated. The presence of petroleum hydrocarbons as a class of contaminants was considered in the selection of the preferred remedial action.

Quantitative estimates of carcinogenic and noncarcinogenic risks were calculated as part of a risk characterization. A risk characterization evaluates potential health risks based on estimated exposure intakes and toxicity values. For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen. The range of acceptable risk is generally considered to be 1 in 10,000 (1×10^{-4}) to 1 in 1,000,000 (1×10^{-6}) of an individual developing cancer over a 70-year lifetime from exposure to the contaminant(s) under specific exposure assumptions. Therefore, sites with carcinogenic risk within the acceptable risk range for a reasonable maximum exposure do not generally require cleanup based upon carcinogenic risk under the NCP.

2.2.2 Risk Uncertainties

There are inherent uncertainties associated with the overall risk assessment process and with each of its components. However, conservative (health-protective) assumptions are used throughout the process to ensure that the risk estimates will be protective of human health and the environment. Examples of uncertainties associated with the risk assessments presented in this ROD include: (1) Samples were collected from locations with known or suspected contamination rather than random locations, which may result in a potential overestimation of risk; (2) Actual natural background concentrations of inorganic compounds in the groundwater are uncertain, due to limited datasets; (3) For inhalation exposures, contaminant concentrations in air were estimated from soil and groundwater concentrations using modeling and conservative model input assumptions, which may result in a potential overestimation of risk; (4) Elevated levels of contaminants in groundwater that were measured following the RI were not factored into the risk assessments, which would result in an underestimation of risk; and (5) It was assumed that groundwater might be used as a potable water source, which is unlikely since the site has ready access to existing water supplies at the former base and in the city of Rome. This would result in a potential overestimation of risk.

2.3 Community Participation

A proposed plan for the OBGW AOC (AFRPA 2007), was released to the public on September 25, 2007. The document was made available to the public in both the ad-

ministrative record file located at 153 Brooks Road in the Griffiss Business and Technology Park and in the Information Repository maintained at the Jervis Public Library. The notice announcing the availability of this document was published in the *Rome Sentinel* on September 24, 2007. The public comment period lasted from September 25, 2007 to October 25, 2007, and was set up to encourage public participation in the alternative selection process. In addition, a public meeting was held on Wednesday, October 3, 2007. The AFRPA, NYSDEC, and the New York State Department of Health (NYSDOH) held an information session at the beginning of the public meeting and answered questions about issues at the AOC and the proposal under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this ROD (see Section 4).

3 Decision Summary

3.1 Landfill 6

3.1.1 Site Name, Location, and Brief Description

The Landfill 6 OBGW site (site identification designation SD-52) is located at the former Griffiss AFB in Rome, Oneida County, New York (see Figure 3-1). Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the National Priorities List (NPL) on July 15, 1987. On August 21, 1990, the EPA, NYSDEC, and the AFRPA entered into an FFA under Section 120 of CERCLA.

The Landfill 6 OBGW site is located in the southern portion of the former Griffiss AFB between Perimeter Road and Three Mile Creek (see Figure 3-1). The landfill was in operation from 1955 to 1959, is unlined, and contains hardfill and general refuse. In 1986, a clay cap was constructed over this disposal area. In 2005, landfill cover improvements specified in the Landfill 6 ROD (February 2001) and the Landfill 6 Closure Plan (March 2004) included installation of an impermeable cover to reduce the amount of water infiltrating into the landfill. In addition, long-term monitoring is currently performed as part of the Landfill 6 closure activities.

3.1.2 Site History and Enforcement Activities

This information is contained in Section 2.1.

3.1.3 Community Participation

This information is contained in Section 2.3.

3.1.4 Scope and Role of Site Remedial Action

The scope of the plan for remedial action for the Landfill 6 OBGW site addresses the concerns for human health and the environment. In situ bioremediation with long-term groundwater monitoring is consistent with the results of the risk assessment performed for residential and industrial groundwater users. Remedial actions at the Landfill 6 OBGW site will reduce COPC levels locally, thus contributing to the remediation of OBGW at the Former Griffiss AFB.

3.1.5 Site Characteristics

The former Griffiss AFB covered approximately 3,552 contiguous acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York. Topography within the valley is relatively flat, with elevations on the former Griffiss AFB ranging from 435 to 595 feet above mean sea level. Three Mile Creek, Six Mile Creek (both of which drain into the New York State Barge Canal, located to the south of the base), and several state and/or federally regulated wetlands are located on the former Griffiss AFB, which is bordered by the Mohawk River on the west. Due to its high average precipitation and predominantly silty sands, the former Griffiss AFB is considered a groundwater recharge zone.

Disposal activities at Landfill 6 were conducted in two areas separated by a dirt access road that passes along the southern boundary of the landfill and bisects the northern area of the landfill. The majority of disposal activity occurred on a hillside north and east of the road; between 38,000 and 62,000 cubic yards of hardfill and general refuse were placed on the ground and burned in this area. The layer of waste and burned residue is estimated to be 5 to 10 feet thick. In the 1980s, fuel-contaminated soils were disposed of to a depth of 3 feet in the central and southern portions of Landfill 6, and in 1986 a clay cap was constructed over this disposal area.

The topography at the Landfill 6 area slopes toward the southwest, with 40 feet of relief occurring across the Landfill 6 OBGW site. Surface water runoff follows the topography, flowing across the site toward Three Mile Creek. Groundwater flow at the Landfill 6 OBGW site is predominantly to the southwest with southerly components in

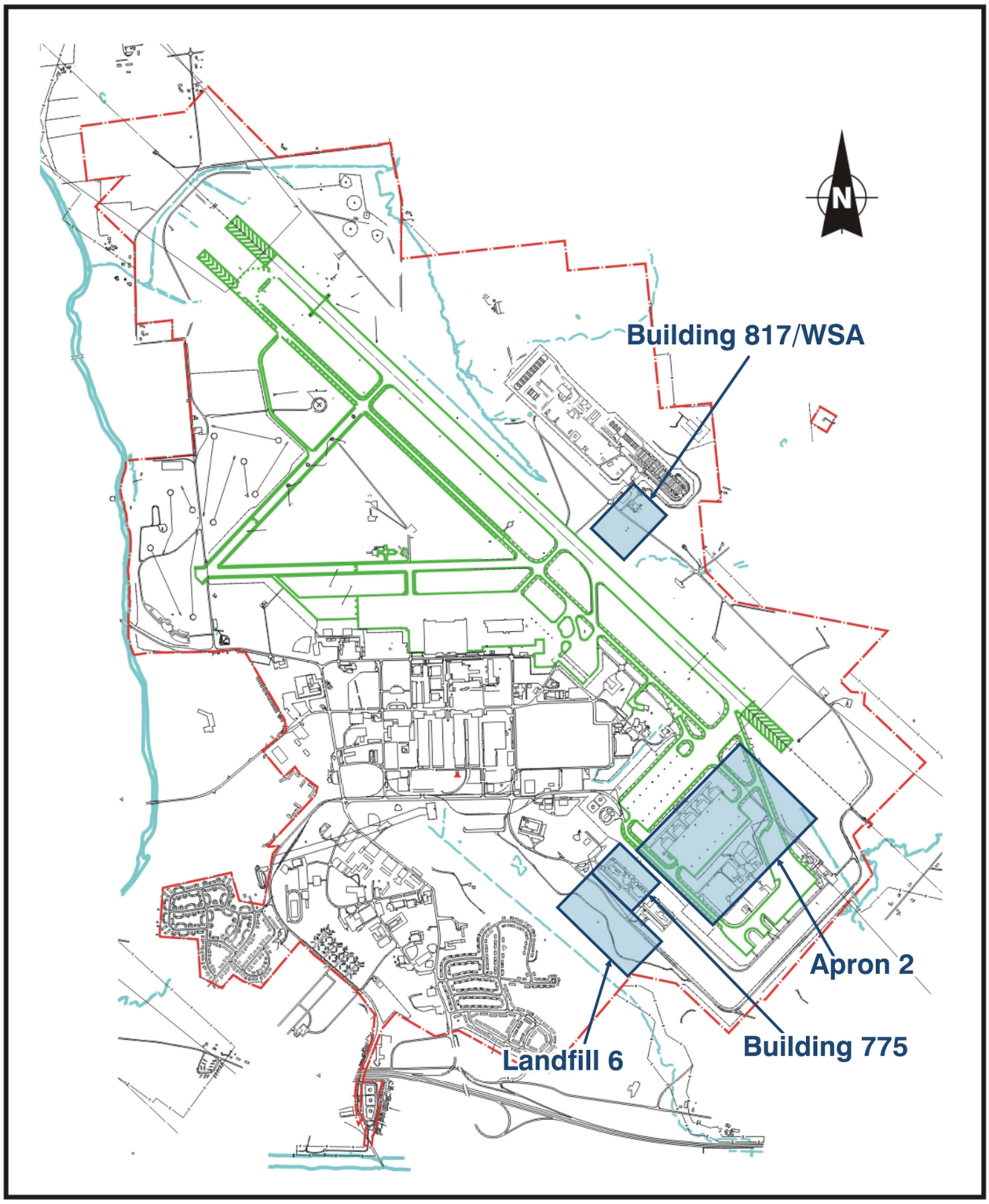

Figure 3-1 On-base Groundwater AOC Locations, Former Griffiss Air Force Base, Rome, NY

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localized areas. The depth to groundwater ranges from 2.6 feet to 64.7 feet below ground surface (BGS) with an average of about 19 feet across the site. The Landfill 6 OBGW site geology primarily consists of an average 60-foot-deep fine silty sand layer with minor quantities of gravel, cobbles, and clay, followed by a 1 to 15-foot-thick till deposit overlying shale bedrock. There are eight groundwater drainage areas on the former base; the Landfill 6 area falls within the east side of the Three Mile Creek drainage basin.

There is a trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE) contaminated groundwater plume associated with Landfill 6 that extends downgradient for approximately 800 feet and covers approximately 8.4 acres. The lateral extent of the plume ranges from 200 to 700 feet and the vertical extent ranges from 20 feet BGS to 70 feet BGS, which is the top of bedrock. The TCE concentrations range from non-detect to 1,600 micrograms per liter (µg/L) and the cis-1,2-DCE concentrations range from non-detect to 1,000 µg/L.

In 2005, landfill cover improvements specified in the Landfill 6 ROD (February 2001) and the Landfill 6 Closure Plan (March 2004) included installation of an impermeable cover to reduce the amount of water infiltrating into the landfill. The cover consists of a gas venting layer, a geomembrane cover, and a barrier protection layer over the entire landfill. Other remedial activities specified in the ROD that were implemented include: maintenance of the impermeable cover, long-term monitoring of the groundwater and stream environment downgradient of Landfill 6, institutional controls in the form of deed restrictions to prohibit use of the area and groundwater, and evaluation of site conditions at least once every five years.

Site Investigations

A groundwater monitoring well (TMCMW-9) was installed at Landfill 6 in 1981. Groundwater samples collected in 1982 indicated the presence of phenols and dissolved chromium, copper, and zinc. A passive soil gas survey performed in 1993 indicated the presence of petroleum fuel constituents. The results of these studies led to the performance of an RI in 1994.

Remedial Investigation. In 1994, an RI was performed. The main objective of the RI was to investigate the nature and extent of environmental contamination from his-

torical releases at the AOC in order to determine whether any remedial action was necessary to prevent potential threats to human health and the environment that might arise from exposure to site conditions. The RI included a geophysical survey consisting of a magnetometry survey and ground-penetrating radar (GPR) survey; a passive soil gas survey; and sampling and analysis of surface soil, the results of which were provided in the Landfill 6 proposed plan and ROD (signed by EPA on June 7, 2001).

The RI also included the installation of six new groundwater monitoring wells. The seven groundwater monitoring wells were then sampled during the RI. Analytical results indicated the presence of four semivolatile organic compounds, 16 VOCs, three pesticides, and 17 metals. Three VOCs and six metals exceeded the most stringent criteria (see Table 3-1). The 1994 RI results indicated the presence of groundwater contamination, primarily consisting of TCE, cis-1, 2-DCE, and vinyl chloride.

TABLE 3-1
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
LANDFILL 6 PLUME
REMEDIAL INVESTIGATION GROUNDWATER SAMPLES (1994)

Compound	Range of Detected Concentrations or Maximum Detected Concentration	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (μg/L)			
Benzene	1.4	1/7	1 [a]
Vinyl Chloride	0.12 J – 30	1/7	2 [a, b]
cis-1,2-Dichloroethene	0.4 J – 170	1/7	5 [a]
Metals (μg/L)			
Aluminum	130 – 210	2/7	50 [c]
Iron	40 – 14,100	1/7	300 [a, c]
Manganese	11 – 1,100	1/7	50 [c]
Nickel	380	1/7	100 [a, c]
Selenium	0.59 J – 1,700	1/7	10 [a]
Sodium	2,700 – 104,000	4/7	20,000 [a]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.
[b] EPA Federal primary maximum contaminant level.
[c] EPA Federal secondary maximum contaminant level.

Key:
J = Estimated concentration.
μg/L = Micrograms per liter.

The final FS concluded that elevated metals concentrations found on site are naturally occurring, except for sodium. Sodium concentrations will continue to exceed most stringent criteria as long as road deicing continues; therefore, the presence of sodium will not be used as a basis for remediation, nor will the naturally occurring metals.

Supplemental Investigation. In 1997, as part of the OBGW AOC SI activities, two test pits were excavated; no drums were encountered in the test pits. Additional activities at Landfill 6 included Geoprobe groundwater screening sample collection at four locations (LF6DGP-1 through 4), the installation of one vertical profile monitoring well (LF6VM-6), and re-sampling of four existing wells. Analytical results of the four Geoprobe groundwater screening samples were all non-detect. Analytical results for the monitoring wells indicated the presence of three semivolatile organic compounds (SVOCs) and five VOCs. Four VOCs were detected at concentrations exceeding the most stringent criteria (see Table 3-2).

TABLE 3-2
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
LANDFILL 6 PLUME
SUPPLEMENTAL INVESTIGATION GROUNDWATER SAMPLES (1997)

Compound	Range of Detected Concentrations or Maximum Detected Concentration	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (μg/L)			
cis-1,2-Dichloroethene	0.30 J – 180	2/5	5 [a]
Benzene	1.0 – 1.2 J	2/5	1 [a]
Trichloroethene	26	1/5	5 [a, b]
Vinyl Chloride	20 – 29	2/5	2 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

μg/L = Micrograms per liter.

Groundwater Study. A comprehensive groundwater study to define the vertical and lateral extent of groundwater contamination at the Landfill 6 OBGW site was completed in spring 2000. This investigation consisted of drilling and vertically profiling 16

boreholes (including 105 Hydropunch samples to vertically and horizontally delineate the Landfill 6 plume), installation and sampling of eight wells, and sampling of two existing Three Mile Creek wells.

Based on Hydropunch data, the contamination plume was delineated both vertically and horizontally. The four COCs detected in the Hydropunch samples and the highest concentrations were: cis-1, 2-DCE at 983 μg/L in LF6VMW-12; tetrachloroethene (PCE) at 1.1 μg/L in LF6VMW-7; TCE at 1,587 μg/L in LF6VMW-12, and vinyl chloride at 8.4 μg/L in LF6VMW-11. cis-1, 2-DCE was detected in eight of the 16 boreholes, PCE was detected in four boreholes, TCE was detected in nine boreholes, and vinyl chloride was detected in one borehole.

During this study, nine VOCs were detected in the monitoring well samples. Three VOCs (cis-1,2-DCE, TCE, and vinyl chloride) were detected in the monitoring wells at concentrations exceeding the most stringent criteria (see Table 3-3). The vertical profiling data indicated that there does not appear to be a single-point source of contamination. The width of the plume was estimated at approximately 200 feet near the top of Landfill 6 and 700 feet at the leading edge (approximately 100 feet from Three Mile Creek) with the base of the plume beneath the top of Landfill 6 appearing to merge or nearly merge with the leading edge of another plume called the Building 775 plume (E & E August 2000).

TABLE 3-3
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
LANDFILL 6 PLUME
2000 GROUNDWATER STUDY GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (μg/L)			
cis-1,2-Dichloroethene	0.254J – 35.4	3/12	5[a]
Trichloroethene	0.864 – 26.3	2/12	5 [a, b]
Vinyl Chloride	0.2457 J – 6.21	1/12	2 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

μg/L = Micrograms per liter.

Bedrock Groundwater Study. A Bedrock Groundwater Study for Landfill 6 was conducted in 2002. The study included the installation and groundwater sampling (VOCs, methane, ethane, ethene, anions, and dissolved organic carbon) of two new downgradient bedrock wells (LF6MW-12RBr and LF6MW-14Br) and one new overburden monitoring well. Analytical results for the bedrock groundwater samples indicated the presence of six VOCs, which were considered to be field or laboratory artifacts. All concentrations were below the most stringent criteria.

The overburden monitoring well (LF6MW-12) was installed and sampled at the most contaminated portion of the plume. Analytical results for the new overburden well and the two Hydropunch samples indicated the presence of five VOCs at concentrations exceeding the most stringent criteria (see Table 3-4). None of these contaminants were detected in bedrock groundwater samples.

TABLE 3-4
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
LANDFILL 6 PLUME
OVERBURDEN MONITORING WELL LF6MW-12 GROUNDWATER SAMPLES

Compound	Maximum Concentration Detected	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
Benzene	2.31	1/1	1 [a]
cis-1,2-Dichloroethene	485	1/3	5 [a]
trans-1,2-Dichloroethene	14.9	1/3	5 [a]
Trichloroethene	1,110	1/3	5 [a, b]
Vinyl chloride	6.90	1/3	2 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

µg/L = Micrograms per liter.

The Bedrock Groundwater Study concluded that the bedrock was free of contamination (TCE, DCE) in the overlying overburden aquifer and no further action was recommended for the bedrock groundwater.

Pre-Design Investigations. In 2006 and 2007, seven monitoring wells (LF6MW-27 through -32 and LF6MW-13RD) and six temporary monitoring wells (LF6TW-33 through LF6TW-38) were installed and sampled to better define the areal extent of the portion of the plume with the highest level of contamination, which surrounds monitoring well LF6VMW-12. Additional activities at the Landfill 6 OBGW site also included re-sampling of four existing monitoring wells (LF6VMW-12, LF6MW-18, LF6MW-19, and LF6MW-20). Analytical results for the monitoring wells indicated the presence of three VOCs at concentrations exceeding the most stringent criteria (see Table 3-5).

TABLE 3-5
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
LANDFILL 6 PLUME
2006 AND 2007 PRE-DESIGN INVESTIGATIONS – GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
cis-1,2-Dichloroethene	0.52J - 284	11/17	5 [a]
trans-1,2-Dichloroethene	0.12J - 9.85	1/17	5 [a]
Trichloroethene	5.7 - 1,140	15/17	5 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

µg/L = Micrograms per liter.

3.1.6 Current and Potential Future Site and Resource Uses

Griffiss AFB was designated for realignment under the Defense Base Closure and Realignment Act (BRAC) in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. Currently, the Landfill 6 OBGW site land use is open space (non-residential) and deed restrictions restrict the use of groundwater at this site. The anticipated future use at the Landfill 6 OBGW site is to remain the same, open space (non-residential). As a municipal water supply is available near the site, future use of site groundwater is not anticipated and thus will limit human exposure.

3.1.7 Summary of Site Risks

A general description of the risk assessment process is provided in Section 2.2. Site-specific results for the risk assessments performed at the Landfill 6 OBGW site are described below.

3.1.7.1 Human Health Risk Assessment

In 1994, as part of the RI, a baseline human health risk assessment was conducted to evaluate current and future potential risks to human health and the environment associated with contaminants found in the groundwater at the Landfill 6 OBGW site. The results of this risk assessment are reported here, however, because supplementary investigations (described below) yielded higher concentrations of contaminants than the RI, the risks are likely underestimated for the exposure scenarios considered. The remedial action objectives described in Section 3.1.8 are based on ARARs and TBCs rather than the results of this risk assessment.

The risk assessment evaluated exposure to potential residential and occupational (industrial worker) populations. The exposure scenarios for each population are described in Table 3-6. The exposure assumptions for each pathway and receptor, which were selected in accordance with EPA guidance, are more fully described in the RI report.

TABLE 3-6
LANDFILL 6 PLUME
RISK ASSESSMENT EXPOSURE SCENARIOS

Residential Receptor (groundwater used for potable water)	Industrial Worker (groundwater used for potable or process water)
• Groundwater ingestion • Inhalation of volatiles in groundwater (bathing, showering) • Dermal contact with groundwater • Ingestion of irrigated crops	• Groundwater ingestion • Inhalation of volatiles in groundwater • Dermal contact with groundwater

Carcinogenic Risk

Although it is unlikely that the land next to Landfill 6 will be developed, the hypothetical future use of this land for residential purposes was considered. The carcinogenic risks to adult residential receptors from dermal contact with compounds in the groundwater and ingestion of crops irrigated with groundwater were calculated as 4 in 100,000 (4×10^{-5}) and 6 in 100,000 (6×10^{-5}), which are below or within the EPA's ac-

ceptable target risk range. The total carcinogenic risks to adult residential receptors from inhalation of VOCs from groundwater and ingestion of groundwater were 5×10^{-4} and 1×10^{-3}, respectively, which are above EPA's acceptable target risk range. The greatest contributor to the excess risk for groundwater pathways was vinyl chloride.

The cumulative carcinogenic risk to industrial workers at Landfill 6 from the groundwater pathways was calculated as 2 in 10,000 (2×10^{-4}), which is above EPA's acceptable target risk range. The greatest contributor to this risk was vinyl chloride through the ingestion of groundwater pathway.

Noncarcinogenic Risk

For noncarcinogenic risks, the child is the receptor generally assumed to have the greatest estimated risk; therefore, HIs were calculated for the adult, adolescent, youth, and child. The total HIs for the future residential adult, adolescent, youth, and child exposed to groundwater were 10, 10, 20, and 30, respectively, which are above the acceptable level of 1. Ingestion of groundwater contaminated with selenium and manganese was the major contributor to this risk. However, the final FS concluded that elevated metals concentrations found on-site are naturally occurring. Therefore, the presence of elevated metals concentrations will not be used as a basis for remediation.

The total HIs for industrial workers exposed to groundwater was calculated as 4, which is above the acceptable level of 1. The HIs calculated for ingestion of groundwater, inhalation of volatiles released from groundwater, and dermal exposure to groundwater were 4, 0.0003, and 0.04, respectively.

Summary

The results of the human health risk assessment indicated that the potential risk of COPCs in groundwater would be reduced substantially if groundwater was not used for drinking water purposes. The quantitative evaluation of risk is subject to several conservative assumptions and should not be considered an absolute measure of risk.

The remedial action selected in this ROD, including institutional controls, is necessary to protect human health or welfare, or the environment from actual or threatened releases of hazardous substances from the Landfill 6 OBGW site into the environment.

3.1.7.2 Ecological Risk Assessment

A baseline risk assessment for ecological receptors from exposures to surface soil at the Landfill 6 OBGW site was conducted during the RI. An ecological risk assessment for exposure to groundwater was not performed because wildlife does not have access to groundwater at the Landfill 6 OBGW site.

3.1.7.3 Site Contaminants of Concern and Proposed Cleanup Goals

Based on investigations and risk assessments performed at the Landfill 6 OBGW site, the site COCs include cis-1,2-DCE, TCE, and vinyl chloride. For site COCs, the NYSDEC Class GA Groundwater Quality Standards were selected as the site cleanup goals. The cleanup goals for cis-1,2-DCE, TCE, and vinyl chloride are 5 µg/L, 5 µg/L, and 2 µg/L, respectively.

3.1.8 Remedial Action Objectives

For the Landfill 6 OBGW site, the remedial action objectives (RAOs) are to:

1. Achieve the cleanup goals for COCs specified in Section 3.1.7.3;

2. Prevent human exposure to groundwater through groundwater-use restrictions until cleanup goals are achieved; and

3. Prevent contaminated groundwater from the site from adversely impacting surface water (in Three Mile Creek), which is defined as surface water concentrations above performance indicators (NYSDEC Class GA Groundwater Quality Standards of 5 µg/L for DCE and 2 µg/L for vinyl chloride).

4. Prevent intrusive work or other activities that will impact the effectiveness of the landfill closure and post-closure activities.

5. Prevent development and use of the property for residential housing, elementary and secondary schools, childcare facilities and playgrounds.

Evaluate Effectiveness of the Remedy

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is performing as planned and is protective of public health and the environment.

Long-term monitoring of the groundwater plume and treatment performance during implementation will be performed. In order to monitor the plume, groundwater sam-

pling will be performed to monitor seasonal water table elevations and contaminant concentration fluctuations. The number and location of the proposed long-term monitoring well network will be finalized during the design stage. The sampling will be coordinated with the sampling required to evaluate the effectiveness of the Landfill 6 cover. Institutional controls in the form of deed restrictions within the main landfill boundary and for affected groundwater have been/will be implemented (see Section 3.1.12). Monitoring will continue until groundwater cleanup standards are achieved.

3.1.9 Description of Alternatives

CERCLA regulations mandate that a remedial action must be protective of human health and the environment. The following remedial alternatives were developed for the Landfill 6 OBGW site. For purposes of the FS, each alternative assumes a maximum 30-year remediation duration which is typically used in FSs for evaluation purposes. A summary of estimated remediation durations and costs are presented in Table 3-7.

TABLE 3-7
SUMMARY OF REMEDIAL ALTERNATIVE DURATIONS AND COSTS FOR LANDFILL 6 OBGW

Description	Alternative					
	1	2	3	4	5	6
	No Action	Institutional Controls	Natural Attenuation	In-Situ Oxidation	In Well Air Stripping	In-Situ Bioremediation
Total Approximate Project Duration (Years)	0	30	30	10	15	20
Total Present Value (in $ 2004)	$0	$635,400	$1,651,800	$4,102,500	$1,917,300	$1,940,700

Alternative 1 (No Action)

CERCLA requires that the No Action alternative be compared with other alternatives. The No Action alternative involves no remedial action for treatment of the Landfill 6 plume. The plume would be allowed to migrate and naturally attenuate. No monitoring would be conducted to evaluate the progress of these natural processes.

Alternative 2 (Institutional Controls)

This alternative would employ methods such as deed restrictions to prevent future use of the groundwater until cleanup goals are achieved (assumed to be 30 years for purposes of this analysis).

Alternative 3 (Monitored Natural Attenuation)

This alternative would employ natural processes to reduce contaminant concentrations within the aquifer. Long-term monitoring and institutional controls would also be included in this alternative. This analysis assumes that on-site contaminant concentrations will remain above cleanup goals for 30 years.

Alternative 4 (In-Situ Chemical Oxidation)

This alternative would involve the delivery of a strong oxidizing agent into the subsurface to oxidize COCs to non-toxic compounds. In addition, institutional controls would be implemented to limit the potential for future exposure to contaminated groundwater until cleanup goals were achieved. During this action, there would be continued monitoring of the extent of migration or natural attenuation of the plume. Since this alternative involves active treatment of and destruction of COCs, maintenance of institutional controls and monitoring will continue until cleanup goals are achieved (expected to be 10 years).

Alternative 5 (In-Well Air Stripping)

This alternative would involve the installation of groundwater-circulating/air-stripping wells to strip the contaminated groundwater of contaminants. Long-term monitoring of the groundwater plume would also be included in this alternative. Monitoring would be performed for an estimated 15 years (5 years during operation of the air stripping system and 10 years into the future).

Alternative 6 (In-Situ Bioremediation)

This alternative would involve in-situ bioremediation combined with extraction, treatment, and disposal if necessary. In-situ bioremediation of the area of the plume with the highest COC concentrations would be performed to enhance remediation efforts at the site. Long-term monitoring of the groundwater plume would also be included in this alternative until cleanup goals are achieved. On-site contaminant concentrations would remain above cleanup goals for an estimated 20 years.

3.1.10 Comparative Analysis of Alternatives

Remedial alternatives are assessed on the basis of both a detailed and a comparative analysis pursuant to the NCP. The detailed analysis of the Landfill 6 OBGW site consisted of (1) an assessment of the individual alternatives against seven evaluation criteria and (2) a comparative analysis focusing upon the relative performance of each alternative against the criteria. In general, the following "threshold" criteria must be satisfied by an alternative for it to be eligible for selection:

1. Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or remedial action with long-term monitoring.

2. Compliance with ARARs addresses whether a remedy would (a) meet all of the ARARs or (b) provide grounds for invoking a waiver.

In addition, the following "primary balancing" criteria are used to make comparisons and identify the major trade-offs among alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants at the site.

5. Short-term effectiveness addresses (a) the period of time needed to achieve protection and (b) any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital, operation and maintenance, and present-worth costs.

Finally, the following "modifying" criteria are considered fully after the formal public comment period on the proposed plan is complete:

8. State acceptance indicates whether, based on its review of historical investigations and this ROD, the state supports or opposes the preferred alternative and/or has identified any reservations with respect to the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in this ROD and the RI reports. Factors of community acceptance include support, reservation, or opposition by the community.

A comparative analysis of the six alternatives based on the nine evaluation criteria follows:

1. Overall Protection of Human Health and the Environment

   No human or environmental receptors are currently impacted by this plume. Although there are no current receptors, Alternative 1 does not include any provisions to prevent future exposures through installation of drinking water wells or construction on soils above the plume. Alternative 2 includes deed restrictions to ensure that there are no future exposures to contaminants. Because the future use of the area above the plume is intended to be open space, this approach would be protective. Alternative 3 builds on Alternative 2, including predictive modeling and increased plume analysis to confirm the areas to which restrictions would apply to prevent exposure. Alternatives 4, 5, and 6 employ active treatment mechanisms to destroy contaminants, providing the highest level of protection to human health and the environment.

2. Compliance with ARARs

   NYSDEC Class GA Groundwater Quality Standards comprise the chemical-specific ARARs for this plume. ARARs would not be achieved with Alternatives 1 and 2. Alternative 3 using natural monitored attenuation would eventually meet ARARs, but over a longer time frame. Alternatives 4, 5, and 6 provide active treatment mechanisms for removing contaminants from the groundwater, decreasing the time required for compliance with these ARARs. Alternatives 4 and 5 employ in-situ treatment technologies, to meet ARARs in the shortest time period. Alternative 6 uses in-situ bioremediation (and extraction and treatment, if necessary) and would likely require a longer treatment duration to meet ARARs.

The selected remedy (Alternative 6) will reduce the concentrations in the aquifer to levels below groundwater standards, meeting chemical-specific ARARs.

3. Long-term Effectiveness and Permanence

Alternative 1 is not effective in the long term. Alternative 2 provides an effective long-term mechanism to protect human health and the environment through the use of deed restrictions. However, in the absence of treatment mechanisms, this alternative is less protective than Alternatives 3, 4, 5, and 6.

Alternative 3 relies entirely on passive treatment processes to bring groundwater concentrations to within standards. Natural attenuation is an accepted solution for effectively protecting human health and the environment. A complete evaluation of its effectiveness for this plume cannot be determined until the program outlined as part of its implementation has been completed. Alternatives 4, 5, and 6 use active in-situ treatment technologies. The chemical oxidation pilot study at this site was effective in reducing contaminant mass; thus, it is effective in the long term. The effectiveness of the in-well air stripping technology presented in Alternative 5 cannot be accurately predicted until after pilot studies and/or initial implementation of the technology. However, this technology has been applied at other sites with similar COCs and is, therefore, expected to be reasonably effective. Pending successful use of this alternative, this technology would represent an effective long-term solution. The selected remedy (Alternative 6) employs a more established, proven technology and, thus, its effectiveness is more predictable. Both in-situ bioremediation and extraction and treatment are well-established technologies that have been known to reduce VOC concentrations and control plume migration, respectively. It would, over the long-term, provide effective protection. However, the time required to reduce concentrations to below groundwater standards is expected to be longer than the other active Alternatives 4 and 5.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 employ no treatment technologies and, thus, do not reduce toxicity, mobility, or volume. Alternatives 3, 4, 5, and 6 employ treatment mechanisms to reduce toxicity of contaminants in the plume. Alternative 3 relies on naturally occurring treatment processes within the plume. Alternative 4 and 6 treat the contaminants directly in-situ, thus, providing the most effective and rapid toxicity reduction. Alternative 5 relies on migration of contaminated groundwater to air stripping wells followed by extraction of vapors to the surface for treatment. This provides effective treatment, but at a slower rate. The adequacy of these treatment mechanisms would have to be verified through the evaluation program.

5. Short-term Effectiveness

Alternatives 1, 2, and 3 do not have significant short-term impacts. Alternatives 2 and 3 include institutional controls such as deed restrictions until cleanup goals are achieved.

Alternative 4 would provide the shortest duration of implementation (assumed to be one year). Monitoring for this alternative would span an assumed 10-year period (until cleanup goals are achieved). In addition, the active in-situ treatment of Alternative 4 would require surface access throughout the area of the plume, which would require clearing some vegetation, but this is not a significant impact. Alternative 5 would provide the next shortest duration of implementation/operation, estimated at five years with monitoring events performed during operation activities and extending an assumed 10 years beyond. The selected remedy (Alternative 6) will consist of injecting vegetable oil into the impacted area causing limited ground disturbance.

6. Implementability

There are no actions to implement for Alternative 1. Alternatives 2, 4, and 6 can be readily implemented. The implementability of natural attenuation for Alternative 3 can only be fully evaluated after the completion of the investigative activities. Similarly, Alternative 5 would require pilot-scale testing to demonstrate effectiveness prior to implementation. It is possible that this testing would reveal technical problems that may limit the ability to implement the technology or require changes from the assumptions that have been made regarding, for example, radius of influence, that may increase or decrease costs of implementation.

7. Cost

Alternative 1 calls for no action and thus incurs no costs. Alternative 2, Institutional Controls, is the least expensive of the remaining alternatives at a 2004 present-worth cost of $635,400. Natural attenuation, the primary component of Alternative 3, is estimated at a 2004 present-worth cost of $1,651,800. The cost for this alternative is greater than Alternative 2 due to a greater number of wells installed and monitored, a wider variety of parameters analyzed, and the addition of up-front investigation, including a potential microcosm study to better ascertain the effectiveness of natural attenuation, including developing flow and degradation modeling.

Alternatives 4, 5, and 6 call for in-situ treatment. Since the chemical oxidation pilot study has been performed at this site, the implementation methodology for Alternative 4 has been evaluated more thoroughly such that the cost estimate is expected to have less potential to vary. On the other hand, the cost estimates for full-scale implementation of Alternative 5 obtained from the in-well air stripping vendors are conceptual and may

not fully represent site-specific conditions. Additionally, the cost estimate for Alternative 5 could vary based on bench- and/or pilot-scale testing.

Considering these issues, the 2004 present-worth cost of Alternative 4 is $4,102,500, which is the most expensive alternative primarily due to the amount of oxidant required to reduce contaminant mass and to obstacles with oxidant delivery methods. Alternative 5 is the least expensive of the active treatment alternatives with a 2004 present-worth cost of $1,917,300. Alternative 6 employs in-situ biodegradation in combination with extraction/treatment, as necessary, to enhance the treatment of the plume. The estimated capital cost of Alternative 6 was $880,800 (in 2001 dollars). The estimated present-worth O&M cost of $944,600 (in 2001 dollars) includes the treatment system maintenance, treatment media replacement and disposal, and long-term monitoring. The 2004 total present-worth cost of the selected alternative is estimated at $1,940,700, which is slightly more than the least expensive of the three active treatment alternatives. Cost estimates for Landfill 6 groundwater remediation alternatives are summarized in Table 3-7.

8. Agency Acceptance

   AFRPA, NYSDEC, and EPA have mutually agreed to select Alternative 6, In Situ Bioremediation, with long-term monitoring for the Landfill 6 OBGW site. The selected remedy satisfies the threshold criteria and ensures compliance with applicable regulations.

9. Community Acceptance

   Community acceptance of the selected remedy was assessed at the public meeting and during the public comment period.

3.1.11 Principal Threat Wastes

There are no principal threat wastes at the Landfill 6 OBGW site.

3.1.12 Selected Remedy

The selected remedy (Alternative 6) for the Landfill 6 OBGW site includes bioremediation of the plume in the area exhibiting the highest COC concentration. The in-situ bioreactor will be created by increasing and sustaining a higher level of dissolved organic carbon in the groundwater contaminated with greater than 500 parts per billion (ppb) of total VOCs which represents the area of the plume with the highest COC concentrations. The organic carbon will be added to the subsurface via injections of a vegetable oil emulsion into injection points within the 500 ppb contour line (see Figure 3-2).

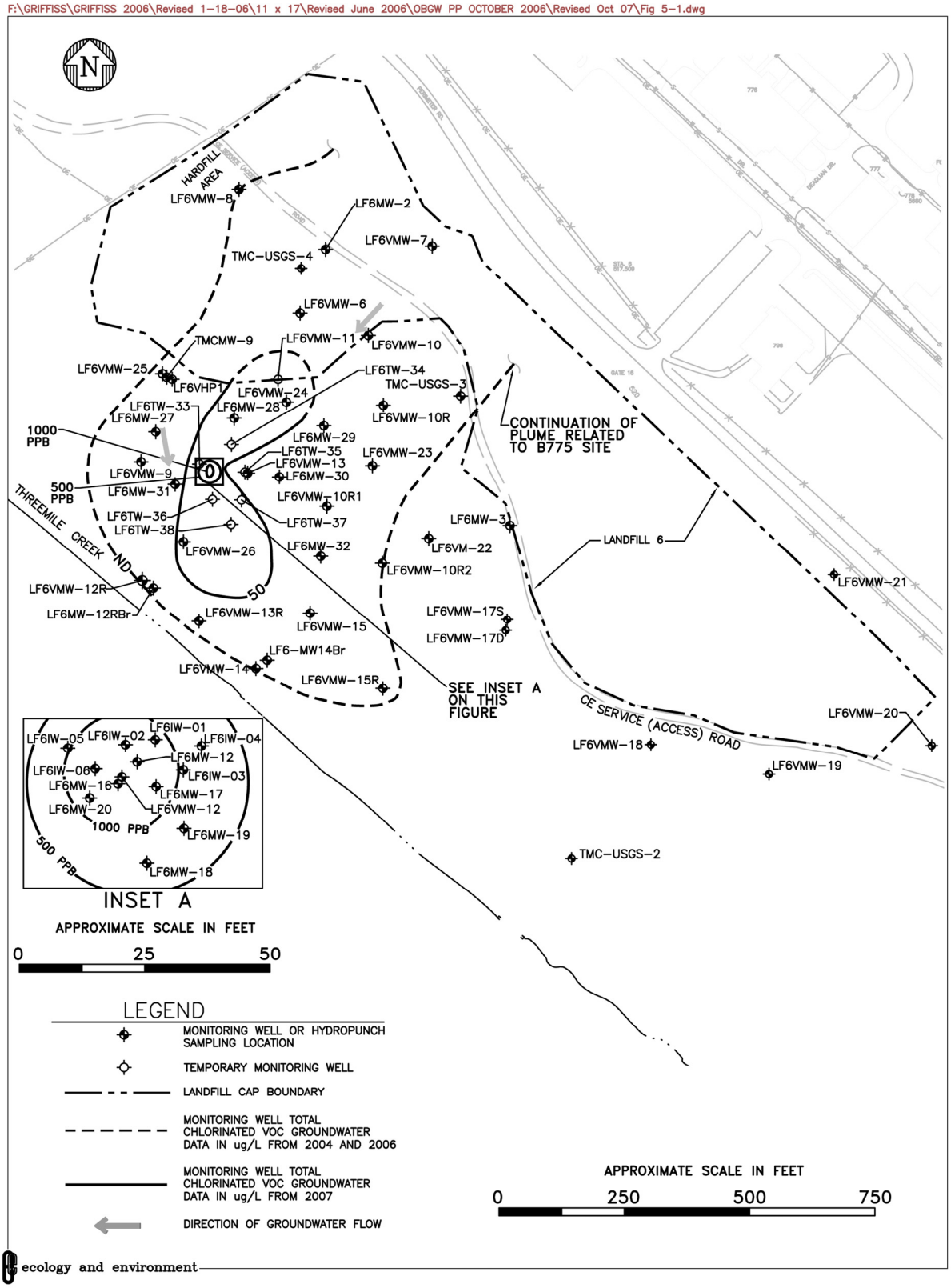

Figure 3-2 Landfill 6 Groundwater Monitoring Well and Sampling Locations

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Several subsequent or additional remedial options may be implemented at the Landfill 6 OBGW site, if necessary. If sampling after two years shows a lack of success, then the Air Force will discuss the following remedial options with EPA and NYSDEC prior to implementation:

- If total VOC concentrations exceed projected future concentrations (to be presented in the remedial design) in monitoring wells within the treatment area, additional vegetable oil injection may be performed.

- If total VOC concentrations in downgradient monitoring well LF6TW-38 exceed 500 ppb, recirculation of on-site groundwater would be considered for implementation. In general, groundwater will be extracted from a downgradient extraction well and reinjected near the source area. By recirculating site groundwater, an artificial hydraulic gradient would be created that is greater than that observed under normal conditions, allowing an increased flow of groundwater through the treatment zone.

- If total VOC concentrations in a monitoring well along the centerline of the plume near Three Mile Creek (within 100 feet of the creek) exceed 50 ppb, implementation of a contingency plan such as installation of an air sparge wall (or other action agreed upon by the Air Force, EPA, and NYSDEC) will be considered. Similarly, if DCE and/or vinyl chloride concentrations attributable to site groundwater are detected in surface water in Three Mile Creek above performance indicators (NYSDEC Class GA Groundwater Quality Standards of 5 µg/L for DCE and 2 µg/L for vinyl chloride), additional round(s) of sampling will be performed to confirm contaminant concentrations. Site data will then be evaluated to determine whether the elevated concentrations are attributable to site groundwater. If the concentrations are attributable to site groundwater, the Air Force will discuss future actions at the site with EPA and NYSDEC. The regulatory agencies will have final approval of the criteria and decision regarding implementation of contingency measures after receiving the Air Force's assessment and recommendation in accordance with the Interagency Agreement.

The selected remedy will result in the reduction of the highest concentrations of VOCs in groundwater at the Landfill 6 OBGW site. Remaining VOC contamination on site is anticipated to attenuate naturally to achieve groundwater standards.

Long-term monitoring of the groundwater plume and treatment performance during full-scale implementation will be performed (long-term monitoring described in this ROD is in addition to the Part 360 monitoring currently performed at Landfill 6 proper). Groundwater sampling will be performed to monitor seasonal water table elevations and

contaminant concentration fluctuations. The number and location of the proposed long-term monitoring well network will be finalized during the design stage. The sampling will be coordinated with the sampling required to evaluate the effectiveness of the Landfill 6 cover. Monitoring wells will be in place during implementation of the selected remedy to determine whether COCs remain above proposed cleanup goals. Monitoring is assumed to be required for 20 years. Long-term monitoring will be performed until four consecutive routine sampling rounds are below the NYSDEC Class GA Groundwater Quality Standards for site COCs. The Air Force may request that EPA/NYSDEC reduce the number of sample rounds used to demonstrate achievement of NYSDEC Class GA Groundwater Quality Standards based on the long-term monitoring data.

Institutional controls in the form of deed restrictions within the main landfill boundary and for affected groundwater will be implemented. Figure 3-3 provides the land use and institutional controls boundary. The starting coordinate of this boundary is located approximately 100 feet south and 60 feet east of the southwest corner of building 750. The institutional controls will be implemented as follows:

- Development and use of the entire SD-52, Landfill 6 Operable Unit AOC property for residential housing, elementary and secondary schools, childcare facilities, and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA, and NYSDEC.

- The owner or occupant of this site shall not extract, utilize, consume, or permit others to extract, utilize, or consume any water from the subsurface aquifer within the boundary of the site unless such owner or occupant obtains prior written approval from the NYSDOH.

- The owner or occupant of this site will not engage in any activities that will disrupt required remedial investigation, remedial actions, and oversight activities, should any be required.

- The owner or occupant of this site will restrict access to and prohibit contact with all subsurface soils and groundwater at or below the groundwater interface at this AOC until cleanup goals are achieved and have been confirmed through sample results.

- Intrusive work or other activities that impact the effectiveness of the landfill closure and post-closure activities will not be allowed within the restricted landfill boundary (see Figure 3-2).

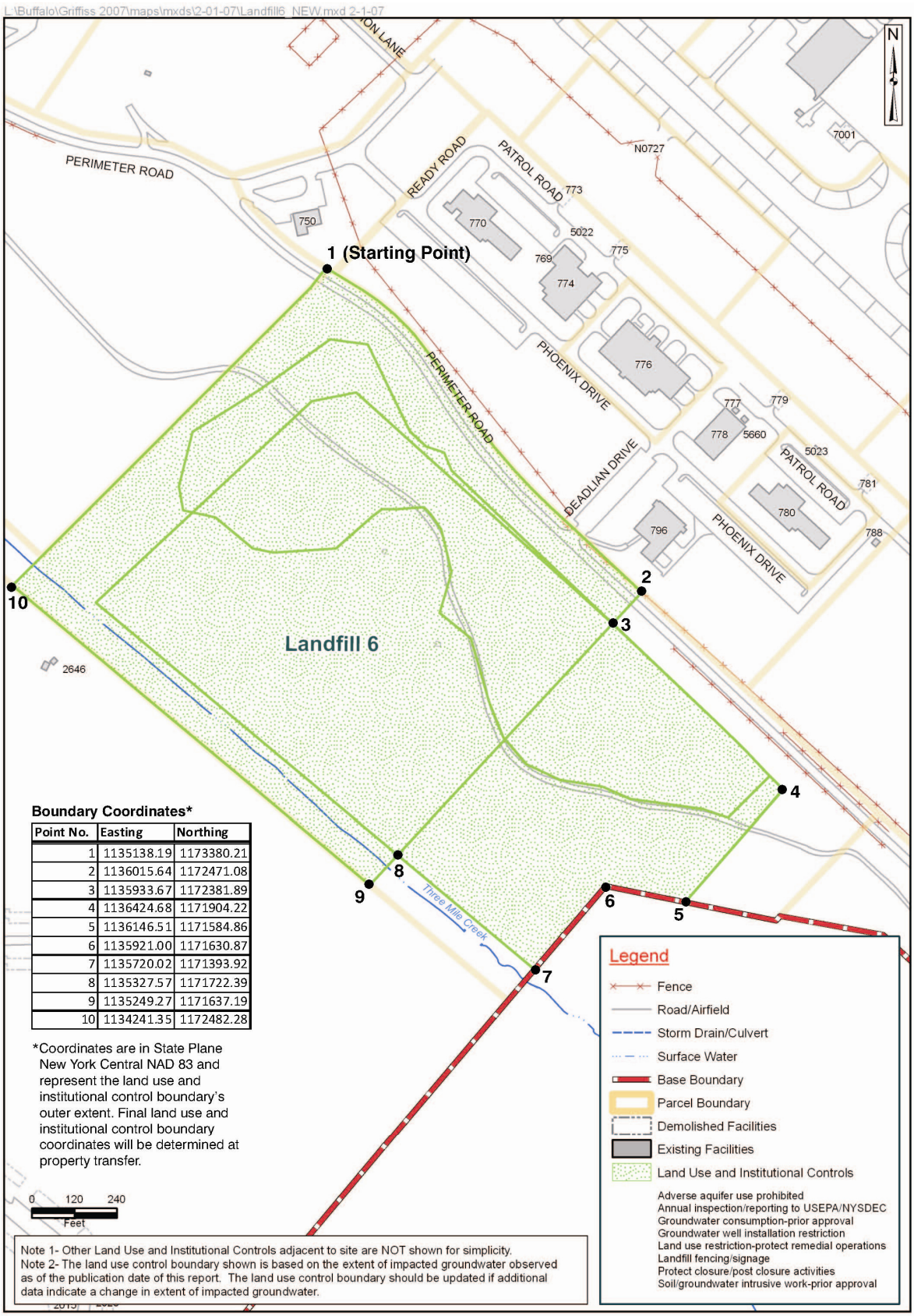

Figure 3-3 Landfill 6 Land Use and Institutional Controls Boundary

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- Posting of notices and signs to minimize the interference with the landfill closure and post-closure activities. Signs will be posted along the landfill property boundary that read "SOLID WASTE LANDFILL – CONTAINS HAZARDOUS SUBSTANCES – NO TRESPASSING."

The above restrictions will be maintained until the concentration of hazardous substances in the groundwater are at such levels to allow for unrestricted use and exposure. Prior approval by EPA and NYSDEC (and from the Air Force if the property has transferred) is required for any anticipated action that may disrupt the effectiveness of or alter or negate the need for institutional controls or for any modification or termination of institutional controls or use restrictions.

The parcels of property encompassing the Landfill 6 OBGW site are currently owned by the Air Force. If this property is transferred to another federal entity (federal-to-federal transfer) or a non-federal entity in the future, the EPA and NYSDEC will be notified at least six months prior to such transfer. If the six-month notification is not possible, the EPA and NYSDEC will be notified no later than 60 days prior to such transfer. The Air Force shall provide a copy of the executed deed to EPA and NYSDEC.

The Air Force will take the following actions to ensure that the aforementioned use restrictions and the controls are effective in eliminating the exposure scenario and protecting human health and the environment:

Deed Restrictions: Each transfer of fee title from the United States will include the information required by CERCLA 120(h)(3)(A)," with the required reservation of access extending to the Air Force, USEPA, and NYSDEC, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Air Force obligations under CERCLA or similar authorities for taking remedial or corrective action on the property. Deeds will also include a description of any residual contamination on the property above unlimited use and unrestricted exposure levels and any related environmental restrictions, and will expressly prohibit activities inconsistent with remedial action objectives. Deeds will contain appropriate provisions designed to ensure that restrictions run with the land and are enforceable by the Air Force.

Lease Restrictions: During the time between the adoption of this ROD and deeding of the property, equivalent restrictions will be implemented by lease terms, which are no less restrictive than the use restrictions and controls described above, in this ROD. These lease terms shall remain in place until the property is transferred by deed, at which time they will be superceded by the institutional controls described in this ROD.

Environmental Easement and State Land Use Notification: The Air Force will condition transfer of the property upon the transferee granting an environmental easement, containing a complete description of the restrictions described in this ROD, for the land use and institutional controls boundary shown on Figure 3-3 in accordance with Article 71, Title 36 of the New York State Environmental Conservation Law. The Air Force will ensure that the transferee will grant the environmental easement to NYSDEC, on behalf of the State of New York, at the time of transfer of title for the property from the United States. The content of the document creating the environmental easement must be pre-approved by NYSDEC.

Notice: Prior to property transfer, the transferee will be notified of any environmental use restrictions and institutional controls or reporting requirements. Concurrent with the transfer of fee title, information regarding the environmental use restrictions and controls will be communicated in writing to appropriate state agencies to ensure that such agencies can factor such conditions into their oversight and decision-making activities regarding the land use and institutional controls boundary. The Air Force will also provide a copy of the deeds to the regulatory agencies as soon as practicable after the transfer of fee title.

Monitoring and Enforcement:

Monitoring: Monitoring of the environmental use restrictions and controls will be conducted annually by the Air Force until the property encompassing the land use and institutional controls boundary is transferred and a report is provided. Any such annual monitoring reports will be included in a separate report or as a section of another environmental report, if appropriate, and be provided to the EPA and NYSDEC. Upon the effective date of the property conveyance, the Air Force will place a requirement in the deed that the transferee or subsequent property owner(s) will conduct annual physical inspections of the Landfill 6 OBGW site to confirm continued compliance with all institutional controls objectives unless and until all institutional controls at the site are terminated and will provide to the Air Force, EPA, and NYSDEC an annual monitoring report. All annual monitoring reports will report on the status of institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed, whether use restrictions and controls were communicated in the deed(s) for any property transferred in the reporting period, and whether use of the property encompassing the land use and institutional controls boundary has conformed to such restrictions and controls.

If a transferee fails to provide an annual monitoring report as described above to the Air Force, the Air Force will notify EPA and NYSDEC as soon as practicable. If EPA does not receive the annual monitoring report from the transferee (either itself or from NYSDEC), it will notify the Air Force as soon as practicable. Within 30 days of the report's due date, the Air Force will take steps to determine whether institutional controls are effective and remain in place and advise the regulators of its efforts. In any event, within 90 days of the report's due date, the

Air Force shall determine the status of institutional controls and provide its written findings, with supporting evidence sufficient to confirm the reported status, based on the use restrictions/institutional controls and site conditions, to EPA and NYSDEC unless either EPA or NYSDEC, in its sole discretion, acts to confirm the status of the institutional controls independently.

The institutional controls monitoring reports will be used in the preparation of the 5-Year Reviews to evaluate the effectiveness of the remedy. The continuation, modification, or elimination of the monitoring reports, as well as any changes to institutional controls monitoring frequencies, will be subject to EPA and NYSDEC approval. The 5-Year Review reports will be submitted to the regulatory agencies for review and comment.

Response to Violations: The Air Force will notify EPA and NYSDEC via e-mail or telephone as soon as practicable, but no later than 10 days after discovery of any activity that is inconsistent with the land and groundwater use objectives or use restrictions, exposure assumptions, or any action that may interfere with the effectiveness of the institutional controls. Any violations that breach federal, state or local criminal or civil law will be reported to the appropriate civilian authorities, as required by law.

Enforcement: Any activity that is inconsistent with the institutional controls objectives or use restriction or any action that may interfere with the effectiveness of the land and groundwater use restrictions will be addressed by the Air Force as soon as practicable (but in no case more than 10 days) after the Air Force becomes aware of the violation. The Air Force will notify EPA and NYSDEC regarding how the breach has been addressed within 10 days of sending EPA and NYSDEC notification of the breach. The Air Force will exercise such rights as it retained under the transfer documents to direct that activities in violation of the controls be immediately halted. To the extent necessary, the Air Force will engage the services of the Department of Justice to enforce such rights.

Notification of Land Use Modification: The recipient of the property will obtain approval from the Air Force, EPA, and NYSDEC for any proposals for a land use change at a site inconsistent with the use restrictions described in this ROD.

The Air Force is responsible for implementing, maintaining, monitoring, and enforcing the selected remedy (including the institutional controls). Although the Air Force may later transfer these responsibilities to another party, the Air Force, both pre-transfer and post-transfer, shall retain ultimate responsibility for implementing, maintaining, monitoring, and enforcing the selected remedy.

Executive Order 11990 Finding of No Practicable Alternative – Wetlands

There may be a disturbance of wetlands if one of the contingency plans is implemented. In that case, the Air Force will take all practicable measures to minimize harm to the wetlands and will restore the wetlands in accordance with the Basewide Wetlands Management Plan (E & E 2003).

3.1.13 Statutory Determinations

The AFRPA and EPA, with concurrence from NYSDEC, have determined that remedial action (in-situ bioremediation) with long-term monitoring is warranted for the Landfill 6 OBGW site. The selected remedy is protective of human health and the environment, complies with federal and NYS ARARs, is cost effective, and utilizes permanent solutions to the extent possible.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is still performing as planned and is protective of public health and the environment.

3.1.14 Documentation of Significant Changes

No significant changes have been made to the selected remedy from the time the proposed plan was released for public comment.

3.2 Building 775

3.2.1 Site Name, Location, and Brief Description

The Building 775 OBGW site (site identification designation SD-52) is located in the SAC Hill Area of the base at the former Griffiss AFB in Rome, Oneida County, New York (see Figure 3-1). Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the NPL on July 15, 1987. On August 21, 1990, the EPA, NYSDEC, and the AFRPA entered into an FFA under Section 120 of CERCLA.

Building 775 is located in the south-central portion of the former Griffiss AFB (see Figure 3-4). The Building 775 OBGW site is situated on a topographic high relative to the runway and flight aprons. Building 775 (also referred to as Pumphouse 3) was one of four pumphouses located east of Ready Road. The topography at the Building 775 area is relatively flat with less than 1 foot of topographic relief. Run-off from the site is channeled into the base storm system discharging to Three Mile Creek.

3.2.2 Site History and Enforcement Activities

This information is contained in Section 2.1.

3.2.3 Community Participation

This information is contained in Section 2.3.

3.2.4 Scope and Role of Site Remedial Action

The scope of the plan for remedial action for the Building 775 OBGW site addresses the concerns for human health and the environment. Groundwater extraction, treatment, and discharge with long-term groundwater monitoring is consistent with the results of the risk assessment performed for industrial groundwater users. Remedial actions at the Building 775 OBGW site will reduce COPC levels locally, thus contributing to the remediation of OBGW at the Former Griffiss AFB.

3.2.5 Site Characteristics

The former Griffiss AFB covered approximately 3,552 contiguous acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York. Topography within the valley is relatively flat, with elevations on the former Griffiss AFB ranging

from 435 to 595 feet above mean sea level. Three Mile Creek, Six Mile Creek (both of which drain into the NYS Barge Canal, located to the south of the base), and several state and/or federally regulated wetlands are located on the former Griffiss AFB, which is bordered by the Mohawk River on the west. Due to its high average precipitation and predominantly silty sands, the former Griffiss AFB is considered a groundwater recharge zone.

It was originally thought that Building 775 (Pumphouse 3) was the origin of a TCE plume at the Building 775 OBGW site, but during the RI and SI investigations (described below), it was determined that the actual source of contamination was the degreasing room/vat in Building 774. This degreasing system utilized a monorail to carry equipment to the degreasing vat for solvent cleaning when the building was used as an armament and electronics shop. Chlorinated solvents that have contributed to the groundwater contamination are suspected to have originated from this area. No evidence of the degreasing system was found during the basewide environmental baseline survey site inspection in April 1994.

The Building 775 OBGW site geology primarily consists of sand, silt, gravel, and clay. Groundwater flow beneath the Building 775 site is predominantly to the southwest with a slight southerly component in localized areas. The average depth to groundwater is about 60 feet. The water table exhibits a low gradient (0.005 feet per foot [ft/ft] to 0.0011 ft/ft) to the southeast.

According to the Groundwater Study performed in 2000 for this site, the downgradient edge of the Building 775 OBGW plume commingles with the upgradient edge of the Landfill 6 OBGW plume. Thus contaminated groundwater from the Building 775 OBGW site is a source to the Landfill 6 OBGW site and Three Mile Creek.

Site Investigations

Three groundwater monitoring wells (775MW-1, -2, and -3) were installed at Pumphouse 3 in 1989 as part of a monitoring well installation program for the four pumphouses. Groundwater samples collected from Building 775 wells in 1989 indicated the presence of PCE and TCE. In August 1991, a leak detection and monitoring system was installed on the hydrant piping system and associated underground storage tanks (USTs)

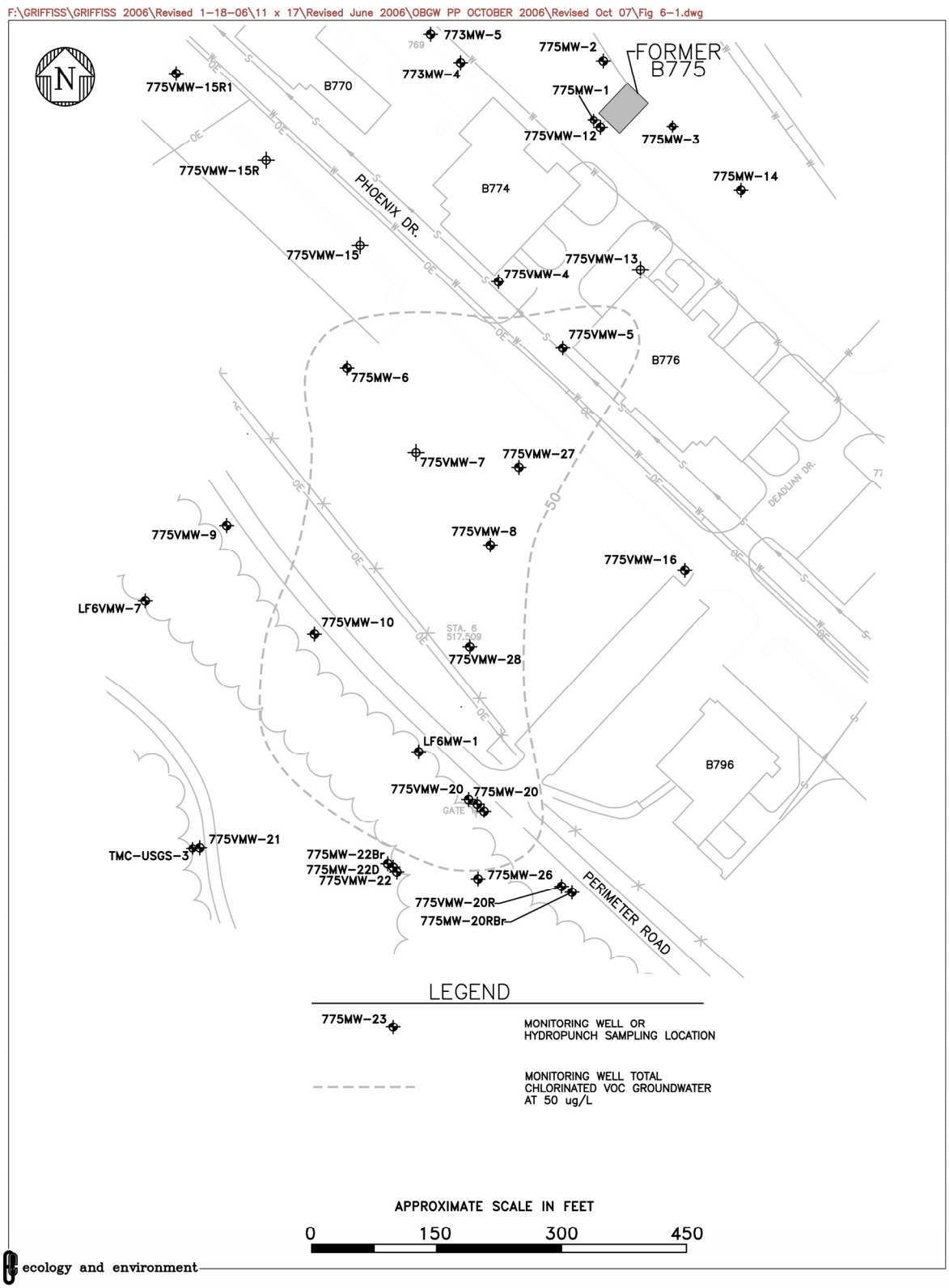

Figure 3-4 Building 775 Groundwater Monitoring Well and Sampling Locations

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at the four pumphouses at the former Griffiss AFB, and in December 1991 the USTs at Pumphouse 3 passed the initial tightness testing. Groundwater samples collected at Pumphouse 3 in 1991 indicated the presence of PCE, TCE, chloroform, methylene chloride, and several metals. Groundwater samples collected from Building 775 wells in 1991 indicated the presence of PCE, TCE, chloroform, methylene chloride, bis (2-ethylhexyl) phthalate, and several metals.

Groundwater samples collected from Building 775 wells in 1992 indicated the presence of chrysene and benzo(a)anthracene. In 1992 and 1993, quarterly groundwater sampling indicated the presence of benzene, chloroform, xylenes, PCE, and TCE, as well as several metals. Benzene, xylenes, and TCE were detected at concentrations exceeding the most stringent criteria (see Table 3-8).

The final FS concluded that elevated metals concentrations found on site are naturally occurring. Therefore, metals will not be used as a basis for remediation.

Remedial Investigation. In 1994, an RI was performed. The main objective of the RI was to investigate the nature and extent of environmental contamination from historical releases at the Building 775 OBGW site in order to determine whether any remedial action was necessary to prevent potential threats to human health and the environment. The RI included an active soil survey, grab groundwater sampling, resampling of one Building 775 well and one Building 773 well, collection of three surface soil samples in the vicinity of the former location of the TCE vat and drum storage area (previously located on the east side of Building 774), and installation and sampling of one soil boring near Building 774.

The active soil gas/groundwater screening survey indicated the presence of chloroform, 1,1,1-trichloroethane, TCE, and PCE, with the highest TCE concentrations in groundwater found in samples located south and west of Building 774. The highest TCE concentrations in soil gas were found in samples located northeast of Building 774. Two groundwater samples were collected from Building 775. Analytical results indicated the presence of three VOCs, three SVOCs, four pesticides, and 11 metals. One VOC (TCE), one SVOC (bis(2-ethylhexyl)phthalate), and five metals were detected at concentrations exceeding the most stringent criteria (see Table 3-8).

TABLE 3-8
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 775 PLUME
1992 - 1993 QUARTERLY AND 1994 RI GROUNDWATER SAMPLING

Compound	Range of Detected Concentrations or Maximum Concentration Detected	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (μg/L)			
Benzene	1.2 – 3.9	3/13	1 [a]
Xylenes	10	1/13	5 [a]
Trichloroethene	11 - 100	12/13	5 [a, b]
SVOCs (μg/L)			
Bis(2-ethylhexyl)phthalate	2 – 16 J	2/13	5 [a]
Metals (μg/L)			
Aluminum	285 – 620	2/13	50 [c]
Iron	60 – 1,710	4/13	300 [a, c]
Lead	3.4	1/13	2.9 [c]
Manganese	29 – 140	3/13	50 [c]
Thallium	0.7 J	1/13	0.5 [d]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.
[b] EPA Federal primary maximum contaminant level.
[c] EPA Federal secondary maximum contaminant level.
[d] NYSDEC Class GA groundwater guidance value, June 1998.

Key:
J = Estimated concentration.
μg/L = Micrograms per liter.

Supplemental Investigation. In 1997, an SI was performed. Four existing monitoring wells were resampled (773MW-1, -2, and -3, and 775MW-2), and seven new wells were installed and sampled (775VMW-4, -5, -7, -8, -9, -10, which were vertically profiled prior to installation, and 775MW-6). Analytical results for the monitoring wells indicated the presence of 10 SVOCs and six VOCs. TCE was detected at concentrations (2.9 to 100 μg/L) exceeding the most stringent criteria (5 μg/L) in eight wells. Analytical results for the vertical profile Hydropunch samples indicated the presence of TCE in concentrations between 18 to 230 μg/L.

Groundwater Study. In the spring of 2000, a comprehensive groundwater study to define the vertical and lateral extent of groundwater contamination at the site was completed. The groundwater study at Building 775 consisted of drilling and vertically profiling 19 boreholes (775VMW-11 through -25; see Figure 3-4) and 104 Hydropunch sam-

ples; installation, development, sampling, and slug testing of 13 new wells (775VMW-11, -14, -15R1, -16, -17, -18R, -19, -20R, -21, -22, -23, -24, and -25); and sampling and slug testing of eight existing wells (775MW-2, 775VMW-4, -5, 775MW-6, 775VMW-7, -8, -9, and -10).

During this study, three VOCs were detected in the monitoring wells at concentrations exceeding the most stringent criteria (see Table 3-9).

TABLE 3-9
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 775 PLUME
2000 GROUNDWATER STUDY MONITORING WELL GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations or Maximum Concentration Detected	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
1,2-Dichloroethane	1.14	1/21	0.6 [a]
1,1,1,-Trichloroethane	1.1 – 7.1	1/21	5 [a]
Trichloroethene	0.429 J – 218	7/21	5 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:
J = Estimated concentration.
µg/L = Micrograms per liter.

The Building 775 contamination plume was delineated both vertically and horizontally using Hydropunch data. Three chlorinated solvents were detected in the Hydropunch samples: cis-1,2-DCE, which was detected in one of the 19 boreholes with a maximum concentration of 12.1 µg/L in 775VMW-15R (exceeding the most stringent criteria of 5 µg/L per NYSDEC Class GA Groundwater Quality Standards); PCE, which was detected in 13 of 19 boreholes with a maximum concentration of 5.2 µg/L in 775VMW-13 (exceeding the most stringent criteria of 5 µg/L per NYSDEC Class GA Groundwater Quality Standards); and TCE, which was detected in 12 of 19 boreholes with a maximum concentration of 608 µg/L in 775VMW-20R (exceeding the most stringent criteria of 5 µg/L per NYSDEC Class GA Groundwater Quality Standards).

Based on the Hydropunch data, the source area for the Building 775 is located around former buildings 773, 774, and 775. The width of the plume was estimated at approximately 500 feet near the source and 800 feet at the leading edge with the base of the leading edge appearing to merge or nearly merge with the leading edge of the Landfill 6 plume.

Bedrock Groundwater Study. A Bedrock Groundwater Study for Building 775 was conducted in 2002 to determine whether contamination was present in the bedrock. The study consisted of the installation, sampling, and slug testing of two new bedrock wells (775MW-20RBr and 775MW-22Br). Analytical results indicated the presence of six VOCs all at concentrations below the most stringent criteria.

Three new overburden monitoring wells were installed and sampled (775MW-20, 775MW-20D, and 775MW-22D), and a grab groundwater sample was collected from existing well 775VMW-7. Analytical results for the three new overburden wells, the four Hydropunch samples, and the grab sample from the existing well indicated the presence of 16 VOCs; the concentration of two VOCs, chloroform and TCE, exceeded the most stringent criteria (see Table 3-10).

TABLE 3-10
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 775 PLUME
BEDROCK GROUNDWATER STUDY
2002 OVERBURDEN GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
Chloroform	0.309 J – 30.3	1/8	7 [a]
Trichloroethene	0.168 J – 84.6	2/8	5 [a, b]
Anions (mg/L)			
Chloride	11.1 – 1,350	2/3	250 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal secondary maximum contaminant level.

Key:

J = Estimated concentration.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.

The Bedrock Groundwater Study concluded that groundwater contamination observed in the overlying overburden aquifer does not appear to have migrated downward into the underlying bedrock at the Building 775 OBGW site. Therefore, no further action was recommended for bedrock groundwater.

Pre-Design Investigations. In 2006, two monitoring wells (775MW-27 and -28) were installed and sampled to better define the areal extent of the portion of the plume with the total VOCs greater than 50 µg/L. Analytical results for the monitoring wells indicated the presence of one VOC in both wells at concentrations exceeding the most stringent criteria (see Table 3-11).

TABLE 3-11
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 775 PLUME
2006 PRE-DESIGN INVESTIGATIONS – GROUNDWATER SAMPLES

Compound	Detected Concentrations	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
Trichloroethene	15, 82	2/2	5 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.
[a] NYSDEC Class GA groundwater standard, June 1998.
[b] EPA Federal primary maximum contaminant level.

Key:
J = Estimated concentration.
µg/L = Micrograms per liter.

3.2.6 Current and Potential Future Site and Resource Uses

Griffiss AFB was designated for realignment under the Defense Base Closure and Realignment Act in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. Currently, the Building 775 OBGW site land use is industrial/commercial (non-residential) and deed restrictions restrict the use of groundwater at this site. The anticipated future use at the Building 775 OBGW site is to remain the same, industrial/commercial (non-residential). As a municipal water supply is available near the site, future use of site groundwater is not anticipated and thus will limit human exposure.

3.2.7 Summary of Site Risks

A general description of the risk assessment process is provided in Section 2.2. Site-specific results for the risk assessments performed at the Building 775 OBGW site are described below.

3.2.7.1 Human Health Risk Assessment

In 1994, as part of the RI, a baseline human health risk assessment was conducted to evaluate current and future potential risks to human health and the environment associated with contaminants found in the groundwater at the Building 775 OBGW site. The results of this risk assessment are reported here; however, because supplementary investigations (described below) yielded higher concentrations of contaminants than the RI, the risks are likely underestimated for the exposure scenarios considered. The RAOs described in Section 3.2.8 are based on ARARs and TBCs rather than the results of this risk assessment.

The current and future land use designation for the Building 775 area is industrial/commercial. The 1994 human health risk assessment evaluated exposure to potential industrial workers if groundwater at the site was used as process water for industrial purposes or as a potable water source. The receptors and pathways evaluated for groundwater exposure in the risk assessment are summarized in Table 3-12. The exposure assumptions were selected in accordance with EPA guidance and are more fully described in the RI report.

TABLE 3-12
BUILDING 775 PLUME
RISK ASSESSMENT EXPOSURE SCENARIO

INDUSTRIAL WORKER (Future) **(groundwater used for potable or process water)**
• Groundwater ingestion • Inhalation of volatiles in groundwater • Dermal contact with groundwater

Carcinogenic Risk

The cumulative carcinogenic risk to industrial workers from site contaminants in groundwater was calculated as 8 in 1,000,000 (8×10^{-6}), which is within EPA's acceptable target risk range. The pathway-specific risks from ingestion, inhalation of volatiles

released from groundwater, and dermal exposure to groundwater were 7×10^{-6}, 3×10^{-7}, and 9×10^{-7}, respectively all within or below EPA's acceptable target risk range.

Noncarcinogenic Risk

The total HI for industrial workers exposed to groundwater was calculated as 0.4, which is below the acceptable level of 1.

Summary

While the human health risk assessment to industrial workers from site contaminants in groundwater was within the acceptable target risk range, the downgradient edge of the Building 775 OBGW plume commingles with the Landfill 6 OBGW plume and thus serves as a source to the Landfill 6 OBGW plume. Based on this source contribution to the Landfill 6 OBGW plume and the potential for contaminated groundwater to migrate to Three Mile Creek, plus the risk analysis being limited to industrial workers, the Air Force has determined it advisable to extract and treat the groundwater from the Building 775 OBGW plume.

The remedial action selected in this ROD, including institutional controls, is necessary to protect human health or welfare, or the environment from actual or threatened releases of hazardous substances from the Building 775 OBGW site into the environment.

3.2.7.2 Ecological Risk Assessment

An ecological risk assessment for exposure to groundwater was not performed because wildlife does not have access to groundwater at the Building 775 OBGW site.

3.2.7.3 Site Contaminants of Concern and Proposed Cleanup Goals

Based on investigations and risk assessments performed at the Building 775 OBGW site, the site COC is TCE. For the site COC, the NYSDEC Class GA Groundwater Quality Standards were selected as the site cleanup goals. The cleanup goal for TCE is 5 μg/L.

3.2.8 Remedial Action Objectives

For the Building 775 OBGW site, the RAOs are to:

1. Achieve the cleanup goals for COCs specified in Section 3.2.7.3;

2. Prevent human exposure to groundwater through groundwater use restrictions until cleanup goals are achieved; and

3. Prevent contaminated groundwater from the site from adversely impacting surface water (in Three Mile Creek), which is defined as surface water concentrations above performance indicators (NYSDEC Class GA Groundwater Quality Standards of 5 µg/L for DCE and 2 µg/L for vinyl chloride).

4. Prevent development and use of the property for residential housing, elementary and secondary schools, childcare facilities and playgrounds.

Evaluate Effectiveness of the Remedy

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is still performing as planned and is protective of public health and the environment.

Long-term monitoring of the groundwater plume and treatment performance during full-scale implementation will be performed. Groundwater sampling will be performed to monitor seasonal water table elevations and contaminant concentration fluctuations. The number and locations of the wells for the proposed long-term monitoring well network will be finalized during the design stage.

Portions of the Building 775 OBGW site have been transferred from Air Force to other entities with remaining portions planned for future transfer. Institutional controls in the form of deed restrictions for affected groundwater have been/will be implemented (see Section 3.2.12). If additional restrictions are required for property already transferred based on deed restrictions presented in this ROD, a deed modification will be issued. Monitoring will continue until groundwater cleanup standards are achieved.

3.2.9 Description of Alternatives

CERCLA regulations mandate that a remedial action must be protective of human health and the environment. The following remedial alternatives were developed for the Building 775 OBGW plume, which consists of a relatively deep plume that has migrated southwest from its apparent original source area near Building 774. For purposes of the FS, each alternative assumes a maximum 30-year remediation duration, which is typically

used in FSs for evaluation purposes. A summary of estimated remediation durations and costs are presented in Table 3-13.

TABLE 3-13
SUMMARY OF REMEDIAL ALTERNATIVE DURATIONS AND COSTS FOR BUILDING 775 OBGW

Description	Alternative				
	1	2	3	4	5
	No Action	Institutional Controls	In-Situ Oxidation	In Well Air Stripping	Extraction, Treatment, and Discharge
Total Approximate Project Duration (Years)	0	30	10	15	20
Total Present Value (in $ 2004)	$0	$665,600	$4,944,200	$2,195,700	$1,246,900

Alternative 1 (No Action)

This alternative involves no remedial action to remediate the Building 775 plume. The plume would be allowed to migrate and naturally attenuate. No monitoring would be conducted to evaluate the progress of these natural processes.

Alternative 2 (Institutional Controls)

This alternative would employ methods such as deed restrictions to prevent future use of the groundwater at the Building 775 AOC until cleanup goals are achieved (assumed to be 30 years for purposes of this analysis).

Alternative 3 (In-Situ Chemical Oxidation)

This alternative would involve the delivery of a strong oxidizing agent into the subsurface through temporary injection points (i.e., direct push points) to oxidize COCs to non-toxic compounds. In addition, institutional controls would be implemented to minimize the potential for future exposure to contaminated groundwater until cleanup goals were achieved. During this action, there would be continued monitoring of the extent of migration or natural attenuation of the plume. This alternative would involve full-scale remediation for the area contained within the 50-µg/L total VOC concentrations contour line, thus removing about 95% of the contaminant mass while addressing approximately 46% (or 6.5 acres) of the plume area. Since this alternative involves active

treatment of and destruction of COCs, maintenance of institutional controls and monitoring will continue until cleanup goals are achieved (expected to be 10 years).

Alternative 4 (In-Well Air Stripping)

This alternative would involve the installation of groundwater-circulating/air-stripping wells to strip the contaminated groundwater of contaminants. The contaminated vapors would be treated and processed in a closed loop system. The treated groundwater would not be removed from the subsurface but cycled through a groundwater circulation cell created around the well. Long-term monitoring of the groundwater plume would also be included in this alternative. This alternative would involve full-scale remediation for the area contained within the 50-µg/L total VOC concentrations contour line (see Figure 3-4), thus removing about 95% of the contaminant mass while addressing approximately 46% (or 6.5 acres) of the plume area. Monitoring would be performed for an estimated 15 years (5 years during operation of the air stripping system and 10 years into the future).

Alternative 5 (Extraction, Treatment, and Discharge)

This alternative would involve installation of recovery wells to extract groundwater from the Building 775 plume, treating the groundwater, and then discharging the treated water. The pumping system capacity will be established during design and will be adequate to remove groundwater from within the 50 µg/L total VOC plume area. Long-term monitoring of the groundwater plume would also be included in this alternative. Groundwater would be discharged to the sanitary sewer for off-site treatment at a wastewater treatment facility or to Three Mile Creek in accordance with substantive State Pollutant Discharge Elimination System (SPDES) requirements. This analysis assumed that on-site contaminant concentrations will remain above cleanup goals for 20 years.

3.2.10 Comparative Analysis of Alternatives

Remedial alternatives are assessed on the basis of both a detailed and a comparative analysis pursuant to the NCP. The detailed analysis of Building 775 OBGW consisted of (1) an assessment of the individual alternatives against nine evaluation criteria and (2) a comparative analysis focusing upon the relative performance of each alternative

against the criteria. In general, the following "threshold" criteria must be satisfied by an alternative for it to be eligible for selection:

1. Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or remedial action with long-term monitoring.

2. Compliance with ARARs addresses whether a remedy would (a) meet all of the ARARs or (b) provide grounds for invoking a waiver.

In addition, the following "primary balancing" criteria are used to make comparisons and identify the major trade-offs among alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants at the site.

5. Short-term effectiveness addresses (a) the period of time needed to achieve protection and (b) any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital, operation and maintenance, and present-worth costs.

Finally, the following "modifying" criteria are considered fully after the formal public comment period on the proposed plan is complete:

8. State acceptance indicates whether, based on its review of the RI and the proposed plan, the state supports or opposes the preferred alternative and/or has identified any reservations with respect to the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in the proposed plan and the RI reports. Factors of community acceptance include support, reservation, or opposition by the community.

A comparative analysis of the five alternatives based on the nine evaluation criteria follows:

1. Overall Protection of Human Health and the Environment

   No human or environmental receptors currently are impacted by this plume. Although there are no current receptors of contamination at the Building 775 plume, Alternative 1 does not prevent future exposures through installation of drinking water wells or construction in soils above the plume.

   Alternative 2 includes deed restrictions to ensure that there are no future exposures to contaminants. Because the future use of the area above the plume would be for offices, open space, and other nonresidential purposes, this approach would be protective. Alternatives 3, 4, and 5 employ active treatment mechanisms to destroy contaminants, providing the highest level of protection of human health and the environment. The selected remedy (Alternative 5) will remove contaminants from the subsurface through direct extraction of contaminated groundwater, eliminating future potential exposure threats. Deed restrictions for use of the area and groundwater will be in place during remediation.

2. Compliance with ARARs

   NYSDEC Class GA Groundwater Quality Standards comprise the chemical-specific ARARs for this plume. ARARs would not be achieved with Alternatives 1 and 2. Alternatives 3, 4, and 5 provide active treatment mechanisms for removing contaminants from the groundwater, decreasing the time required for compliance with these ARARs. Alternatives 3 and 4 employ in-situ treatment technologies to meet ARARs in the shortest period of time. Alternative 5 uses extraction and treatment that would require longer treatment durations before ARARs are met.

3. Long-term Effectiveness and Permanence

   Alternative 1 is not effective in the long term. Alternative 2 provides an effective long-term mechanism to protect human health and the environment through the use of deed restrictions. However, in the absence of treatment mechanisms, protection is less than that provided in Alternatives 3, 4, and 5.

Alternatives 3 and 4 use active in-situ treatment technologies. The chemical oxidation pilot study at the adjacent Landfill 6 OBGW site was effective in reducing contaminant mass, and since conditions at Building 775 are similar, it is also expected to be effective in the long-term. The effectiveness of the in-well air stripping technology presented in Alternative 4 cannot be well predicted until after pilot studies and/or initial implementations of the technology. However, this technology has been applied at other sites with similar contaminants of concern and is therefore expected to be reasonably effective. Pending successful use of this technology, this alternative would represent an effective long-term solution.

Alternative 5 employs a more-established technology and thus its effectiveness is more predictable. Extraction and treatment is a well-established, proven technology that is known to control plume migration. Over the long-term it would provide effective protection.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 employ no treatment technologies and thus do not reduce toxicity, mobility, or volume. Alternatives 3, 4, and 5 employ treatment mechanisms to reduce toxicity of contaminants in the plume. Alternative 3 treats the contaminants directly in-situ, thus providing the most effective and rapid toxicity reduction. Alternatives 4 and 5 rely on migration of contaminated groundwater to air stripping/extraction wells followed by extraction of vapors/groundwater to the surface for treatment. This provides effective treatment, but at a slower rate (Alternative 5 assumes longer treatment duration).

5. Short-term Effectiveness

Alternatives 1 and 2 do not have significant short-term impacts. Alternative 2 includes institutional controls such as deed restrictions until cleanup goals are achieved.

Active in-situ treatment described in Alternative 3 would require surface access throughout the area of the plume, but this area is currently relatively open. Alternative 3 would also provide the shortest duration of implementation (assumed to be one year). Monitoring for this alternative would span over an assumed 10-year period.

Alternative 4 would provide the next shortest duration of implementation/ operation, estimated at five years, with monitoring events performed during operation activities and extending an assumed 10 years beyond. The duration of the extraction called for by Alternative 5 is assumed to require 20 years before standards are met. Implementation of the selected remedy (Alternative 5) would require the installation of five wells to recover the groundwater and a small treatment building and discharge pipeline. These actions would require clearing of vegetation and associated well drilling

activities, which would result in minor impacts to on-site workers and the environment.

6. Implementability

There are no actions to implement for Alternative 1. Alternatives 2, 3, and 5 are readily implementable. Alternative 4 would require pilot-scale testing to demonstrate effectiveness prior to implementation. There is a possibility that this testing would reveal technical problems that may limit the ability to implement the technology or require changes in the assumptions that have been made regarding, for example, radius of influence, that then may increase or decrease costs of implementation.

7. Cost

Alternative 1 calls for no action and thus incurs no costs. Alternative 2, Institutional Controls, is the least expensive of the remaining alternatives at a 2004 present worth cost of $665,600.

Alternatives 3 and 4 both call for in-situ treatment. Since the chemical oxidation pilot study has been performed at the adjacent Landfill 6 site, the implementation methodology for Alternative 3 has been evaluated to the point where the cost estimate presented in the FS is expected to have less potential to vary. On the other hand, the cost estimates for full-scale implementation of Alternative 4 obtained from the in-well air stripping vendors are conceptual and may not fully represent site-specific conditions. Additionally, the cost estimate for in-situ treatment could vary based on the bench- and/or pilot-scale testing.

Considering these issues, the 2004 present-worth cost of Alternative 3 is $4,944,200, which is the most expensive alternative primarily due to the amount of oxidant required to reduce contaminant mass and to obstacles with oxidant delivery methods. Alternative 4 costs are between the least and most expensive in-situ treatment alternatives with a 2004 present worth cost of $2,195,700.

The selected remedy (Alternative 5) employs extraction and treatment to treat the plume and is the least expensive of the active alternatives. The estimated capital cost of $520,100 (in 2001 dollars) includes the treatment system, extraction and monitoring wells, underground piping, and electrical distribution. The present-worth estimated O&M cost of $652,700 (in 2001 dollars) includes the treatment system maintenance, treatment media replacement and disposal, and long-term monitoring. The 2004 total present-worth cost of the selected remedy is estimated at $1,246,900.

8. Agency Acceptance

AFRPA, NYSDEC, and EPA have mutually agreed to select Alternative 5, Extraction, Treatment, and Discharge, with long-term monitoring for the Building 775 OBGW site. The selected remedy satisfies the threshold criteria and ensures compliance with applicable regulations.

9. Community Acceptance

Community acceptance of the selected remedy was assessed at the public meeting and during the public comment period.

3.2.11 Principal Threat Wastes

There are no principal threat wastes at the Building 775 OBGW site.

3.2.12 Selected Remedy

The selected remedy (Alternative 5) for the Building 775 OBGW site includes installation of recovery wells to extract the groundwater from the Building 775 plume and then treat the groundwater. The groundwater will be discharged to the sanitary sewer for off-site treatment at a wastewater treatment facility or treated and discharged to Three Mile Creek.

The proposed plan presented a figure from the Feasibility Study that depicted five extraction wells, which had been placed to capture contaminated groundwater within the 50 ppb total chlorinated VOC contour line (based on data collected prior to 2004). The proposed plan also stated that "the layout of the recovery wells will be based on field studies completed during the design stage." Based on the pre-design investigation at this site, both the size of the VOC plume and the total chlorinated VOC concentrations have decreased. Therefore, it is estimated that plume capture can be attained through installation of a lesser number of recovery wells.

Extraction wells located within the approximated 50 µg/L plume contamination contour are selected for the extraction scheme. The layout of the recovery wells will be based on field studies completed during the design stage.

The extracted groundwater will be pumped either to the on-site sanitary sewer line for off-site treatment at a wastewater treatment facility or a treatment system and ultimately discharged to Three Mile Creek. The existing overhead electric lines are assumed to be sufficient to power the treatment building and the extraction wells. The piping from

the recovery wells would be connected to a common underground pipe to convey the contaminated groundwater to the drainage location. Long-term maintenance of the system will likely require sampling of the influent and effluent VOC concentrations.

The selected remedy will result in the reduction of the highest concentrations of VOCs in groundwater at the Building 775 OBGW site. The remaining on-site VOC contamination is anticipated to attenuate naturally to achieve groundwater standards.

Long-term monitoring of the groundwater plume and treatment performance during full-scale implementation will be performed. Groundwater sampling will be performed to monitor seasonal water table changes and contaminant concentration fluctuations. The number and locations of the wells for the proposed long-term monitoring well network will be finalized during the design stage. Portions of the Building 775 OBGW site have been transferred with remaining portions planned for future transfer. Monitoring wells will be in place during implementation of the selected remedy to determine whether COCs remain above proposed cleanup goals. Monitoring is assumed to be required for 20 years (10 years during O&M of the extraction and treatment system and 10 years of long-term monitoring). Long-term monitoring will be performed until four consecutive routine sampling rounds are below the NYSDEC Class GA Groundwater Quality Standards for site COCs. The Air Force may request that EPA/NYSDEC reduce the number of sample rounds used to demonstrate achievement of NYSDEC Class GA Groundwater Quality Standards based on the long-term monitoring data.

Institutional controls in the form of deed restrictions for affected groundwater will be implemented. Figure 3-5 provides the land use and institutional controls boundary. The starting coordinate of the Building 775 land use and institutional controls boundary is located approximately 390 feet north and 350 feet east of the northern corner of Building 770. The institutional controls will be implemented as follows:

- Development and use of the entire SD-52, Building 775 Operable Unit AOC property for residential housing, elementary and secondary schools, childcare facilities and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA, and NYSDEC.

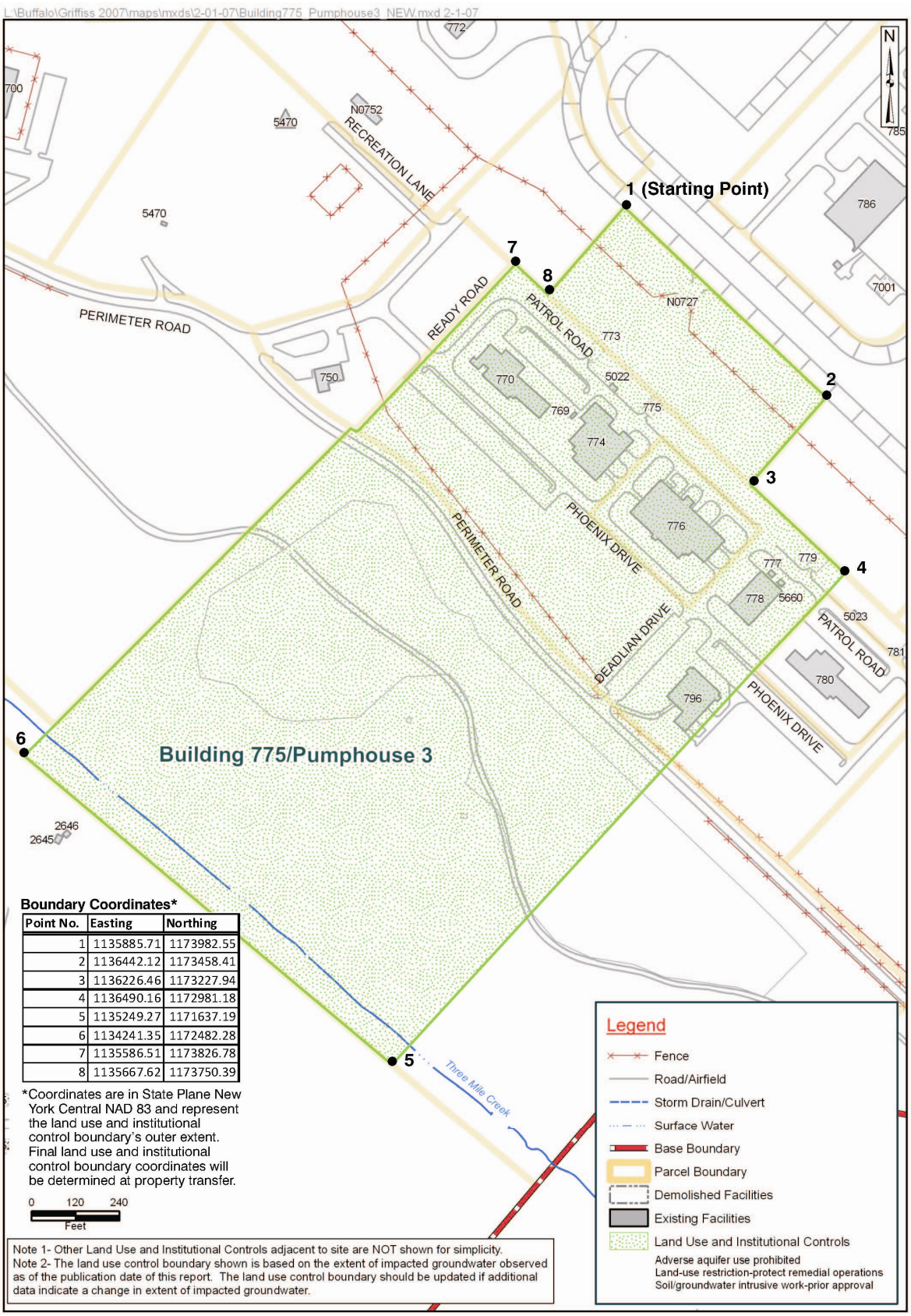

Figure 3-5 Building 775 Land Use and Institutional Controls Boundary

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- The owner or occupant of this site shall not extract, utilize, consume, or permit others to extract, utilize, or consume any water from the subsurface aquifer within the boundary of the site unless such owner or occupant obtains prior written approval from the NYSDOH.

- The owner or occupant of this site will not engage in any activities that will disrupt required remedial investigation, remedial actions, and oversight activities, should any be required.

- The owner or occupant of this site will restrict access to and prohibit contact with all subsurface soils and groundwater at or below the groundwater interface at this AOC until cleanup goals are achieved and have been confirmed through sample results.

- The owner or occupant of this site shall provide the Air Force with 60 days advance notice of any proposed alterations that will involve excavating in and/or disturbing soil and/or groundwater and shall not proceed with any such proposed alterations until it has received written notice from the Air Force that the alterations are acceptable to the Air Force, EPA, and NYSDEC.

The above restrictions will be maintained until the concentration of hazardous substances in the groundwater is at such levels to allow for unrestricted use and exposure. Prior approval by EPA and NYSDEC (and from the Air Force if the property has transferred) is required for any anticipated action that may disrupt the effectiveness of or alter or negate the need for institutional controls or for any modification or termination of institutional controls or use restrictions.

The parcels of property encompassing the Building 775 OBGW site are either owned by the Air Force or transferred by deed to the GLDC. If the property that has not yet been transferred is transferred to another federal entity (federal-to-federal transfer) or a non-federal entity in the future, the EPA and NYSDEC will be notified at least six months prior to such transfer. If the six-month notification is not possible, the EPA and NYSDEC will be notified no later than 60 days prior to such transfer. The Air Force shall provide a copy of the executed deed to EPA and NYSDEC.

The Air Force will take the following actions to ensure that the aforementioned use restrictions and the controls are effective in eliminating the exposure scenario and protecting human health and the environment:

Deed Restrictions: The early transfer of fee title from the United States for the portion of the property already transferred does not include the information re-

quired by CERCLA 120(h)(3)(A) for the property encompassing the Building 775 OBGW site, because at the time of transfer it was not yet determined whether additional remedial action would be needed. The Air Force will include the information required by CERCLA 120(h)(3)(A) in the deed for the portion of the property already transferred once the remedial action is operating properly and successfully. The deed contains a description of the residual contamination on the property and the environmental use restrictions, described above, expressly prohibiting activities inconsistent with the performance measure goals and objectives. For the remainder of the property yet to be transferred, each transfer of fee title from the United States will include the information required by CERCLA 120(h)(3)(A), with the required reservation of access extending to the Air Force, USEPA, and NYSDEC, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Air Force obligations under CERCLA or similar authorities for taking remedial or corrective action on the property. Deeds will also include a description of any residual contamination on the property above unlimited use and unrestricted exposure levels and any related environmental restrictions, and will expressly prohibit activities inconsistent with remedial action objectives. Deeds will contain appropriate provisions designed to ensure that restrictions run with the land and are enforceable by the Air Force.

Lease Restrictions: During the time between the adoption of this ROD and deeding of the Building 775 OBGW site property that has not yet been transferred, equivalent restrictions will be implemented by lease terms, which are no less restrictive than the use restrictions and controls described above, in this ROD. These lease terms shall remain in place until the property is transferred by deed, at which time they will be superceded by the institutional controls described in this ROD.

Environmental Easement and State Land Use Notification: The Air Force will condition transfer of the property upon the transferee granting an environmental easement, containing a complete description of the restrictions described in this ROD, for the land use and institutional controls boundary shown on Figure 3-5 in accordance with Article 71, Title 36 of the New York State Environmental Conservation Law. The Air Force will ensure that the transferee will grant the environmental easement to NYSDEC, on behalf of the State of New York, at the time of transfer of title for the property from the United States. The content of the document creating the environmental easement must be pre-approved by NYSDEC.

Notice: Prior to property transfer, the transferee will be notified of any environmental use restrictions and institutional controls or reporting requirements. Concurrent with the transfer of fee title, information regarding the environmental use restrictions and controls will be communicated in writing to appropriate state agencies to ensure that such agencies can factor such conditions into their oversight and decision-making activities regarding the land use and institutional controls boundary. The Air Force will also provide a copy of the deeds to the regulatory agencies as soon as practicable after the transfer of fee title.

Monitoring and Enforcement:

Monitoring: Monitoring of the environmental use restrictions and controls will be conducted annually by the Air Force until the property encompassing the land use and institutional controls boundary is transferred and a report will be provided. Any such annual monitoring reports will be included in a separate report or as a section of another environmental report, if appropriate, and be provided to the EPA and NYSDEC. Upon the effective date of the property conveyance, the Air Force will place a requirement in the deed that the transferee or subsequent property owner(s) will conduct annual physical inspections of the Building 775 OBGW site to confirm continued compliance with all institutional controls objectives unless and until all institutional controls at the site are terminated and will provide to the Air Force, EPA and NYSDEC an annual monitoring report. All annual monitoring reports will report on the status of institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed, whether use restrictions and controls were communicated in the deed(s) for any property transferred in the reporting period, and whether use of the property encompassing the land use and institutional controls boundary has conformed to such restrictions and controls.

If a transferee fails to provide an annual monitoring report as described above to the Air Force, the Air Force will notify EPA and NYSDEC as soon as practicable. If EPA does not receive the annual monitoring report from the transferee (either itself or from NYSDEC), it will notify the Air Force as soon as practicable. Within 30 days of the report's due date, the Air Force will take steps to determine whether institutional controls are effective and remain in place and advise the regulators of its efforts. In any event, within 90 days of the report's due date, the Air Force shall determine the status of institutional controls and provide its written findings, with supporting evidence sufficient to confirm the reported status, based on the use restrictions/institutional controls and site conditions, to EPA and NYSDEC unless either EPA or NYSDEC, in its sole discretion, acts to confirm the status of the institutional controls independently.

The institutional controls monitoring reports will be used in the preparation of the 5-Year Reviews to evaluate the effectiveness of the remedy. The continuation, modification, or elimination of the monitoring reports, and any changes to institutional controls monitoring frequencies, will be subject to EPA and NYSDEC approval. The 5-Year Review reports will be submitted to the regulatory agencies for review and comment.

Response to Violations: The Air Force will notify EPA and NYSDEC via e-mail or telephone as soon as practicable, but no later than 10 days after discovery of any activity that is inconsistent with the institutional control objectives or use restrictions, exposure assumptions, or any action that may interfere with the effectiveness of the institutional controls. Any violations that breach federal, state or local criminal or civil law will be reported to the appropriate civilian authorities, as required by law.

Enforcement: Any activity that is inconsistent with the institutional control objectives or use restriction or any action that may interfere with the effectiveness of the institutional controls will be addressed by the Air Force as soon as practicable (but in no case more than 10 days) after the Air Force becomes aware of the violation. The Air Force will notify EPA and NYSDEC regarding how the breach has been addressed within 10 days of sending EPA and NYSDEC notification of the breach. The Air Force will exercise such rights as it retained under the transfer documents to direct that activities in violation of the controls be immediately halted. To the extent necessary, the Air Force will engage the services of the Department of Justice to enforce such rights.

Notification of Land Use Modification: The recipient of the property will obtain approval from the Air Force, EPA, and NYSDEC for any proposals for a land use change at a site inconsistent with the use restrictions described in this ROD.

The Air Force is responsible for implementing, maintaining, monitoring, and enforcing the selected remedy (including the institutional controls). Although the Air Force may later transfer [has transferred] these responsibilities to another party, the Air Force, both pre-transfer and post-transfer, shall retain ultimate responsibility for implementing, maintaining, monitoring, and enforcing the selected remedy.

3.2.13 Statutory Determinations

The AFRPA and EPA, with concurrence from NYSDEC, have determined that remedial action (extraction, treatment, and discharge) with long-term monitoring is warranted for the Building 775 OBGW site. The selected remedy is protective of human health and the environment, complies with federal and NYS ARARs, is cost effective, and utilizes permanent solutions to the extent possible.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is still performing as planned and is protective of public health and the environment.

3.2.14 Documentation of Significant Changes

No significant changes have been made to the selected remedy from the time the proposed plan was released for public comment.

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3.3 Building 817/WSA

3.3.1 Site Name, Location, and Brief Description

The Building 817/WSA OBGW site (site identification designation SD-52) is located at the former Griffiss AFB in Rome, Oneida County, New York (see Figure 3-1). Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the NPL on July 15, 1987. On August 21, 1990, the EPA, NYSDEC, and the AFRPA entered into an FFA under Section 120 of CERCLA.

The Building 817/WSA OBGW site is located on the north side of the main runway south of the southeast end of the WSA (see Figure 3-6). The Building 817/WSA OBGW site includes Building 817, a former electronic equipment research laboratory, and a wastewater-related system (WW-817). According to a 1960 drawing, WW-817 was used to treat flow from the restrooms and floor drains inside Building 817. Although the system may still be operational, the building is no longer in use. In general, the groundwater in this area eventually discharges to Six Mile Creek or to its tributaries that flank the WSA to the north and south.

3.3.2 Site History and Enforcement Activities

This information is contained in Section 2.1.

3.3.3 Community Participation

This information is contained in Section 2.3.

3.3.4 Scope and Role of Site Remedial Action

The scope of the plan for remedial action for the Building 817/WSA OBGW site addresses the concerns for human health and the environment. Enhanced bioremediation with long-term groundwater monitoring is consistent with the results of the risk evaluation completed for the site. Remedial actions at the Building 817/WSA OBGW site will reduce COPC levels locally, thus contributing to the remediation of OBGW at the Former Griffiss AFB.

3.3.5 Site Characteristics

The former Griffiss AFB covered approximately 3,552 contiguous acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York. Topography within the valley is relatively flat, with elevations on the former Griffiss AFB ranging from 435 to 595 feet above mean sea level. Three Mile Creek, Six Mile Creek (both of which drain into the New York State Barge Canal, located to the south of the base), and several state and/or federally regulated wetlands are located on the former Griffiss AFB, which is bordered by the Mohawk River on the west. Because of its high average precipitation and predominantly silty sands, the former Griffiss AFB is considered a groundwater recharge zone.

In general, the groundwater in this area eventually discharges to Six Mile Creek or to its tributaries that flank the WSA to the north and south. The water table exhibits a gradient of approximately 0.04 ft/ft across the site. The Building 817/WSA OBGW site geology consists of an approximately 10- to 30-foot silty sand layer overlying till and weathered bedrock.

TCE/PCE-contaminated groundwater extends downgradient from the Building 817/WSA OBGW site for approximately 1,000 feet and covers approximately 8 acres. The lateral extent of the plume is approximately 250 feet, and the vertical extent ranges from 5 feet BGS to 25 feet BGS, which is the top of bedrock. The TCE and PCE concentrations range from non-detect to 100 µg/L and 57 µg/L, respectively. The plume has not reached the culverted section of Six Mile Creek.

Site Investigations

In 1992, an initial site investigation was performed to determine whether contamination was present from historical releases at the WSA including petroleum hydrocarbons, the discharge of aqueous film (forming foam into a lagoon), use of paints and solvents for vehicle maintenance, and potential use of polychlorinated biphenyls (PCBs). During this investigation, one well was installed at the Building 817/WSA OBGW site (WSAMW-2). Groundwater from this well was analyzed for VOCs, SVOCs, total and dissolved metals, and total hexavalent chromium. None of the analytes was detected at a level of concern.

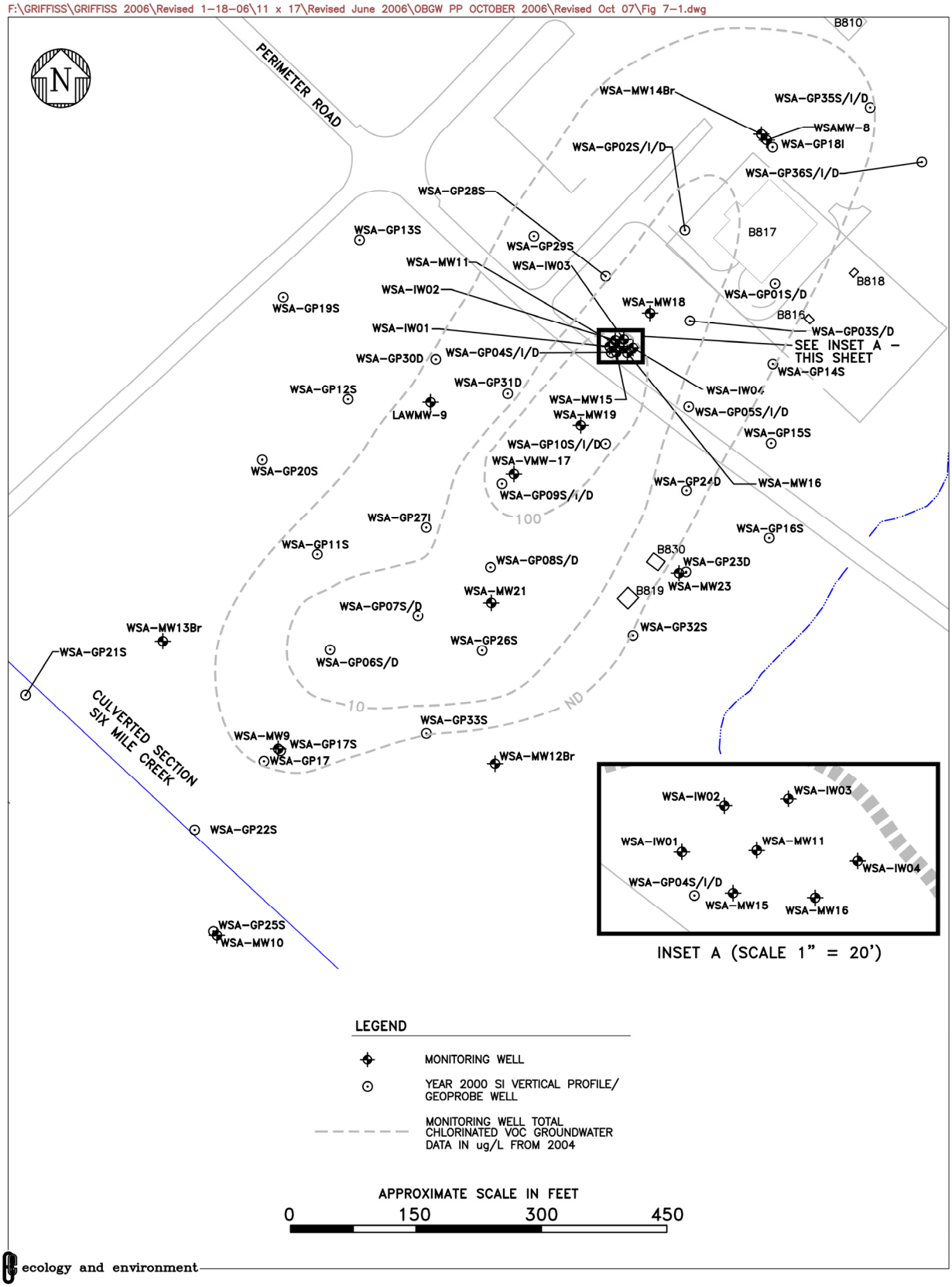

Figure 3-6 B817/WSA Groundwater Monitoring Well and Sampling Locations

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Remedial Investigation. In 1994, an RI was performed for the OBGW AOC. The RI included drilling, installation, and sampling of 23 new monitoring wells basewide; aquifer testing of 22 new monitoring wells; and groundwater sampling of 16 existing wells. Only one well (LAWMW-9) was installed near the area south of Building 817/WSA. One VOC (TCE) was found at a concentration of 7.6 μg/L, which was above the most stringent criterion of 5 g/L.

Supplemental Investigation. In 1997, an SI was performed to determine the levels and extent of contamination at the Building 817/WSA OBGW site. Three temporary wells were installed and sampled and existing well WSAMW-2 was resampled. Analytical results for the monitoring wells indicated the presence of two SVOCs and three VOCs. One SVOC and the three VOCs were detected at concentrations exceeding the most stringent criteria (see Table 3-14).

TABLE 3-14
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 817/WSA PLUME
1997 SI GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations or Maximum Detected Concentration	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (μg/L)			
Chloroform	0.66 – 9.0	1/5	7 [a]
Tetrachloroethene	7.5	1/5	5 [a, b]
Trichloroethene	0.31 J – 31	1/5	5 [a, b]
SVOCs (μg/L)			
Bis (2-ethylhexyl) phthalate	83 J	1/5	5 [a]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

μg/L = Micrograms per liter.

Expanded Site Investigation. In 1998, during an expanded site investigation (ESI) and confirmatory sampling at the AOIs, one temporary well was drilled to a depth of 15 feet between Buildings 816 and 818. Analytical results for VOCs, SVOCs, PCBs,

and total recoverable petroleum hydrocarbon (TRPH) were non-detect. Several metals were detected but they were below NYSDEC criteria.

Additional Supplemental Investigation. In 2000, an additional SI was conducted to further define the source and areal extent of the TCE plume. Temporary Geoprobe wells were installed and sampled at 36 locations (13 of these locations were vertically profiled); three new wells (WSAMW-8, -9, and -10) outside the plume area were drilled, installed, developed, and sampled; one existing well (LAWMW-9) within the plume was sampled; and a surface water sample from the culverted section of Six Mile Creek was collected. Analytical results for the Geoprobe groundwater samples indicated the presence of 17 VOCs with only four exceeding the most stringent criteria (see Table 3-15).

TABLE 3-15
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 817/WSA PLUME
2000 SI GEOPROBE GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations or Maximum Detected Concentration	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
Benzene	Trace – 1.7	7/56	1 [a]
Tetrachloroethene	Trace – 56.9	11/56	5 [a, b]
Trichloroethene	Trace – 98.5	17/56	5 [a, b]
Vinyl Chloride	3.4 J	1/56	2 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

µg/L = Micrograms per liter.

Bedrock Groundwater Study. In 2002, a Bedrock Groundwater Study for the Building 817/WSA OBGW site was conducted to determine whether contamination was present in the bedrock. Three new bedrock wells (WSA-MW12Br, WSA-MW13Br, and WSA-MW14Br) were drilled, installed, developed, aquifer tested, and sampled for VOCs, methane, ethane, ethene, anions, and dissolved organic carbon. In addition, one

overburden well (WSA-MW11; see inset on Figure 3-6) was drilled to provide a soil sample for the groundwater treatability bench-scale study and to serve as a monitoring point for future investigations. The location of the sample was the site of the highest level of groundwater contamination detected in the 2000 SI. Depth to bedrock at the site is approximately 20 feet BGS.

Groundwater samples were collected during installation of the bedrock wells (Hydropunch samples) and following installation of all four wells. Analytical results for Hydropunch samples indicated the presence of six VOCs in one well (WSA-MW12Br) with only one VOC (TCE at 5.13 μg/L) at a concentration slightly above the most stringent criterion (5 μg/L). Groundwater samples from the three bedrock wells indicated the presence of chloroform, which is believed to be a field or laboratory artifact, at a concentration below the most stringent criterion. Five VOCs were detected in the groundwater sample from the overburden well, with PCE (46.9 μg/L) and TCE (58.7 μg/L) exceeding the most stringent criterion of 5 μg/L. These concentrations are similar to those found at the corresponding Geoprobe boring during the 2000 SI.

The Bedrock Groundwater Study concluded that groundwater contamination observed in the overlying overburden aquifer does not appear to have migrated downward into the underlying bedrock at the site. Therefore, no further action was recommended for bedrock groundwater.

Pre-Design Investigations. In 2006, four monitoring wells (WSA-MW18, WSA-MW19, WSA-MW21, and WSA-MW23) were installed and sampled to better define the plume. In an effort to locate the suspected plume source, a membrane interface probe survey was performed. Use of this technology provided continuous, relative measurements of total VOCs in groundwater at 22 locations from just north of Perimeter Road to approximately 150 feet northeast of Building 817. This survey did not identify a source of the plume. Additional activities at the Building 817/WSA OBGW site also included performance of an initial vegetable oil injection at eight new temporary injection wells. Three additional temporary monitoring wells (B817-MW-001 through -003) located in the vicinity of the injection activities were installed and sampled to monitor the initial

injection. Analytical results for the monitoring wells indicated the presence of two VOCs at concentrations exceeding the most stringent criteria (see Table 3-16).

3.3.6 Current and Potential Future Site and Resource Uses

Griffiss AFB was designated for realignment under the Defense Base Closure and Realignment Act in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. Currently, the Building 817/WSA OBGW site land use is open space (non-residential) and deed restrictions restrict the use of groundwater at this site. The anticipated future use at the Building 817/WSA OBGW site is industrial/commercial (non-residential). As a municipal water supply is available near the site, future use of site groundwater is not anticipated and thus will limit human exposure.

TABLE 3-16
COMPOUNDS EXCEEDING STANDARDS AND GUIDANCE VALUES
BUILDING 817/WSA PLUME
2006 PRE-DESIGN INVESTIGATIONS – GROUNDWATER SAMPLES

Compound	Range of Detected Concentrations	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
Tetrachloroethene	5.6 – 53 J	4/7	5 [a, b]
Trichloroethene	21 - 68	5/7	5 [a, b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.

[b] EPA Federal primary maximum contaminant level.

Key:

J = Estimated concentration.

µg/L = Micrograms per liter.

3.3.7 Summary of Site Risks

During the SIs, analytical results were screened against federal and state groundwater standards. Based on COPC exceedences of these criteria, it was determined that, although groundwater is not currently in use, remedial action at the Building 817/WSA OBGW site would be performed to protect human health and the environment.

Furthermore, the 2003 Six Mile Creek ROD identifies contaminated groundwater at the Building 817/WSA OBGW site as a potential source of contamination to Six Mile Creek. The Building 817/WSA OBGW FS determined contaminated groundwater from

the site is a potential source to Six Mile Creek based on data presented in historical site investigations and recommended remediation of this site. Based on the potential for contaminated groundwater to migrate to Six Mile Creek, the Air Force has determined it advisable to use enhanced bioremediation to remediate the Building 817/WSA OBGW plume.

The remedial action selected in this ROD, including institutional controls, is necessary to protect human health or welfare, or the environment from actual or threatened releases of hazardous substances from the Building 817/WSA OBGW site into the environment.

3.3.7.1 Site Contaminants of Concern and Proposed Cleanup Goals

Based on investigations performed at the Building 817/WSA OBGW site, the site COCs include PCE and TCE. For site COCs, the NYSDEC Class GA Groundwater Quality Standards were selected as the site cleanup goals. The cleanup goals for PCE and TCE are 5 μg/L and 5μg/L, respectively.

3.3.8 Remedial Action Objectives

For the Building 817/WSA OBGW site, the RAOs are to:

1. Achieve the cleanup goals for COCs specified in Section 3.3.7.1;

2. Prevent human exposure to groundwater through groundwater use restrictions until cleanup goals are achieved; and

3. Prevent contaminated groundwater from the site from adversely impacting surface water (in Six Mile Creek), which is defined as surface water concentrations above performance indicators (NYSDEC Class GA Groundwater Quality Standards of 5 μg/L for DCE and 2 μg/L for vinyl chloride).

4. Prevent development and use of the property for residential housing, elementary and secondary schools, childcare facilities and playgrounds.

Evaluate Effectiveness of the Remedy

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is performing as planned and is protective of public health and the environment.

Long-term monitoring of the groundwater plume and treatment performance during implementation will be performed. Groundwater sampling will be performed to monitor seasonal water table elevations and contaminant concentration fluctuations. The number and location of wells for the proposed long-term monitoring well network will be finalized during the design stage. Institutional controls in the form of deed restrictions for affected groundwater have been/will be implemented (see Section 3.3.12). Monitoring will continue until groundwater cleanup standards are achieved.

3.3.9 Description of Alternatives

CERCLA regulations mandate that a remedial action must be protective of human health and the environment. The following seven remedial alternatives were developed for the Building 817/WSA OBGW plume, which consists of a relatively shallow plume that has migrated southwest from its assumed original source area near Building 817. For purposes of the FS, each alternative assumes a maximum 30-year remediation duration which is typically used in FSs for evaluation purposes. A summary of estimated remediation durations and costs are presented in Table 3-17.

TABLE 3-17
SUMMARY OF REMEDIAL ALTERNATIVE DURATIONS AND COSTS FOR BUILDING 817/WSA OBGW

Description	Alternative						
	1	2	3	4	5	6	7
	No Action	Institutional Controls	In-Situ Oxidation	In-Well Air Stripping	Zero-Valent Iron Wall	Extraction, Treatment, and Disposal	Enhanced Bioremediation
Total Approximate Project Duration (Years)	0	30	10	15	30	30	15
Total Present Value of Alternative	$0	$478,600	$2,267,700	$2,912,900	$1,201,900	$1,155,700	$1,443,000

Key:
LTM = Long-term monitoring.

Alternative 1 (No Action)

CERCLA requires that the No Action alternative be compared with other alternatives. The No Action alternative involves no remedial action to remediate the Building 817/WSA plume. The plume would be allowed to migrate and naturally attenuate. No monitoring would be conducted to evaluate the progress of these natural processes.

Alternative 2 (Institutional Controls)

This alternative would employ methods such as deed restrictions to prevent future use of the groundwater at the Building 817/WSA OBGW site until cleanup goals are achieved (assumed to be 30 years for purposes of this analysis).

Alternative 3 (In-Situ Chemical Oxidation)

This alternative would involve the delivery of a strong oxidizing agent into the subsurface through temporary injection points (i.e., direct-push points) to oxidize COCs to non-toxic compounds. In addition, institutional controls would be implemented to minimize the potential for future exposure to contaminated groundwater until cleanup goals were achieved. This alternative would involve full-scale remediation using this technology for the area contained within the 10-µg/L total VOC concentrations contour line (see Figure 3-7), thus removing about 90% of the contaminant mass while addressing approximately 58% (or 4.7 acres) of the plume area. Because this alternative involves active treatment of and destruction of COCs, maintenance of institutional controls and monitoring will continue until cleanup goals are achieved (expected to be 10 years).

Alternative 4 (In-Well Air Stripping)

This alternative would involve the installation of groundwater-circulating/air-stripping wells to strip the contaminated groundwater of contaminants. The contaminated vapors would be treated and processed in a closed loop system. The treated groundwater would not be removed from the subsurface but cycled through a groundwater circulation cell created around the well. Long-term monitoring of the groundwater plume would also be included in this alternative. This alternative would involve full-scale remediation for the area contained within the 10-µg/L total VOC concentrations contour line, thus removing about 90% of the contaminant mass while addressing approximately 58% (or 4.7 acres) of the plume area. Monitoring is assumed to be required for an estimated 15 years (5 years during operation of the air stripping system and 10 years into the future).

Alternative 5 (Zero-Valent Iron Wall)

This alternative would involve the installation of an in situ permeable reactive barrier (PRB) containing commercially available granular iron. The groundwater will flow through the iron wall barrier where metal-enhanced reductive dehalogenation reactions reduce the chlorinated ethenes present in the groundwater to ethene and chloride. Long-term monitoring of the groundwater plume would also be included in this alternative. Because the treatment mechanism relies on the plume migrating through the PRB, a portion of the plume upgradient of the PRB will remain contaminated during the treatment process. For this reason, a deed restriction would have to be placed over the area that defines the plume. This analysis assumes that on-site contaminant concentrations will remain above cleanup goals for 30 years.

Alternative 6 (Extraction, Treatment, and Disposal)

This alternative would involve collection of contaminated groundwater using a 275-foot-long, 11-foot-deep intercepting trench, followed by treatment with a carbon-adsorption system. Treated groundwater would then be discharged to the culverted section of Six Mile Creek. Long-term monitoring of the groundwater plume would also be included in this alternative. Treated water would be discharged to the creek under the substantive SPDES requirements. This analysis assumes that on-site contaminant concentrations will remain above cleanup goals for 30 years.

Alternative 7 (Enhanced Bioremediation)

This alternative would involve removal of a contaminant source through enhanced bioremediation. Enhanced bioremediation at this site would consist of vegetable oil/lactate injection(s) directly into the subsurface in the most contaminated part of the site. The vegetable oil/lactate would stimulate biodegradation of site COCs over a two- to three-year period. Monitoring of the groundwater plume would be performed during the injection(s) as well as into the long term. If elevated concentrations of DCE and/or vinyl chloride attributable to site groundwater are detected in Six Mile Creek, implementation of a contingency air sparge wall will be installed, if necessary. If an air sparge wall is needed, the wall would consist of a line of in-situ air sparging wells approximately 150

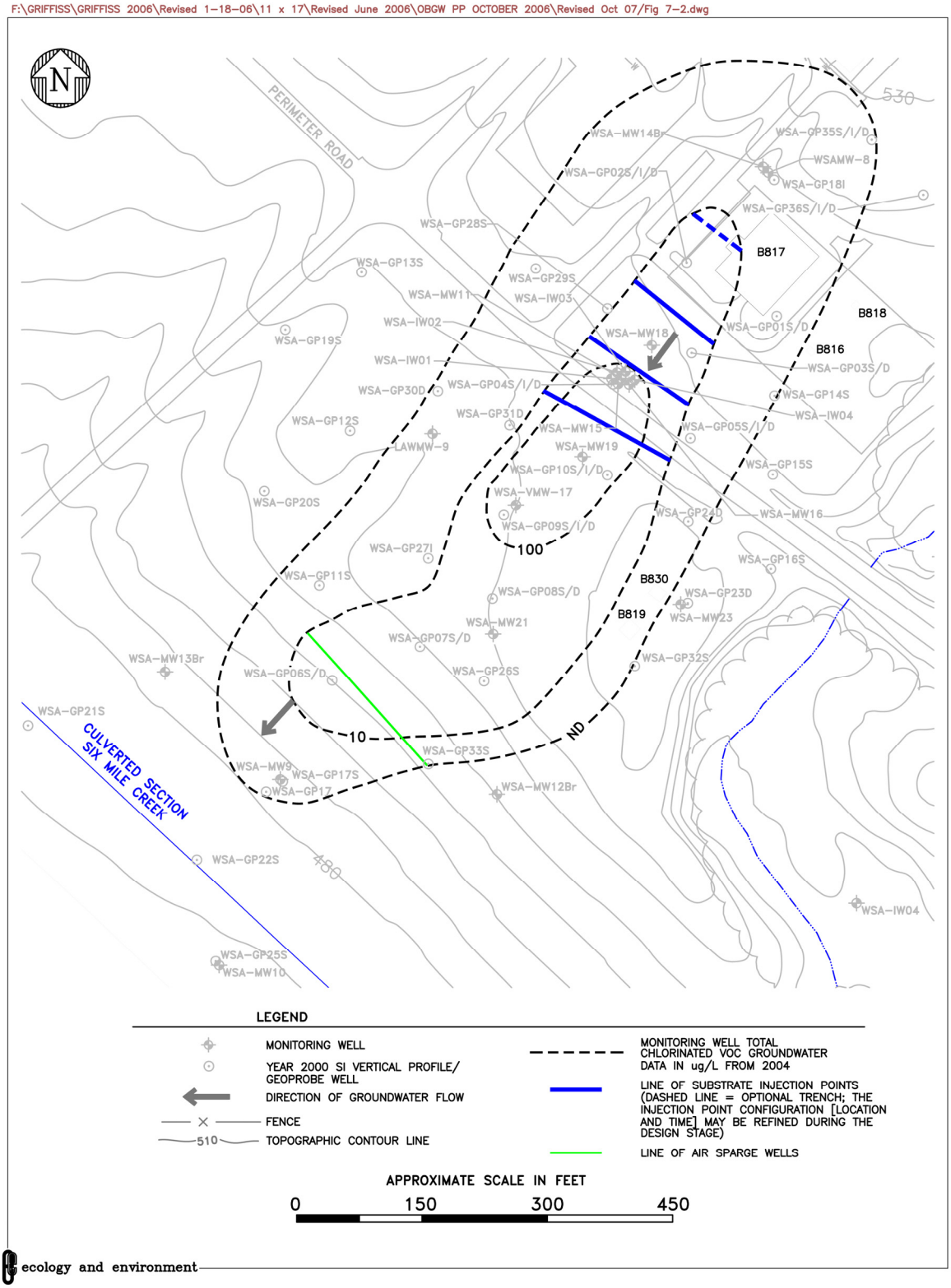

Figure 3-7 B817/WSA Enhanced Bioremediation

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feet long (see Figure 3-7). For purposes of the FS, it was assumed that on-site contaminant concentrations would remain above cleanup goals for at least 15 years.

3.3.10 Comparative Analysis of Alternatives

Remedial alternatives are assessed on the basis of both a detailed and a comparative analysis pursuant to the NCP. The detailed analysis of Building 817/WSA OBGW consisted of (1) an assessment of the individual alternatives against seven evaluation criteria and (2) a comparative analysis focusing upon the relative performance of each alternative against the criteria. In general, the following "threshold" criteria must be satisfied by an alternative for it to be eligible for selection. The selected alternative is briefly evaluated below for each of the first seven criteria:

1. Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or remedial action with long-term monitoring.

2. Compliance with ARARs addresses whether a remedy would (a) meet all of the ARARs or (b) provide grounds for invoking a waiver.

In addition, the following "primary balancing" criteria are used to make comparisons and identify the major trade-offs among alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants at the site.

5. Short-term effectiveness addresses (a) the period of time needed to achieve protection and (b) any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital, operation and maintenance, and present-worth costs.

Finally, the following "modifying" criteria are considered fully after the formal public comment period on the proposed plan is complete:

8. State acceptance indicates whether, based on its review of historical investigations and this ROD, the state supports or opposes the preferred alternative and/or has identified any reservations with respect to the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in this ROD and the RI reports. Factors of community acceptance include support, reservation, or opposition by the community.

A comparative analysis of the seven alternatives based on the nine evaluation criteria follows:

1. Overall Protection of Human Health and the Environment

   There are currently no human or environmental receptors impacted by this plume. Although there are no current receptors of contamination at the Building 817/WSA plume, Alternative 1 does not prevent future exposures through installation of drinking water wells or construction in soils above the plume. Alternative 2 includes deed restrictions to ensure that there are no future exposures to contaminants. Because the future use of the area above the plume is used for open space and other nonresidential purposes at this time, this approach would be protective. Alternatives 3, 4, 5, 6, and 7 employ active treatment mechanisms to destroy contaminants, thus providing the highest level of protection of human health and the environment.

2. Compliance with ARARs

   NYSDEC Class GA Groundwater Quality Standards comprise the chemical-specific ARARs for this plume. ARARs would not be achieved with Alternatives 1 and 2. Alternatives 3, 4, 5, 6, and 7 provide active treatment mechanisms for removing contaminants from the groundwater, thus accelerating compliance with these ARARs. Alternatives 3 and 4 provide treatment throughout the plume. Alternative 5 provides in-situ treatment but relies on a passive technique, requiring the plume to flow through the reactive wall to provide contaminant destruction. Although this technique is effective, groundwater upgradient of the PRB would remain above ARARs until it passes through the wall, which would take many years due

to the rate of groundwater flow in the area of the plume (expected to be approximately 20 to 30 years). Alternative 6 uses extraction and treatment that would require still longer treatment periods before ARARs are met. Alternative 7 focuses treatment on the contaminated hot spot groundwater areas as well as treatment prior to groundwater flowing off site. Alternatives 3, 4, and 7 employ active in-situ treatment technologies to meet ARARs in the shortest period.

Alternative 7 treats groundwater by organic substrate injections and an air sparge wall (if necessary) to levels below groundwater standards and thus meets chemical-specific ARARs. While residual COCs (potentially DCE and vinyl chloride) could remain in the plume after the injection treatment, the installation of a downgradient air sparging wall would intercept and treat the groundwater prior to potentially entering Six Mile Creek or flowing off site if the sparge wall is deemed necessary.

3. Long-term Effectiveness

Alternative 1 is not effective in the long term. Alternative 2 provides an effective long-term mechanism to protect human health and the environment through the use of deed restrictions. However, in the absence of treatment mechanisms, protection is less compared with Alternatives 3, 4, 5, 6, and 7.

Alternatives 3, 4, 5, 6, and 7 use active in-situ treatment technologies. The chemical oxidation pilot study at this site was relatively effective in reducing contaminant mass and thus is effective in the long term. Potential preferential pathways found during the chemical oxidation pilot study would need to be addressed prior to full-scale implementation of Alternative 3. As with any in-situ technology, effectiveness can not be well predicted until after pilot studies and/or initial implementations of the technology. However, the in-well air stripping technology used in Alternative 4, the zero-valent iron technology used in Alternative 5, and reductive dechlorination and air sparging technology used in Alternative 7 has been applied at a number of sites and are therefore expected to be reasonably effective. Pending successful use of these technologies, they would represent effective long-term solutions.

Alternative 6 employs a more established, proven technology and thus its effectiveness is more predictable. Extraction and treatment is a well-established technology known to control plume migration. It would, over the long term, provide effective protection. However, its ability to completely reduce concentrations to groundwater standards throughout the aquifer is somewhat limited by the long period required to reduce concentrations.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 employ no treatment technologies and thus do not reduce toxicity, mobility, or volume. Alternatives 3, 4, 5, 6, and 7 employ treatment mechanisms to reduce toxicity of contaminants in the plume. Alternative 3 (in-situ chemical oxidation) treats the contaminants in-situ, providing the most effective and most rapid toxicity reduction. Alternative 3 provides more rapid and complete treatment in smaller radius of influence Alternatives 4, 5, and 6 rely on migration of contaminants to either air stripping wells, a PRB, or extraction wells respectively. Contaminants will be treated and disposed of accordingly, thus reducing toxicity. Alternative 7 (enhanced bioremediation and air sparge wall) also treats the contaminants in-situ, providing the most effective and most rapid toxicity reduction. Alternative 7 also provides a more continuous treatment over a larger radius (and depth) of influence.

5. Short-term Effectiveness

Alternatives 1 and 2 do not have significant short-term impacts. Alternative 2 includes institutional controls such as deed restrictions until cleanup goals are achieved. In addition, the active in-situ treatment of Alternative 3 would require surface access throughout the area of the plume, but this area is currently relatively open. Alternative 3 would also provide the shortest duration of implementation (assumed to be one year). Monitoring for this alternative would span an assumed 10-year period.

Alternative 4's implementation/operation duration is estimated at five years with monitoring events performed during operation activities and extending 10 years beyond. Alternative 5 assumes ARARs will be achieved in approximately 20 to 30 years. However, monitoring is assumed to be performed for a total of 30 years. The duration of the extraction called for by Alternative 6 is assumed to require decades before standards are met.

Alternative 7 would provide the next shortest duration of implementation/operation estimated at 3 years operation of the air sparging wall, as necessary, with monitoring events performed during operation and extending 12 years beyond. Implementation of the selected remedy (Alternative 7) will include the delivery of injection points and placement of air sparge wells (as necessary) in the path of the plume. Injections are expected to be completed within one year while the air sparge wall system (if needed) is anticipated to be in operation for two to three years. Because the area is already developed and relatively open and operation of the sparge wall system would be located close to Six Mile Creek (approximately 500 feet away from the developed portion of the site), this site would have minor short-term impacts. Monitoring is assumed for approximately 15 years.

6. Implementability

There are no actions to implement for Alternative 1. Alternatives 2, 3, and 6 are readily implementable. Alternatives 4, 5, and 7 employ in-situ treatment technologies, which would require initial- (and possibly bench-) testing to demonstrate effectiveness prior to implementation. There is a possibility that testing would reveal technical problems that may limit the ability to implement the technology or require changes from the assumptions that have been made regarding, for example, radius of influence or amount of zero-valent iron required, that may increase or decrease costs of implementation.

7. Cost

Alternative 1 calls for no action and thus incurs no costs. Alternative 2, Institutional Controls, is the least expensive of the remaining alternatives at a 2004 present-worth cost of $478,600.

Alternatives 3, 4, 5, and 7 call for in-situ treatment. Since the chemical oxidation pilot study has been performed at this site, the implementation methodology for Alternative 3 has been evaluated to the point where the cost estimate is expected to have less potential to vary. On the other hand, the cost estimates for full-scale implementation of Alternatives 4 and 5 obtained from the in-well air stripping and iron wall vendors are conceptual and may not fully represent site-specific conditions. Costs for Alternative 7 were developed based on site-specific-conditions and previous experience at similar sites. Additionally, the cost estimate for in-situ treatment could vary based on the bench- and/or initial testing.

The 2004 present-worth cost of Alternative 3 (in-situ chemical oxidation) is estimated at $2,267,700. The cost of Alternative 4 is $2,912,900, which is the most expensive alternative primarily due to the cost associated with the installation of the number of in-well air stripping wells and associated equipment needed to effectively treat the plume. Alternative 5 (zero-valent iron wall) is the least expensive of the active treatment alternatives with a 2004 present-worth cost of $1,201,900.

Alternative 6 employs extraction and treatment to treat the plume. Its present-worth cost is estimated to be less than the active treatment alternatives (Alternatives 3, 4, 5, and 7). Most of its $1,155,700 estimated 2004 present-worth cost is due to 30 years of operation of the treatment system. The cost for implementing Alternative 7 (enhanced bioremediation and air sparge wall) is estimated at $1,443,000.

8. Agency Acceptance

AFRPA, NYSDEC, and EPA have mutually agreed to select Alternative 7, Enhanced Bioremediation, with long-term monitoring for the Building

817/WSA OBGW site. The selected remedy satisfies the threshold criteria and ensures compliance with applicable regulations.

9. Community Acceptance

Community acceptance of the selected remedy was assessed at the public meeting and during the public comment period.

3.3.11 Principal Threat Wastes

There are no principal threat wastes at the Building 817/WSA OBGW site.

3.3.12 Selected Remedy

The proposed plan states that remediation at Building 817/WSA will include "a combination of soil excavation source removal (if a source can be identified) and enhanced bioremediation." During the pre-design investigation at this site, the presence of a source was not conclusively found. Therefore, excavation of contaminated source soils is not included as part of this selected remedy.

The selected remedy (Alternative 7) for the Building 817/WSA OBGW site consists of a two-step groundwater remediation approach that will include enhanced bioremediation followed by air sparging to both volatilize and aerobically degrade DCE and vinyl chloride residuals, as needed. An initial injection of vegetable oil/lactate was performed to demonstrate the feasibility of the approach and to collect injection design data. This injection was completed in the most contaminated part of the site. Upon successful completion of the initial injection, enhanced reductive dechlorination will be completed with a second injection event of a vegetable oil/lactate emulsion in the event TCE/PCE rebound has occurred or if the initial injection does not achieve reasonable reductions in average source area concentrations. Figure 3-7 shows the selected location of injection points based on existing site data. Unlike the short reaction time of oxidation injections, which may only impact the contaminants within a few feet of the injection points, vegetable oil has the advantage of a delayed breakdown over a two to three year period creating long-term biological reduction of VOCs not only at the point of injection but tens to hundreds of feet downgradient of the injection. Lactate provides a highly soluble organic substrate to immediately stimulate biodegradation. The injection point configuration (location and time) may be refined during the design stage.

During the long-term monitoring at this site, if total VOC concentrations in monitoring well WSA-MW9 are greater than 30 ppb, surface water samples from the culverted section of Six Mile Creek will be collected. Implementation of a contingency air sparge wall (or other action agreed upon by the Air Force, EPA, and NYSDEC) will be completed if surface water samples from the culverted section of Six Mile Creek contain elevated concentrations of DCE and/or vinyl chloride (which is defined as surface water concentrations above performance indicators (NYSDEC Class GA Groundwater Quality Standards of 5 µg/L for DCE and 2 µg/L for vinyl chloride). Additional round(s) of sampling will be performed to confirm contaminant concentrations. Site data will then be evaluated to determine whether the elevated concentrations are attributable to site groundwater. If the concentrations are attributable to site groundwater, the Air Force will discuss future actions at the site with EPA and NYSDEC. The regulatory agencies will have final approval of the criteria and decision regarding implementation of contingency measures after receiving the Air Force's assessment and recommendation in accordance with the Interagency Agreement. If installed, the wall is assumed to be a line of in-situ air sparging wells approximately 150 feet long (see Figure 3-7). The purpose of this sparging wall would be to remove any residual daughter products (such as DCE and vinyl chloride) from the aquifer through volatilization and the addition of oxygen at the leading edge of the plume. A blower would inject air into the groundwater via the sparge wells acting as an underground stripper to remove contaminants by volatilization. This remedy would also ensure protection of Six Mile Creek.

The selected remedy will result in the reduction of the highest concentrations of VOCs in groundwater at the Building 817/WSA OBGW site. Remaining on-site VOC contamination is anticipated to attenuate naturally to achieve groundwater standards.

Long-term monitoring of the groundwater plume and treatment performance during full-scale implementation will be performed. Groundwater sampling will be performed to monitor seasonal water table changes and contaminant concentration fluctuations. The number and location of wells for the proposed long-term monitoring well network will be finalized during the design stage. Monitoring wells will be in place during implementation of the selected remedy to determine whether COCs remain above proposed cleanup goals. Monitoring is assumed to be required for 15 years. Long-term monitoring will be performed until four consecutive routine sampling rounds are below

the NYSDEC Class GA Groundwater Quality Standards for site COCs. The Air Force may request that EPA/NYSDEC reduce the number of sample rounds used to demonstrate achievement of NYSDEC Class GA Groundwater Quality Standards based on the long-term monitoring data.

Institutional controls in the form of deed restrictions for affected groundwater will be implemented. Figure 3-8 provides the land use and institutional controls boundary. The starting coordinate of the Building 817/WSA land use and institutional controls boundary is located approximately 515 feet north of the northern corner of Building 817. The institutional controls will be implemented as follows:

- Development and use of the entire SD-52, Building 817/WSA Operable Unit property for residential housing, elementary and secondary schools, childcare facilities, and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA, and NYSDEC.

- The owner or occupant of this site shall not extract, utilize, consume, or permit others to extract, utilize, or consume any water from the subsurface aquifer within the boundary of the site unless such owner or occupant obtains prior written approval from the NYSDOH.

- The owner or occupant of this site will not engage in any activities that will disrupt required remedial investigation, remedial actions, and oversight activities, should any be required.

- The owner or occupant of this site will restrict access to and prohibit contact with all subsurface soils and groundwater at or below the groundwater interface at this AOC until cleanup goals are achieved and have been confirmed through sample results.

The above restrictions will be maintained until the concentration of hazardous substances in the groundwater are at such levels to allow for unrestricted use and exposure. Prior approval by EPA and NYSDEC (and from the Air Force if the property has transferred) is required for any anticipated action that may disrupt the effectiveness of or alter or negate the need for institutional controls or for any modification or termination of institutional controls or use restrictions.

The parcels encompassing the Building 817/WSA OBGW site are either owned by the Air Force or leased to Oneida County. If this property is transferred to another federal entity (federal-to-federal transfer) or a non-federal entity in the future, the EPA and

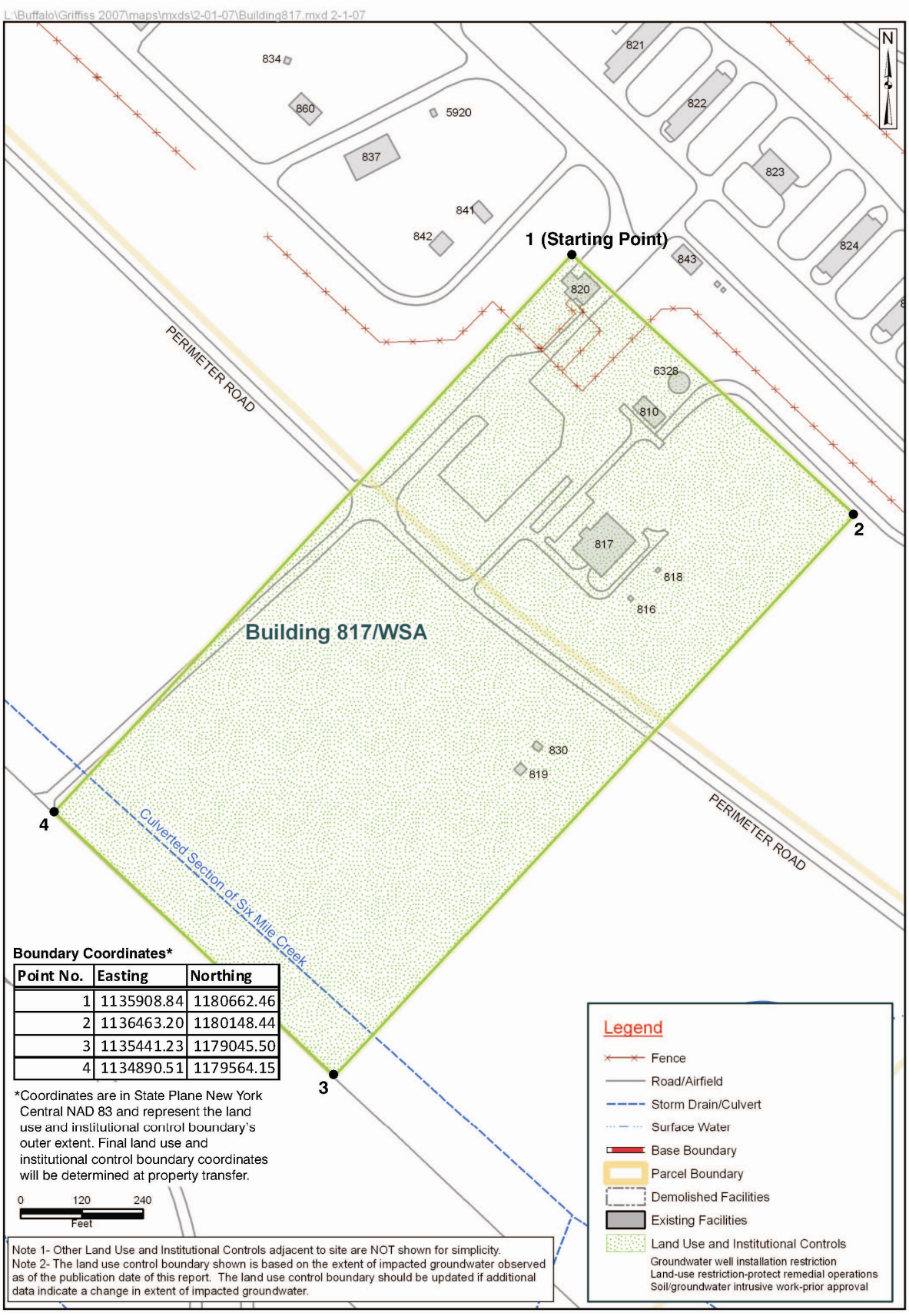

Figure 3-8 B817/WSA Land Use and Institutional Controls Boundary

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NYSDEC will be notified at least six months prior to such transfer. If the six-month notification is not possible, the EPA and NYSDEC will be notified no later than 60 days prior to such transfer. The Air Force shall provide a copy of the executed deed to EPA and NYSDEC.

The Air Force will take the following actions to ensure that the aforementioned use restrictions and the controls are effective in eliminating the exposure scenario and protecting human health and the environment:

Deed Restrictions: Each transfer of fee title from the United States will include the information required by CERCLA 120(h)(3)(A)," with the required reservation of access extending to the Air Force, USEPA, and NYSDEC, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Air Force obligations under CERCLA or similar authorities for taking remedial or corrective action on the property. Deeds will also include a description of any residual contamination on the property above unlimited use and unrestricted exposure levels and any related environmental restrictions, and will expressly prohibit activities inconsistent with remedial action objectives. Deeds will contain appropriate provisions designed to ensure that restrictions run with the land and are enforceable by the Air Force.

Lease Restrictions: During the time between the adoption of this ROD and deeding of the property, equivalent restrictions will be implemented by lease terms, which are not less restrictive than the use restrictions and controls described above, in this ROD. These lease terms shall remain in place until the property is transferred by deed, at which time they will be superceded by the institutional controls described in this ROD.

Environmental Easement and State Land Use Notification: The Air Force will condition transfer of the property upon the transferee granting an environmental easement, containing a complete description of the restrictions described in this ROD, for the land use and institutional controls boundary shown on Figure 3-8 in accordance with Article 71, Title 36 of the New York State Environmental Conservation Law. The Air Force will ensure that the transferee will grant the environmental easement to NYSDEC, on behalf of the State of New York, at the time of transfer of title for the property from the United States. The content of the document creating the environmental easement must be pre-approved by NYSDEC.

Notice: Prior to property transfer, the transferee will be notified of any environmental use restrictions and institutional controls or reporting requirements. Concurrent with the transfer of fee title, information regarding the environmental use restrictions and controls will be communicated in writing to appropriate state agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the land use and institutional controls

boundary. The Air Force will also provide a copy of the deeds to the regulatory agencies as soon as practicable after the transfer of fee title.

Monitoring and Enforcement:

Monitoring: Monitoring of the environmental use restrictions and controls will be conducted annually by the Air Force until the property encompassing the land use and institutional controls boundary is transferred and a report is provided. Any such annual monitoring reports will be included in a separate report or as a section of another environmental report, if appropriate, and be provided to the EPA and NYSDEC. Upon the effective date of the property conveyance, the Air Force will place a requirement in the deed that the transferee or subsequent property owner(s) will conduct annual physical inspections of the Building 817/WSA OBGW site to confirm continued compliance with all institutional controls objectives unless and until all institutional controls at the site are terminated and will provide to the Air Force, EPA, and NYSDEC an annual monitoring report. All annual monitoring reports will report on the status of institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed, whether use restrictions and controls were communicated in the deed(s) for any property transferred in the reporting period, and whether use of the property encompassing the land use and institutional controls boundary has conformed to such restrictions and controls.

If a transferee fails to provide an annual monitoring report as described above to the Air Force, the Air Force will notify EPA and NYSDEC as soon as practicable. If EPA does not receive the annual monitoring report from the transferee (either itself or from NYSDEC), it will notify the Air Force as soon as practicable. Within 30 days of the report's due date, the Air Force will take steps to determine whether institutional controls are effective and remain in place and advise the regulators of its efforts. In any event, within 90 days of the report's due date, the Air Force shall determine the status of institutional controls and provide its written findings, with supporting evidence sufficient to confirm the reported status, based on the use restrictions/institutional controls and site conditions, to EPA and NYSDEC unless either EPA or NYSDEC, in its sole discretion, acts to confirm the status of the institutional controls independently.

The institutional controls monitoring reports will be used in the preparation of the 5-Year Reviews to evaluate the effectiveness of the remedy. The continuation, modification, or elimination of the monitoring reports, and any changes to institutional controls monitoring frequencies, will be subject to EPA and NYSDEC approval. The 5-Year Review reports will be submitted to the regulatory agencies for review and comment.

Response to Violations: The Air Force will notify EPA and NYSDEC via e-mail or telephone as soon as practicable, but no later than 10 days after discovery of any activity that is inconsistent with the land and groundwater use objectives or use restrictions, exposure assumptions, or any action that may interfere with the

effectiveness of the institutional controls. Any violations that breach federal, state or local criminal or civil law will be reported to the appropriate civilian authorities, as required by law.

Enforcement: Any activity that is inconsistent with the institutional controls objectives or use restriction or any action that may interfere with the effectiveness of the land and groundwater use restrictions will be addressed by the Air Force as soon as practicable (but in no case more than 10 days) after the Air Force becomes aware of the violation. The Air Force will notify EPA and NYSDEC regarding how the breach has been addressed within 10 days of sending EPA and NYSDEC notification of the breach. The Air Force will exercise such rights as it retained under the transfer documents to direct that activities in violation of the controls be immediately halted. To the extent necessary, the Air Force will engage the services of the Department of Justice to enforce such rights.

Notification of Land Use Modification: The recipient of the property will obtain approval from the Air Force, EPA, and NYSDEC for any proposals for a land use change at a site inconsistent with the use restrictions described in this ROD.

The Air Force is responsible for implementing, maintaining, monitoring, and enforcing the selected remedy (including the institutional controls). Although the Air Force may later transfer [has transferred] these responsibilities to another party, the Air Force, both pre-transfer and post-transfer, shall retain ultimate responsibility for implementing, maintaining, monitoring, and enforcing the selected remedy.

3.3.13 Statutory Determinations

The AFRPA and EPA, with concurrence from NYSDEC, have determined that remedial action (enhanced bioremediation and air sparge wall) with long-term monitoring is warranted for the Building 817/WSA OBGW site. The selected remedy is protective of human health and the environment, complies with federal and NYS ARARs, is cost effective, and utilizes permanent solutions to the extent possible.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is still performing as planned and is protective of public health and the environment.

3.3.14 Documentation of Significant Changes

No significant changes have been made to the selected remedy from the time the proposed plan was released for public comment.

3.4 Nosedocks/Apron 2

3.4.1 Site Name, Location, and Brief Description

The Nosedocks/Apron 2 OBGW site (site identification designation SD-52) is located at the former Griffiss AFB in Rome, Oneida County, New York (see Figure 3-1). Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the NPL on July 15, 1987. On August 21, 1990, the EPA, NYSDEC, and the AFRPA entered into an FFA under Section 120 of CERCLA.

Apron 2, a former aircraft parking apron and refueling area, and the Nosedocks, each used as aircraft maintenance facilities, are located in the southeast portion of the former Griffiss AFB (see Figure 3-9). The Apron is a relatively flat, 18-inch thick, steel-reinforced concrete pad. The concrete paving is flanked by 50-foot wide areas of asphalt paving on the northwest and southeast sides. The surrounding surface is unpaved lawn. The vicinity of the Nosedocks encompasses the buildings themselves, two oil/water separators (OWS 5730 [removed in 2001] and 6389-3), and several underground utilities (storm drains and sanitary sewers). Groundwater flow in the area of the Nosedocks is complicated due to the large surface pavements of Aprons 1 and 2. Massive construction has altered the natural hydrology in the area of the Aprons and has compacted the subsurface layers, leading to perched groundwater conditions in the area. In general, however, the groundwater flow direction is northeasterly.

3.4.2 Site History and Enforcement Activities

This information is contained in Section 2.1.

3.4.3 Community Participation

This information is contained in Section 2.3.

3.4.4 Scope and Role of Site Remedial Action

The scope of the plan for remedial action for the Nosedocks/Apron 2 OBGW site addresses the concerns for human health and the environment. Monitored natural attenuation is consistent with the results of the risk assessment performed for industrial groundwater users. Remedial actions at the Nosedocks/Apron 2 OBGW site will reduce

COPC levels locally, thus contributing to the remediation of OBGW at the Former Griffiss AFB.

3.4.5 Site Characteristics

The former Griffiss AFB covered approximately 3,552 contiguous acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York. Topography within the valley is relatively flat, with elevations on the former Griffiss AFB ranging from 435 to 595 feet above mean sea level. Three Mile Creek, Six Mile Creek (both of which drain into the New York State Barge Canal, located to the south of the base), and several state and/or federally regulated wetlands are located on the former Griffiss AFB, which is bordered by the Mohawk River on the west. Due to its high average precipitation and predominantly silty sands, the former Griffiss AFB is considered a groundwater recharge zone.

The Apron is sloped toward the center, where storm water collection drains channel runoff into trenches that discharge through an oil/water separator (OWS) and into the Six Mile Creek drainage area. The Nosedock buildings are surrounded by grassy areas with several asphalt parking areas and driveways. The topography across the Nosedocks/Apron 2 OBGW site is relatively flat.

Before 1950, the land in the Nosedocks area was part of a family farm. Two houses, a large barn, a hayfield, and a chicken coop were located at the Nosedocks/Apron 2 OBGW site, and Six Mile Creek flowed through the site in an open channel. High-voltage power lines, including several 45-foot towers, cut through the southern portion of the site. The government procured the Nosedocks and Apron 2 property in the 1950s. After acquisition, the land was significantly altered to accommodate the large aircraft aprons (including Apron 1) and the Nosedocks. Six Mile Creek was diverted into an underground culvert, and the old channel was filled in. The high-voltage power lines in the area were rerouted (Law 1996). The main JP-4 fuel line for the refueling system at Apron 2 originated from the Bulk Fuel Storage Area (BFSA) located at the southern boundary of the base. The fuel line extended from the BFSA in generally a northwest direction onto the base, turned east along Brookley Road, passed above Three Mile Creek, turned north towards the Building 775 OBGW area, and branched off to Pumphouses 1 through 5.

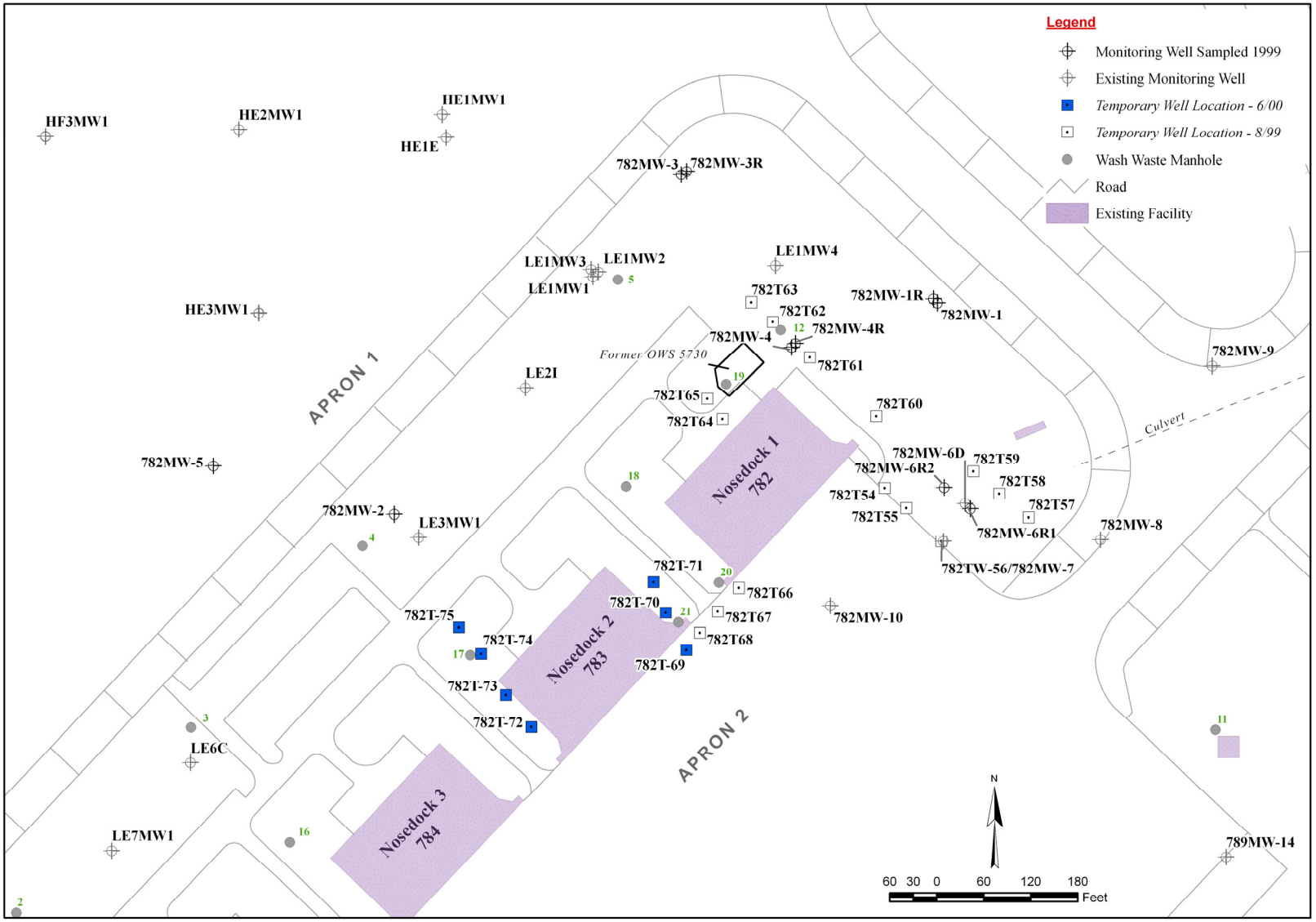

Figure 3-9 Nosedocks/Apron 2 Groundwater Monitoring Well and Sampling Locations

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The five Nosedocks (Buildings 782 through 786) were also used as aircraft maintenance buildings. Interior drains at each Nosedock received a variety of liquid wastes generated by maintenance activities, while exterior drains received drainage from the apron. The Nosedock Wash Waste system was installed in 1959 to receive wash wastes from the Apron 2 interior and exterior trench drains. The system collected drainage from the five Nosedocks and a wash rack that was set up in the corner of Building 786, and drained to Manhole 19, where the effluent was pumped to former OWS 5730. Currently, the Nosedocks buildings house either private businesses or are vacant and all of the interior floor drains/trenches have been plugged by the Air Force.

Surface soils (from 0 feet BGS to approximately 20 feet BGS) consist of uniform brown, silty fine sand, with variable quantities of gravel and occasional clay. The soil appears to be fill material. The native material beneath the fill underneath the Apron area consists of brown, silty, fine to coarse sand with variable quantities of gravel. Surface runoff in the vicinity of Nosedocks 1 and 2 flows into storm drains by way of a large unpaved drainage swale that extends several hundred feet from the southwest to the northeast. The storm drains of the Nosedocks flow through to OWS 6389-3 before discharging into Six Mile Creek.

The depth to groundwater ranges from 4 to 14.5 feet. Groundwater flow in the area of the Nosedocks is complicated because of the large surface pavements of Aprons 1 and 2. Massive construction has altered the natural hydrology in the area of the Aprons and has compacted the subsurface layers, leading to perched groundwater conditions in the area. In general, however, the groundwater flow direction is northeasterly.

The groundwater plume at Nosedocks/Apron 2 appears to extend from the northern vicinity of Building 786 east-northeast to Six Mile Creek. The suspected source area may be associated with the former Wash Waste System between Manholes 14 and 15. The manholes are upgradient of those locations where elevated concentrations of chlorinated hydrocarbons were detected. The RI documented that natural attenuation processes are ongoing. Continued groundwater monitoring following the RI for two years has indicated that the plume is stable and that Six Mile Creek is not impacted.

Site Investigations

The following summarizes the site activities that led to the delineation of the Nosedocks/Apron 2 chlorinated plume including previous investigations at adjacent sites, specifically Nosedocks 1 and 2.

Remedial Investigation – Nosedocks 1 and 2. In 1994, an RI was performed. The main objective of the RI was to investigate the nature and extent of environmental contamination from historical releases. The RI included a passive soil gas survey; collection of one waste oil sample from the OWS; collection of surface soil samples, and the installation and sampling of 24 soil borings and four new monitoring wells.

Groundwater and soil samples were collected from the north and northwest sides of Nosedocks 1 and 2 (Buildings 782 and 783) during this RI. Analytical results indicated the presence of 20 VOCs, nine SVOCs, six metals, and 11 pesticides. No chlorinated hydrocarbons were detected in soil samples. Thirteen VOCs and six metals exceeded the most stringent criteria (see Table 3-18).

The final RI and final FS for the Nosedocks/Apron 2 OBGW site identifies chlorinated hydrocarbons as the focus of further investigation/remediation for this site. Furthermore, metals sampling in groundwater performed in 2002 for risk assessment purposes detected elevated levels of iron, manganese, and sodium. As identified in other OBGW FSs, elevated metals concentrations found at this site are naturally occurring while sodium is likely attributable to road deicing. Therefore, metals were not used as a basis for remediation.

Supplemental Investigation – Nosedocks 1 and 2. In 1997, an SI was performed to address the data gaps and uncertainties identified in the RI. New monitoring wells were installed including 782MW-5, 782MW-6R1, and 782MW-6R2 (see Figure 3-9). Existing wells 782MW-1R, -2, and -3R were also sampled during the SI. A groundwater sample collected at 782MW-6R2 indicated the presence of cis-1,2-DCE (37 µg/L) and vinyl chloride (26 µg/L) above the most stringent criterion of 5 µg/L; no chlorinated hydrocarbons were reported above the detection limits in 782MW-2, -3R, or -5. The SI recommended that additional wells be installed to the east of Building 782 to characterize the extent of groundwater contamination.

TABLE 3-18
COMPOUNDS EXCEEDING GUIDANCE VALUES
NOSEDOCKS 1 AND 2
REMEDIAL INVESTIGATION GROUNDWATER SAMPLES (1994)

Compound	Range of Detected Concentrations or Maximum Detected Concentration	Frequency of Detection Above Most Stringent Criterion	Most Stringent Criterion
VOCs (µg/L)			
Acetone	3.4J – 66	1/4	50 [a]
Benzene	4.8 -410	3/4	1 [a]
sec-Butylbenzene	0.8 – 29	1/4	5 [a]
cis-1,2-Dichloroethene	0.4J – 12	1/4	5 [a]
Ethylbenzene	36 – 39	2/4	5 [a]
Hexachlorobutadiene	1.2	2/4	0.5 [a]
Isopropylbenzene	4.5 – 21	1/4	5 [a]
Naphthalene	17 – 28D	2/4	10 [b]
Toluene	0.8 – 1,400	1/4	5 [a]
1,2,4-Trimethylbenzene	62 – 530D	2/4	5 [a]
1,3,5-Trimethylbenzene	24 – 180D	2/4	5 [a]
m,p-Xylene	100D – 220	2/4	5 [a]
o-Xylene	4.2 – 130	1/4	5 [a]
Metals (µg/L)			
Aluminum	400	1/4	50 [d]
Arsenic	2.16J – 29	1/4	10 [c]
Iron	12,700 – 66,100	4/4	300 [a, d]
Manganese	2,960 – 9,210	4/4	50 [d]
Sodium	20,040 – 23,800	4/4	20,000 [a]
Thallium	0.7J	1/4	0.5 [b]

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

[a] NYSDEC Class GA groundwater standard, June 1998.
[b] NYSDEC Class GA groundwater guidance value, June 1998.
[c] EPA Federal primary maximum contaminant level.
[d] EPA Federal secondary maximum contaminant level.

Key:
D = Sample required dilution.
J = Estimated concentration.
µg/L = Micrograms per liter.

2002 Remedial Investigation – Nosedocks/Apron 2. In 2002, a second RI was performed for Nosedocks/Apron 2 OBGW site. This RI included plume delineation and potential source area identification. This RI included:

- Drilling and vertically profiling 39 boreholes, including the collection of 110 Hydropunch samples;

- Installation of 28 new groundwater monitoring wells screened across the zone with the highest concentration of chlorinated hydrocarbons reported during the vertical profiling;

- Collection of groundwater samples from the 28 new wells and six existing wells for the analysis of VOCs and geochemical parameters to evaluate the extent of ongoing biodegradation across the contaminated plume; and

- Collection of surface water and groundwater seepage samples downgradient of the detected contamination to evaluate the plume transport off site.

Four contaminants were detected at levels exceeding the most stringent criteria (NYSDEC Class GA Groundwater Quality Standards) from plume extent wells sampled in February 2002. These permanent wells include: 782VMW-76, -78, -80, -81, -83, -84, -87, -88, -90, -92, through -97, -101 -104, -105B, 782MW-4R, -6D, -6R2, -10, and AP2MW-3.

TCE was reported in five wells ranging from 0.85 µg/L to 49.95 µg/L, and at levels exceeding the most stringent criteria in four wells. Cis-1,2-DCE, which was detected in eight wells ranging from 1.47 µg/L to 66 µg/L, and at levels exceeding the most stringent criteria in five wells. Vinyl chloride, was detected in 13 wells ranging from 1.39 µg/L to 77.8 µg/L, and at levels exceeding the most stringent criteria in 11 wells. Methyl tert-butyl ether (MTBE), was reported in eight wells ranging from 9.59 µg/L to 251 µg/L, and at levels exceeding the most stringent criteria in five wells. There were no chlorinated hydrocarbon detections present at any surface water locations. Figure 3-10 illustrates the groundwater contamination identified at the site during the 2002 RI.

Groundwater Study. Supplemental to the previous field activities, groundwater monitoring was performed quarterly at the 33 monitoring wells and four surface water locations from February 2003 to September 2004 (the monitoring network for the site is illustrated in Figure 3-11, including surface water locations). The objectives of sampling the groundwater at the Nosedocks/Apron 2 were to monitor for the presence of chlorinated hydrocarbons within and downgradient of the site, monitor plume attenuation, and characterize and delineate localized contamination.

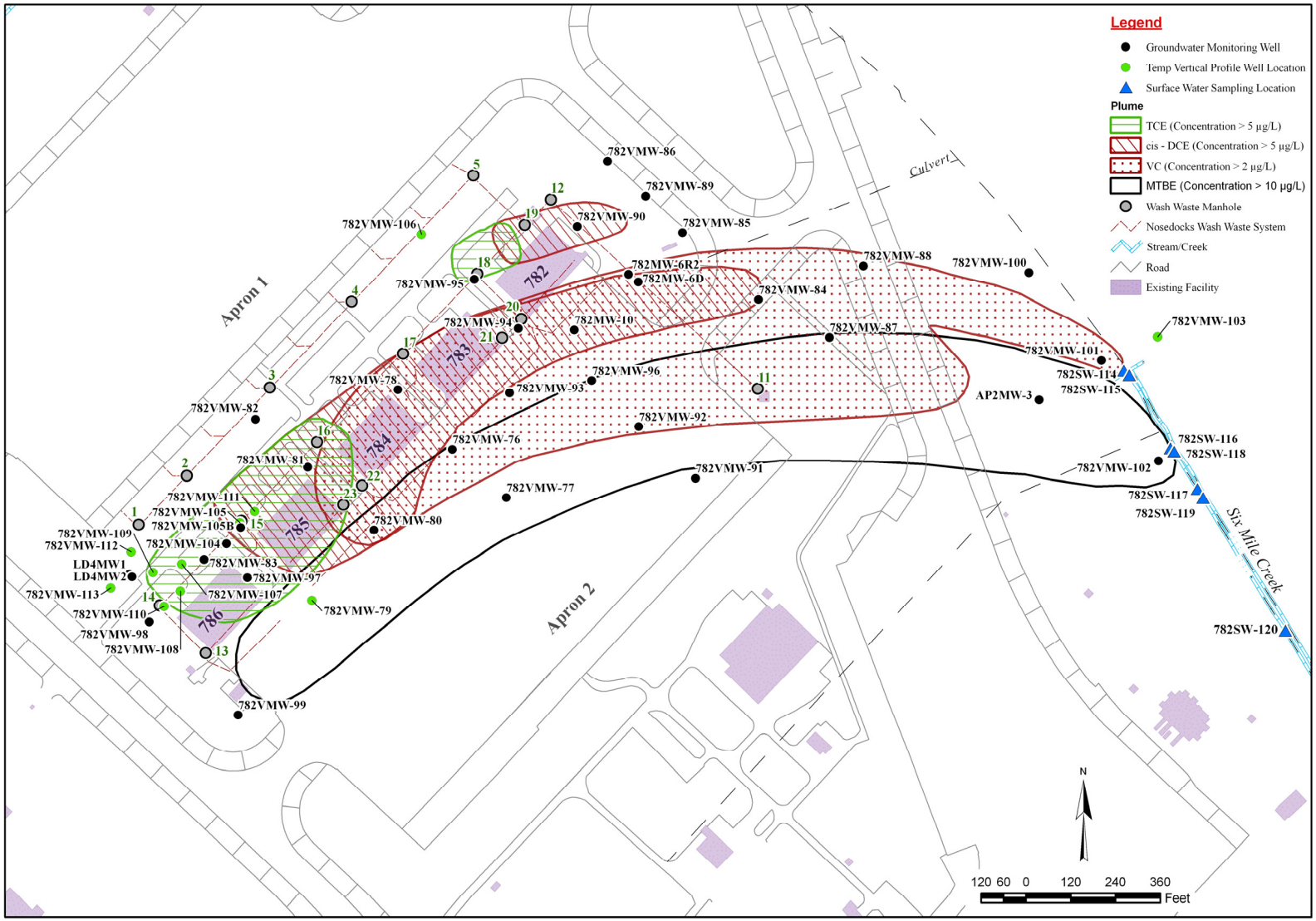

Figure 3-10 Nosedocks/Apron 2 Groundwater Contamination (February 2002)

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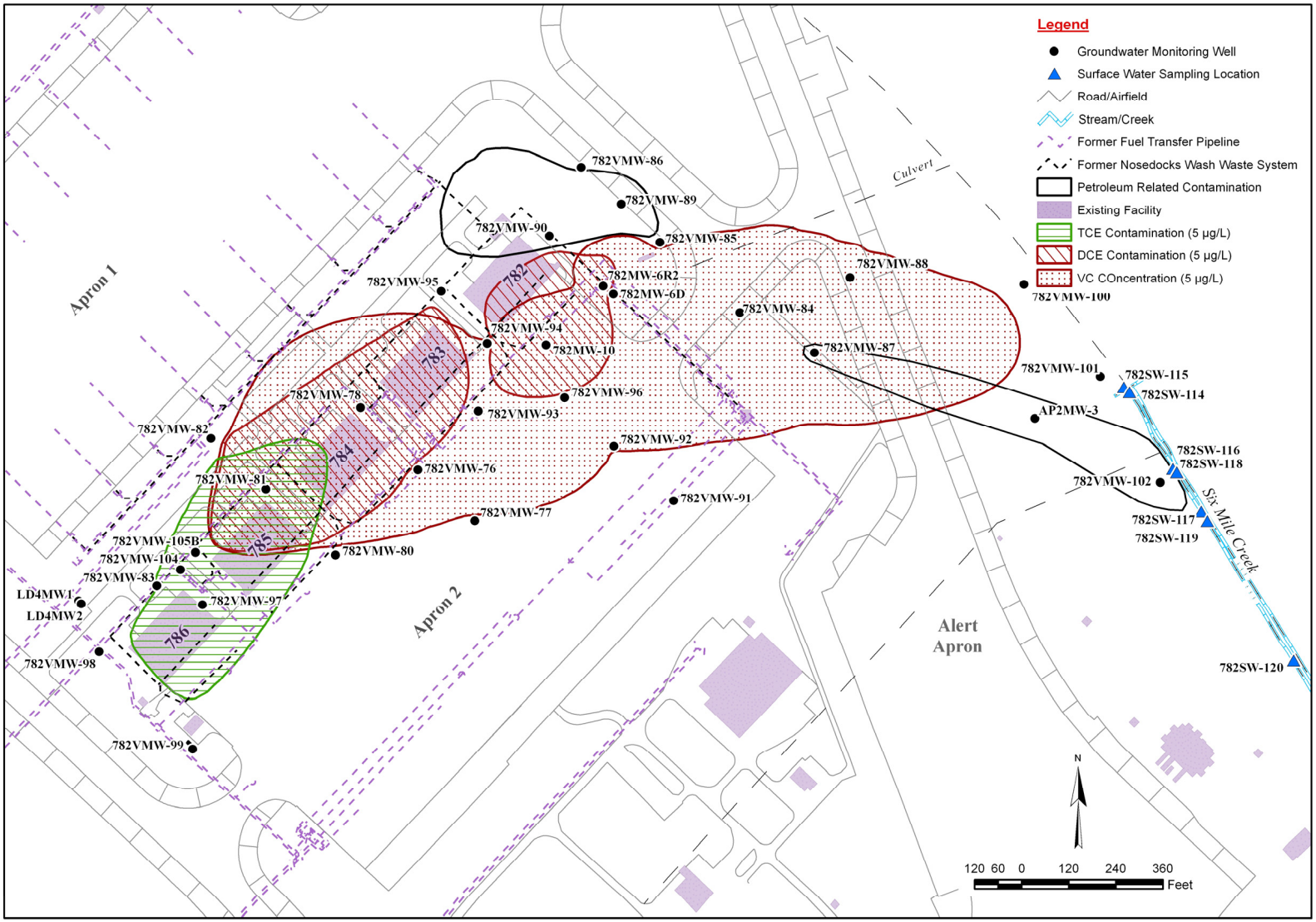

Figure 3-11 Nosedocks/Apron 2 Groundwater Plumes (September 2004)

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Each monitoring well location was sampled and tested for VOCs, metals, natural attenuation parameters (chloride, nitrate, sulfate, sulfide, total alkalinity, and total organic carbon), and ferrous iron, which was measured in the field. Surface water samples were analyzed for VOCs.

Table 3-19 summarizes the results for chlorinated hydrocarbons from February 2003 to September 2004. Four consecutive rounds of no exceedances for VOCs warranted either the removal of or a frequency change for that particular location. Based on the laboratory data, modifications included frequency changes from quarterly to semi-annually at well locations 782VMW-77, -85, -86, and -100; monitoring wells 782VMW-82, -95, 98, and -99 were removed from the monitoring program.

TABLE 3-19
CHLORINATED HYDROCARBONS DETECTED IN GROUNDWATER
NOSEDOCKS/APRON 2 CHLORINATED PLUME
GROUNDWATER MONITORING (FEBRUARY 2003 THROUGH SEPTEMBER 2004)

Compound	NYS GW Std	Range of Detection Feb 2003	Range of Detection June 2003	Range of Detection Sept 2003	Range of Detection Dec 2003	Range of Detection April 2004	Range of Detection July 2004	Range of Detection Sept 2004
VOCs (µg/L)								
cis-1,2-DCE	5	0.45F - 64	0.21F – 68	0.4F - 68	0.3F - 55	0.33F - 75	0.46F - 60	0.2F - 56
TCE	5	0.21F - 39	3.3 – 32	0.22F - 26	0.28F - 21	0.21F - 32	0.2F - 25	0.27F - 29
Trans-1,2-DCE	5	0.28F - 3.6	0.29F - 3.8	0.2F – 5.5	0.21F - 4.3	0.23F - 1.3	0.66F - 3.7	0.24F - 4.6
Vinyl Chloride	2	0.66F - 96	0.22F - 130J	0.35F - 120	0.34F - 97	0.46F - 130	0.34F - 62	0.25F - 80

Analytical concentrations presented in the table are for detected values only. Non-detect values and/or concentrations below the most stringent criterion are excluded in the first value listed in the "Frequency of Detection Above Most Stringent Criterion" column.

Key:
F = The analyte was detected above the minimum detection limit, but below the reporting level.
J = The analyte was positively identified, the quantitation is approximate.
µg/L = Micrograms per liter.

Recent groundwater data indicates that chlorinated hydrocarbon contamination formerly associated with the northern cis-1,2-DCE plume has attenuated to levels below NYSDEC Class GA Groundwater Quality Standards. The data also indicate that the contamination is not migrating off-site through seepages or discharges to Six Mile Creek. However, based on the data, the southern chlorinated hydrocarbon plume (TCE, DCE, and vinyl chloride contamination) has shown relative stability with minor attenuation along the eastern edge of the plume throughout the sampling rounds as is evident with the optimization of the monitoring network. Figure 3-11 also illustrates the chlorinated hydrocarbon contamination along with the petroleum contamination plumes present at the Nosedocks/Apron 2 OBGW site. Vinyl chloride contamination at the site appears to be

peripherally commingling with petroleum contamination downgradient at the Apron 2 location of the site (see Figure 3-11). Biosparging is currently anticipated to be the recommended alternative for cleanup of the petroleum-related contamination northeast and northwest of Aprons 1 and 2. The effect of this alternative was considered during the development of the remedy selection. Recent data has indicated that petroleum-related MTBE contamination previously identified during the RI has naturally attenuated as indicated in Figure 3-11. All remaining petroleum contamination is addressed under the NYSDEC Petroleum Spills Program.

3.4.6 Current and Potential Future Site and Resource Uses

Griffiss AFB was designated for realignment under the Defense Base Closure and Realignment Act in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. Currently, the Nosedocks/Apron 2 OBGW site land use is industrial/commercial (non-residential) and deed restrictions restrict the use of groundwater at this site. The anticipated future use at the Nosedocks/Apron 2 OBGW site is to remain the same, industrial/commercial (non-residential). As a municipal water supply is available near the site, future use of site groundwater is not anticipated and thus will limit human exposure.

3.4.7 Summary of Site Risks

A general description of the risk assessment process is provided in Section 2.2. Site-specific results for the risk assessments performed at this site are described below.

3.4.7.1 Human Health Risk Assessment

A baseline human health risk assessment was conducted during the 2002 RI to determine whether chemicals detected at the Nosedocks/Apron 2 could pose health risks to individuals under current and proposed future land uses if no remediation occurs.

The current and future land use designation for Nosedocks/Apron 2 is industrial/commercial. The human health risk assessment for groundwater evaluated exposure scenarios for potential industrial workers. The receptors and pathways evaluated for groundwater exposure in the risk assessment are summarized in Table 3-20. The expo-

sure assumptions, which were selected in accordance with EPA guidance, are more fully described in the RI report.

TABLE 3-20 RISK ASSESSMENT EXPOSURE SCENARIOS NOSEDOCKS/APRON 2
Industrial Workers (groundwater used for potable or process water)
• Ingestion of groundwater • Dermal contact with groundwater • Inhalation of VOCs from groundwater

Carcinogenic Risk

The cumulative carcinogenic risk from exposure to contaminants in groundwater by industrial workers was 5×10^{-5}, which is within EPA's acceptable target risk range. Benzene and pentachlorophenol were the major risk contributors for this exposure scenario.

Noncarcinogenic Risk

The total HIs for industrial workers from ingestion of groundwater, inhalation of VOCs released from groundwater, and dermal contact with groundwater were 20, 0.08, and 2, respectively. The exposure pathway presenting the greatest potential hazard was from the ingestion of groundwater contaminated with benzene and manganese.

Summary

The results of the human health risk assessment indicated that the potential risk of COPCs in groundwater would be reduced substantially if groundwater was not used for drinking water purposes. The quantitative evaluation of risk is subject to several conservative assumptions and should not be considered an absolute measure of risk.

The remedial action selected in this ROD, including institutional controls, is necessary to protect human health or welfare, or the environment from actual or threatened releases of hazardous substances from the Nosedocks/Apron 2 OBGW site into the environment.

3.4.7.2 Ecological Risk Assessment

A baseline risk assessment for ecological receptors from exposures to surface soil at the Nosedocks/Apron 2 OBGW site was conducted during the RI. An ecological risk assessment for exposure to groundwater was not performed because wildlife does not have access to groundwater in this area.

3.4.7.3 Site Contaminants of Concern and Proposed Cleanup Goals

Based on investigations and risk assessments performed at the Nosedocks/Apron 2 OBGW site, the site COCs include cis-1,2-DCE, TCE, and vinyl chloride. For site COCs, the NYSDEC Class GA Groundwater Quality Standards were selected as the site cleanup goals. The cleanup goals for cis-1,2-DCE, TCE, and vinyl chloride are 5 μg/L, 5 μg/L, and 2 μg/L, respectively.

3.4.8 Remedial Action Objectives

For the Nosedocks/Apron 2 OBGW site, the RAOs are to:

1. Achieve the cleanup goals for COCs specified in Section 3.4.7.3;

2. Prevent human exposure to groundwater through groundwater use restrictions until cleanup goals are achieved; and

3. Prevent contaminated groundwater from the site from adversely impacting surface water (in Six Mile Creek), which is defined as surface water concentrations above performance indicators (NYSDEC Class GA Groundwater Quality Standard of 2 μg/L for vinyl chloride).

4. Prevent development and use of the property for residential housing, elementary and secondary schools, childcare facilities and playgrounds.

Evaluate Effectiveness of the Remedy

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is performing as planned and is protective of public health and the environment.

Long-term monitoring of the groundwater plume during implementation will be performed. Groundwater sampling will be performed to monitor seasonal water table elevations and contaminant concentration fluctuations. Institutional controls in the form

of deed restrictions for affected groundwater have been/will be implemented (see Section 3.4.12). Monitoring will continue until groundwater cleanup standards are achieved.

3.4.9 Description of Alternatives

CERCLA regulations mandate that a remedial action must be protective of human health and the environment. The following remedial alternatives were developed for the Nosedocks/Apron 2 OBGW plume, which is a relatively deep plume (32 to 40 feet BGS) that has migrated northeast from their apparent original source area near Buildings 785 and 786. For purposes of the FS, each alternative assumes a maximum 30-year remediation duration which is typically used in FSs for evaluation purposes. A summary of estimated remediation durations and costs are presented in Table 3-21.

TABLE 3-21
SUMMARY OF REMEDIAL ALTERNATIVE DURATIONS AND COSTS
FOR BUILDING NOSEDOCKS/APRON 2 OBGW

Description	Alternative						
	1	2	3	4	5	6	7
	No Action	Institutional Controls	Monitored Natural Attenuation	Air Sparging and Soil Vapor Extraction	In-Situ Permeable Reactive Barriers	In-Situ Active Chemical Oxidation	Six Mile Creek Horizontal Air Sparging Barrier
Total Approximate Project Duration (Years)	0	30	30	5	15	10	30
Total Present Value of Alternative	$50,000	$1,480,000	$1,565,000	$31,090,000	$4,920,000	$2,925,000	$2,785,000

Key:
LTM = Long-term monitoring.

Alternative 1 (No Action)

CERCLA requires that the No Action alternative be compared with other alternatives. The No Action alternative involves no remedial action for treatment of the plumes. The plumes would be allowed to migrate and naturally attenuate. No monitoring would be conducted to evaluate the progress of these natural processes.

Alternative 2 (Institutional Controls)

Institutional controls in the form of legally enforceable groundwater use restrictions would be implemented together with a long-term monitoring program to periodi-

cally ensure that the controls remain in place and that they remain protective of human health and the environment. Based on monitoring data collected over several years, the chlorinated groundwater plume has stabilized or is shrinking in extent over time and the overall mass of contamination in the chlorinated plume within contours defined by target cleanup concentration levels is reducing over time due to hydrogeologic and natural attenuation processes. The proposed long-term monitoring would be performed for the assumed 30-year remediation period to verify that the chlorinated plume is stable and that the current trend toward gradual reduction in volume of plume and mass of contaminants within the plume continues.

Alternative 3 (Monitored Natural Attenuation)

This alternative attenuation would employ natural processes to reduce contaminant concentrations within the aquifer. To implement monitored natural attenuation a groundwater monitoring network would be established to evaluate contaminant and natural attenuation parameter concentrations within the plume, and gather additional data required for evaluating site hydraulics and in-situ natural attenuation parameters. Long-term monitoring and institutional controls would also be included in this alternative for an assumed 30-year remediation duration.

Alternative 4 (In-Situ Air Sparging and Soil Vapor Extraction)

This alternative would involve the installation of groundwater air-sparging wells to inject pressurized air into the groundwater within the chlorinated plume such that the air enters the groundwater from the bottom of the contaminated zone. As the injected air traverses up through the plume, the VOCs present in the groundwater would be transferred to the air medium and transported toward the surface. The contaminated vapors would be captured by soil vapor extraction wells (by means of vacuum extraction) and either treated aboveground or discharged directly into the atmosphere. Operation and maintenance of the air sparge/soil vapor extraction system is estimated to occur over 2 years with monitoring to extend 3 years beyond. Groundwater, surface water, and soil vapor monitoring would be conducted during the implementation period. Institutional controls would be implemented and a long-term groundwater and surface water monitoring program would be conducted to verify that the remedy remains protective.

Alternative 5 (In-Situ Permeable Reactive Barriers)

This alternative is selected for the portions of the plumes with concentrations greater than 20 µg/L TCE in the TCE plume, greater than 30 µg/L DCE in the DCE plume (in both plume zones), and greater than 80 µg/L vinyl chloride in the vinyl chloride plume. In this alternative, PRB walls constructed of zero-valent iron would be used for remediation of the TCE and DCE plumes via reductive dechlorination, and oxygen releasing compound (ORC) would be injected at multiple locations for remediation of the vinyl chloride plume via aerobic degradation. Institutional controls would be implemented and a long-term groundwater and surface water monitoring program for an assumed 15-year duration would be conducted for the entire plume to verify that the remedy remains protective.

Alternative 6 (In-Situ Chemical Oxidation)

This alternative would involve the delivery of a strong oxidizing agent into the subsurface through temporary injection points (i.e., direct-push points) to oxidize COCs to non-toxic compounds. In addition, institutional controls, including long-term monitoring of groundwater for an estimated 10-year duration, would be implemented to limit the potential for future exposure to contaminated groundwater until cleanup goals were achieved. During this action, there would be continued monitoring of the extent of migration or natural attenuation of the plume. This alternative would involve full-scale remediation for those portions of the plumes with concentrations greater than 20 µg/L for TCE, greater than 30 µg/L for DCE and greater than 80 µg/L for vinyl chloride.

Alternative 7 (Six Mile Creek Horizontal Air Sparging Barrier)

A Six Mile Creek in-situ air sparging barrier system would be implemented under this alternative. A biosparge horizontal treatment system would treat the residual vinyl chloride component of the plume prior to discharge to Six Mile Creek. Air sparging would be used to inject pressurized air into the groundwater across the plume width and upgradient of Six Mile Creek (which at this discharge point is expected to have residual or negligible concentrations of contaminants). As the injected air traverses up though the groundwater, any VOCs that may be present are transferred to the air medium and trans-

ported toward the surface (unsaturated zone), where they are discharged to ambient air as areally distributed (non-point source) emissions. No soil vapor extraction system is selected since it is not needed for controlling and collecting the vapors due to the absence of buildings or other habitable structures in this area near the creek. Institutional controls would be implemented and a long-term groundwater and surface water monitoring program for an estimated 30-year period would be conducted to evaluate the extent of migration and attenuation of the plume upgradient and downgradient from the barrier system and to verify that the remedy remains protective.

3.4.10 Comparative Analysis of Alternatives

Remedial alternatives are assessed on the basis of both a detailed and a comparative analysis pursuant to the NCP. The detailed analysis of the Nosedocks/Apron 2 OBGW plume consisted of (1) an assessment of the individual alternatives against seven evaluation criteria and (2) a comparative analysis focusing upon the relative performance of each alternative against the criteria. In general, the following "threshold" criteria must be satisfied by an alternative for it to be eligible for selection:

1. Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or remedial action with long-term monitoring.

2. Compliance with ARARs addresses whether a remedy would (a) meet all of the ARARs or (b) provide grounds for invoking a waiver.

In addition, the following "primary balancing" criteria are used to make comparisons and identify the major trade-offs among alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants at the site.

5. Short-term effectiveness addresses (a) the period of time needed to achieve protection and (b) any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital, O&M, and present-worth costs.

Finally, the following "modifying" criteria are considered fully after the formal public comment period on the proposed plan is complete:

8. State acceptance indicates whether, based on its review of historical investigations and this ROD, the state supports or opposes the preferred alternative and/or has identified any reservations with respect to the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in this ROD and the RI reports. Factors of community acceptance include support, reservation, or opposition by the community.

A comparative analysis of the seven alternatives based on the nine evaluation criteria follows:

1. Overall Protection of Human Health and the Environment

   There are currently no human or environmental receptors impacted by this plume. Although there are no current receptors of groundwater contamination from the Nosedocks/Apron 2 plume, Alternative 1 does not prevent future exposures, such as through installation of drinking water wells or construction in soils above the plume.

   Alternatives 2 and 3 include deed restrictions to ensure that there are no future exposures to contaminants. Because the future use of the area above the plume is used for industrial purposes at this time, this approach would be protective. Alternatives 4, 5, 6, and 7 employ active treatment mechanisms to destroy contaminants, thus providing the highest level of protection of human health and the environment.

2. Compliance with ARARs

   NYSDEC Class GA Groundwater Quality Standards comprise the chemical-specific ARARs for this plume. ARARs would not be achieved with

Alternative 1. Alternatives 2 and 3 will be in compliance with the ARARs in the long term. Although no treatment is proposed, it has been determined that reductive dechlorination occurs at the site and the implementation of the selected remedy (Alternative 3) will ensure that the proposed protective controls remain in place and they remain protective. Institutional controls will be in place as long as it is necessary for the contaminants to naturally attenuate to levels below ARARs.

Alternatives 4, 5, 6, and 7 provide treatment mechanisms for removing contaminants from the groundwater, thus accelerating compliance with these ARARs. Alternatives 4 and 6 employ active in-situ treatment technologies to meet ARARs in the shortest period. They provide treatment throughout the plume. Alternative 5 provides in-situ treatment but relies on a passive technique, requiring the plume to flow through the reactive wall to provide contaminant destruction. Although this technique is effective, groundwater upgradient of the PRB would remain above ARARs until it passes through the wall, which would take many years due to the rate of groundwater flow in the area of the plume (expected to be approximately 15 years). Alternative 7 focuses treatment on the contaminated groundwater through a sparge wall prior to leaving the site.

3. Long-term Effectiveness and Permanence

Alternative 1 would not be effective in the long term. The use of deed restrictions as called for by Alternatives 2 and 3 provides an effective long-term mechanism to protect human health and the environment. Furthermore, since the available monitoring data demonstrates ongoing natural attenuation of site COPCs, the selected remedy (Alternative 3) is effective in the long term.

Alternatives 4, 5, 6, and 7 use active in-situ treatment technologies. As with any in-situ technology, effectiveness can not be well predicted until after pilot studies and/or initial implementations of the technology. However, the air sparging technology used in Alternatives 4 and 7, permeable reactive barrier/zero-valent iron technology used in Alternative 5, and the chemical oxidation technology used in Alternative 6 have been applied at a number of similar sites and are therefore expected to be reasonably effective. Pending successful use of these technologies, they would represent effective long-term solutions.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 employs no treatment technologies and thus do not reduce toxicity, mobility, or volume. Alternatives 2 and 3 will include periodic assessments to register the reductions in toxicity, mobility, or volume that is occurring at the site due to natural attenuation processes that have been determined to be occurring at the site. The analyses of the monitoring data indicated that the selected remedy (Alternative 3) will achieve site-specific

remediation objectives within a time frame that is reasonable compared to other alternatives and will result in reductions in toxicity, mobility, and/or volume of chlorinated groundwater contamination at the site. The selected remedy does not interfere with the ongoing natural degradation of TCE, DCE, and vinyl chloride.

Alternatives 4, 5, 6, and 7 employ treatment technologies to reduce toxicity of contaminants in the plume. Alternative 4 (air sparging and soil vapor extraction) and Alternative 6 (in-situ chemical oxidation) treats the contaminants in-situ, providing the most effective and most rapid toxicity reduction. Alternative 6 provides more rapid treatment site COPCs due to the oxidation injections targeting areas of highest concentrations whereas Alternative 4 provides a more continuous treatment throughout the plume. Alternatives 5 and 7 rely on migration of contaminants to either a PRB or an air sparging barrier respectively. Contaminants will be treated and disposed accordingly, thus reducing toxicity.

5. Short-term Effectiveness

Alternatives 1 and 2 do not have significant short-term impacts. Alternative 2 includes institutional controls such as deed restrictions until cleanup goals are achieved. The selected remedy (Alternative 3) can be readily implemented with minimal short-term impacts through the construction of a minimal amount of new monitoring wells and use of several existing monitoring wells in the monitoring network. Alternatives 1, 2, and 3 assume a 30-year implementation duration.

The implementation/operation of Alternative 4 is estimated at 3 years for operation of the air sparging wall with monitoring events performed during operation and extending 5 years beyond. The PRBs in Alternative 5 will be in operation for an estimated 15 years while implementation of Alternative 6 will occur over 10 years. Alternative 7 assumes a 30 year implementation duration.

6. Implementability

There are no actions to implement for Alternative 1. Alternatives 2, 3, 4, and 7 are readily implementable. Alternatives 5 and 6 employ in-situ treatment technologies, which would require initial (and possibly bench) testing to demonstrate effectiveness prior to implementation. There is a possibility that testing would reveal technical problems that may limit the ability to implement the technology or require changes from the assumptions that have been made regarding, for example, radius of influence or amount of zero-valent iron required, that may increase or decrease costs of implementation.

7. Cost

   Alternative 1 calls for no action and incurs a nominal cost of $50,000 for administrative expenses. Alternative 2, Institutional Controls, is the least expensive of the remaining alternatives with a present-worth cost of $1,480,000. Alternative 3 is slightly more expensive ($1,600,000) including costs for 30 years of monitored natural attenuation and long-term monitoring.

   Under Alternatives 4, 5, 6, and 7, several active treatment technologies would be employed. Alternative 4 would result in the shortest treatment period but is associated with the highest cost ($31,100,000). The estimated cost for Alternative 5 is approximately $4,900,000, including costs for 15 years of long-term monitoring. Alternatives 6 and 7 have comparable cost ($2,900,000 and $2,800,000 respectively), however Alternative 6 includes costs for 10 years of long-term monitoring while Alternative 7 includes costs for 30 years of long-term monitoring.

8. Agency Acceptance

   AFRPA, NYSDEC, and EPA have mutually agreed to select Alternative 3, Monitored Natural Attenuation, for the Nosedocks/Apron 2 OBGW site. The selected remedy satisfies the threshold criteria and ensures compliance with applicable regulations.

9. Community Acceptance

   Community acceptance of the selected remedy was assessed at the public meeting and during the public comment period.

3.4.11 Principal Threat Wastes

There are no principal threat wastes at the Nosedocks/Apron 2 OBGW site.

3.4.12 Selected Remedy

The selected remedy (Alternative 3) for the Nosedocks/Apron 2 OBGW site consists of monitored natural attenuation, including groundwater and surface water monitoring. Monitoring will be conducted to verify that assumptions from the FS are valid and that human health and the environment are protected. The monitoring network will be developed using existing wells that have proven to be capable of tracking the plume. Given the flat water table in the vicinity of Apron 2 and the stable nature of the plume, which is evident from years of monitoring data, it is believed that contaminant level variations can be adequately tracked with quarterly monitoring of VOCs for the first year

and semiannually thereafter. A higher monitoring frequency is selected for the first year to identify seasonal fluctuations and uncertainties within the plume. Actual monitoring network revision/optimization will be conducted as data is collected and reviewed by the Air Force, EPA, and NYSDEC. Similarly, the actual monitoring period will depend on the observed contaminant levels and locations over time. Long-term monitoring will be performed until four consecutive routine sampling rounds are below the NYSDEC Class GA Groundwater Quality Standards for site COCs. The Air Force may request that EPA/NYSDEC reduce the number of sample rounds used to demonstrate achievement of NYSDEC Class GA Groundwater Quality Standards based on the long-term monitoring data. A contingency alternative, such as a horizontal air sparging barrier (or other action agreed upon by the Air Force, EPA, and NYSDEC) will be implemented if surface water samples from Six Mile Creek contain elevated concentrations of vinyl chloride (NYSDEC Class GA Groundwater Quality Standard of 2 µg/L for vinyl chloride). Additional round(s) of sampling will be performed to confirm contaminant concentrations. Site data will then be evaluated to determine whether the elevated concentrations are attributable to site groundwater. If the concentrations are attributable to site groundwater, the Air Force will discuss future actions at the site with EPA and NYSDEC. The regulatory agencies will have final approval of the criteria and decision regarding implementation of contingency measures after receiving the Air Force's assessment and recommendation in accordance with the Interagency Agreement.

Institutional controls in the form of deed restrictions for affected groundwater will be implemented. Figure 3-12 provides the land use and institutional controls boundary. The starting coordinate of the Nosedocks/Apron 2 land use and institutional controls boundary is located approximately 515 feet north of the northern corner of Building 782. The institutional controls will be implemented as follows:

- Development and use of the entire SD-52, Nosedocks/Apron 2 Operable Unit AOC property for residential housing, elementary and secondary schools, childcare facilities, and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA, and NYSDEC.

- The owner or occupant of this site shall not extract, utilize, consume, or permit others to extract, utilize, or consume any water from the subsurface aquifer within the boundary of the site unless such owner or occupant obtains prior written approval from the NYSDOH.

- The owner or occupant of this site will not engage in any activities that will disrupt required remedial investigation, remedial actions, and oversight activities, should any be required.

- The owner or occupant of this site will restrict access to and prohibit contact with all subsurface soils and groundwater at or below the groundwater interface at this AOC until cleanup goals are achieved and have been confirmed through sample results.

The above restrictions will be maintained until the concentration of hazardous substances in the groundwater are at such levels to allow for unrestricted use and exposure. Prior approval by EPA and NYSDEC (and from the Air Force if the property has transferred) is required for any anticipated action that may disrupt the effectiveness of or alter or negate the need for institutional controls or for any modification or termination of institutional controls or use restrictions.

The parcels of property encompassing the Nosedocks/Apron 2 OBGW site are either owned by the Air Force, have been transferred by deed to Oneida County and GLDC, or leased to the GLDC. If the property that has not yet been transferred is transferred to another federal entity (federal-to-federal transfer) or a non-federal entity in the future, the EPA and NYSDEC will be notified at least six months prior to such transfer. If the six-month notification is not possible, the EPA and NYSDEC will be notified no later than 60 days prior to such transfer. The Air Force shall provide a copy of the executed deed to EPA and NYSDEC.

The Air Force will take the following actions to ensure that the aforementioned use restrictions and the controls are effective in eliminating the exposure scenario and protecting human health and the environment:

Deed Restrictions: The transfer of fee title from the United States for the portions of the property already transferred to the GLDC do not include the information required by CERCLA 120(h)(3)(A) for the property encompassing the Nosedocks/Apron 2 OBGW site, since at the time of transfer no hazardous substances were known to have been released or disposed of on the property. The Air Force will include the information required by CERCLA 120(h)(3)(A) in the deed for the portion of property already transferred to the GLDC once the remedial action is operating properly and successfully. The transfer of fee title from the United States for the portion of the property already transferred to Oneida County includes the information required by CERCLA 120(h)(3)(A) for the property

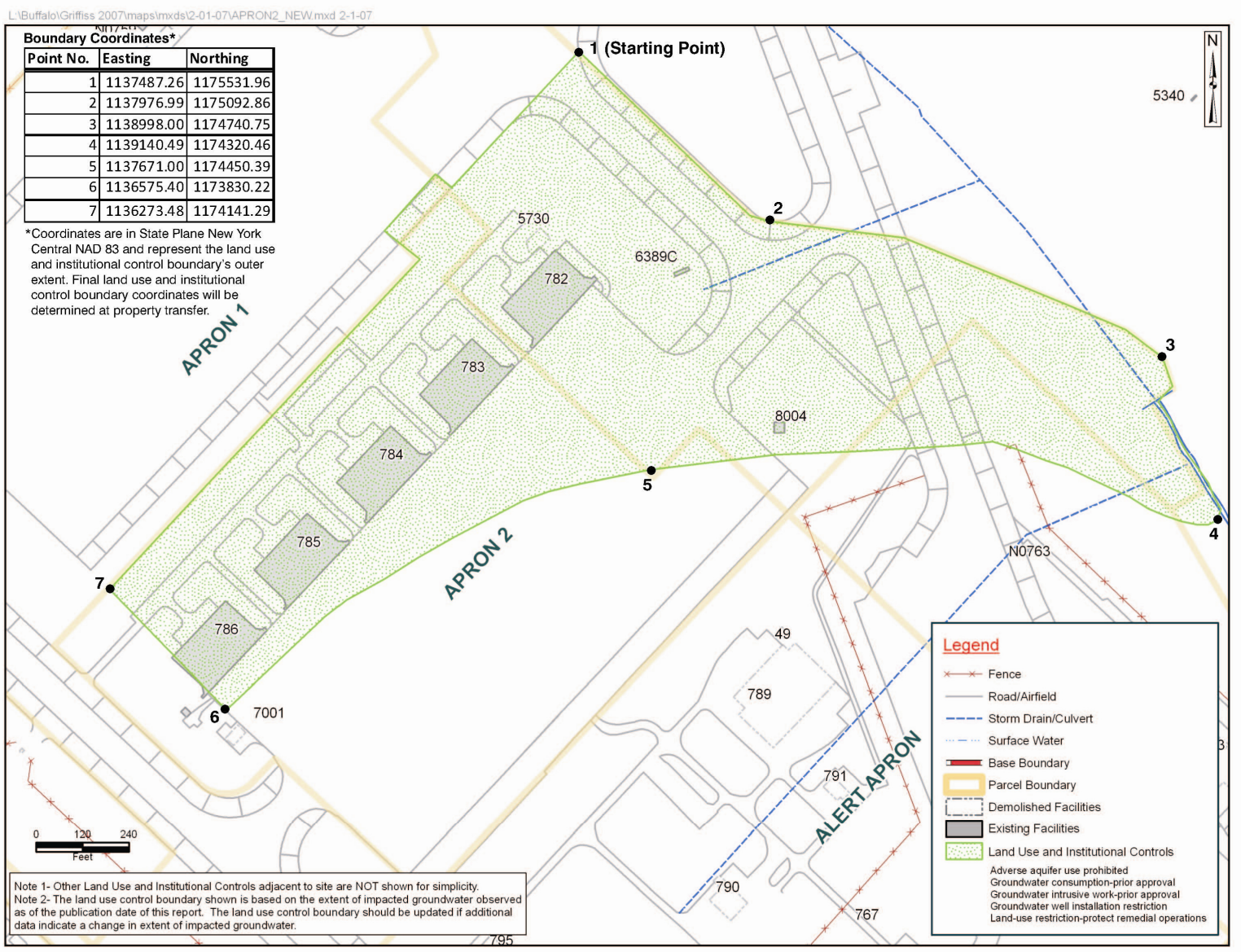

Figure 3-12 Nosedocks/Apron 2 Land Use and Institutional Controls Boundary

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encompassing the Nosedocks/Apron 2 OBGW site. The deed contains a description of the residual contamination on the property and the environmental use restrictions, described above, expressly prohibiting activities inconsistent with the performance measure goals and objectives. For the remainder of the property yet to be transferred, each transfer of fee title from the United States will include the information required by CERCLA 120(h)(3)(A)," with the required reservation of access extending to the Air Force, USEPA, and NYSDEC, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Air Force obligations under CERCLA or similar authorities for taking remedial or corrective action on the property. Deeds will also include a description of any residual contamination on the property above unlimited use and unrestricted exposure levels and any related environmental restrictions, and will expressly prohibit activities inconsistent with remedial action objectives. Deeds will contain appropriate provisions designed to ensure that restrictions run with the land and are enforceable by the Air Force.

Lease Restrictions: During the time between the adoption of this ROD and deeding of the property, equivalent restrictions will be implemented by lease terms, which are no less restrictive than the use restrictions and controls described above, in this ROD. These lease terms shall remain in place until the property is transferred by deed, at which time they will be superceded by the institutional controls described in this ROD.

Environmental Easement and State Land Use Notification: The Air Force will condition transfer of the property upon the transferee granting an environmental easement, containing a complete description of the restrictions described in this ROD, for the land use and institutional controls boundary shown on Figure 3-12 in accordance with Article 71, Title 36 of the New York State Environmental Conservation Law. The Air Force will ensure that the transferee will grant the environmental easement to NYSDEC, on behalf of the State of New York, at the time of transfer of title for the property from the United States. The content of the document creating the environmental easement must be pre-approved by NYSDEC.

Notice: Prior to property transfer, the transferee will be notified of any environmental use restrictions and institutional controls or reporting requirements. Concurrent with the transfer of fee title, information regarding the environmental use restrictions and controls will be communicated in writing to appropriate state agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the land use and institutional controls boundary. The Air Force will also provide a copy of the deeds to the regulatory agencies as soon as practicable after the transfer of fee title.

Monitoring and Enforcement:

Monitoring: Monitoring of the environmental use restrictions and controls will be conducted annually by the Air Force until the property encompassing the land

use and institutional controls boundary is transferred and a report will be provided. Any such annual monitoring reports will be included in a separate report or as a section of another environmental report, if appropriate, and be provided to the EPA and NYSDEC. Upon the effective date of the property conveyance, the Air Force will place a requirement in the deed that the transferee or subsequent property owner(s) will conduct annual physical inspections of the Nosedocks/Apron 2 OBGW site to confirm continued compliance with all institutional controls objectives unless and until all institutional controls at the site are terminated and will provide to the Air Force, EPA, and NYSDEC an annual monitoring report. All annual monitoring reports will report on the status of institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed, whether use restrictions and controls were communicated in the deed(s) for any property transferred in the reporting period, and whether use of the property encompassing the land use and institutional controls boundary has conformed to such restrictions and controls.

If a transferee fails to provide an annual monitoring report as described above to the Air Force, the Air Force will notify EPA and NYSDEC as soon as practicable. If EPA does not receive the annual monitoring report from the transferee (either itself or from NYSDEC), it will notify the Air Force as soon as practicable. Within 30 days of the report's due date, the Air Force will take steps to determine whether institutional controls are effective and remain in place and advise the regulators of its efforts. In any event, within 90 days of the report's due date, the Air Force shall determine the status of institutional controls and provide its written findings, with supporting evidence sufficient to confirm the reported status, based on the use restrictions/institutional controls and site conditions, to EPA and NYSDEC unless either EPA or NYSDEC, in its sole discretion, acts to confirm the status of the institutional controls independently.

The institutional controls monitoring reports will be used in the preparation of the 5-Year Reviews to evaluate the effectiveness of the remedy. The continuation, modification, or elimination of the monitoring reports, and any changes to institutional controls monitoring frequencies, will be subject to EPA and NYSDEC approval. The 5-Year Review reports will be submitted to the regulatory agencies for review and comment.

Response to Violations: The Air Force will notify EPA and NYSDEC via e-mail or telephone as soon as practicable, but no later than 10 days after discovery of any activity that is inconsistent with the institutional control objectives or use restrictions, exposure assumptions, or any action that may interfere with the effectiveness of the institutional controls. Any violations that breach federal, state or local criminal or civil law will be reported to the appropriate civilian authorities, as required by law.

Enforcement: Any activity that is inconsistent with the institutional control objectives or use restriction or any action that may interfere with the effectiveness of the institutional controls will be addressed by the Air Force as soon as practicable (but in no case more than 10 days) after the Air Force becomes aware of the violation. The Air Force will notify EPA and NYSDEC regarding how the breach has been addressed within 10 days of sending EPA and NYSDEC notification of the breach. The Air Force will exercise such rights as it retained under the transfer documents to direct that activities in violation of the controls be immediately halted. To the extent necessary, the Air Force will engage the services of the Department of Justice to enforce such rights.

Notification of Land Use Modification: The recipient of the property will obtain approval from the Air Force, EPA, and NYSDEC for any proposals for a land use change at a site inconsistent with the use restrictions described in this ROD.

The Air Force is responsible for implementing, maintaining, monitoring, and enforcing the selected remedy (including the institutional controls). Although the Air Force may later transfer [has transferred] these responsibilities to another party, the Air Force, both pre-transfer and post-transfer, shall retain ultimate responsibility for implementing, maintaining, monitoring, and enforcing the selected remedy.

3.4.13 Statutory Determinations

The AFRPA and EPA, with concurrence from NYSDEC, have determined that remedial action (monitored natural attenuation) is warranted for the Nosedocks/Apron 2 OBGW site. The selected remedy is protective of human health and the environment, complies with federal and NYS ARARs, is cost effective, and utilizes permanent solutions to the extent possible. Although this remedy does not use treatment as a principal element of the remedy it accomplishes the required end result of protection of human health and the environment.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that the selected remedy is still performing as planned and is protective of public health and the environment.

3.4.14 Documentation of Significant Changes

No significant changes have been made to the selected remedy from the time the proposed plan was released for public comment.

4 Responsiveness Summary

On Tuesday, September 25, 2007, AFRPA, following consultation with and concurrence of the EPA and NYSDEC, released for public comment the proposed plan for remedial actions at the OBGW AOC located at the former Griffiss AFB. The release of the proposed plan initiated the public comment period, which concluded on October 25, 2007.

During the public comment period, a public meeting was held on Wednesday, October 3, 2007, at 5:00 p.m. at the Mohawk Valley EDGE (MVE) Conference Room, Air Force Real Property Agency, 153 Brooks Road, Griffiss Business and Technology Park, Rome, New York. The selected remedies for the OBGW AOC sites were presented at the public meeting and a court reporter recorded the proceedings of the meeting. Copies of the transcript and attendance list are included in the Administrative Record. The public comment period and the public meeting were intended to elicit public comment on the proposed plan for the OBGW AOC.

This document summarizes and provides responses to the verbal and written comments received at the public meeting. No additional written comments were received during the public comment period.

ORAL COMMENTS

Comment no. 1 (Unidentified Speaker).

The commenter asked whether it would cost more money to install additional pumping wells at the Building 775 OBGW site as part of the contingency. He fur-

ther asked whether the current contract authorizing the remedial actions at the site would need to be renegotiated if these additional pumping wells were installed.

Response no. 1.

Although the installation of additional pumping wells at the Building 775 OBGW site would cost more money, the contractor implementing the design is responsible for developing a remedy that is effective at the site under a fixed price contract. Therefore, there would be no renegotiation of the contract.

Comment no. 2 (Mr. Malcolm Didio).

On behalf of the Technical Assistance for Public Participation (TAPP) subcommittee of the RAB, the commenter agreed with the alternatives selected in the proposed plan for Building 775 OBGW, Building 817/WSA OBGW, and Nosedocks/Apron 2 sites. However, he disagreed with the preferred alternative selected for the Landfill 6 OBGW site, Alternative 6 (In Situ Bioremediation). He recommended that Alternative 4 (In Situ Chemical Oxidation) be the preferred alternative for the following reasons:

1. Although the cost for Alternative 4 is greater than Alternative 6, he believes that in the long run the actual cost for Alternative 6 in today's dollars would be more than Alternative 4.
2. Alternative 4 would remediate the site faster than Alternative 6.
3. Alternative 4 would result in a more certain cleanup at the site and be less subject to contingencies than Alternative 6.

Response no. 2.

Considering the CERCLA remedy evaluation criteria presented in the FS, both Alternatives 4 and 6 are similar with respect to overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and implementability. The alternatives differ when it comes to short-term effectiveness (expected remediation duration) and cost. Because the proposed future land use at this site is open space, the remediation duration is not the deciding factor in the selection of one of these alternatives. Regarding cost, Alternative 4 is estimated at double the present worth cost (defined as the value on a given date of a future payment or series of future payments, discounted to reflect the time value of money) of Alternative 6. In the FS, present worth costs for both Alternatives 4 and 6 were developed considering capital and long-term monitoring costs into the future at a discounted rate (up to 30 years depending on the alternative).

Recent groundwater sampling performed at the Landfill 6 OBGW site illustrated a reduction in plume size since the 2004 RI. Because remedial actions have not occurred at this site since the 2004 RI, this reduction is likely due to natural processes. Bioremediation, as proposed, is a remedy that will work with natural proc-

esses to reduce contaminant concentrations whereas chemical oxidation works against natural processes.

The Air Force, USEPA, and NYSDEC have reviewed historical site investigations along with alternatives presented in the FS and have collectively selected the alternative for the Landfill 6 OBGW site presented in this ROD.

Comment no. 3 (Mr. Nelson Robinson; this comment received orally as well as written at the public meeting).

The commenter asked how off-base groundwater cannot be affected by on-base pollution. He stated that landowners near the base should have language added to their deed that they need to monitor their water for contaminants or connect to the City of Rome or other municipal water supply. He also asked whether there is a final report about contaminated soils at the site (as this proposed plan discusses groundwater). Additional concerns were voiced by the commenter regarding the past environmental practices of the military.

Response no. 3.

Several off-base investigations were conducted by the Air Force from 1989 through 1994 (these investigations are described in the proposed plan), and it has been determined that there is no contamination at levels of health concern affecting off-base groundwater wells.

As off-base groundwater was not impacted by on-base groundwater contamination, the addition of monitoring or restriction language to deeds of landowners located near the base as a result of activities at the former Griffiss AFB is not warranted.

Proposed plans and RODs are handled individually depending on site-specific conditions. As described in Section 3.1 of the proposed plan, site investigations performed for the Building 775, Building 817/WSA, and Nosedocks/Apron 2 OGBW sites concluded that no further action for soil was recommended. Institutional controls in the form of deed restrictions were placed on Landfill 6 as described separately in the Landfill 6 ROD (Air Force February 2001).

A summary of the information regarding the remediation of other areas of concern, including both soils and groundwater, is contained in Table 3-2 of the proposed plan.

Comment no. 4 (Mrs. Freda Melkum).

The commenter asked whether tritium is a concern at the WSA (specifically for the Building 817/WSA OBGW site) as she recalls reading a document saying that tritium was present in the WSA around 1980.

Response no. 4.

A radiological decommissioning survey was performed by the Air Force at the WSA in 1995 (letter report from Captain James M. Hicks, USAF, to 416 Medical Group/SGPB, dated September 3, 1995). The sampling for the survey was performed in accordance with standard protocol approved by the United States Nuclear Regulatory Commission (NRC) and included testing for the presence of tritium. The survey concluded that sampling results for radiological contamination were at or below background levels. Therefore, tritium is not a COC at the WSA.

In addition, a copy of the Decommissioning Study for the Weapons Storage Area at Griffiss Air Force Base (Armstrong Laboratories 1995) was transmitted to Mrs. Melkum on September 26, 1995. Responses to Mrs. Melkum's questions on the report were provided during the October 26, 1995, Griffiss Air Force Base Restoration Advisory Board meeting.

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