

**U.S. Army Corps of Engineers
New England Division**

**NO FURTHER ACTION DECISION UNDER
CERCLA**

**STUDY AREA 48
BUILDING 202 LEAKING UNDERGROUND
STORAGE TANK SITE**

FORT DEVENS, MASSACHUSETTS

CONTRACT DACA33-91-D-0006

JANUARY 1995

PRINTED ON RECYCLED PAPER

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FORT DEVENS, MASSACHUSETTS**

Prepared for:

**U.S. Army Corps of Engineers .
New England Division
Waltham, Massachusetts**

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Project No. 7143.00**

**Contract No. DACA33-91-D-0006
Delivery Order 19**

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EXECUTIVE SUMMARY

Completion of a soil removal action at Study Area 48 at Fort Devens, Massachusetts has resulted in the decision that no further studies or remediation are required at this site. Study Area 48, the Building 202 Leaking Underground Storage Tank Site, was identified in the Federal Facilities Agreement between the U.S. Environmental Protection Agency and the U.S. Department of Defense as a potential site of contamination.

Fort Devens was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act as amended by the Superfund Amendments and Reauthorization Act on December 21, 1989. In addition, under Public Law 101-510, the Defense Base Realignment and Closure Act of 1990, Fort Devens was selected for cessation of operations and closure. In accordance with these acts, numerous studies, including a Master Environmental Plan, and Enhanced Preliminary Assessment, a Site Investigation, and a Supplemental Site Investigation, have been conducted which address Study Area 48.

Study Area 48 is situated in the southwest corner of Carey and St. Mihiel streets in the northeast portion of the Main Post. The Study Area comprises both a portion of Building 202 and the former underground storage tank location immediately adjacent to and southeast of Building 202. Study Area 48 is bordered on the southeast and southwest sides by a flat gravel-surfaced yard and Carey Street and St. Mihiel Street to the northwest and northeast, respectively.

Historically, Building 202 and an adjacent yard have been used principally for military vehicle maintenance and storage. Vehicle servicing no longer takes place inside the building, but vehicles are currently stored in the southwestern portion of the fenced-in yard. In 1989, a 1,000-gallon underground storage tank, located adjacent to Building 202, was removed along with approximately 100 cubic yards of petroleum-contaminated soil. This removal was supervised by Environmental Engineering and Geotechnics, Inc., as authorized by Alan Mechanical Services Corporation. The tank had reportedly been used for the storage of waste oil. Soil removed during the tank excavation was disposed of at the Consolidated Landfill in Norridgewock, Maine. The excavation was lined with polyethylene and backfilled with clean soil. Confirmatory investigations and sampling indicated the presence of residual total petroleum hydrocarbons (916 parts per million and 3,213 parts per

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million) in the excavation, and total volatile organic compounds (headspace screening) in soil downgradient of the former tank.

In 1991, Ecology and Environment, Inc. performed investigation activities at Study Area 48 as part of the Group 1B Site Investigation. The investigation focused on characterization of the nature and extent of residual contamination in the vicinity of the former underground storage tank. Analytical results indicated the presence of total petroleum hydrocarbons (1,350 milligrams/kilogram) in one surface soil sample. In addition, certain metals were detected in groundwater samples at concentrations exceeding applicable standards. Ecology and Environment, Inc. attributed these elevated concentrations to the presence of particulate matter in the groundwater samples. The Site Investigation Report recommended that the residual petroleum-contaminated soil be removed from the site.

In October 1992, the U.S. Army Toxic and Hazardous Materials Agency prepared an Action Memorandum to document the decision to perform a soil removal action in the immediate vicinity of the former tank location at Study Area 48. In April and May 1993, Site Remediation Services, Inc., under contract to the U.S. Army Corps of Engineers, removed approximately 150 tons of waste oil contaminated soil for subsequent disposal at Waste Management, Inc.'s, Rochester, New Hampshire facility. Excavation and soil removal was limited by the presence of Building 202 and concerns for the building's foundation's integrity, and by the reach of the excavator. Results of confirmatory screening, analytical results, and observations made during excavation indicated that waste oil contamination at low levels remained in subsurface soils adjacent to and possibly beneath Building 202, and in soil below a depth of 20 feet in the immediate vicinity of the former tank. The excavation was backfilled with clean soil.

In 1993, ABB Environmental Services, Inc. was contracted by the U.S. Army Corps of Engineers to perform a supplemental site investigation and preliminary risk evaluation in order to quantify soil contamination remaining in the vicinity of the former tank and to determine if and what further actions were warranted. Results of screening and laboratory analyses performed during this investigation confirmed the presence of total petroleum hydrocarbons at levels below the lowest Massachusetts criterion in soil from within and immediately adjacent to the former tank excavation. Total petroleum hydrocarbon contamination was not detected in any other soil samples, including those from beneath Building 202 and those downgradient of the former excavation. Low concentrations of volatile organic

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compounds and semivolatile organic compounds detected in on-site soil samples either were attributable to laboratory-introduced contamination, or were present at concentrations well below their respective state and federal regulatory criteria.

Further, total petroleum hydrocarbons were not detected in any of the four groundwater samples. Low concentrations of volatile and semivolatile organic compounds detected in these samples are not considered attributable to leakage of the former underground storage tank.

Risk evaluations conducted using the supplemental site investigation field screening and confirmatory laboratory results qualitatively determined that the residual concentrations of underground storage tank-derived petroleum hydrocarbons and other detected contaminants at Study Area 48 pose no significant threat to human health or the environment. With the contamination related to the former leaking underground storage tank adequately characterized and removed, and in the absence of significant residual risk, the Army has recommended no further action for the former underground storage tank location at Study Area 48.

1.0 INTRODUCTION

This document has been prepared as part of the U.S. Department of Defense (DOD) Base Realignment and Closure (BRAC) program to assess the nature and extent of contamination associated with site operations at Fort Devens. Under Public Law 101-510, the Defense Base Realignment and Closure Act of 1990, Fort Devens has been selected for cessation of operations and closure. An important aspect of BRAC actions is to determine environmental restoration requirements before property transfer can be considered. Contained within the report is a summary of activities conducted at Study Area (SA) 48, the Building 202 Leaking Underground Storage Tank Site, in support of this mission.

In conjunction with the Army's Installation Restoration Program (IRP), Fort Devens and the U.S. Army Environmental Center (USAEC; formerly the U.S. Army Toxic and Hazardous Materials Agency [USATHAMA]) initiated a Master Environmental Plan (MEP) in 1988. The MEP, which has undergone several revisions and was finalized in 1992, consists of assessments of the environmental status of SAs, specifies necessary investigations, and provides recommendations for response actions with the objective of identifying priorities for environmental restoration at Fort Devens. SA 48 was identified as a potential source of contamination in the MEP due to residual petroleum in soils from the former waste oil underground storage tank (UST).

An Enhanced Preliminary Assessment (PA) was also performed at Fort Devens to address areas not normally included in the CERCLA process, but requiring review prior to closure. A final version of the PA report was completed in April 1992. In 1991, DOD, through USAEC, also initiated a Site Investigation (SI) for SA 48 along with five other SAs in Group 1B at Fort Devens. The SI was conducted by Ecology and Environment, Inc. (E&E). The SI Report recommended that the residual petroleum contaminated soil be removed from the site.

The New England Division (NED) of the U.S. Army Corps of Engineers was tasked with the removal effort. The removal action was begun in April 1993 and was completed in December 1993. This No Further Action Decision Document focuses on the removal action and the results of the subsequent supplemental site investigation (SSI) activities as the basis for the no further action decision.

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2.0 BACKGROUND AND PHYSICAL SETTING

2.1 DESCRIPTION AND LAND USE

Fort Devens is located approximately 35 miles northwest of Boston, Massachusetts, adjacent to the town of Ayer and within Middlesex and Worcester counties. The installation consists of approximately 9,280 acres and includes portions of the towns of Ayer, Harvard, Lancaster, and Shirley. Cities in the vicinity include Fitchburg, Leominster, and Lowell. Land surfaces range from about 200 feet above mean sea level (MSL) along the Nashua River in the northern portion of the installation to 450 feet above MSL in the southern portion of the installation.

Fort Devens was established in 1917 as Camp Devens, a temporary training camp for soldiers from the New England area. In 1931, the camp became a permanent installation and was redesignated as Fort Devens. Throughout its history, Fort Devens has served as a training and induction center for military personnel and a unit mobilization and demobilization site. All or portions of this function occurred during World Wars I and II, the Korean and Vietnam conflicts, and operations Desert Shield and Desert Storm. The primary mission of Fort Devens is to command, train, and provide logistical support for non-divisional troop units and support various tenant activities. The installation also supports that portion of the U.S. Army Intelligence School located at Fort Devens, for the Army Readiness Region, for Reserve Components, and for Army Reserve and National Guard in the New England area.

Fort Devens currently consists of three major land use areas: Main Post, South Post, and North Post (Figure 2-1).

The majority of the facilities on Fort Devens are located in the Main Post area, north of Massachusetts Highway 2. The Nashua River intersects the Main Post along its western edge. The Main Post provides all of the on-post housing, including over 1,700 family units and 9,800 bachelor units (barracks and unaccompanied officer's quarters). Other facilities on the Main Post include community support activities (such as a cafeteria, post exchange, commissary, bowling alley, and golf course), administrative buildings, classrooms and training facilities, maintenance facilities, and ammunition storage facilities. SA 48 is located on the Main Post.

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The South Post is located south of Massachusetts Highway 2 and contains individual training areas designated for troop training, range activities, and a drop zone where air training exercises are performed. The Nashua River bounds the South Post on the northeast side.

The North Post is directly north of the Main Post. The principal activities on the North Post are the Douglas E. Moore Army Airfield and the installation Waste Water Treatment Plant.

2.2 REGIONAL GEOLOGY

Fort Devens is near the western boundary of the Seaboard Lowland Section of the New England-Maritime Physiographic province (Jahns, 1953). It is adjacent to the Worcester County Plateau of the Central Uplands province and part of the installation lies within the province (Koteff, 1966). The land surface is almost completely covered with unconsolidated glacial outwash deposits, resulting in few bedrock outcrops. The surficial deposits are underlain by a highly complex assemblage of intensely folded and faulted metasedimentary rocks with occasional igneous intrusions. The geomorphology of the region is dominated by glacial features such as outwash plains, kames, kame terraces, drumlins, and eskers.

2.3 REGIONAL HYDROGEOLOGY

Groundwater at Fort Devens occurs largely in the permeable glacial-deltaic outwash deposits of sand, gravel, and boulders. Well yields within these sediments are dependent upon the hydraulic characteristics of the aquifer and can range from 2 to over 300 gallons per minute (gpm). Small amounts of groundwater can be obtained from fractured bedrock with yields ranging from 2 to 10 gpm. Minor amounts of groundwater may be found in thin, permeable glacial lenses elsewhere on the installation. The primary hydrogeologic feature at Fort Devens is the Nashua River, which flows through the installation in a south to north direction, with an average discharge rate of 55 cubic feet per second. In addition to the Nashua River, the terrain is dissected by numerous brooks that are associated with attendant wetlands. There are also several kettle ponds and one kettle lake located within the installation.

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2.4 STUDY AREA DESCRIPTION AND HISTORY

SA 48 is situated in the southwest corner of Carey and St. Mihiel streets in the northeast portion of the Main Post adjacent to Building 202 (Figures 2-1 and 2-2). The SA comprises both a portion of Building 202 and the former UST location immediately adjacent to and southeast of Building 202. Building 202 is bordered on the southeast and southwest sides by a flat gravel-surfaced yard and Carey Street and St. Mihiel Street to the northwest and northeast, respectively.

Building 202 and the associated yard were historically used principally for military vehicle maintenance, but have most recently been used by the 104th Transportation Company for vehicle storage. Vehicle maintenance no longer takes place inside the building, but tractor-trailer trucks are currently stored in the southwestern portion of the fenced-in yard.

As part of the Fort Devens UST Management Program, a 1,000-gallon waste oil UST, in service since 1942, was identified (in 1988) at Building 202 and removed in February 1989. This tank was replaced by above-ground storage tanks.

The UST at Building 202 was used to store waste oil from vehicle servicing historically inside the building. Tank removal observations were documented in a report prepared by Environmental Engineering and Geotechnics, Inc. (EE&G), entitled "Tank Removal Monitoring Report," dated November 15, 1989. The highlights of this removal effort are summarized below.

Three hundred gallons of product and approximately 80 gallons of sediment sludge were removed from the tank prior to excavation. The UST was then removed from the excavation. Contaminated soil, possibly resulting from a seam separation in the UST, was discovered on the excavation walls. Screening of the contaminated soil with a photoionization detector (PID) yielded total organic vapor (TOV) concentrations between 8.8 and 45.3 parts per million (ppm). Approximately 100 cubic yards of waste oil contaminated soil (TOV > 10 ppm) was removed from the tank excavation. Stockpiled soil was removed by Enpro Services, Inc., of Newburyport, Massachusetts, and disposed of at the Consolidated Waste Services Facility (landfill) in Norridgewock, Maine under a hazardous waste manifest.

Nineteen samples of residual soil collected from the bottom and sides of the excavation were field screened for TOVs using a PID. PID readings ranged from

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0.0 ppm to 10 ppm. While the excavation was open, two rounds of confirmatory sampling with laboratory analysis were conducted. During the first round, a composite soil sample was collected from the bottom of the tank excavation and submitted to LCC Institute of Water Research, Lubbock, Texas, for analysis for total petroleum hydrocarbons (TPHC). Results of the first round analysis indicated the presence of TPHC at 916 ppm. This TPHC concentration exceeded the "limiting criteria of 50 ppm" then in place; soils exceeding the limiting criteria would require that corrective measures be taken, as reported in the Tank Removal Monitoring Report. An additional composite sample was collected and submitted for TPHC analysis to confirm the presence of the elevated concentration. TPHC was detected at a concentration of 3,210 ppm in this second sample. The excavation was lined with plastic sheeting and backfilled.

In May 1989, EE&G advanced two soil borings (B-3 and B-4) to 32 feet below ground surface (BGS) near the former tank location. Geologic materials encountered consisted of sand, gravelly sand, and silty sand. The water table was encountered at 29 feet BGS. Soil samples were collected at 5-foot intervals to a depth of 10 feet, and continuously sampled from 10 feet to the bottom of the borings. TOV screening concentrations were less than 0.5 ppm for all samples except the sample from the 18- to 20-foot interval in B-3, which yielded a reading of 150 ppm.

3.0 RELATED INVESTIGATIONS

3.1 MASTER ENVIRONMENTAL PLAN

Based on results of the tank removal and investigation conducted by EE&G, the former UST location at Building 202 was subsequently listed in the MEP as SA 48 - Building 202 Leaking Underground Storage Tank Site. The MEP recommended that the extent of contamination be delineated through the installation of soil borings to characterize soil contamination and monitoring wells to characterize groundwater contamination if warranted (Biang, et al., 1992).

3.2 ENHANCED PRELIMINARY ASSESSMENT

The PA included a review of the study and recommendations presented in the MEP and considered other areas that might require evaluation due to the closure of Fort Devens (Roy F. Weston, 1992). No additional findings or recommendations for SA 48 were provided in the PA.

3.3 SITE INVESTIGATION REPORT

The SI was initiated in June 1991 and included the six Group 1B SAs listed in the MEP.

- SA 15 Landfill No. 11
- SA 24 Waste Explosives Storage Bunker 187
- SA 25 Waste Explosives Detonation/Explosive Ordnance Demolition Range
- SA 26 Waste Explosives Training and Detonation Areas - Zulu I and II
- SA 32 Defense Reutilization and Marketing Office Storage Yard
- SA 48 Building 202 Leaking Underground Storage Tank Site

The SI was conducted by E&E under contract with USAEC. The Final SI Report was issued in December 1992. The purpose of the SI was to verify the presence or absence of environmental contamination and to determine whether further

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investigation or remediation was warranted. As recommended in the MEP, the investigation was designed to further characterize soil contamination associated with the former UST and to assess the effects of residual soil contamination on groundwater conditions in the vicinity of the study area. A single borehole (B202-BH1) was advanced close to the former tank location for the purpose of characterizing residual contamination there. The seven soil samples collected from various depths within the boring were analyzed for TPHC. Analytical results indicated the presence of TPHC at 1,350 milligrams per kilogram (mg/kg) in only the surface soil sample (E&E, 1992).

Three additional soil borings were advanced for the purpose of installing groundwater monitoring wells. The three water table monitoring wells were installed cross-gradient (B202-1), downgradient (B202-2), and upgradient (B202-3) from the former tank location (see Figure 2-2). Two rounds of groundwater samples were collected for laboratory analysis. The first round of samples (unfiltered) were analyzed for TPHC, target compound list (TCL) organics, target analyte list (TAL) inorganics, and cations/anions. No detectable TPHC was found in any Round 1 sample. Elevated inorganic analyte concentrations were observed, but were likely attributable to high turbidity. Elevated chloride and sodium were attributed to road deicing. The one organic compound detected (methylene chloride) was determined to be the result of laboratory contamination (E&E, 1992).

In the second round of groundwater sampling, explosive compounds were added to the list of analytes. TPHC was not detected in any of the Round 2 samples. Except for general decreases, no significant changes in inorganic analyte concentrations were noted in the unfiltered samples. An explosive compound, cyclonite, and a pesticide, aldrin, were both detected at low concentrations in the upgradient well (B202-3). Because of the location relative to the former tank location (i.e., upgradient), these compounds were determined not to be associated with the petroleum release. The low concentrations of methylene chloride and chloroform detected in wells were again attributed to laboratory contamination. The trace concentration of trichloroethylene (TCE) detected in the crossgradient well was also not determined to be related to a release from the former UST (E&E, 1992).

The SI concluded that no evidence of significant release of waste oil to groundwater or soil was observed. Downgradient groundwater quality indicated no effects from residual petroleum contamination observed in the soil around the former UST. However, because of the presence of TPHC in certain soil samples, E&E

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recommended that a removal action be performed at SA 48 on soil contaminated with residual TPHC (E&E, 1992).

4.0 SOIL REMOVAL ACTION

In October 1992, USATHAMA prepared an Action Memorandum to document the decision to perform soil removal actions at SA 48. The Action Memorandum indicated that soil would be removed from two areas. The first area was in the immediate vicinity of B202-BH1, and the second was in the immediate vicinity of the former tank. According to a memorandum entitled "Report of Field Activities", prepared for the NED Geotechnical Engineering Division (Schmidt, 1993), an excavation service contract was awarded to Site Remediation Services, Inc., by NED in November 1992. In April and May 1993, approximately 335 cubic yards of soil were excavated from the two areas identified in the Action Memorandum. Of that volume, an estimated 150 tons (later determined to be 132 tons) was segregated as contaminated with waste oil. The remaining material was determined by field screening to be uncontaminated and was returned to the polyethylene-lined excavation with approximately 95 cubic yards of clean backfill.

Contaminated soil observed on the northwestern wall of the excavation (nearest Building 202) during the removal suggested possible contaminant migration beneath the Building 202 foundation. Excavation and soil removal was limited laterally by the presence of Building 202 (concerns for the integrity of the building's foundation), and vertically by the reach limitation of the excavator. Results of confirmatory screening, analytical results, and observations made during excavation suggested that waste oil contamination remained in subsurface soils adjacent to and possibly beneath Building 202, and in soil beneath a depth of 20 feet in the immediate vicinity of the former tank. Figure 4-1 presents a summary of confirmatory TPHC screening results. Confirmatory samples collected from the excavation at 4-foot, 15-foot, and 20-foot depths contained TPHC at 118 ppm, 4,322 ppm, and 2,127 ppm, respectively (Schmidt, 1993). Other confirmatory samples generally contained TPHC at less than the 50 ppm detection limit.

Excavation activities were suspended, the excavation was lined with polyethylene, and clean fill was added to bring the excavation up to grade. Two samples of the stockpiled contaminated soil were collected and submitted for laboratory analysis for the full suite of Toxicity Characteristic Leaching Procedure analytes, corrosivity, reactivity, and ignitability. On November 16, 1993, Webster Engineering Co., Inc. of Dorchester, Massachusetts collected an additional seven soil samples from the stockpiled soil for further characterization for disposal. One or more of the samples

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were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls, and TPHC. Results of waste characterization sampling are provided in the Final Closure Report (ABB-ES, 1994). On December 21, 1993, 132 tons of stockpiled waste oil contaminated soil from the April and May 1993 removal were transported by Merrimac Cartage, Inc. of North Andover, Massachusetts from the site under Bill of Lading Number BWSC-012A/B/C for disposal at Waste Management's Rochester, New Hampshire landfill. This removal was performed under Corps of Engineers Contract No. DACA-33-C-0061 by Webster Engineering Co., Inc. of Dorchester, Massachusetts.

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5.0 SUPPLEMENTAL SITE INVESTIGATION

An SSI was recommended to characterize the extent of residual contamination associated with migration beneath the foundation and to provide confirmatory sampling results for the soil removal effort.

NED was tasked with implementing the SSI and confirmatory sampling effort. In accordance with NED Contract No. DACA33-91-D-0006, Delivery Order 19, ABB Environmental Services, Inc. (ABB-ES) conducted an SSI and Removal Site Evaluation at SA 48. The objective of this SSI effort was to evaluate residual soil and groundwater contamination in the vicinity of the former tank location at SA 48 and determine if and what further action was required. Fieldwork was conducted between December 6, 1993, and January 11, 1994, in accordance with procedures presented in the SA 48 Final Work Plan dated November 1993. The Final Work Plan was revised and republished in January 1994, subsequent to completion of field work (ABB-ES, 1993d). The plan was based on task requirements presented in the NED Scope of Work dated August 6, 1993, and subsequently revised on August 12 and 19, 1993 (U.S. Army Corps of Engineers, New England Division, 1993). The existing Project Operation Plan for Fort Devens (ABB-ES, 1993c) was incorporated by reference into the work plan.

A total of seven borings (48B-93-01X through 48B-93-06X, and 48B-93-09X) were drilled at SA 48 in and around the former tank location (Figures 5-1 and 5-2) to characterize subsurface geologic materials, collect subsurface soil samples for chemical analysis, and in one case, install a monitoring well. An additional two borings, proposed in the Scope of Work, were deemed unnecessary because the first seven borings (and associated soil samples) adequately defined the extent of TPHC contamination. Soil samples were collected at 5-foot intervals down to the water table. The monitoring well boring (48B-93-04X) was advanced to 15 feet BGS in the former tank location. Soil samples were collected at 5-foot intervals thereafter to a depth of 42 feet BGS. Observations made during advancement of borings indicate the presence of sand and gravelly sand from the ground surface to at least 10 feet below the water table. Soil descriptions for each sample were logged in the field by an on-site geologist (ABB-ES, 1994).

One monitoring well (48M-92-04X) was installed as part of the SA 48 investigation to provide a means of sampling groundwater and measuring water-table depth below the former UST location. The well was screened across the water table,

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which was encountered at approximately 30 feet BGS, in unconsolidated glacial sediments. Groundwater samples were collected from the newly installed monitoring well and the three pre-existing nearby wells for analysis.

The SA 48 analytical program was based on both historical operations at Building 202 and on previous contaminant findings. The laboratory analytical program included analysis of soil and groundwater samples for TPHC using U.S. Environmental Protection Agency (USEPA) Method 418.1, TCL VOCs by Method 8240, and TCL SVOCs by Method 8270. Groundwater samples were also analyzed for dissolved and total TAL inorganics using Methods 6000/7000. Laboratory analyses for the TCL organics and TAL inorganics is considered approximately equivalent to USEPA analytical support Level III quality data.

5.1 SUMMARY OF SUBSURFACE SOIL SAMPLING RESULTS

A total of 41 soil samples were collected from the seven borings advanced during the supplemental investigation. Soil samples were screened in the ABB-ES' Fort Devens field laboratory for the presence of VOCs by headspace analysis using a PID and for TPHC by a non-dispersive infrared (NDIR) spectrophotometer. The field NDIR analysis for TPHC is considered approximately equivalent to USEPA analytical support Level II quality data.

Total VOC and TPHC field screening results are presented in Figure 5-2. As illustrated, all PID readings were less than 3.9 ppm in sample headspace. TPHC was detected in two samples at concentrations exceeding the NDIR instrument detection limit of 50 ppm. TPHC was detected at 250 ppm in the sample from the 15- to 17-foot interval in boring 48B-93-01X, and at 160 ppm in the 15- to 17-foot sample from boring 48M-93-04X. Boring 48B-93-01X is located adjacent to Building 202, between the building and the former tank location. Boring 48B-93-04 is located in the center of the former tank location. Visual evidence of contamination (slight oil sheen on split-spoon sample) was encountered only in boring 48B-93-01X, at the 15- to 17-foot interval.

One soil sample from each boring was selected for submittal to the laboratory for confirmatory analysis of TPHC, VOCs, and SVOCs. The soil sample exhibiting the highest TPHC concentration was selected for laboratory analysis. If all samples from a boring contained TPHC less than the NDIR detection limit (50 ppm), a sample was selected for laboratory analysis based on headspace VOC readings,

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visual evidence of contamination, or proximity to the water table. Coast-to-Coast Analytical Services, Inc., of Westbrook, Maine performed the laboratory analyses. Selected samples and depth intervals are presented in Figure 5-2. The analytical results (detected compounds only) for each sample collected during the SSI are summarized in Figure 5-3 and on Table 5-1. Agreement between TPHC screening and laboratory analytical results was generally good.

The confirmatory sample results indicated that TPHC was detected in the two samples from borings 48B-93-01X [100 mg/kg (average of field sample and its duplicate)] and 48M-93-04X (180 mg/kg). TPHC was not detected in any other soil sample at concentrations above the quantitation limit (25 mg/kg).

Three VOCs were detected in five of the seven soil samples. However, one of the compounds, methylene chloride, was also detected in the associated laboratory method blank, and is likely attributable to laboratory contamination. The other two compounds, 1,1,1-trichloroethane and 1,1,2,2-tetrachloroethane, were detected at concentrations less than the laboratory's practical quantitation level, and have been qualified (with a "J") by the laboratory as such. These compounds were present at estimated concentrations equal to or less than 4J micrograms per kilogram ($\mu\text{g/kg}$).

A total of three site-derived SVOCs were detected in samples from the following five borings: 48B-93-01X, -02X, -04X, -05X, and -06X. The compounds, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, and butyl benzylphthalate, were detected at concentrations less than their sample quantitation level, and so the values are considered estimates. Di-n-butylphthalate was detected in five samples at concentrations ranging from 81J $\mu\text{g/kg}$ to 130J $\mu\text{g/kg}$. Bis(2-ethylhexyl)phthalate was detected in three samples at concentrations from 49J to 360J $\mu\text{g/kg}$. Butyl benzylphthalate was detected in one sample at 190J $\mu\text{g/kg}$. A fourth SVOC, diethylphthalate, was detected at 2J $\mu\text{g/kg}$ in the rinsate blank, but was not detected in any of the soil samples.

5.2 SUMMARY OF GROUNDWATER SAMPLING RESULTS

One monitoring well (48M-92-04X) was installed as part of the SA 48 investigation to provide a means of sampling groundwater and measuring water-table depth below the former UST location. The well was screened across the water table, which was encountered at approximately 30 feet BGS, in unconsolidated glacial sediments. Groundwater samples were collected from the newly installed

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monitoring well and the three pre-existing nearby wells for analysis. Groundwater analytical results from the SSI sampling program are presented in summary form (detects only) in Figure 5-4 and Table 5-2, and in their entirety in the Final Closure Report (ABB-ES, 1994).

TPHC was not detected in groundwater samples from the four monitoring wells. One VOC, TCE, was detected in groundwater from one site monitoring well. TCE was detected at 3J micrograms per liter ($\mu\text{g/L}$), below the sample quantitation limit, in the sample from monitoring well B202-1 as it was in the Round 2 SI sampling. Two other compounds (1,1,1-trichloroethane and methylene chloride) detected in groundwater samples were also detected in the laboratory method blank and so are not considered to have originated at the site.

SVOCs were detected in all groundwater samples. Samples from monitoring wells B202-1 and -2 located cross- and downgradient of the former tank location contained only phenol, at 17 $\mu\text{g/L}$ and 11 $\mu\text{g/L}$, respectively. The sample from the upgradient well, B202-3, contained three SVOCs; phenol (12 $\mu\text{g/L}$), bis(2-ethylhexyl)phthalate (2J $\mu\text{g/L}$), and chrysene (8J $\mu\text{g/L}$). The sample from the well located in the former tank location, 48M-93-04X, contained phenol at 5J $\mu\text{g/L}$ and bis(2-ethylhexyl)phthalate at 4J $\mu\text{g/L}$.

Both filtered and unfiltered groundwater samples from each well were analyzed for TAL inorganics. Six metals were detected in both the filtered and unfiltered sample from one or more wells: barium, calcium, magnesium, manganese, potassium, and sodium. Aluminum, iron, and nickel were detected in the unfiltered (total) sample, but, because of their absence in the filtered (dissolved) samples, were determined to be the result of suspended solids in the samples.

6.0 QUALITATIVE EVALUATION OF RESIDUAL RISK

The human health preliminary risk evaluation (PRE) presented in this section is based on the analytical data collected in the SSI and removal site evaluation. The PRE is a screening-level evaluation of actual and potential risks that environmental contaminants may pose to human receptors in the area of SA 48. For this PRE, the future use of the SA 48 area is assumed to remain commercial/industrial.

The PRE Methodology has been described in detail in previous Fort Devens SI Reports for the Groups 3, 5, and 6 Study Areas (ABB-ES, 1993a) and the Groups 2, 7, and Historic Gas Stations Study Areas (ABB-ES, 1993b). A brief summary of the methodology used for the human health PRE is included in the following paragraphs.

For the human health PRE, the analytical data were compared to available public health guidelines, standards, and criteria for soil and groundwater. The most recent updates of standards and guidelines discussed in the Groups 3, 5, and 6 Study Areas (ABB-ES, 1993a) and the Groups 2, 7, and Historic Gas Stations Study Areas (ABB-ES, 1993b) are used in the SA 48 PRE, including:

- USEPA Region III Risk-Based Concentration Table, Second Quarter, 1994 (USEPA, 1994);
- USEPA Office of Water publication entitled "Drinking Water Regulations and Health Advisories" (USEPA, 1993);
- "Drinking Water Standards and Guidelines for Chemicals in Massachusetts Drinking Waters" (MADEP, 1993a)
- Method 1 Soil and Groundwater Standards in the Massachusetts Contingency Plan (MCP) (MADEP, 1993b).

For a Method 1 Risk Characterization under the MCP, compliance with the soil standards constitutes a demonstration of no significant health risk from exposure to oil or hazardous materials in soil. For this PRE, Method 1 S-2/GW-1 soil standards were used as screening guidelines along with the Region III Risk-Based concentrations. SA 48 subsurface soil is presumed to be Category S-2 soil, and SA

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SECTION 6

48 groundwater is assumed to be Category GW-1 groundwater under the MCP (MADEP, 1993b). Soil standards for GW-1 groundwater were selected based on the assumption that groundwater in the area represents a potentially productive aquifer.

6.1 SUBSURFACE SOILS

Table 6-1 presents summary statistics on the subsurface soil sampling locations at SA 48, as well as USEPA commercial/industrial risk-based soil concentrations and MADEP MCP S-2/GW-1 soil guidelines for comparison. With the exception of NDIR field TPHC data, no analytical data were available for the top 15 feet of soil, the interval typically evaluated in the Fort Devens PREs (ABB-ES, 1993b). This PRE includes an evaluation of the NDIR field TPHC data from the top 15 feet of soil at SA 48, as well as an evaluation of analytical data from the 15- to 17-foot interval.

All NDIR field screening TPHC data collected at SA 48 between zero and 15 feet BGS were below detection limits (50 mg/kg) (see Figure 5-2). This detection limit concentration is well below 2,500 mg/kg, the available standard/criteria for TPHC in soils (Table 6-1). It is also well below the S-1/GW-1 soil standard of 500 mg/kg, which is the most conservative MCP standard for TPHC. The maximum TPHC concentration in the 15- to 17-foot interval was 180 mg/kg. This concentration is also below all available standards and guidelines. Therefore, residual TPHC concentrations at SA 48 are not posing unacceptable risks to human receptors.

An assessment of the organic analyte data from the 15- to 17-foot interval shows the presence of three VOCs (1,1,1-trichloroethane, methylene chloride, and 1,1,2,2-tetrachloroethane). As discussed in Section 5.0, methylene chloride was found in the blanks and is not thought to be a site-related contaminant. Three phthalate ester SVOCs were detected in the 15- to 17-foot interval (di-n-butylphthalate, butyl benzylphthalate, and bis(2-ethylhexyl)phthalate). The concentrations of all subsurface soil VOCs and SVOCs evaluated in this PRE are well below the available standard/guideline concentrations (Table 6-1).

6.2 GROUNDWATER

Table 6-2 presents summary statistics on groundwater associated with SA 48 and drinking water standards/guidelines for comparison. All data reported in Table 6-2

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are based on unfiltered samples. Six organic analytes were detected in SA 48 groundwater (methylene chloride, 1,1,1-trichloroethane, TCE, phenol, bis(2-ethylhexyl)phthalate, and chrysene). Two of these organic analytes, methylene chloride and 1,1,1-trichloroethane, were associated with blank contamination and were not evaluated in this PRE. Of the remaining four organic analytes in SA 48 groundwater, only chrysene (detected in one out of five samples at an estimated concentration of $8 \mu\text{g/L}$) exceeded its drinking water standard/guideline ($0.2 \mu\text{g/L}$). Chrysene was detected in the well upgradient of the former tank location, and so is not expected to have originated from the tank.

An assessment of the data for unfiltered groundwater at SA 48 indicates that calcium, nickel, and sodium were present at concentrations above the Fort Devens background levels. Of these three inorganic analytes, only sodium has a drinking water standard or guideline. The maximum concentration of sodium detected in SA 48 unfiltered groundwater ($32,000 \mu\text{g/L}$) is in excess of the sodium groundwater standard/guideline considered in this PRE ($20,000 \mu\text{g/L}$). The sodium guideline considered in this PRE is a notification guideline (rather than a health standard) for water supply users with sodium-restricted diets.

The low concentrations (below applicable standards and guidelines) of residual contaminants in soil and groundwater from and downgradient of the former tank location suggest that no significant residual risks to human health exist as a result of leakage from the former tank.

For ecological risk, residual contamination in the form of low concentrations of TPHC and other organic compounds is located below the depth to which terrestrial receptors are likely to burrow or otherwise be exposed. Based on this lack of exposure pathways, no comparison of soil analyte concentrations to ecological benchmark reference values was conducted. No evidence of significant residual risk to ecological receptors was identified at SA 48.

7.0 CONCLUSIONS

The objective of the SSI was to evaluate residual contamination associated with a former UST. Previous studies and removal efforts had identified residual contamination at the bottom of the UST excavation and adjacent to the Building 202 southeastern wall. Consistent with earlier findings, TPHC was detected in soil samples collected during the SSI from the center of the former tank location, and in the sample collected adjacent to the building. The concentrations were, however, determined to be lower than the lowest applicable state TPHC concentration guidelines and are therefore presumed to pose no significant threat to human health. TPHC was not detected in soil samples collected from underneath Building 202, indicating that UST-derived contaminants have not migrated under the building.

Several organic compounds (both VOCs and SVOCs) were detected at levels below the laboratory's quantitation limit in soil samples collected during the SSI. It is questionable whether these compounds were the result of releases from the UST, but all were at very low concentrations and none exhibited concentrations that pose unacceptable risks to human health or the environment.

The initial SI determined that groundwater flow beneath the site is towards the northeast or north-northeast. SSI data supports this assertion and monitoring well B202-2 was confirmed to be immediately downgradient of SA 48. B202-3 is located most nearly upgradient and B202-1 is located across gradient from SA 48. TPHC was not detected in any site-related groundwater samples. VOCs and SVOCs detected in groundwater samples at, and downgradient of, the former tank location are present at concentrations which do not exceed applicable state and federal guidelines posing unacceptable health risks. Chrysene was detected in groundwater from the background well (B202-3) above the applicable drinking water standard. This compound was not present in on-site soil samples, nor was it detected in the on-site and downgradient wells, and so is not likely to have originated from the former UST.

With the exception of nickel (in one sample) and certain more highly water soluble elements such as calcium and sodium, maximum concentrations of metals detected in filtered and unfiltered samples were typically less than the Fort Devens statistical background concentrations (ABB-ES, 1993a and 1993b) (Table 6-2). The source of the soluble elements is likely road de-icing activities. Both the average and

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SECTION 7

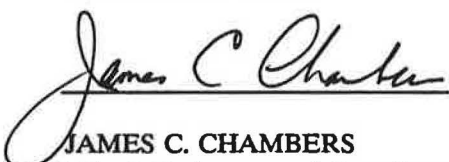
maximum detected concentration of sodium in groundwater exceed the Massachusetts drinking water guideline, which requires notification only. No other metals, including nickel, were detected in groundwater at concentrations that exceeded federal or state primary drinking water standards.

Inorganic contaminants detected in the samples from and downgradient of the former tank location were also commonly detected in both the upgradient and across-gradient samples, at comparable or higher concentrations. This contaminant distribution substantiates the inference that groundwater and soils at the former tank location are not a source for the elevated inorganic concentrations detected.

Confirmatory data collected during the SSI has shown that contaminants associated with past releases from the former UST at SA 48 have been adequately characterized and that previous response actions successfully removed contamination in the immediate vicinity of the former UST. The PRE performed as part of the SSI identified no unacceptable risk to human health and the environment which is attributable to residual contaminants associated with releases from the leaking UST. Based on these findings, no further action is recommended at Building 202 and the former UST area of SA 48.

8.0 DECISION

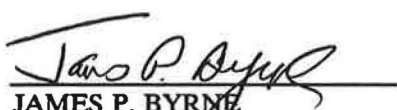
On the basis of findings at SA 48, there is no evidence or reason to conclude that possible residual contamination from the former UST has caused significant environmental contamination or poses a threat to human health or the environment. The decision has been made to remove SA 48 from further consideration in the IRP process. In accordance with CERCLA 120 (h) (3), all remedial actions necessary have taken place, and the USEPA and MADEP signatures constitute concurrence in accordance with the same.


JAMES C. CHAMBERS
BRAC Environmental Coordinator

18 JAN 95

Date

U.S. ENVIRONMENTAL PROTECTION AGENCY



JAMES P. BYRNE
Fort Devens Remedial Project Manager

1/18/95
Date

☒ Concur

☐ Non-concur (Please provide reasons for non-concurrence in writing)

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION


D. LYNNE WELSH
Section Chief, Federal Facilities - CERO

1/18/95
Date

☒ Concur

☐ Non-concur (Please provide reasons for non-concurrence in writing)

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ABB-ES	ABB Environmental Services, Inc.
BGS	below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOD	U.S. Department of Defense
E&E	Ecology & Environment, Inc.
EE&G	Environmental Engineering and Geotechnics, Inc.
gpm	gallons per minute
IRP	Installation Restoration Program
MADEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
MEP	Master Environmental Plan
$\mu\text{g/kg}$	micrograms per kilogram
$\mu\text{g/L}$	micrograms per liter
mg/kg	milligrams per kilogram
MSL	mean sea level
NDIR	non-dispersive infrared
NED	New England Division
PA	Enhanced Preliminary Assessment
PID	photoionization detector
ppm	parts per million
PRE	preliminary risk evaluation
SA	study area
SI	site investigation
SSI	supplemental site investigation
SVOC	semivolatile organic compounds

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

TAL	Target Analyte List
TCE	trichloroethylene
TCL	Target Compound List
TOV	total organic vapor
TPHC	total petroleum hydrocarbon compound
USAEC	U.S. Army Environmental Center
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

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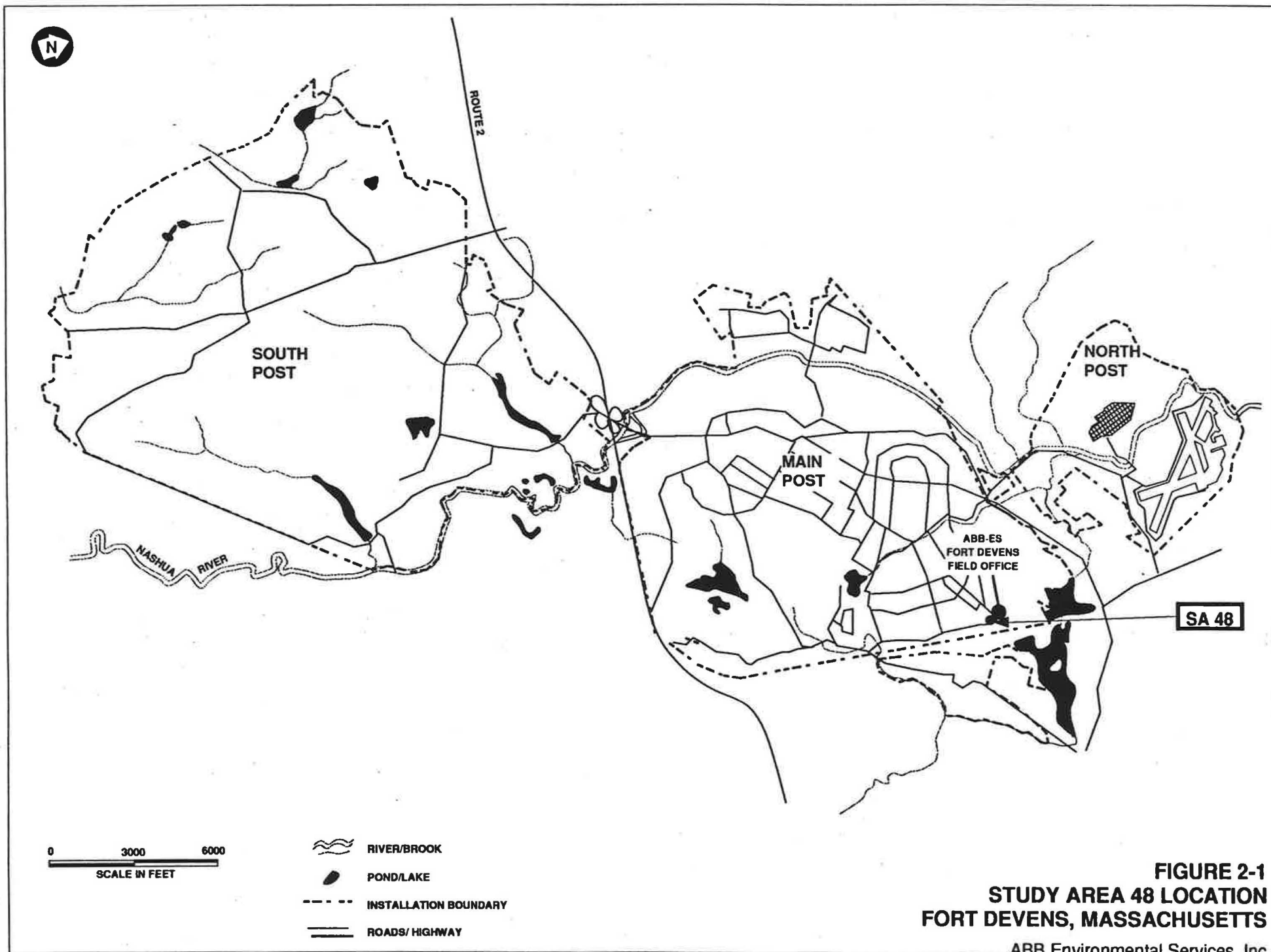


FIGURE 2-1
STUDY AREA 48 LOCATION
FORT DEVENS, MASSACHUSETTS

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• B-202-1

T-201

DECON AREA

FIELD OFFICE

• B-202-2

T-203

APPROXIMATE EXCAVATION AREA

MARKET STREET

CAREY STREET

202

ST MIHIEL STREET

GENERAL WAREHOUSING

SARATOGA STREET

FENCE

FENCE

FENCE

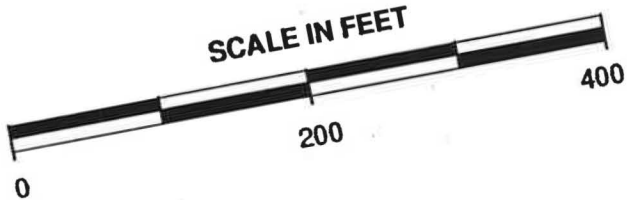
255

• B-202-3

T-1407

T-1406

SCALE IN FEET



• - SOIL BORING

MA (1992). FINAL ACTION MEMORANDUM

**FIGURE 2-2
SITE FEATURES
STUDY AREA 48
FORT DEVENS, MASSACHUSETTS**
ABB Environmental Services, Inc.



BUILDING 202

B-3

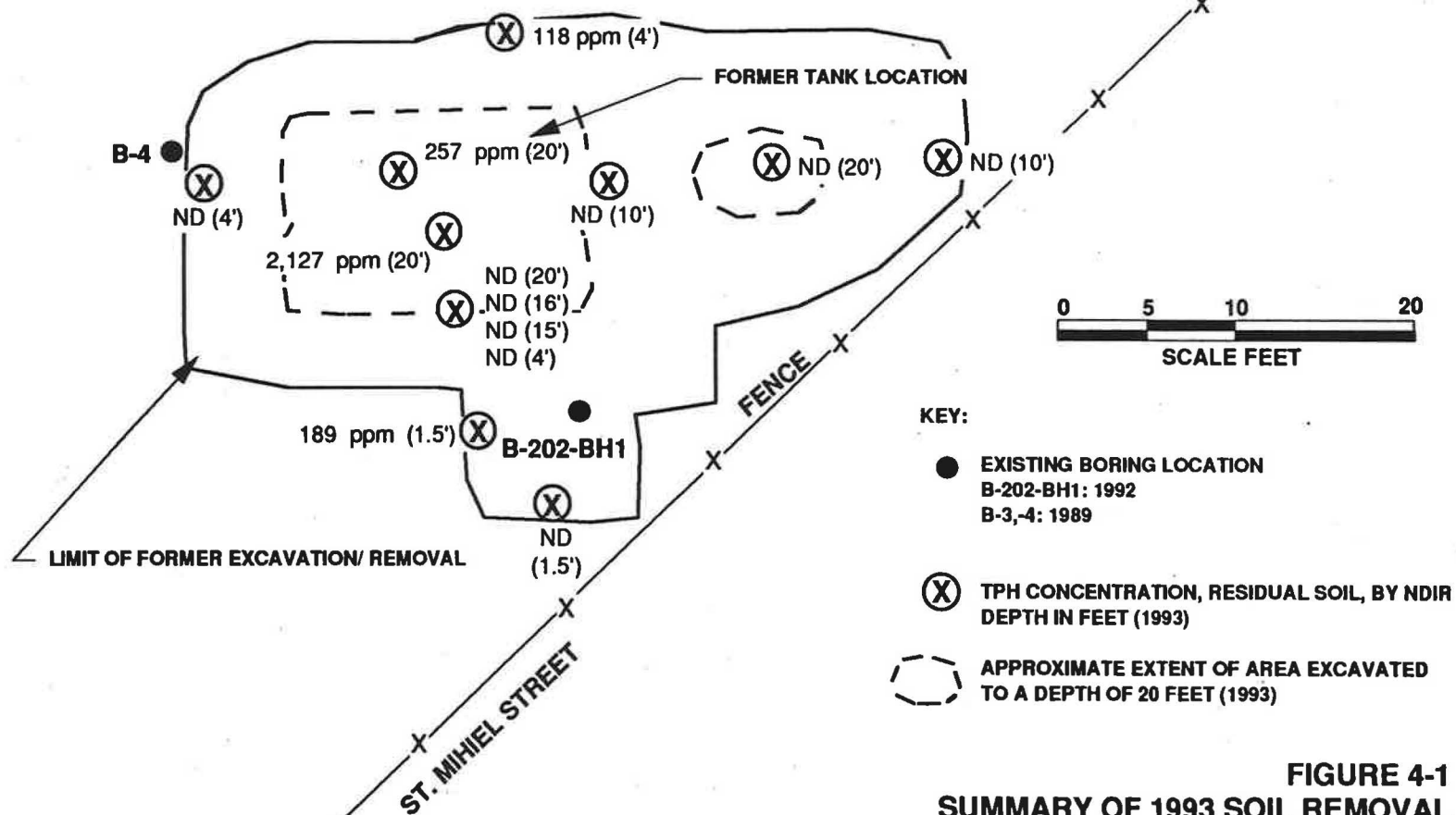


FIGURE 4-1
SUMMARY OF 1993 SOIL REMOVAL
STUDY AREA 48
FORT DEVENS, MASSACHUSETTS

Note: Soil sample and boring locations are approximate.
Source of information: Schmidt, 1993; EE&G, 1989; E&E 1992.

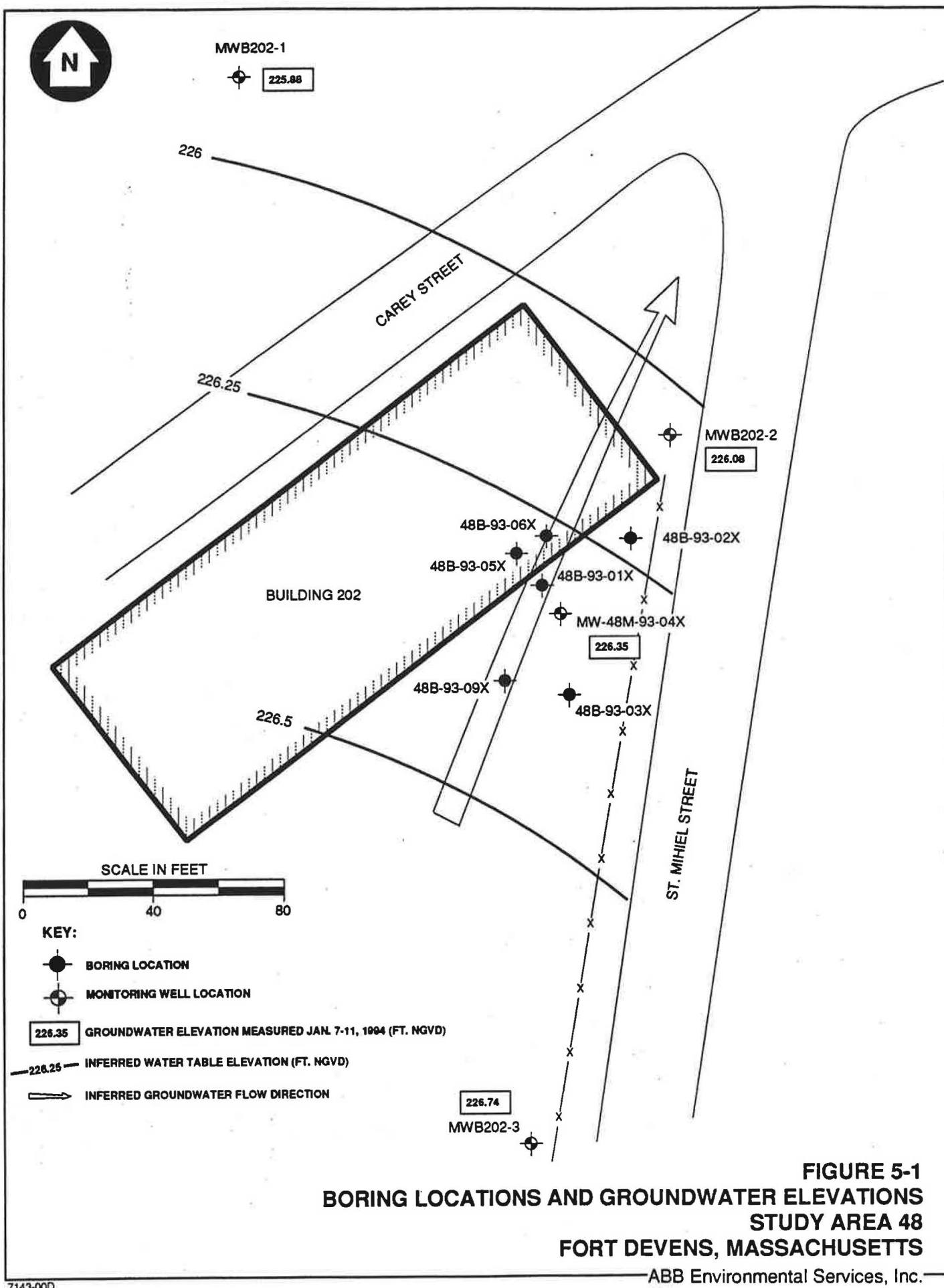


FIGURE 5-1
BORING LOCATIONS AND GROUNDWATER ELEVATIONS
STUDY AREA 48
FORT DEVENS, MASSACHUSETTS

ABB Environmental Services, Inc.

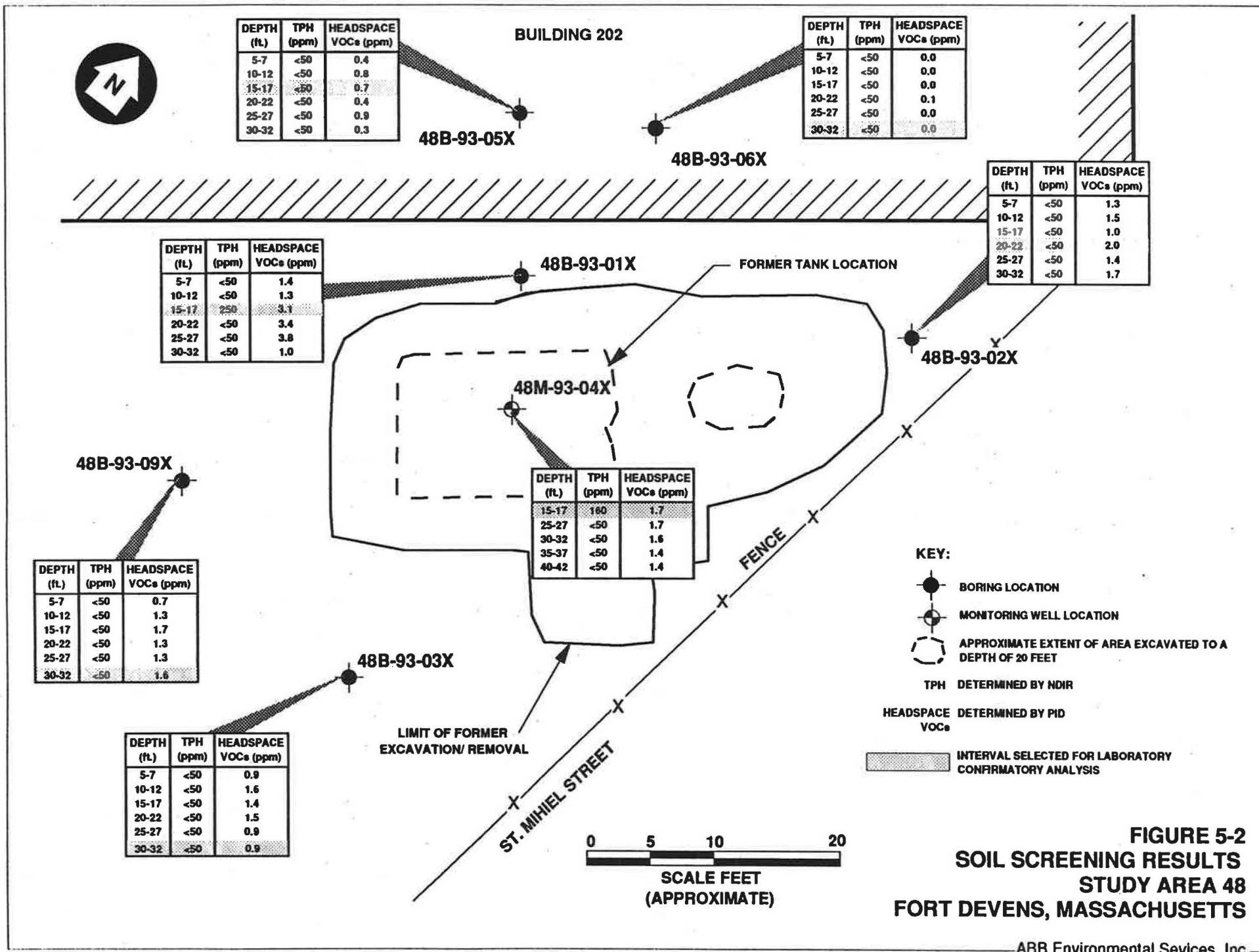


FIGURE 5-2
SOIL SCREENING RESULTS
STUDY AREA 48
FORT DEVENS, MASSACHUSETTS

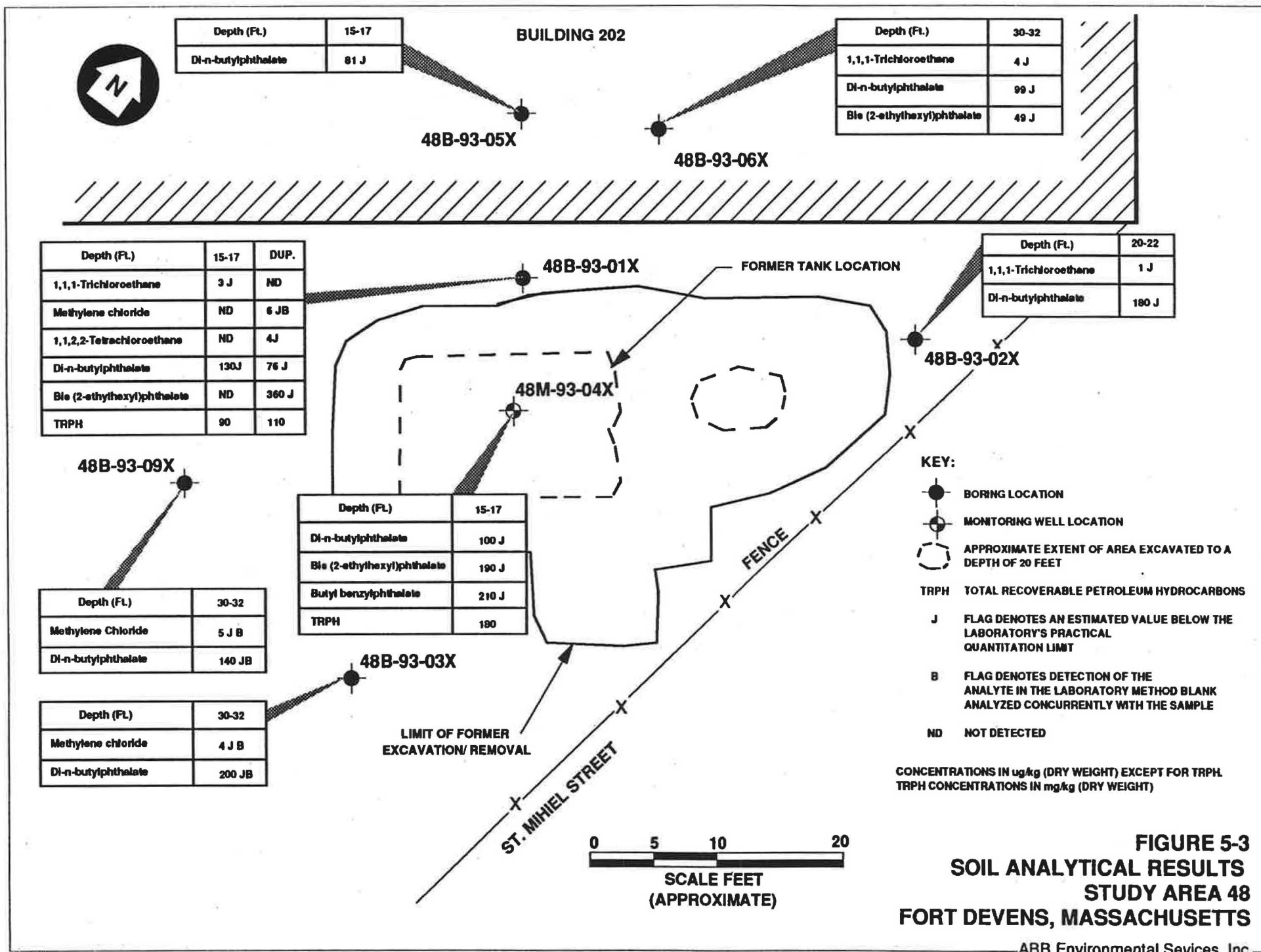


FIGURE 5-3
SOIL ANALYTICAL RESULTS
STUDY AREA 48
FORT DEVENS, MASSACHUSETTS



MWB202-1

1,1,1-Trichloroethane	1 JB
Methylene Chloride	2 JB
Trichloroethene	3 J
Phenol	17
Barium	0.009/0.010
Calcium	14/14
Magnesium	1.8/1.8
Nickel	ND/0.042
Potassium	1.2/1.9
Sodium	31/32

CAREY STREET

Phenol	11
Barium	0.007/0.009
Calcium	11/11
Iron	ND/0.028
Magnesium	1.4/1.4
Potassium	1.1/1.2
Sodium	19/19

MWB202-2

BUILDING 202

48B-93-06X

48B-93-05X

48B-93-01X

48B-93-02X

MW-48M-93-04X

48B-93-09X

48B-93-03X

ST. MICHIEL STREET

SCALE IN FEET



KEY:



BORING LOCATION



MONITORING WELL LOCATION

CONCENTRATIONS OF ORGANICS IN ug/L
CONCENTRATIONS OF INORGANICS IN mg/L. VALUES
INDICATE DISSOLVED/TOTAL CONCENTRATIONS.

J FLAG DENOTES AN ESTIMATED VALUE BELOW THE
LABORATORY'S PRACTICAL
QUANTITATION LIMIT

B FLAG DENOTES DETECTION OF THE
ANALYTE IN THE LABORATORY METHOD BLANK
ANALYZED CONCURRENTLY WITH THE SAMPLE

ND NOT DETECTED

NOTE: SAMPLE RESULTS FROM JANUARY 1994.
SSI SAMPLING ONLY.

1,1,1-Trichloroethane	ND	1 JB
Methylene Chloride	3 JB	3 JB
Phenol	5 J	5 J
Bis(2-ethylhexyl)phthalate	4 J	1 J
Aluminum	ND/0.10	ND/0.11
Barium	ND/0.005	ND/ND
Calcium	9.0/9.0	8.4/8.5
Magnesium	1.1/1.1	1.0/1.1
Manganese	0.023/0.021	0.028/0.017
Potassium	1.5/1.6	1.2/1.1
Sodium	17/16	18/15

MWB202-3

1,1,1-Trichloroethane	1 JB
Methylene Chloride	3 JB
Phenol	12
Bis(2-ethylhexyl)phthalate	2 J
Chrysene	8 J
Aluminum	ND/0.13
Barium	0.005/ND
Calcium	19/17
Magnesium	2.2/1.9
Manganese	0.018/0.015
Potassium	1.1/1.4
Sodium	14/10

FIGURE 5-4
GROUNDWATER ANALYTICAL RESULTS
STUDY AREA 48
FORT DEVENS, MASSACHUSETTS

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**TABLE 5-1
ANALYTES IN SOIL
SUPPLEMENTAL SITE INVESTIGATION
STUDY AREA 48**

**NO FURTHER ACTION DECISION UNDER CERCLA
FORT DEVENS, MASSACHUSETTS**

ANALYTE	BORING	48B-93-01X	48B-93-01X	48B-93-02X	48B-93-03X
	SAMPLE ID	BX480115	BX481115	BX480220	BX480330
	DEPTH	15 FT	15 FT DUP	20 FT	30 FT
VOLATILE ORGANICS (ug/kg dry wt)					
1,1,1-TRICHLOROETHANE		3 J	< 6	1 J	< 6
METHYLENE CHLORIDE		< 12	6 JB	< 11	4 JB
1,1,2,2-TETRACHLOROETHANE		< 6	4 J	< 6	< 6
SEMIVOLATILE ORGANICS (ug/kg dry wt)					
DI-N-BUTYL PHTHALATE		130 J	76 J	180 J	200 JB
BIS(2-ETHYLHEXYL)PHTHALATE		< 400	360 J	< 360	< 400
BUTYL BENZYL PHTHALATE		< 400	< 360	< 360	< 400
DIETHYL PHTHALATE		< 400	< 360	< 360	< 400
OTHER (mg/kg dry wt)					
TOTAL PETROLEUM HYDROCARBONS		90	110	< 25	< 25

Notes:

Sampling date: December 1993

J Flag denotes an estimated value less than the laboratory's Practical Quantitation Limit.

B Flag denotes detection of the analyte in the laboratory method blank analyzed concurrently with the sample.

< Indicates analyte not detected above sample quantitation limit.

TABLE 5-1, continued
ANALYTES IN SOIL
SUPPLEMENTAL SITE INVESTIGATION
STUDY AREA 48

NO FURTHER ACTION DECISION UNDER CERCLA
FORT DEVENS, MASSACHUSETTS

ANALYTE	BORING	48M-93-04X	48B-93-05X	48B-93-06X	48B-93-09X
	SAMPLE ID	BX480415	BX480515	BX480630	BX480930
	DEPTH	15 FT	15 FT	30 FT	30 FT
VOLATILE ORGANICS (ug/kg dry wt)					
1,1,1-TRICHLOROETHANE		< 6	< 6	4 J	< 6
METHYLENE CHLORIDE		< 11	< 11	< 12	5 JB
1,1,2,2-TETRACHLOROETHANE		< 6	< 6	< 6	< 6
SEMIVOLATILE ORGANICS (ug/kg dry wt)					
DI-N-BUTYL PHTHALATE		100 J	81 J	99 J	140 JB
BIS(2-ETHYLHEXYL)PHTHALATE		190 J	< 360	49 J	< 400
BUTYL BENZYL PHTHALATE		210 J	< 360	< 400	< 400
DIETHYL PHTHALATE		< 360	< 360	< 400	< 400
OTHER (mg/kg dry wt)					
TOTAL PETROLEUM HYDROCARBONS		180	< 25	< 25	< 25

Notes:

Sampling date: December 1993

J Flag denotes an estimated value less than the laboratory's Practical Quantitation Limit.

B Flag denotes detection of the analyte in the laboratory method blank analyzed concurrently with the sample.

< Indicates analyte not detected above sample quantitation limit.

**TABLE 5-2
ANALYTES IN GROUNDWATER
SUPPLEMENTAL SITE INVESTIGATION
STUDY AREA 48**

**NO FURTHER ACTION DECISION UNDER CERCLA
FORT DEVENS, MASSACHUSETTS**

ANALYTE	WELL	B202-1	B202-1	B202-2	B202-2	B202-3	B202-3
	SAMPLE ID	MX4801X1	MX4801X1	MX4802X1	MX4802X1	MX4803X1	MX4803X1
	BACKGROUND	FILTERED	UNFILTERED	FILTERED	UNFILTERED	FILTERED	UNFILTERED
VOLATILE ORGANICS (ug/L)							
1,1,1-TRICHLOROETHANE		NA	1 JB	NA	< 5	NA	1 JB
METHYLENE CHLORIDE		NA	2 JB	NA	< 10	NA	3 JB
TRICHLOROETHENE		NA	3 J	NA	< 5	NA	< 5
SEMIVOLATILE ORGANICS (ug/L)							
PHENOL		NA	17	NA	11	NA	12
BIS(2-ETHYLHEXYL)PHTHALATE		NA	< 10	NA	< 10	NA	2 J
CHRYSENE		NA	< 10	NA	< 10	NA	8 J
INORGANICS (ug/L)							
ALUMINUM	6870	< 100	< 100	< 100	< 100	< 100	130
BARIUM	39.6	9	10	7	9	5	< 5
CALCIUM	14700	14000	14000	11000	11000	19000	17000
IRON	9100	< 25	< 25	< 25	28	< 25	< 25
MAGNESIUM	3480	1800	1800	1400	1400	2200	1900
MANGANESE	291	< 5	< 5	< 5	< 5	18	15
NICKEL	34.3	< 40	42	< 40	< 40	< 40	< 40
POTASSIUM	2370	1200	1900	1100	1200	1100	1400
SODIUM	10800	31000	32000	19000	19000	14000	10000
OTHER (mg/L)							
TOTAL PETROLEUM HYDROCARBONS		NA	< 1.3	NA	< 1.2	NA	< 1.3

Notes:

Sampling date: January 1994

J Flag denotes an estimated value less than the laboratory's Practical Quantitation Level.

B Flag denotes detection of the analyte in the laboratory method blank analyzed concurrently with the sample.

NA Not analyzed.

< Indicates analyte not detected above sample quantitation limit shown.

**TABLE 5-2
ANALYTES IN GROUNDWATER
SUPPLEMENTAL SITE INVESTIGATION
STUDY AREA 48**

**NO FURTHER ACTION DECISION UNDER CERCLA
FORT DEVENS, MASSACHUSETTS**

ANALYTE	WELL	48M-93-04X	48M-93-04X	48M-93-04X DUP	48M-93-04X DUP
	SAMPLE ID	MX4804X1	MX4804X1	MX4811X1	MX4811X1
	BACKGROUND	FILTERED	UNFILTERED	FILTERED	UNFILTERED
VOLATILE ORGANICS (ug/L)					
1,1,1-TRICHLOROETHANE		NA	< 5	NA	1 JB
METHYLENE CHLORIDE		NA	3 JB	NA	3 JB
TRICHLOROETHENE		NA	< 5	NA	< 5
SEMIVOLATILE ORGANICS (ug/L)					
PHENOL		NA	5 J	NA	5 J
BIS(2-ETHYLHEXYL)PHTHALATE		NA	4 J	NA	1 J
CHRYSENE		NA	< 10	NA	< 11
INORGANICS (ug/L)					
ALUMINUM	6870	< 100	100	< 100	110
BARIUM	39.6	< 5	5	< 5	< 5
CALCIUM	14700	9000	9000	8400	8600
IRON	9100	< 25	< 25	< 25	< 25
MAGNESIUM	3480	1100	1100	1000	1100
MANGANESE	291	23	21	28	17
NICKEL	34.3	< 40	< 40	< 40	< 40
POTASSIUM	2370	1500	1600	1200	1100
SODIUM	10800	17000	16000	18000	15000
OTHER (mg/L)					
TOTAL PETROLEUM HYDROCARBONS		NA	< 1.1	NA	< 1

Notes:

Sampling date: January 1994

J Flag denotes an estimated value less than the laboratory's Practical Quantitation Level.

B Flag denotes detection of the analyte in the laboratory method blank analyzed concurrently with the sample.

NA Not analyzed.

< Indicates analyte not detected above sample quantitation limit shown.

TABLE 6-1
HUMAN HEALTH PRE EVALUATION OF SUBSURFACE SOIL
STUDY AREA 48
NO FURTHER ACTION DECISION UNDER CERCLA
FORT DEVENS, MASSACHUSETTS

ANALYTE	FREQUENCY OF DETECTION	DETECTED CONCENTRATIONS [a]		REGION III COMMERCIAL/INDUSTRIAL SOIL CONCENTRATION	MCP S-2/GW-1 STANDARD	MAXIMUM EXCBEDS GUIDELINE CONCIENTRATION?
		AVERAGE	MAXIMUM			
ORGANICS (mg/kg)						
1,1,1-TRICHLOROETHANE	1/4	0.003	0.003	92,000	30	NO
1,1,2,2-TETRACHLOROETHANE	1/4	0.004	0.004	14	0.02	NO
DI-N-BUTYLPHTHALATE	4/4	0.09675	0.13	100,000	NA	NO
BUTYL BENZYL PHITHALATE	1/4	0.21	0.21	200,000	NA	NO
BIS(2-ETHYLHEXYL)PHTHALATE	2/4	0.275	0.36	200	100	NO
OTHER (mg/kg)						
TOTAL PETROLEUM HYDROCARBONS [b]	3/4	126.7	180	NA	2500	NO

Notes:

[a] Subsurface samples from 15-17 foot interval, borings 48B-93-01X, 48B-93-01X (DUP), 48M-93-04X, and 48B-93-05X.

[b] Field screening data presented in Figure 5-2.

NA = not available.

mg/kg = milligrams per kilogram

MCP = Massachusetts Contingency Plan

Includes SSI results only.

TABLE 6-2
HUMAN HEALTH PRE EVALUATION OF GROUNDWATER
STUDY AREA 48
NO FURTHER ACTION DECISION UNDER CERCLA
FORT DEVENS, MASSACHUSETTS

ANALYTE	GROUNDWATER BACKGROUND CONCENTRATION (ug/L)	FREQUENCY OF DETECTION	DETECTED CONCENTRATIONS [a]		MAXIMUM EXCEEDS BACKGROUND?	DRINKING WATER STANDARD/GUIDELINE [b] (ug/L)	MAXIMUM EXCEEDS STANDARD/ GUIDELINE?
			AVERAGE (ug/L)	MAXIMUM (ug/L)			
ORGANICS							
TRICHLOROETHENE		1/5	3	3	—	5	NO
PHENOL		5/5	10	17	—	4000	NO
BIS(2-ETHYLHEXYL)PHTHALATE		3/5	2.3	4	—	6	NO
CHRYSENE		1/5	8	8	—	.2	YES
INORGANICS							
ALUMINUM	6870	3/5	113.3	130	NO	50-200	NO
BARIUM	39.6	2/5	7	9	NO	2000	NO
CALCIUM	14700	5/5	11,920	17,000	YES	NA	—
IRON	9100	1/5	28	28	NO	300	NO
MAGNESIUM	3480	5/5	1,460	1,900	NO	NA	—
MANGANESE	291	3/5	17.66	21	NO	50	NO
NICKEL	34.3	1/5	42	42	YES	100	NO
POTASSIUM	2370	5/5	1,440	1,900	NO	NA	—
SODIUM	10800	5/5	18,400	32,000	YES	20,000	YES

Notes:

[a] Unfiltered samples from B202-1, B202-2, B202-3, 48M-93-04X, and 48M-93-04X (DUP).

[b] Includes the lower of either the USEPA or the MADEP drinking water standards, or if no federal standard is available, the Region III tap water concentration.

NA = not available

ug/L = micrograms per liter

— = not applicable

Shaded compounds exceed standard or guideline.

Includes SSI results only.