PROPOSED PLAN
AOC 50

U.S. Army Reserve Forces Training Area
Devens, Massachusetts

SUPERFUND PROGRAM

JANUARY 2003

Introduction

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Section 117), the law that established the Superfund Program, and the National Contingency Plan (NCP) 300.430 (F)(2), this document summarizes the Army's proposed cleanup plan for Area of Contamination (AOC) 50 to protect human health and the environment. The purpose of this plan is to help the public understand and comment on the Army's proposal. The Army developed the proposed plan with support from the U.S. Environmental Protection Agency (USEPA) and the Massachusetts Department of Environmental Protection (MADEP). The Army's preferred alternative for AOC 50 is Alternative 6: soil vapor extraction (SVE), enhanced reductive dechlorination (ERD), in-well stripping (IWS), monitoring, and institutional controls (IC). In response to public comment, the Army, in consultation with the USEPA, may modify the preferred alternative for AOC 50 or select another response action presented in the Feasibility Study (FS) or in this plan. Therefore, the public is encouraged to review and comment on all the alternatives. The Final Remedial Investigation (RI) and FS Reports for AOC 50 contain detailed information on the Site, and are available for review at the public repositories at the Ayer Public Library, the Hazen Memorial Library in Shirley, the Harvard Public Library, and the Lancaster Public Library.

Site Description and History

AOC 50 is located in Ayer, Middlesex County, Massachusetts, approximately 35 miles northwest of Boston (Figure 1). It is located at the eastern side of the current Devens Reserve Forces Training Area property on the former North Post. The Site is located in an area that is bordered to the west by the Nashua River, to the north and east by Route 2A, and to the south by Bishop Road.

Camp Devens was created in 1917 as a temporary cantonment for training soldiers from the New England area. In 1932, Camp Devens was formally dedicated as Fort Devens. Fort Devens became a reception center for New England draftees in 1940 and expanded to more than 10,000 acres. The Fort Devens Airfield (Moore Army Airfield) was built in 1941 and two fueling systems were installed at this time. During World War II, over 614,000 inductees were processed at the Fort and population reached a peak of 65,000. In 1992, BRAC identified the North and Main Posts of Fort Devens for closure and the South Post for realignment. Closure was legislated to begin by September 30, 1992 and to be completed by July 31, 1997. On March 31, 1996, the installation ceased to be Fort Devens and the Devens Reserve Forces Training Area assimilated the remaining Army mission.

The AOC 50 Source Area comprises less than 2 acres (Figure 2); however, impacted groundwater extends approximately 2,900 feet downgradient of the Source Area across the airfield to the Nashua River. The Source Area surrounds Buildings 3803 (the former parachute shop), 3840 (the former parachute shakeout tower), 3824 (a gazebo), and 3801 (the former 10th Special Forces airplane parachute simulation building). These buildings were used by the 10th Special Forces Unit of the Army from approximately 1968 to the closure of Fort Devens in 1996. Currently the airfield is closed to aircraft traffic and is used by the Massachusetts State Police for training and vehicle storage. The Devens RFTA retained approximately 20 acres of the former airfield (including most of AOC 50) for vehicle storage and maintenance.

AOC 50 was identified as an area of potential concern due to the presence of two World War II vintage fueling systems: System A (used for fueling aircraft and trucks) and System B (used for fueling trucks). Releases of fuel associated with incidental spills at the former aircraft fuel pits, truck-fill stands, and railroad fuel-delivery points were considered sources of contamination. The Army removed these fueling system components as well as approximately 450 tons of contaminated soil in 1992. Other sources of contamination include a former drywell located outside Building 3840, and an area next to Building 3801 that was formerly used to store drums of tetrachloroethene (PCE) (drum storage area). The PCE was used to spot clean parachutes. Other potential sources of contamination may include a former cesspool and a floor drain associated with Building 3840. Based on the combined findings of the RI, UST removal, and Supplemental RI, it was determined that PCE-contaminated soil and groundwater were posing potentially unacceptable risks to human health and the environment.

In an effort to mitigate the source of contamination at AOC 50, the fueling systems and associated contaminated soil was excavated and removed from the Site in 1992. A soil vapor extraction (SVE) system was then operated in the drum storage area from February 1994 to July 1996 (and again in December 1998, May and June 1999, and October and November 1999) to remove PCE in soils above the groundwater table. During its operation, the SVE system removed approximately 240 pounds, or 18 gallons, of PCE. In 1996, the drywell and associated PCE-contaminated soil was excavated and removed.

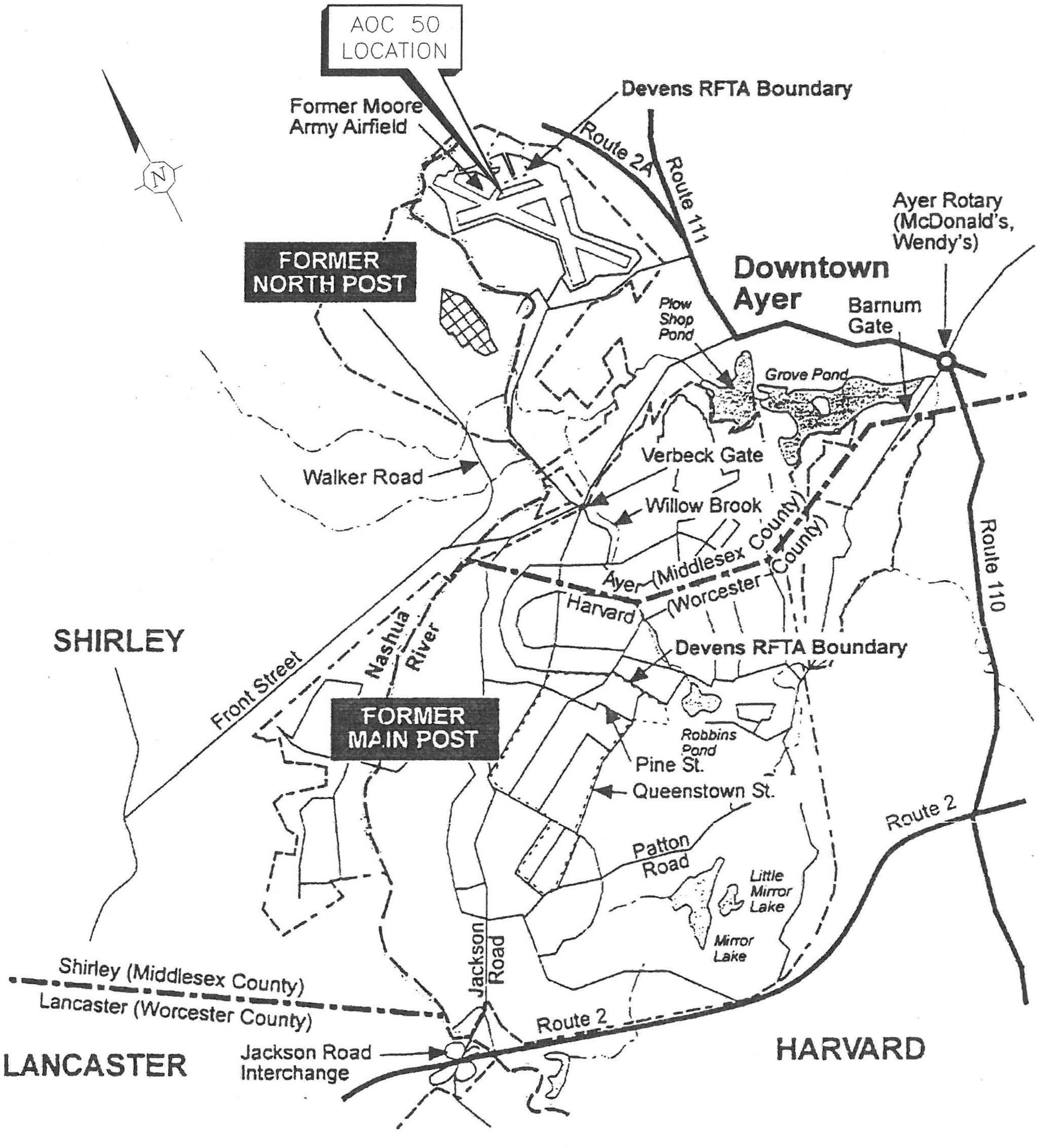


Figure 1 Location of AOC 50 at U.S. Army RFTA

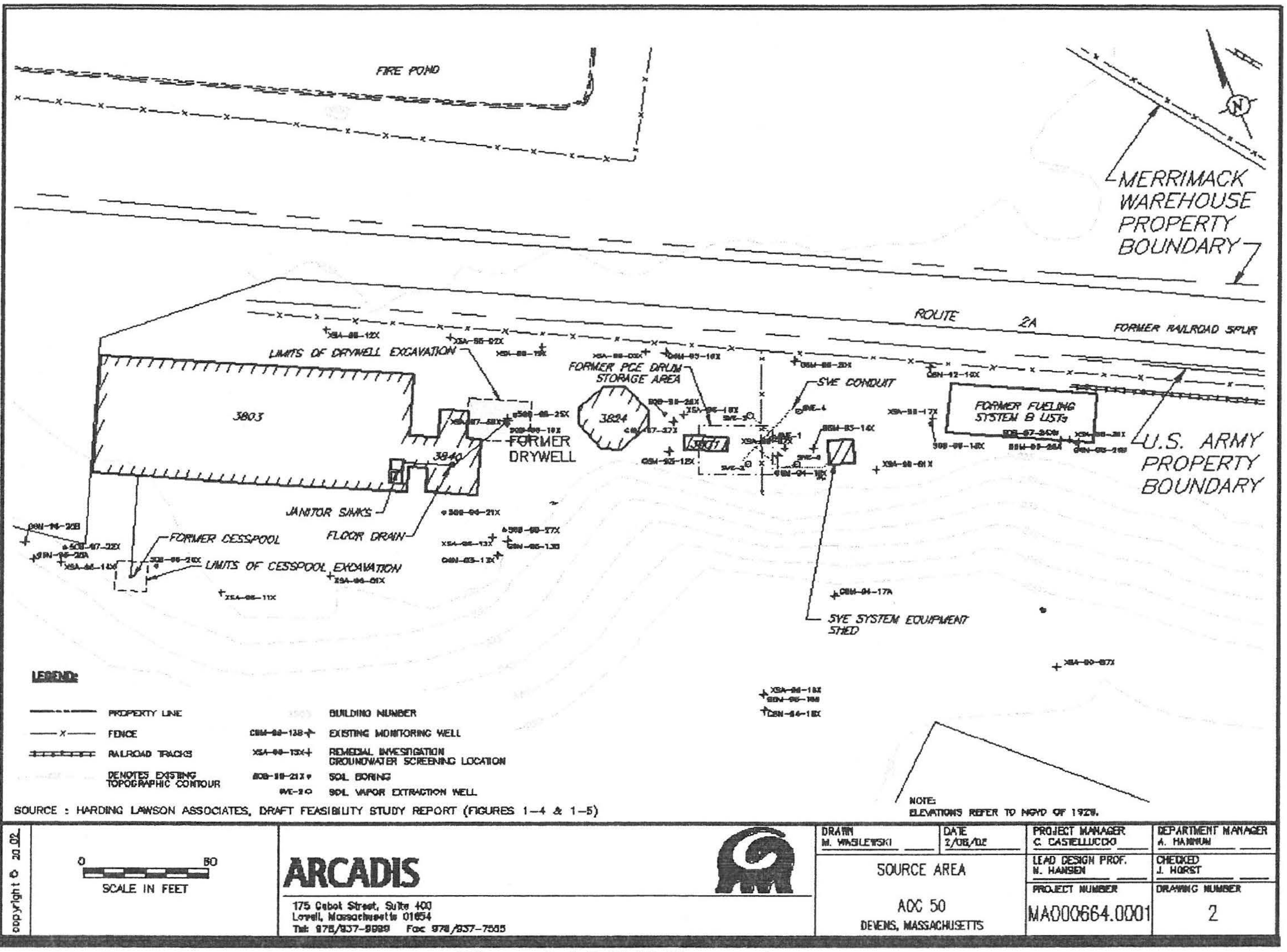


Figure 2 AOC 50 Source Area

The primary constituents of concern in groundwater include PCE, trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), vinyl chloride (VC), 1,2-dichloropropane (1,2-DCP), benzene and arsenic. Groundwater impacts, consisting primarily of PCE, extend from AOC 50 (Source Area) in an approximate 2,900-foot long plume from the former drywell/drum storage area to the Nashua River (Southwest Plume). A limited area of groundwater impact is also present north of Route 2A (North Plume). The Source Area, Southwest Plume and North Plume are shown on Figure 3.

Characterization of Potential Risks

Human Health Risk Assessment

The RI Report evaluated potential human-health risks associated with exposure to site contaminants in soil and groundwater based upon sampling data collected during the RI. Possible health risks were evaluated for the current land uses, likely future land uses, and unrestricted land uses. Based on the results of the human-health risk assessments, it is the Army's current position that the preferred alternative identified in the Proposed Plan, is necessary to protect the public health or welfare if the property were to be beneficially utilized in the future.

Estimates of human health risk are compared to the Superfund target risk range for known or suspected carcinogen-causing chemicals of $1x10^{-6}$ to $1x10^{-4}$ and to non-carcinogen Hazard Index (HI) values of 1. Estimates of risk to ecological receptors are also compared to HI values of 1.

Current Land Use: Under current land use, there are no complete exposure pathways. There are no occupied buildings located above relatively shallow groundwater. Therefore, the vapor migration from the groundwater to indoor air pathway is incomplete. Groundwater beneath and immediately downgradient of the Source Area is not used as a source of potable water. Although impacted groundwater discharges to the Nashoba River, there is currently no recreational exposure

Figure 3 AOC 50 Site Plan

to the portion of the river adjacent to the Site. The Nashua River is not used as a source of potable water for at least 12 miles downstream of the Site. In addition, there are no non-potable uses of groundwater that are likely to result in human exposure under current land-use conditions.

Possible Future Land and Unrestricted Land Use: The risk evaluation performed during the remedial investigation concluded that risks associated with surface soils were insignificant for future unrestricted land use and did not require further evaluation. Exposure to groundwater at AOC 50 would only occur if the land use and/or groundwater use were to change in the future.

Based on the results of the risk assessment, the following future and unrestricted site and groundwater uses are associated with health risks that do not exceed the USEPA Superfund target risk ranges:

- Construction and full-time occupation of a commercial/industrial building over the Source Area;
- Potable use of the groundwater associated with the North Plume by a full-time commercial/industrial worker;
- Use of the groundwater associated with the North Plume in an "open" industrial process (e.g., washing and spraying) by a full-time commercial/industrial worker; and
- Swimming in the Nashua River (area at Southwest Plume discharge point) by area residents (children and adults).

The following future and unrestricted site and groundwater uses are associated with health risks that exceed the USEPA Superfund target risk ranges:

- Potable use of the groundwater associated with the Source Area by a full-time commercial/industrial worker;
- Potable use of the groundwater associated with the Southwest Plume by a full-time commercial/industrial worker;
- Use of the groundwater associated with the Source Area in an "open" industrial process by a full-time commercial/industrial worker;
- Unrestricted potable use of the groundwater associated with the Source Area, North, and Southwest Plumes (e.g., consumption and volatile inhalation by residents); and
- Construction and occupation of residential dwellings over the Source Area.

Ecological Risk Assessment

The ecological risk assessment contained in the RI provides a qualitative screening-level evaluation of potential risks to ecological receptors posed by chemicals of potential concern (CPCs) detected in groundwater from the Southwest Plume and Source Area. The ecological risk assessment was updated during the Feasibility Study to incorporate additional groundwater modeling information. The potentially exposed receptors include aquatic organisms (pelagic and benthic) that inhabit the Nashua River. The pelagic organisms generally inhabit surface water and the benthic organisms generally inhabit sediment (including porewater).

Current exposure pathways evaluated for aquatic organisms included direct contact with and ingestion of surface water and sediment (including porewater) in the Nashua River from groundwater in the Southwest Plume. Maximum and average concentrations of chemicals in groundwater during the last three years (in the Southwest Plume) were used to estimate chemical concentrations in the surface water and sediment (including porewater). A dilution factor of 237 was used to estimate current chemical concentrations in the Nashua River surface water. The dilution factor was derived using the groundwater flux and the lowest 7-day average flow in a 10-year period for the Nashua River.

Future exposure pathways evaluated for aquatic organisms include ingestion and direct contact with surface water and sediment (including porewater) in the Nashua River from maximum groundwater concentrations estimated in the future. Future chlorinated volatile organic compounds (CVOC) concentrations in the surface water and sediment (including porewater) were derived using a solute transport model during the Feasibility Study. All other CPCs are estimated based on average and maximum concentrations observed in groundwater across the Site during the last three years. A dilution factor of 237 was used to estimate current chemical concentrations in the Nashua River surface water.

In general, the groundwater model predicted low potential risks for benthic organisms under both average and maximum exposure estimates for current and future conditions. Risks posed to pelagic organisms under current and future conditions are predicted to be negligible. A detailed summary of the ecological risk assessment can be found in Section 2.8.2 of the FS report (ARCADIS, 2002).

How Does the Army Choose the Final Cleanup Plan?

The Army uses USEPA's nine criteria to balance the pros and cons of cleanup alternatives. The following list of the nine criteria highlights questions the Army will consider in selecting a cleanup plan. Public comments that focus on these criteria help the Army better evaluate all aspects of the alternatives.

1. Overall protection of human health and the environment: Will the alternative protect you and the plant and animal life on and near the Site? Will each source of contamination be minimized, reduced, or controlled.
2. Compliance with Applicable or Relevant and Appropriate Requirement (ARARs): Does the alternative meet federal and state environmental statutes, regulations, and requirements?
3. Long-term effectiveness and permanence: Will the effects of the cleanup plan last or could residual

contamination present a risk again over time?

4. Reduction of mobility, toxicity, or volume through treatment: Does the alternative permanently and significantly reduce the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present?
5. Short-term effectiveness: How soon will site risks be adequately reduced? Are there short-term hazards to workers, residents, or the environment that could occur during the cleanup operation?
6. Implementability: Is the alternative technically and administratively feasible? Are the goods and services (i.e. treatment equipment, space at an approved disposal facility) necessary to implement the plan readily available?
7. Cost: What is the total cost (capital and operation and maintenance) of an alternative over time in today's dollars? The Army must find a plan that gives necessary protection for a reasonable cost.
8. State acceptance: Do state environmental agencies agree with the Army's recommendations?
9. Community acceptance: What objections, suggestions, or modifications does the public offer during the comment period?

Comparison of Remedial Alternatives

In the FS Report, the Army developed nine remedial alternatives for AOC 50. Each of the nine alternatives was evaluated against the nine USEPA criteria described above, with two exceptions: the eighth and ninth criteria (state and community acceptance) will be deferred until after the public comment period. A summary of the nine remedial alternatives, their key components, and their projected duration is presented in Table 1. Additional details can be found in the Final FS.

Following evaluation of the nine remedial alternatives against the USEPA criteria, the Army completed a comparative analysis to identify the preferred alternative (Section 6 of the Final FS). A summary of the key criteria used in the analysis is provided in Table 2. In the analysis, Remedial Alternatives 1, 2, 3, 4, 8, and 9 were eliminated from consideration, due to the following factors:

- Remedial Alternative 1 does not satisfy the seven evaluation criteria and has an excessive remedial time frame.
- Remedial Alternative 2 and 4 have excessive time frames (48 and 30 years, respectively). The excessive time frame and poor short term protectiveness at the Nashua River offset the cost advantage of Alternative 2.
- Remedial Alternatives 3, 8, and 9 have excessive costs ranging from $9.6 MM to $11.1 MM. The remedial time frame for these alternative are comparable to the time frames for the remaining three alternatives (5, 6, and 7). The additional costs are not justified.

The remaining alternatives (5, 6, and 7) were further compared to each other. Remedial Alternative 5 forms the basis for Alternative 6 and 7, which both add In-Well Stripping at the downgradient edge of the plume (for short term protection to the Nashua River). Remedial Alternative 7 also adds the use of Zero-Valent Iron (ZVI) to enhance cleanup in the Source Area. Additional observations are as follows:

- The time frames for each of these alternatives are within approximately 10 % of each other. Practically speaking, this is not significant, but results in the perceived cost difference between Alternatives 6 and 7.
- Alternative 5 provides less protection to the Nashua River during the course of the remediation than Alternatives 6 and 7. Alternative 7 has a disadvantage based on the complexity of implementation of ZVI in the Source Area.

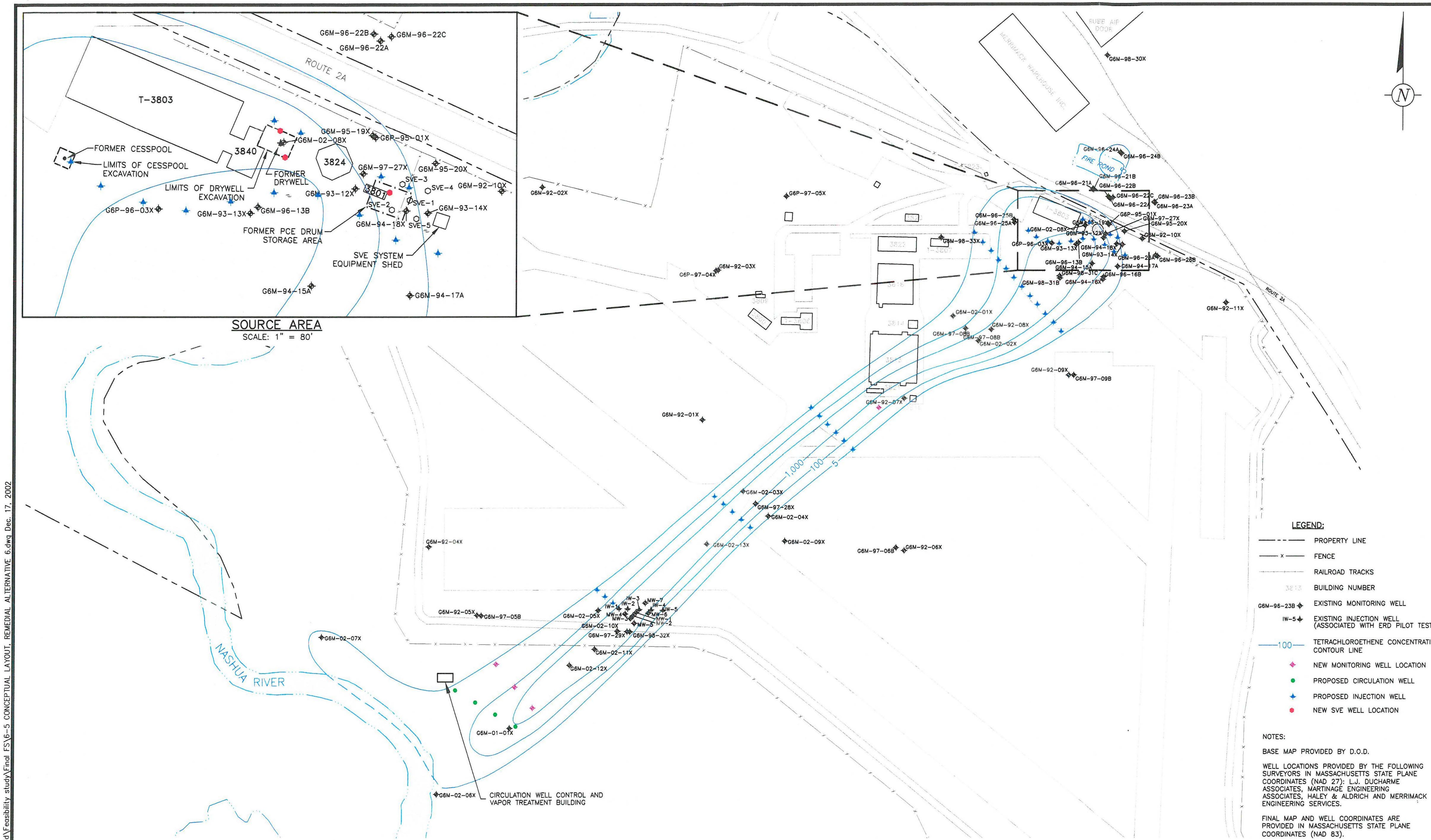
Based on the information above, Alternative 6 will result in a timely, cost-effective cleanup; can be easily implemented and will be protective of the Nashua River over the duration of the remedy. Therefore, the Army selects Remedial Alternative 6 as the preferred alternative. The conceptual layout of this remedial alternative is shown on Figure 4.

Why Does the Army Recommend Alternative 6?

The Army proposes to implement Alternative 6 to reduce potential human-health and ecological risks associated with exposure to contaminated groundwater at AOC 50. The key components comprising this remedy are described as follows:

Pre-Design Investigation Activities – Over the past 12 months, the Army has undertaken extensive field investigation at AOC 50 to further assess the nature and extent of PCE impacts at AOC 50. A pilot test of the ERD technology was completed between December 2001 and July 2002, the results of which were documented in a report incorporated into the Final FS. The USEPA requested that the ERD application be continued to gather additional data for the remedial design. Additional investigation activities will be conducted to support the remedial design (RD). This will include collection and analysis of groundwater and soil samples, and the installation of additional permanent monitoring wells, as necessary. A work plan will be submitted for review prior to initiating additional investigation activities. A study will also be performed to evaluate the effectiveness of the SVE system and to provide engineering data for design.

Installation of Additional Groundwater Monitoring Wells – As part of the preferred alternative, additional permanent groundwater monitoring wells will be installed to facilitate performance monitoring. The exact number, locations, and completion details of the new monitoring wells will be specified in the RD.



NOTES:

BASE MAP PROVIDED BY D.O.D.

WELL LOCATIONS PROVIDED BY THE FOLLOWING SURVEYORS IN MASSACHUSETTS STATE PLANE COORDINATES (NAD 27): L.J. DUCHARME ASSOCIATES, MARTINAGE ENGINEERING ASSOCIATES, HALEY & ALDRICH AND MERRIMACK ENGINEERING SERVICES.

FINAL MAP AND WELL COORDINATES ARE PROVIDED IN MASSACHUSETTS STATE PLANE COORDINATES (NAD 83).

G:\APROJECT\Devens\cadd\Feasibility study\Final FS\6-5 CONCEPTUAL LAYOUT, REMEDIAL ALTERNATIVE 6.dwg Dec. 17, 2002

0 — 80 SCALE IN FEET

0 — 300 SCALE IN FEET

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
175 Cabot Street, Suite 400
Lowell, Massachusetts 01854
Tel: 978/937-9999 Fax: 978/937-7555

AOC 50

DEVENS, MASSACHUSETTS

CONCEPTUAL LAYOUT, REMEDIAL ALTERNATIVE 6

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	11/13/02	C. CASTELLUCCIO	P. MILIONIS
		LEAD DESIGN PROF. M. HANSEN	CHECKED J. HORST
		PROJECT NUMBER MA000664.0001	DRAWING NUMBER 4

Table 1 – Summary of Remedial Alternatives

Alternative No.	Description/Key Components	Estimated Restoration Time (years)
1	*No Action:* No remedial action components to reduce, control, or monitor potential human health or ecological risks associated with site groundwater.	48
2	*SVE, Monitored Natural Attenuation, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; long-term groundwater monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	48
3	*SVE, Pump & Treat, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; recovery of impacted groundwater throughout the plume, treatment via air stripping and activated carbon, and discharge to the Nashua River; long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	25
4	*SVE, IWS, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; in-well stripping of dissolved-phase contaminants in select portions of the plume using curculation well technology (recovered vapors treated by activated carbon); long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	30
5	*SVE, ERD, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; in-situ destruction of dissolved-phase contaminants in select portions of the plume using enhanced reductive dechlorination; long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	26
6	*SVE, ERD, IWS, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; in-situ destruction of dissolved-phase contaminants in select portions of the plume using enhanced reductive dechlorination; in-well stripping of dissolved-phase contaminants at the downgradient edge of the plume using curculation well technology (recovered vapors treated by activated carbon); long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	27
7	*SVE, ERD, IWS, ZVI, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; in-situ destruction of dissolved-phase contaminants in select portions of the plume using enhanced reductive dechlorination, augmented with zero-valent iron in the source area; in-well stripping of dissolved-phase contaminants at the downgradient edge of the plume using curculation well technology (recovered vapors treated by activated carbon); long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	23
8	*SVE, IWS, Chemical Oxidation, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; in-well stripping of dissolved-phase contaminants in select portions of the southwest plume using curculation well technology (recovered vapors treated by activated carbon); chemical oxidation to destroy contaminant mass in the source area; long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	29
9	*SVE, ERD, Pump & Treat, Monitoring, Institutional Controls:* Treatment of unsaturated soils in source area using SVE; in-situ destruction of dissolved-phase contaminants in select portions of the plume using enhanced reductive dechlorination; recovery of impacted groundwater at the downgradient edge of the plume, treatment via air stripping and activated carbon, and discharge to the Nashua River; long-term monitoring; institutional controls (deed restrictions) and compliance inspections; remedial progress reviews every five years.	24

Table 2 – Comparison of Remedial Alternatives

Evaluation Criteria	Alt. 1 No Action	Alt. 2 SVE, MNA, IC	Alt. 3 SVE, P&T, Monitoring, IC	Alt. 4 SVE, IWS, Monitoring, IC	Alt. 5 SVE, ERD, Monitoring, IC	Alt. 6* SVE, ERD, IWS, Monitoring, IC	Alt. 7 SVE, ERD, IWS, ZVI, Monitoring, IC	Alt. 8 SVE, IWS, CHEM OX, Monitoring, IC	Alt. 9 SVE, ERD, P&T, Monitoring, IC
Protects Human Health and Environment	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Meets Federal and State Requirements (ARARs)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Long-term Protection (effectiveness)	○	○	◑	◑	◑	●	●	◑	●
Reduces Mobility, Toxicity, or Volume	○	○	◑	◑	◑	◑	◑	◑	◑
Short-term Protection (effectiveness)	○	○	●	◑	○	●	●	◑	●
Relative Ease of Implementation	●	●	◑	◑	●	◑	○	◑	◑
Cost	$0	$4,200,000	$9,600,000	$10,700,000	$5,700,000	$8,200,000	$7,800,000	$11,100,000	$10,500,000
State Agency Acceptance	The state letter of concurrence will be provided after the public comment period.								
Community Acceptance	To be determined after the public comment period.								

○ Low ◑ Moderate ● High * Preferred alternative

Application of SVE in the Source Area – Based on the results of pre-design testing, to be performed, the existing SVE system formerly operated in the Source Area at AOC 50 will be refurbished for use in the preferred alternative. The system will apply vacuum to wells completed within the unsaturated soils, capturing VOC mass in the vapor phase as soil gases are withdrawn. The soil gases extracted from the subsurface will be treated with activated carbon prior to being discharged to the atmosphere. Operation of the SVE system in the Source Area will provide indirect remediation of groundwater impacts, if recoverable CVOC mass is present. Specifically, the potential capture of adsorbed phase mass present in the vadose zone soils will be removed as a continuing source for groundwater contamination. Additional SVE wells will be installed if necessary, in the Source Area to supplement the existing SVE well network. Any field-testing activities will be outlined in a work plan to be submitted for review prior to initiating those activities.

Enhanced Reductive Dechlorination (ERD) Implementation – This technology is implemented *in-situ* by stimulating microbial activity and significantly increasing rates of CVOC degradation. The microbial activity is stimulated through the injection of a food-grade organic carbon substrate. The areas within which this substrate is delivered become anaerobic and reducing due to the uptake of available electron acceptors to support respiration of the microbes, providing the environment required for the ERD process to take place. The preferred remedy will involve the installation of multiple injection wells, deployed either individually or in a series of transects oriented perpendicular to the direction of groundwater flow. This will include the five injection wells already installed as part of the ERD pilot test previously mentioned. A dilute solution of potable water and the organic carbon substrate (molasses or other) will be periodically injected into the formation through these wells to drive the groundwater environment to anaerobic and reducing conditions. A pH-buffering compound such as sodium bicarbonate may also be added to the reagent mixture to help maintain a circumneutral pH in groundwater during application. The exact locations, spacing, and completion details of the injection wells/transects will be specified in the RD. In an effort to optimize the design and further reduce the remedy duration, the design will reflect the most up to date groundwater quality data and flow modeling.

IWS/Circulation Well Transect. Alternative 6 will involve the installation of approximately four groundwater circulation/ IWS wells in a single transect oriented perpendicular to groundwater flow at the downgradient edge of the Southwest Plume, just upgradient of the Nashua River. At the single transect, the inlet (lower) screen interval of the circulation wells will be positioned to intercept the zone of highest CVOC concentrations, with the recharge (upper) screen interval positioned at the upper limit of the impacted zone (to prevent cross-contamination of unimpacted zones). As with the new monitoring wells, the exact locations, spacing, and completion details of the circulation wells will be specified in the RD.

The circulation wells will be connected to a vapor recovery and treatment system via underground piping. The approximate locations of the underground piping and treatment building servicing the circulation well transect (blowers and air emission controls) are depicted on Figure 5.

The Army proposes to accelerate the implementation of this component of the remedy to rapidly address groundwater impact near the Nashua River.

North Plume Remediation – As outlined in the FS, the primary method of groundwater remediation for the low levels of CVOCs observed in the North Plume area will be the application of ERD in the AOC 50 Source Area. This ERD application will reduce the concentrations of CVOCs in the Source Area, thus limiting the potential for possible future migration of CVOCs off-site to the North. However, the Army does recognize the need to provide proactive treatment of the low concentrations of CVOCs present in the North Plume area (e.g., the 11 ug/L of PCE observed in Monitoring Well G6M-96-24B in February 2002). In the event that the PCE exceeds the MCL of 5 ug/L one year after ERD implementation in the Source Area, a direct application of in-situ Chemical Oxidation will be utilized to treat the PCE in the North Plume Area. The use of in-situ Chemical Oxidation is proposed over possible ERD application due to the concerns regarding potential inorganic solubilization related to ERD application. Additional details regarding the North Plume Remediation will be included in the RD.

Sentinel Groundwater Monitoring Wells – existing and/or proposed wells will be located in strategic locations between the Nashua River and the most downgradient ERD injection transect. As shown on Figure 5, the Sentinel Well network will consist of approximately three wells to be installed approximately 400 feet from the most downgradient ERD injection transect. These wells will be located laterally across the plume to monitor the possible presence of solubilized inorganics beyond the expected extent of the reducing conditions created by the ERD application.

Monitoring – Long-term monitoring will be performed to confirm that contaminant of concern (COC) concentrations are reduced to remediation goals as well as to evaluate performance of the remedy. During the initial phases of implementation, monitoring will be conducted more frequently. As the progress of the remedy is established, monitoring frequency will be reduced. Samples will primarily be analyzed for VOCs, with additional analyses including dissolved metals (arsenic, iron, and manganese), nitrate, redox couples (sulfate/sulfide, and carbon dioxide/methane), and dissolved gases (oxygen, ethane, and ethene). Field parameters (e.g., ORP, pH, conductivity, turbidity, and temperature) will also be collected during sampling. Details will be outlined in a Long Term Monitoring Plan (LTMP).

Institutional Controls – Institutional controls will be implemented to restrict land and groundwater use at the Site. This will be accomplished by recording deed restrictions for the affected property. All land-use restrictions will be stated in full or by reference within zoning ordinances and/or deeds, easements, mortgages, leases, or other instrument of property transfer. They will be maintained until such time that remediation goals are achieved or it can be demonstrated that risk levels posed by the COCs are within the USEPA's CERCLA risk range and equal or lower than the target HI from exposure to groundwater.

5-Year Site Reviews – Under CERCLA 121c, any remedial action that results in contaminants remaining on-site at concentrations greater than those allowing unrestricted use must be reviewed at least once every 5 years. During 5-year site reviews, an assessment is made of whether the implemented remedy continues to be protective of human health and the environment or whether the implementation of additional remedial action is appropriate. Restoration Advisory Board (RAB) meetings will be held coincident with these 5-year site reviews to keep the public informed of site status including its general condition, remaining contaminant concentrations, and protectiveness of the remedial action. RAB meetings will also continue to be held on a regular basis to update the community on the progress of the remedy design and implementation.

Contingency Plan

As outlined in the Final FS, inorganics such as iron, manganese or arsenic can be solubilized within the reducing zones created by ERD technology. Inorganics solubilized within the reducing *in-situ* reactive zones (IRZs) are not expected to migrate beyond the boundary of reducing conditions, and are not expected to persist once the prevailing aerobic groundwater environment is restored either naturally or via aeration in the vicinity of the downgradient circulation wells. Outside of the zone of reducing conditions (i.e., under the naturally aerobic conditions present in the groundwater at AOC 50) and in the area of the circulation wells, it is expected these constituents (iron, manganese and arsenic) will be oxidized and subsequently immobilized through precipitation, adsorption or other means. Despite this expectation, it is recognized that a contingency must be available should groundwater monitoring indicate that there is an iron deficiency in the circulation treatment area (i.e., towards the Nashua River) that may preclude the effective immobilization of dissolved arsenic as it is recognized that arsenic solubility is strongly controlled by the presence of iron. The proposed contingency remedy will consist of two major components:

Monitoring Program - The monitoring program for the sentinel wells as part of the Contingency Plan will be outlined fully in a pre-design work plan currently being developed. However, the monitoring will be conducted on a regular basis to detect a deficiency of iron in the system and allow time for Remedy Implementation.

Remedy Implementation – The proposed criteria for implementing the contingency remedy will be dissolved arsenic concentrations greater than 10 ug/L and dissolved iron concentrations less than eight-times the concentration of arsenic (on a molar basis) in any of the Sentinel Wells for two consecutive sampling events. For example, if dissolved arsenic was detected at a concentration of 20 ug/L and iron concentrations were less than 120 ug/L (8 times the arsenic concentration on a molar basis) as well, for two consecutive sampling events, the contingency would be triggered.

In the event that the contingency remedy is required to address dissolved inorganics, the proposed contingency will be the addition of a supplemental dissolved iron source into the aquifer. As outlined above and in the FS, it is recognized that the immobilization of dissolved arsenic is strongly controlled by the presence of iron in groundwater. The conceptual approach for the supplemental iron injection will include the installation of a series of reagent injection wells. These wells will be located in a transect across the plume as shown on Figure 5. These wells would then be used to inject a ferrous chloride solution to provide additional dissolved iron to the groundwater system and thereby facilitate the immobilization of arsenic upon oxidation.

Design details for the contingency remedy will be presented in the RD following signing of the Record of Decision (ROD). The Army proposes to complete the remedial design within 120 days of ROD signing. However, it is envisioned that the supplemental iron addition would be performed on an as needed basis to maintain the necessary concentrations of dissolved iron. Field parameter measurements and inorganic groundwater samples will also be collected on a periodic basis to confirm the desired conditions, and the monitoring of the Sentinel Well network will be maintained to assure the success of the contingency remedy.

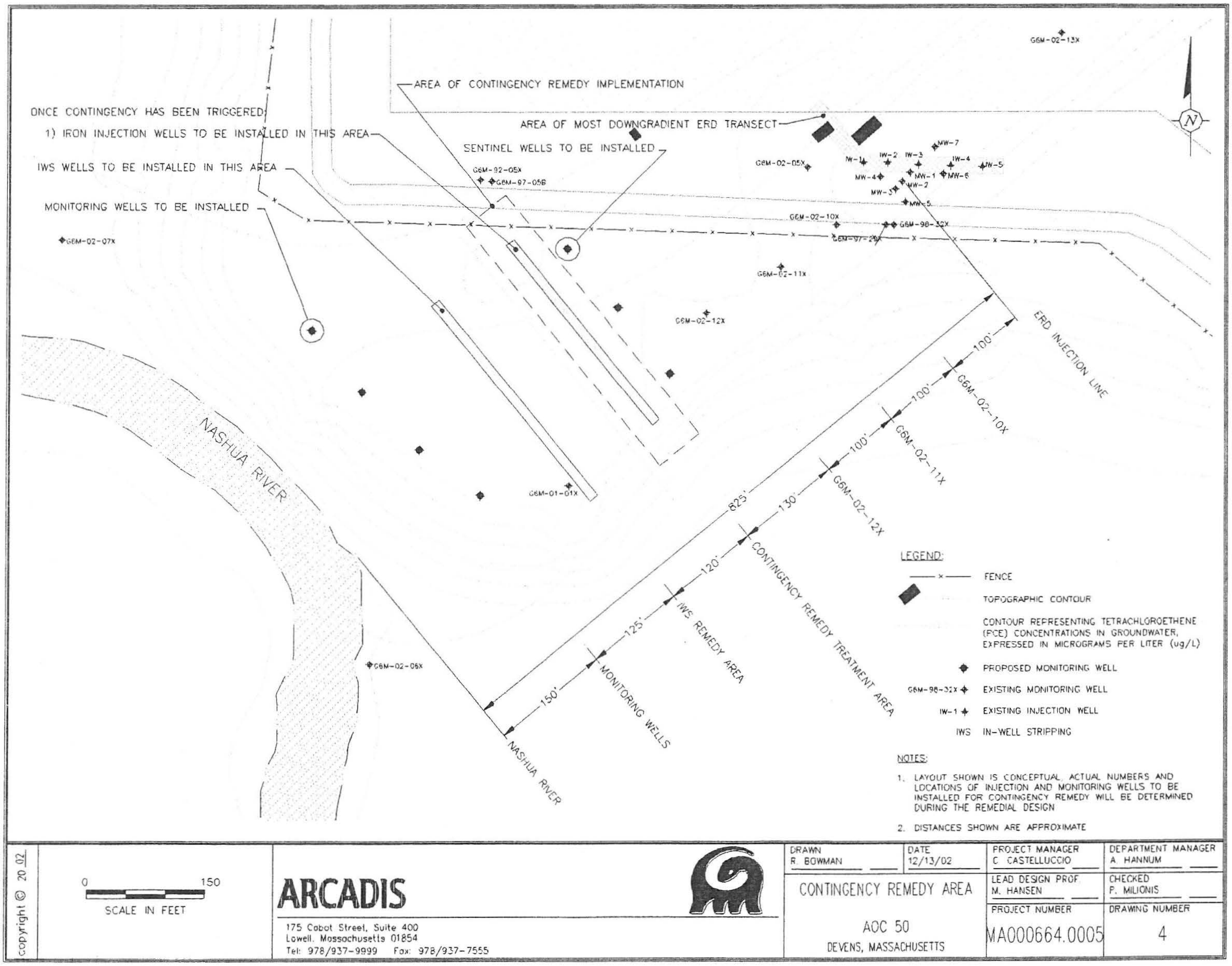


Figure 5 IWS Remedy and Contingency Remedy Area

Learn More About AOC 50 and the Army's Proposed Plan

The Army will describe the proposed plan for AOC 50 and conduct an informal question and answer session at a public meeting to be held at the U.S. Army RFTA. Opportunity will also be provided at this meeting for individuals to provide formal comments on the proposed plan. The public meeting will be held at the following time and place:

Public Meeting
January 30, 2003 7:00 p.m.
Devens Conference Center
100 Sherman Avenue
Devens, Massachusetts 01432

What Do You Think?

Do you have a comment or concern relating to the Army's Proposed Plan? If so, the Army would like to know what it is before making a final decision on whether the proposed alternative provides adequate protection.

During the 30-day public comment period from January 22 to February 20, 2003 the Army will accept formal written comments on the proposed plan, and hold a public meeting to accept either oral or written comments. It is important to note that regulations distinguish between "formal" comments received during the public comment period and "informal" comments received outside of the public comment period. While the Army uses comments throughout the site investigation and cleanup, regulations require the Army to respond to formal comments in writing.

To make a formal comment, you need only

1. Offer oral or written comments during the public meeting on January 30, 2003.

Or

2. Send written comments, postmarked no later than February 20, 2003 to:

   Mr. Ben Goff
   U.S. Army Reserve Forces Training Area
   BRAC Environmental Office
   30 Quebec Street
   P.O. Box 100
   Devens, MA 01433-5190
   Fax (978) 796-3133

Why Submit a Formal Comment?

Your comment will become part of the official public record, a crucial element in the decision-making process. The Army will consider all formal comments made during the 30-day public comment period prior to making the final selection.

A transcript of formal comments and the Army's written responses will be issued in a document called a Responsiveness Summary that will accompany the Record of Decision for AOC 50.

Next Steps

The Army expects to complete review of all formal comments, select a remedial alternative, and issue the Record of Decision. The Record of Decision and Responsiveness Summary will be available for public review at the public information repositories at the Ayer Public Library, the Hazen Memorial Library in Shirley, the Harvard Public Library, and the Lancaster Public Library. In addition, the Army will announce the decision through the local news media and the community mailing list.

Glossary

Applicable or Relevant and Appropriate Requirements (ARARs): ARARs include any state or federal statute or regulation that pertains to protection of human health and the environment in addressing certain site conditions or using a particular cleanup technology at a Superfund site. The Army must consider whether a remedial alternative meets ARARs as part of the process for selecting a cleanup alternative for a Superfund site.

Area of Contamination (AOC): A portion of a Superfund site where investigations have established that contamination exists and requires further assessment.

Cleanup: Actions taken because of the release or threatened release of hazardous substances to reduce the risks to human health or the environment. The term "cleanup" is often used broadly to describe various aspects of a remedial response.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):
A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act created a special tax that goes to a trust fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Contingency Plan: A portion of the remedy to be implemented in the event that certain monitoring data exceeds a predetermined value for a predetermined duration or frequency.

Downgradient: The direction in which groundwater flows. The slope of the water table determines the hydraulic gradient under which groundwater movement takes place. The term downgradient also refers to the portion of groundwater that has migrated away from a contaminant source.

Enhanced Reductive Dechlorination (ERD): A technology implemented *in-situ* by stimulating microbial activity and significantly increasing rates of CVOC degradation.

Feasibility Study (FS): A study that develops and evaluates remedial alternatives for the cleanup of Superfund sites.

Groundwater: Water found beneath the earth's surface, which fills pores between materials such as sand, soil, and gravel, and fills cracks in bedrock, and often serves as a source of drinking water.

In-Situ: In place or in its natural position.

In-Situ Chemical Oxidation (ISCO): A treatment technology in which an oxidizing chemical agent is introduced into the subsurface to address groundwater impacts.

Institutional Controls (IC): Controls placed on property to restrict access and future development, such as zoning and deed restrictions.

In-Well Stripping (IWS): Also known, as Recirculation Well Technology is an innovative technology in which specially designed wells are employed to physically remove CVOCs from groundwater via the process of air stripping.

Maximum Contaminant Level (MCL): The maximum permissible level of a contaminant in drinking water. These levels are determined by USEPA and are applicable to all drinking water supplies.

Monitored Natural Attenuation: The reliance on natural attenuation processes to achieve site-specific remedial objectives within a time frame that is reasonable compared to other methods.

Monitoring Wells: A well drilled to 'monitor" groundwater quality and movement. A well of this type does not supply water for drinking or industrial use. Samples from a monitoring well are analyzed to detect the presence of contaminants. Comparing water levels in monitoring wells shows the direction of groundwater flow.

National Contingency Plan (NCP): The federal regulation that guides the Superfund program.

Plume: The horizontal and vertical extent of groundwater impacts that exceed a defined value.

Pump and Treat (P&T): A technology implemented by pumping groundwater to the surface, removing contaminants and discharging the treated water.

Operable Unit: A discrete action that comprises an incremental step toward a final remedy. Operable units may address geographic portions of a site, specific site problems, or the initial phase of an action.

Preliminary Remediation Goals (PRGs): Numerical goals for site cleanup that are protective of human health and the environment and that comply with ARARs.

Record of Decision (ROD): A public document that explains the cleanup alternative to be used at a National Priorities List (NPL) site. The ROD is based on information and technical analysis generated during the RI and FS, and on consideration of the public comments and community concerns. Art interim ROD is prepared to explain and document the rationale for an interim remedial action.

Remedial Alternatives (RA): An option evaluated during the FS to address the source and/or migration of contaminants at a Superfund site to meet cleanup goals.

Remedial Design (RD): Technical information and data incorporated into technical drawings and specifications for the remedy.

Remedial Investigation (RI): An investigation that evaluates the nature and extent of contamination at a hazardous waste site, and helps to direct the types of cleanup options that are evaluated in the FS.

Risk Assessment: A qualitative or quantitative evaluation of human health and ecological risk resulting from exposure to a chemical or physical agent (pollutant) that combines exposure assessment information with toxicity information to estimate risk.

Soil Vapor Extraction (SVE): A technology implemented using a vacuum to remove volatile contaminants from the subsurface vadose zone.

Superfund: The common name for CERCLA, the Comprehensive Environmental Response, Compensation, and Liability Act.

Surface Water: Bodies of water on the surface of the earth, such as rivers, lakes, and streams.

Vadose Zone: The zone between the land surface and the zone of saturation, that is, the water table.

Zero-Valent Iron (ZVI): A technology implemented using nano-scale iron particles to enhance CVOC degradation rates.

For More Information

To obtain more information regarding the AOC 50 Site, please attend the monthly Restoration Advisory Board (RAB) meetings held at 7 PM on the second Thursday of each month. Locations are advertised in the local papers, libraries, and Town Halls.

Should you have further questions please feel free to contact:

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Massachusetts Department of
Environmental Protection
Mr. John Regan
627 Main Street
Worcester, MA 01605
(508) 767-2840
John.J.Regan@state.ma.us

Use This Space to Write Your Comments

The Army wants your comments on the proposed plan for AOC 50. You may use the form below to submit written comments. If you have questions about how to comment, please call the BRAC Environmental Coordinator, Mr. Ben Goff, at (978) 796-2205, extension 311. Send this form or any other written comments, postmarked no later than February 20, 2003 to:

Mr. Ben Goff
U.S. Army reserve Forces Training Area
BRAC Environmental Office
30 Quebec Street
P. O. Box 100
Devens, MA 01432-5190
Fax: (978) 796-3133

Comment Submitted by: ______________________

Address: ______________________

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