

Impact Area Groundwater Study Program

DEMOLITION AREA 1 DECISION DOCUMENT ADDENDUM

JUNE 2009

FACT SHEET 2009-1

Demolition Area 1 is part of the ongoing U.S. Army Impact Area Groundwater Study Program (IAGWSP) cleanup at Camp Edwards on the Massachusetts Military Reservation.

In order to accelerate groundwater remediation, the U.S. Environmental Protection Agency (EPA), with Massachusetts Department of Environmental Protection (MassDEP) concurrence, expedited the decision for the comprehensive groundwater response at the site.

This addendum modifies the *Decision Document Demolition Area 1 Groundwater Operable Unit (EPA 2006)* (Decision Document) to include response actions taken to address contaminated soil, munitions and explosives associated with the Demolition Area 1 source area. This fact sheet contains a summary of the *Draft Demolition Area 1 Decision Document Addendum*, which announces no further action for the source area based on previous soil response actions, investigation data and ongoing groundwater cleanup system with long-term groundwater monitoring.

The proposed decision was selected in accordance with Section 1431(a) of the Safe Drinking Water Act, 42 USC Section 300i(a), as amended, the related USEPA Administrative Order concerning response actions (SDWA-1-2000-0014), and includes consideration of the cleanup standards set forth under Massachusetts General Laws, M.G.L. c. 21E and 310 CMR 40.0000, the Massachusetts Contingency Plan (MCP). The Mass DEP has also proposed that no further remedial action is necessary at the Demolition Area 1 source area to protect public health, safety, welfare and the environment.

INFORMAL PUBLIC COMMENT PERIOD JUNE 17 THROUGH JULY 17, 2009

The EPA is issuing the **Demolition Area 1 Decision Document Addendum** for an informal public comment period that will run from June 17 to July 17, 2009. For information on the Decision Document and how to submit comments, please turn to the back of this fact sheet.

BACKGROUND

Demolition Area 1 is located on Camp Edwards northeast of the Otis Rotary in Bourne. The 7.4-acre, 45-foot-deep topographic depression was used from the mid-1970s to 1997 for training and disposal of munitions, fireworks, explosives and other items. Investigations identified contamination from RDX, other explosives, and perchlorate, in both the Demolition Area 1 groundwater and source area.

GROUNDWATER

Groundwater investigations identified a 9,000-foot by 1,000-foot area of groundwater contamination migrating west from the Demolition Area 1 source area with maximum concentrations, prior to treatment start-up, of 370 ppb for RDX and 500 ppb for perchlorate. The plume currently extends 8,500 feet in length by 625 feet in width. It contains RDX up to 22.8 parts per billion (ppb), which is above the 2 ppb Federal Lifetime Health Advisory, the state 1 ppb groundwater cleanup standard and the level resulting in an excess cancer risk of one in a million (0.6 ppb). It also contains perchlorate up to 99.2 ppb, which is above the Massachusetts Maximum Contaminant Level of 2 ppb.

The *Decision Document Demolition Area 1 Groundwater Operable Unit* was signed by the EPA in November 2006. Based on that document, the Demolition Area 1 groundwater plume is currently being remediated with a system that extracts and treats 1.3 million gallons of water per day. It consists of five extraction wells and four reinjection wells that return treated water to the aquifer. The plume is entirely on-base and is not impacting any drinking water wells.

The comprehensive groundwater treatment system, which became operational in mid-2007, expanded on an interim system that began groundwater cleanup in 2004. The initial system treated 460,000 gallons per day using modular treatment units placed at two locations along the center of the plume, two extraction wells, and three reinjection wells. In addition to adding three extraction wells and an injection well, the comprehensive system also replaced the three modular units at one location with one larger treatment facility.

The treatment system uses ion exchange resin to remove perchlorate and granular activated carbon to remove explosives. The system and select monitoring wells are regularly sampled to assure cleanup goals are being achieved. With more than a billion gallons of groundwater treated to date and 1.3 million gallons being cleaned each day, the system is expected to restore the aquifer beneath and downgradient of Demolition Area 1 to 0.6 ppb of RDX and 2 ppb of perchlorate by 2018.

SOURCE AREA

The source area is comprised of the 7.4-acre Demolition Area 1 depression, the perimeter road surrounding the depression and a 3.3-acre area immediately outside the perimeter road. The following is a summary of the actions completed at the source area, which is documented in the *Demolition Area 1 Source Area Completion of Work Report, including the Supplementary Post-Screening Investigation Report*.

Source Area Investigation: Since 1997, approximately 950 soil samples have been collected from within the source area. This sampling, along with geophysical investigations, identified explosive, propellant and perchlorate contamination, and a significant number of metal anomalies in the soil. The primary contaminants of concern (COCs), RDX and perchlorate, were detected inside the perimeter road, along with HMX, TNT, 2,4-DNT, and 2A and 4A-DNT.

Post-Screening Investigation: In 2002, a Post-Screening Investigation was conducted to determine if the extent of contamination had been adequately delineated. Findings indicated that the areas north, east, and south of the perimeter road required additional sampling to confirm the extent of contamination in the area outside the perimeter road. The Supplemental Post-Screening Investigation was conducted to gather the necessary data regarding this area.

Source Removal Rapid Response Action: In 2004, a source removal action was conducted to address contaminated soil and geophysical anomalies. The objective of this action was to eliminate any potential ongoing source of groundwater contamination through the removal of contaminated soil, explosives and munitions. This action also was designed to abate or eliminate the risk to public health, safety, welfare and the environment. Details on the scope of this response action are in the *Draft Rapid Response Action / Release Abatement Measure Plan Demo 1 Soil OU (2003)*.

Major fieldwork components of the action included:

- Pre-Excavation Anomaly Removal
- Soil and Burn Pit Excavation
- Soil Screening, Treatment and Disposal
- Post-excavation Anomaly Removal
- Backfill and Site Restoration

Pre-Excavation Anomaly Removal: All metallic debris, including potentially unexploded ordnance, was cleared to a depth of 2-feet below ground surface (bgs) prior to the excavation of each foot of soil. During this operation, 11,388 inert or potentially explosive munitions items were removed, 23 of which were blown in place. Approximately 44,000 pounds of debris also were removed and properly disposed of off site.



Demolition Area 1

Soil Excavation: More than 27,000 tons of soil were excavated at the site. Soil was removed to a depth of 1 foot on the outer edge (3.3 acres) and to a depth of two feet from the middle contour (0.3 acres). The center (0.8 acres) was excavated until undisturbed soil was reached (an average depth of eight feet). Post-excavation soil samples ensured that RDX and perchlorate had been effectively removed. Additional excavation was completed at any area where contaminants were detected above cleanup levels.

Burn Pit Excavation: During the source area removal 15 burn pits were discovered - 13 within the center of the depression and two along the edge of the depression and the 2-foot contour. A soil characterization sample was collected during the removal of all burn pit items and soils, and a post-soil-excavation confirmation sample was collected once the excavation was completed.



Pre-excavation

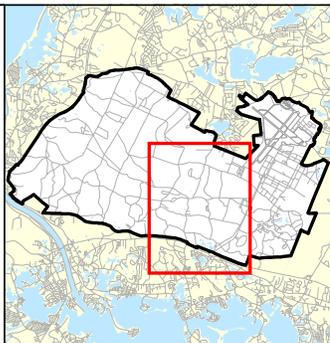


Impact Area Groundwater Study Program

- Monitoring Well
- ▲ Reinjection Well
- ⬇ Extraction Well
- ⊙ Piezometer
- ⊗ Staff Gage
- Influent Pipeline
- Effluent Pipeline
- MMR Boundary
- Perchlorate Plume > 2 ppb
- RDX Plume > 0.6 ppb

Note: Plume shell illustrated is representative of widest observed at each transect cross-section. Groundwater data through April 2008. Contour lines dashed where inferred.

LOCATION MAP

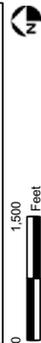


NOTES & SOURCES

Basemap data from US Geological Survey 7 1/2 minute
Topographic Maps. Source: MassGIS
Aerial Photography. Source: MassGIS
Date Flown: 2002. Source: EarthData International

TITLE

Demolition Area 1 Groundwater Plume
April 2008



Environmental Science & Solutions
A Division of
EarthData International

DRAFT

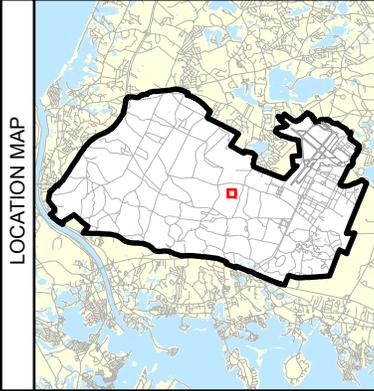
FIGURE

\\MW000000\Demolition\Bioscience\Reports\Fig_001089.pdf
January 13, 2008 DWN:MTW_CKGD.DW



Impact Area
Groundwater Study Program

LEGEND	
	Monitoring Well
	22'x22' SoilGrids
	RRA Soil Excavation Area
	Supplemental Post Screening Investigation
	Perimeter Road



NOTES & SOURCES

Basemap data from: US Geological Survey 7 1/2 minute
Topographic Maps; Source: Mosaic/US
Aerial Photos; Color: Digital Orthophotos; Date Flown: 2012
Source: EarthData International

TITLE

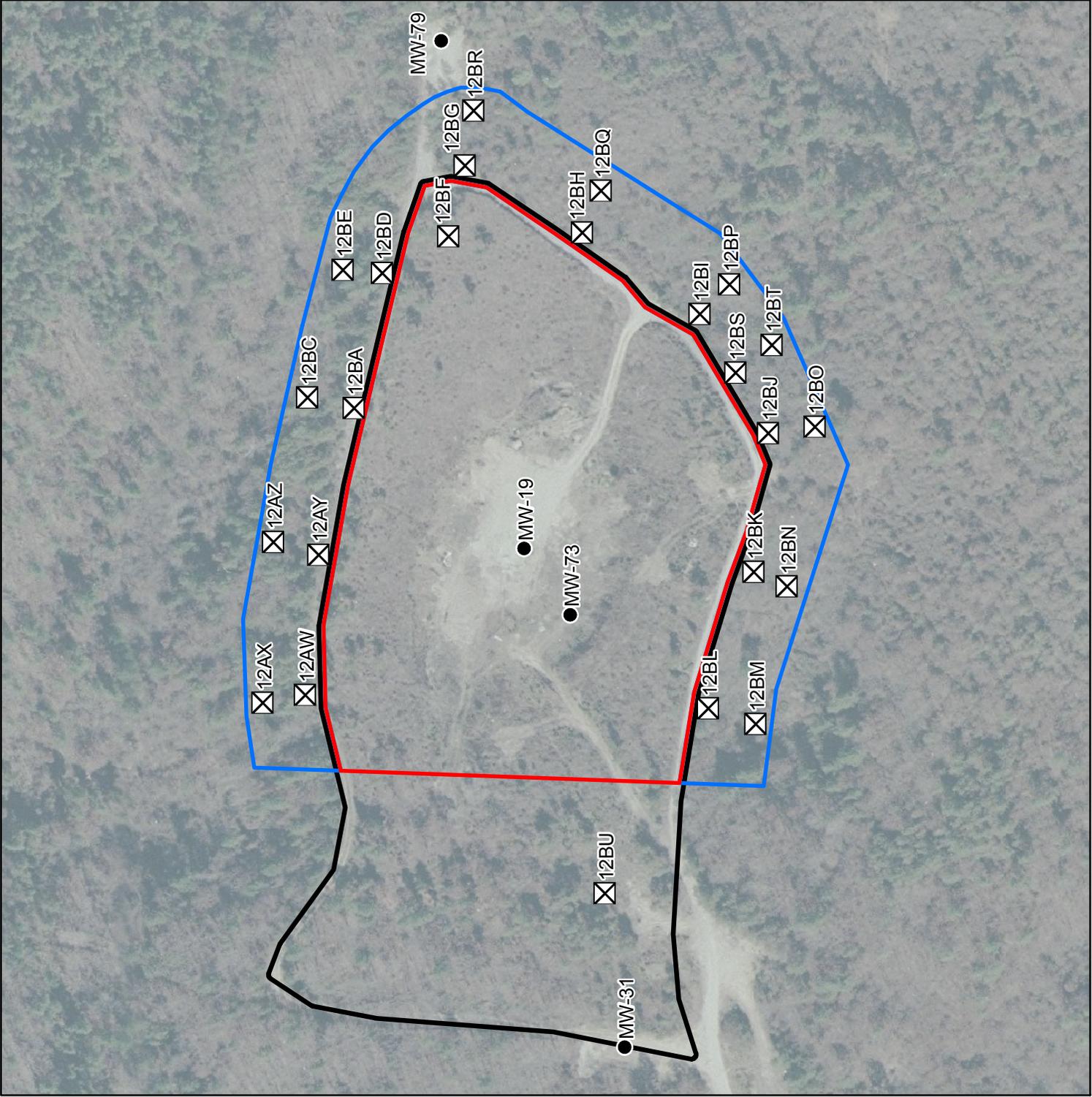
Demolition Area 1
Soil Sample Locations
for Outside Perimeter Road



FIGURE

2

US Army Corps of Engineers
New England District
M:\MMR\2009\Demol\DecisionDoc\Figures\Fig_052806.pdf
M:\MMR\2009\Demol\DecisionDoc\AMD5\Fig_052109.mxd
May 28, 2009 DWN:MTW CHD:PRK



Soil Screening, Treatment and Disposal: Most of the 27,000 tons of soil excavated from Demolition Area 1 were treated on site using a Low-Temperature Thermal Desorption unit. The system used heat to separate the contaminants from the soil and destroy them. Treated soil was analyzed for explosives and perchlorate to ensure that the soil treatment criteria were met. Soils not meeting the criteria were treated again. Following successful treatment, the soils were used as backfill at Demolition Area 1.

Approximately 980 tons of burn-pit and other soil were transported off site for appropriate disposal based on the results from the characterization samples.

Confirmation samples from the base of the excavation and burn pits show that no detectable concentrations of RDX remain in the core source area (i.e., within the perimeter road). The highest concentration of perchlorate remaining (2.5 ppb) is below the MassDEP soil cleanup standard of 100 ppb.

Post-excavation Anomaly Removal: Following excavation and sampling, geophysical surveys were performed within the perimeter road to identify any remaining sub-surface anomalies. The investigation resulted in 2,480 targets being identified and removed including 2,278 items categorized as debris. Fifty-nine inert or potentially explosive munitions items were discovered, including four that were blown in place.

Backfill and Site Restoration: Approximately 50,000 tons of treated soil from Demolition Area 1 and other Massachusetts Military Reservation sites were used to backfill the excavation area at Demolition Area 1. Top soil from an adjacent property was added and area was revegetated. Monitoring indicates the vegetation has been successfully re-established

Supplemental Post-Screening Investigation: A Supplemental Post-Screening Investigation was conducted to characterize surface soils outside the perimeter road at Demolition Area 1 and help determine if the perimeter road was the appropriate delineation for the source removal action. Details of this investigation are included in the *Supplemental Post-Screening Investigation Report* (February 2009).



Thermal Desorption Unit

Sampling was conducted at 22 locations outside the perimeter road, but adjacent to the core source area, (see "X"ed boxes on Figure 2) and two locations within the road. The explosive compounds 2,4-DNT, TNT, RDX, and HMX were each detected only once at the sample locations outside the road. Perchlorate was detected at three locations outside the road and one within the road. Semi-Volatile Organic Compounds were detected sporadically at low concentrations. Various metals commonly found in Massachusetts Military Reservation soils also were detected.

Of the concentrations detected outside the perimeter road during the Supplemental Post-Screening Investigation only the individual detections of lead, 2,4-DNT and RDX were above state cleanup standards. The low frequency of detections suggests that a widespread source of contamination is not present. Because the detections outside the perimeter road are sparse and of relatively low concentrations, the detections appear to represent the outer edges of the area impacted by Demolition Area 1 activities.



During excavation



Post excavation.

SUMMARY

The Draft Demolition Area 1 Decision Document Addendum presents a no further action decision for the source area based on the following factors

- The Demolition Area 1 rapid response action removed the significant sources of contamination from within the perimeter road.
- The Post-Screening and Supplemental Post-Screening investigations did not discover other significant sources of contamination.
- The capture zone for the Demolition Area 1 treatment system envelopes the source area.
- The long-term monitoring program, in place as part of the Demolition Area 1 groundwater remedy would confirm that the source area, including any areas outside the perimeter road, are not contributing to groundwater contamination.

Given these factors and the low risk deriving from this portion of the site, the groundwater monitoring and land-use controls already in place are expected to ensure protection of human health, the environment, and the aquifer from any residual source contaminants.

PUBLIC AND REGULATORY INVOLVEMENT

Details of the investigation and source removal actions were regularly briefed to the public during meetings of citizens' advisory groups including the Impact Area Review Team, Senior Management Board, and more recently, the MMR Cleanup Team. Information also was made available through fact sheets, media releases, advertisements, poster board sessions and meetings with town officials.

Following a briefing on the response action plan, a public comment period was held in February 2003. The Draft Decision Document Addendum was briefed to the public in May 2009. The removal action and decision document addendum were conducted pursuant to EPA Administrative Orders issued under the federal Safe Drinking Water Act and includes consideration of the clean up standards set forth under Massachusetts General Laws, M.G.L. c. 21E and 310 CMR 40.0000, the Massachusetts Contingency Plan (MCP).



Post restoration

OPPORTUNITIES FOR PUBLIC COMMENT

A 30-day informal public comment period on the *Decision Document Addendum No. 1 Demolition Area 1 Source Area* will be held from **June 17 through July 17, 2009**.

The Addendum will be available for review on the EPA Web site:

www.epa.gov/ne/mmr

Other related Demolition Area 1 documents available on the Web site will include:

- *Decision Document Demolition Area 1 Groundwater Operable Unit*
- *Demolition Area 1 Source Area Completion of Work Report, including the Supplementary Post-Screening Investigation Report*

These documents also will be available at:

groundwaterprogram.army.mil:

Comments can be submitted as follows:

- By fax to: 617-918-0028
 - By mail to: Jim Murphy
EPA
One Congress Street, 11th Floor
(Mailcode: ORA)
Boston, MA 02114
- By e-mail to: murphy.jim@epa.gov

FOR MORE INFORMATION

Contact the following individuals for more information:

Kris Curley – IAGWSP -508-968-5626 Ellie Grillo – MassDEP - 508-946-2866 Jim Murphy – EPA - 617-918-1028

Or visit the Impact Area Groundwater Study Program Web site at: groundwaterprogram.army.mil

Information repositories have been established in local public libraries to make information on the program available to the public. The repositories are updated to ensure that the most recent documents including copies of work plans, sampling results, site reports, fact sheets, meeting minutes and other materials are available.

The repositories are located at:

Falmouth Public Library	Sandwich Public Library	*Jonathan Bourne Library
123 Katharine Lee Bates Road	142 Main Street	19 Sandwich Road
Falmouth, MA 02540	Sandwich, MA 02563	Bourne, MA 02532

*A complete repository of documents related to the program is available at this library and on the CLAMS system.

This fact sheet was developed by the Impact Area Groundwater Study Program in coordination with the EPA and the MassDEP.