United States Environmental Protection Agency
Region 1

Decision Document
Addendum No. 1
Demolition Area 1 Source Area

Camp Edwards
Massachusetts Military Reservation
Cape Cod, Massachusetts

August 2009

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Decision Document
Addendum No. 1
Demolition Area 1 Source Area

A. SITE NAME

The subject site is the Demolition Area 1 (Demo 1) location (Figure 1) within Camp Edwards at the Massachusetts Military Reservation (MMR). The site source area includes the area within a 7.4-acre natural topographic depression surrounded by a perimeter road, and the area immediately outside the perimeter road consisting of approximately 3.3 acres (Figure 2).

A 9,000-foot long by 1,000-foot wide by 60-foot deep area of groundwater contaminated by explosives and perchlorate is migrating from the site (Figure 3). This groundwater contamination was initially addressed in 2004 by an interim response action that consisted of a pump and treat system that extracted and treated 460,000 gallons of groundwater per day. That system, which included two extraction and three injection wells, along with four modular treatment units, operated until June of 2007 when it was replaced by the more comprehensive treatment system outlined in the *Demolition Area 1 Groundwater Operable Unit Decision Document* dated November 12, 2006 (Decision Document). The comprehensive system treats and reinjects 1.3 million gallons of water a day using five extraction wells, four injection wells, one modular treatment unit and a permanent treatment facility. It is expected to restore the groundwater to risk-based levels by 2018.

B. STATEMENT OF BASIS AND PURPOSE

This Addendum No. 1 (Addendum) to the Demolition Area 1 Groundwater Operable Unit Decision Document dated November 12, 2006 (Decision Document) modifies the Decision Document to include the response actions taken to address contaminated soil, munitions and explosives associated with the Demolition Area 1 source area. The source area includes both soil and munitions that may be in or on the soil. As explained in more detail below, this Addendum reflects EPA's decision that no further remedial action for the Demolition Area 1 source area is necessary. EPA has reached this decision because previous response actions have removed the majority of contaminants that may pose a threat to the aquifer and the continued operation of the groundwater treatment system is expected to effectively treat any additional groundwater contamination that might result from any residual source contaminants.

This Addendum supplements, incorporates, and is incorporated into and made part of the Decision Document, and every requirement in this Addendum is enforceable as a requirement of the Decision Document. The Decision Document contains the Demolition Area 1 site description, site history, site characteristics, site uses, site risks, groundwater alternatives, selected response action, community participation, and state role.

The Demolition Area 1 Groundwater decision was expedited to ensure rapid cleanup of groundwater contaminated with explosives and propellants at the site. The Decision Document announced a decision in November 2006 and by June 2007, a pump and treat system cleaning 908 gallons per minute was operational. The Demolition Area 1

groundwater remedy has cleaned more than a billion gallons of groundwater through March 2009.

The source area was addressed by a source response action in 2004. Approximately 27,000 tons of soils contaminated with explosives and propellants were excavated from the area inside the perimeter road and either treated on-site or sent off-site for disposal. The *Draft Demolition Area 1 Soil Rapid Response Action and Soil Operable Unit Closeout Report* was issued in December 2005 to document that no further action relating to soil contamination was necessary within the perimeter road. However, when that report was issued, investigations outside of the perimeter road had not yet been completed, documented, or reviewed by regulators. This additional investigation was necessary to confirm that the source area was adequately addressed. Results from the Supplemental Post-Screening Investigation Report were incorporated into the *Demolition Area 1 Source Area Completion of Work Report* (USAEC 2009). This addendum documents the initial response action, additional investigation and final selected response for the Demolition Area 1 Source Area.

This selected response was chosen in accordance with section 1431(a) of the Safe Drinking Water Act (SDWA), 42 U.S.C. § 300i(a), as amended, and with the Administrative Order concerning response actions issued thereunder, U.S. Environmental Protection Agency Region 1 (EPA) Administrative Order No. SDWA-1-2000-0014 (AO3), including consideration of the substantive cleanup standards of the Massachusetts Contingency Plan 310 CMR 40.0000. The Regional Administrator of EPA Region 1 has been delegated the authority to select the necessary response action pursuant to EPA Delegation No. 9-17 (1200-TN-350) dated May 11, 1994.

This decision is based on the Administrative Record, which has been developed in accordance with AO3 and with a previous EPA Administrative Order, SDWA 1-97-1019 (AO1), requiring investigation of contamination at the Training Ranges and Impact Area. This Administrative Record is available for review at the Impact Area Ground Water Study Program (IAGWSP) office, 1803 West Outer Road, Camp Edwards, MA.

This EPA decision is issued pursuant to the SDWA and AO3. EPA's decision that no further source area remedial response is necessary reflects EPA's conclusion that any groundwater contamination that might be caused by any remaining source area contamination will be adequately addressed by the groundwater remedy described in the Decision Document. However, neither the Decision Document nor this Addendum reflects any decision, or forecloses future action under legal authorities other than the SDWA, relating to non-groundwater risks (e.g., explosive safety risks, ecological risks, dermal contact risks, and/or soil ingestion risks) that could potentially result from any remaining source contamination.

C. ASSESSMENT OF THE SITE

Since 1997, approximately 950 soil samples were collected from the Demolition Area 1 site during various investigations. This investigation and soil sampling determined that soil contaminated with explosives and propellants and a significant amount of metallic debris were present within the perimeter road that surrounds the Demolition Area 1 site. The following seven primary contaminants of concern (COCs) were identified within the source area:

- Hexahydro-1, 3, 5-trinitro-1,3, 5-triazine (RDX);
- Octahydro-1, 3, 5, 7-tetranitro-1, 3, 5, 7-tetrazocine (HMX);
- 2-amino-4, 6-dinitrololuene (2A-DNT);
- 4-amino-3, 6-dinitrotoluene (4A-DNT);
- 2, 4, 6-trinitrotoluene (TNT);
- 2, 4-dinitrotoluene (2,4-DNT); and
- Perchlorate.

In Spring 2002, a Post-Screening Investigation was conducted in the Demolition Area 1 source area to determine if the extent of contamination had been adequately delineated. This investigation included a geophysical survey of the area outside the perimeter road and the excavation and removal of anomalies that were potential unexploded ordnance (Figure 4.) No unexploded ordnance or burials were found, but the findings from the Post-Screening Investigation 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.

In 2003, a Supplemental Post-Screening Investigation was conducted in the area outside the perimeter road to determine the lateral extent of contamination. The Supplemental Post-Screening Investigation concluded that while there were some limited areas of soil contamination outside the perimeter road, the area inside the perimeter road delineated the extent of the significant contamination in soil at Demolition Area 1.

D. DESCRIPTION OF COMPREHENSIVE RESPONSE ACTION

The Decision Document set forth the selected response action for the remediation of the plume of groundwater contamination emanating from the Demolition Area 1 site. An initial groundwater treatment system was installed in 2004 with a more comprehensive system installed in 2007. A source area response action was undertaken in 2003 to eliminate any continuing source of explosives and propellants to groundwater.

1. Source Response Action

A source removal action was conducted by the IAGWSP to address the contaminated soil and geophysical anomalies within the perimeter road (Figure 5). The objective of this action was to eliminate potential sources contributing to groundwater contamination at Demolition Area 1 through the removal of explosives, munitions and soil contaminated with explosives and propellant. The scope of the source response action was developed and presented in the *Draft Rapid Response Action / Release Abatement Measure Plan, Demo 1 Soil OU* (2003) (*Draft RRA Plan*).

This Plan was briefed to the Impact Area Review Team on February 5, 2003 and the Senior Management Board on March 26, 2003. Routine updates were provided at the Impact Area Review Team and Senior Management Board meetings throughout 2003 and 2004 during the soil response action. A public comment period was also held in February 2003. The response action was conducted pursuant to United States EPA Administrative Orders AO1 and AO3, issued under the federal SDWA.

The major fieldwork components of the Demolition Area 1 source area response action included:

- Pre-Excavation Anomaly Removal (Munitions and metal clearance);
- Soil Excavation;
- Burn Pit Excavation;
- Soil Screening, Treatment and Disposal;
- Post-soil-excavation Geophysical Investigation and Anomaly Removal; and
- Backfill and Site Restoration.

a. Pre-Excavation Anomaly Removal: Metal clearance commenced in July 2003 and was performed up to a depth of 24-inches below ground surface (bgs) prior to soil excavation with earth moving machinery. After all metal debris was cleared, the area was excavated to a depth of 12-inches bgs. This was followed by a subsequent clearance of munitions to a depth of 24-inches bgs as required for additional excavation. This procedure was repeated until the soil excavation was complete. During this operation, 11,388 inert or potentially explosive munitions were removed, 23 of which were blown in place.

b. Soil Excavation: Approximately 3.3 acres of the depression were excavated to a depth of one foot, 0.8 acres were excavated to a depth of two feet, and 0.8 acres were excavated to a depth of eight feet. The center of the natural depression was excavated until natural undisturbed soil was encountered. A four-foot deep test trench was excavated in the depression so that the underlying soils could be observed. Inspection of the test trench confirmed that the excavation had been completed to previously undisturbed native soil. After the prescribed depths of excavation were reached, confirmation samples were collected and analyzed for explosives. The sample results were reviewed to ensure that the residual RDX concentration was not greater than 120 µg/kg, the sampling method reporting limit, and perchlorate concentrations were not greater than 4.0 µg/kg. Given the focus upon addressing soil contamination that may adversely impact the aquifer, EPA adopted conservative soil cleanup values that assured that the groundwater remediation goals would be met or surpassed.

c. Burn Pit Excavation: A total of 15 burn pits were discovered during the metal debris clearance and excavation activities. Thirteen of these burn pits were discovered within the center of the depression defined by the 110-foot topographic contour line. The other two were located along the edge of the depression between the 110-foot and 120-foot topographic contour lines. A soil characterization sample was collected from each burn pit during removal of burn pit items and soils. Once all items and stained soils were removed from the pit, a post-soil-excavation confirmation sample was collected from the soils remaining after excavation. The excavated soil was containerized and sent off-site for disposal based on results of characterization sampling.

d. Soil Screening, Treatment and Disposal: The final excavation volume from Demolition Area 1 was approximately 18,500 cy (27,000 tons). A majority of the excavated soil was processed in the Thermal Treatment Unit. Samples of treated soil were collected and analyzed for explosives and perchlorate to ensure that the soil treatment criteria (i.e., RDX less than 120 µg/kg; perchlorate less than 4.0 µg/kg) for backfill were met. Soils not meeting these criteria were treated again. After successful treatment, the soils were used as backfill at Demolition Area 1.

All the burn pit soils and some response action soils were transported off-site for appropriate disposal based on the results from respective characterization samples. A total of approximately 830 tons of soil was transported off-site as non-hazardous waste and a total of approximately 150 tons was sent off-site as hazardous waste. This included soil that exceeded the Toxicity Characteristic Leaching Procedure for lead, contained high concentrations of lead or mercury or were from quadrants or blow-in-place sites excavated after the thermal treatment unit was demobilized from the site.

Confirmation samples from the base of the excavation and burn pit show that no detectable concentrations of RDX remain in the core source area (i.e., within the perimeter road). Only one explosive compound, HMX, was detected in soils that remain at the site. The HMX concentrations detected at three separate locations (760, 760 and 130 µg/kg) are all below state cleanup (i.e. MassDEP Method1 S-1/GW-1) standards. The highest concentration of perchlorate remaining (2.5 µg/kg) is below the reporting limit of the analytical method and state cleanup standards.

e. Post-soil-excavation Geophysical Investigation and Anomaly Removal: Geophysical surveys were performed within the perimeter road after all excavation and sampling were completed. Results from the surveys were used to identify and remove sub-surface anomalies that may have remained after soil removal and the initial clearance. The anomaly investigation resulted in removal of 59 inert or potentially explosive munitions items, four of which were blown in place.

f. Backfill and Site Restoration: After all response activities were completed, approximately 35,000 cubic yards of treated soil was backfilled. This soil includes approximately 18,000 cubic yards from Demolition Area 1 and 17,000 cubic yards from other sites at MMR that were treated for explosives and perchlorate in the thermal treatment unit during 2004 and 2005. All of this soil was analyzed for explosives and perchlorate after thermal treatment and the analytical results indicated that the project remediation goals were achieved.

g. Pre-excavation samples from four Demolition Area 1 quadrants had concentrations of lead above the Method 1 S-1/GW-1 standard of 300 mg/kg. However, the average concentrations of lead in soil excavated from those quadrants and treated in the thermal desorption unit were below the Method 1 S-1/GW-1 standard. The average concentration for lead in all the Demolition Area 1 quadrants treated by thermal desorption was 59.2 mg/kg.

   Pre-characterization samples collected from the soil from all the other sites treated in the thermal desorption unit were analyzed for lead to comply with state air-emission regulations. The average lead results for each site were below Method 1 S-1/GW-1 standards. The average concentration from all the sites, including Demolition Area 1, was 86 mg/kg.

   Only one sample from the Supplemental Post-Screening Investigation had a detection of lead above the MCP Method 1 S-1/GW-1 Standard. Based on the vertical averaging of the lead concentrations from this grid the average lead concentration (193 mg/kg) was below the Method 1, S-1/GW-1 soil standard (300

mg/kg). Soil from another Supplemental Post-Screening grid where lead was detected above the Method 1 S-1/GW-1 standard was removed as part of the soil response action. Although there is no post-excavation confirmation sample for lead in that grid, the deepest pre-excavation sample result at the 0.5 to 1-foot depth in that grid was below the Method 1 S-1/GW-1 standard.

Exposure Point Concentrations (EPCs) for lead in soil were calculated using the arithmetic average. The calculated EPC is below the state cleanup standard for lead.

2. Supplemental Post-Screening Investigation

A Supplemental Post-Screening Investigation was conducted in October to November 2002 to collect additional data to characterize the surface soils outside the perimeter road at Demolition Area 1 (Figure 6). Sampling conducted as part of this investigation identified low levels of propellants, explosives and metals in soil at locations outside the perimeter road, but adjacent to the core source area. Details of this investigation are included in the *Supplemental Post-Screening Investigation Report* (February 2009).

Explosive compounds (2,4-DNT, TNT, RDX, and HMX) were detected at two of the 22 sample locations. Perchlorate was detected at four sample locations. Semi-Volatile Organic Compounds were detected sporadically at low concentrations. Various metals commonly found in MMR soils were also detected.

The Supplemental Post-Screening Investigation results supported the conclusion that the extent of significant contamination in soil at Demolition Area 1 was confined to the area inside the perimeter road and that the perimeter road formed an appropriate line of delineation for the excavation conducted during the source area response action. The investigation also concludes that the residual contaminants identified outside the perimeter road would be unlikely to cause groundwater contamination at levels that would interfere with restoration of the aquifer or pose an unacceptable risk to human health from groundwater.

3. Alternatives to Address Area Outside of Perimeter Road

A number of alternatives were considered for addressing the soil contaminants identified outside the perimeter road at Demolition Area 1. The concentrations of contaminants in most of the soil samples were below detection limits or below the state cleanup standards. 2,4-DNT was detected in two of 73 soil samples at concentrations of 0.77 and 1.1 mg/kg, above the state standard of 0.7 mg/kg. These sporadic detections are consistent with the conceptual site model and are not likely to pose a significant groundwater impact.

Four alternatives for addressing the residual contaminants in Demolition Area 1 soil were considered in accordance with the criteria set forth in AO3 and in Part II.K of the Decision Document:

a. **Leave soils in place to weather and degrade through natural processes and to use the ongoing groundwater monitoring program being conducted as part of the groundwater response action to confirm that these compounds do not cause unacceptable groundwater contamination.** This alternative,

which EPA has selected, is consistent with the findings of the Supplemental Post-Screening Investigation. Those findings indicated that the contaminant concentrations outside the Demolition Area 1 perimeter road would be unlikely to leach to groundwater at levels that would pose an unacceptable human health risk. This alternative is protective of human health and the environment, including preservation of the aquifer as a public drinking water supply; complies with federal and state requirements; is effective in both the short and long term; is easily implemented; and involves low costs. While it does not involve further reduction of toxicity, mobility, or volume of contaminants through treatment (beyond that already achieved through the source response action described above in Part D.1), given the low risk of additional groundwater contamination deriving from this portion of the site, EPA finds it appropriate to rely on groundwater monitoring and land use controls to prevent exposure to any such contaminated groundwater. As part of the five-year reviews required by Part II.M of the Decision Document, the IAGWSP will assess whether soil contamination outside the perimeter road is contributing to groundwater contamination at levels higher than anticipated, or if new information suggests that the human health risks from any such contamination are higher than previously determined. EPA may revisit the appropriateness of this aspect of the Demolition Area 1 remedy during the five-year review or before such a review if new information warrants.

b. **Removal of the soils containing this residual contamination.** This alternative would require clearing vegetation and excavating soil. The soil would then be transported to a landfill for off-site disposal. This alternative is, in theory, the most protective with respect to groundwater, maximizes reduction of toxicity through treatment, and minimizes residual risk, because it would aim at removing all known sources of contaminated soil that might potentially leach to groundwater. In addition, it complies with federal and state requirements, and, in combination with continued groundwater monitoring and land use controls, would be at least as effective in the short and long term as the first alternative. However, this alternative was not selected because the results of the Supplemental Post-Screening Investigation have shown that the soil contaminant concentrations detected in 2002 outside the Demolition Area 1 perimeter road would be unlikely to leach to groundwater at levels that would pose an unacceptable human health risk. In addition, the contaminants likely exist as widely distributed small particles and there is no way to ensure that a soil removal action would remove every particle. Thus, while removal of a given section of soil is implementable, a response action defined as removal of all (or even most) contaminated soil is substantially less implementable. For the same reasons, it is uncertain that soil removal would be any more effective in the short term or long term than the first alternative. Given the doubts regarding the additional marginal effectiveness of such an alternative, and in light of the low residual risk from the soil contamination, the impacts to the natural environment from the soil removal action itself, and the additional cost, EPA did not select this alternative.

c. **Conduct additional soil characterization outside of the perimeter road using a revised multi-increment sampling approach.** This option, which is not itself a remedial alternative but rather a proposal for further investigation, was rejected because it is unlikely that additional sampling would provide a more useful understanding of the distribution of contaminants. The existing data are

consistent with the conceptual site model and provide the information necessary to reach a decision.

d. **Consider the contaminants outside the perimeter road as a separate operable unit from the area within the perimeter road.** This alternative, which is not itself a remedial alternative but rather an administrative mechanism, was evaluated to streamline the closure of the Demolition Area 1 source area within the perimeter road. This approach would leave the closure of the area outside the road for a later time. The contaminants detected outside the perimeter road during the Supplemental Post-Screening Investigation are consistent with contaminants found within the source area and are at much lower concentrations. There does not appear to be a separate source outside the perimeter road. The Supplemental Post-Screening Investigation concluded that the contaminants detected are related to Demolition Area 1 activities and that the perimeter road was appropriate as the limit of the response action excavation. While the area sampled in the Supplemental Post-Screening Investigation could be managed separately from the Demolition Area 1 source area, there seems to be no advantage in doing so since the Supplemental Post-Screening Investigation does not suggest a need for further active remediation.

Based on the data generated from the Supplemental Post-Screening Investigation, the detected contaminant concentrations in soil do not warrant any further assessment or remediation. The ongoing groundwater monitoring will provide adequate assurance that the remaining soil contamination does not interfere with restoration of the aquifer or pose an unacceptable risk to human health. In addition, the limited locations, extent, concentrations, and mobility of the contamination identified in the Supplemental Post-Screening Investigation support the conclusions in the *Completion of Work Report* that the response action's and the SDWA AOs' objective of eliminating potential threats to the groundwater aquifer and public health has been achieved.

4. Land Use Controls

A complete description of Land Use Controls are found in Part II.L of the Decision Document, however the areal extent of the land use controls was not specified completely. This addendum provides clarification of the extent of the land use controls which encompass the source area, the groundwater plume, and a zone of land outside the source area and the plume. Figure 7 replaces Figure 2 in the original Decision Document and is a graphical depiction of the aerial extent of land-use controls as of June 2009 for the Demolition Area 1 source area and groundwater plume. This map will be updated, as necessary, as part of the Environmental Monitoring Report to reflect changes in the plume.

E. DETERMINATIONS

The comprehensive source area response action selected in this Addendum includes the removal of 27,000 tons of material under a response action and groundwater monitoring of minor, residual contamination at the outer fringes of the site. The removal work has been completed. The groundwater monitoring and land use controls will continue to be implemented as described in Part II.L of the Decision Document.

This response action will protect the public health from any endangerment which may be presented by the presence or potential entry of COCs into an underground source of drinking water from the Demolition Area 1 source. In addition, with the implementation of the land use controls under this response action, no COCs will present a significant human health risk. Finally, continued monitoring of and operation of the groundwater treatment system for the Demolition Area 1 plume is expected to ensure protection of the aquifer from any additional groundwater contamination that might result from any residual source contaminants.

The response actions meet current applicable federal and state requirements.

As required by AO3, the selected remedy provides a level of protection to the aquifer underlying and downgradient of the Demolition Area 1 source area. EPA has determined that the response actions have achieved the objectives set forth in SDWA § §1431(a), 42 U.S.C. § 300i(a) and the AOs.

The selected response includes a periodic review at a frequency not to exceed five years. At each review, relevant data will be provided for EPA review to determine if additional measures are necessary for the protection of public health.

MassDEP has concurred with EPA's decision and has determined that no further response actions are necessary at the Demolition Area 1 source area in order to achieve the level of protection to public health, safety, welfare and the environment required under M.G.L. c.21E and 310 CMR 40.0000, the Massachusetts Contingency Plan.

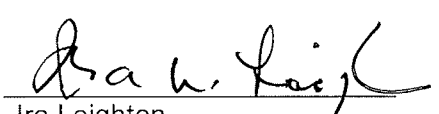
F. SUPPORTING DATA

Detailed information on the site and source area is included in the original Decision Document dated November 1, 2006 and the Final Source Area Completion of Work Report dated February 25, 2009. The *Completion of Work Report* includes the Supplemental Post-Screening Investigation results, which are included as Appendix F. Additional information is found in the Administrative Record for the site.

G. AUTHORIZING SIGNATURE

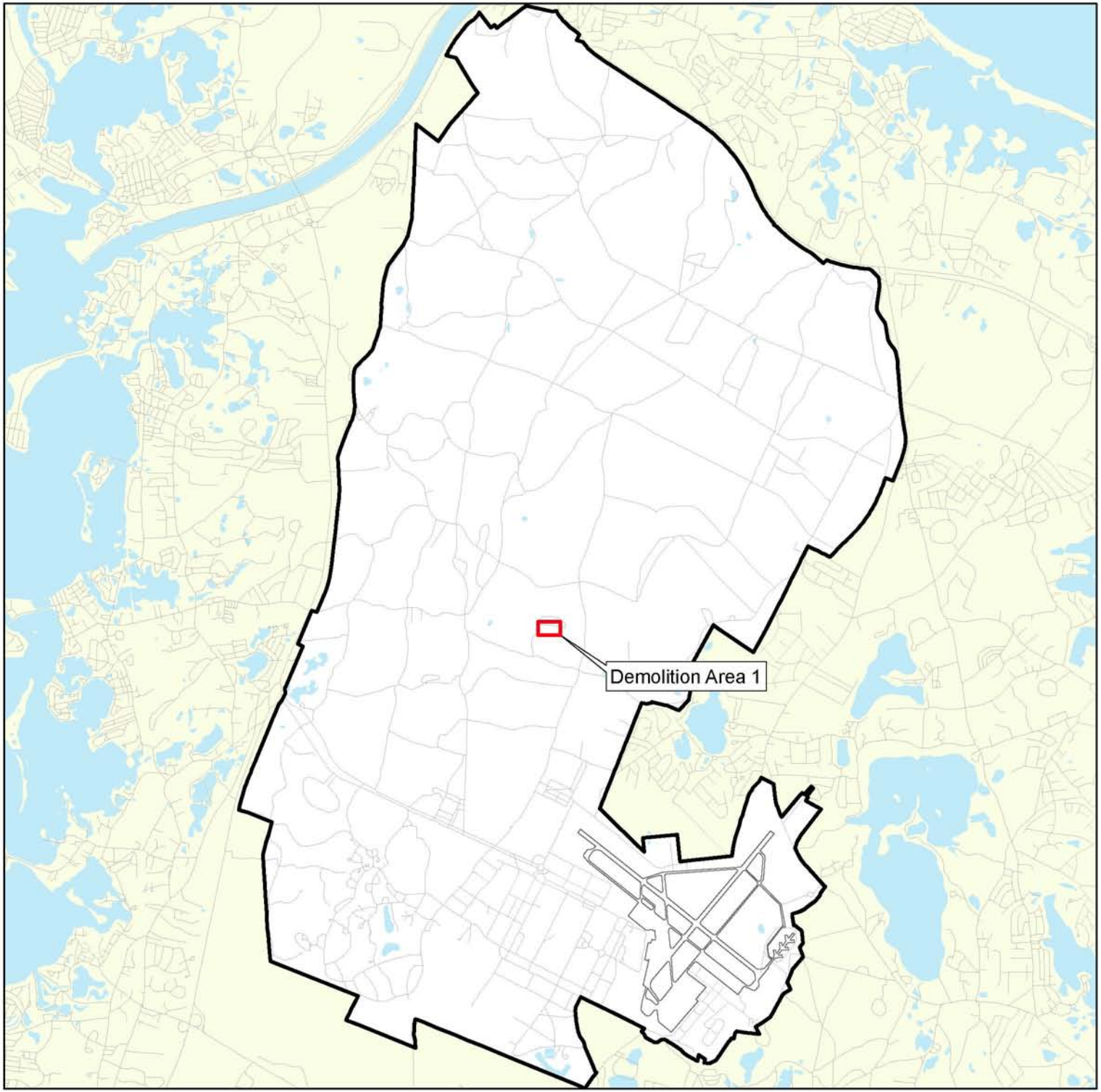
This Addendum modifies the Decision Document to document the selected response action taken to address soil contamination associated with the Demolition Area 1 source area. The response action was selected by the U.S. Environmental Protection Agency under the authority of the Safe Drinking Water Act. The Massachusetts Department of Environmental Protection concurs with this decision.

U.S. Environmental Protection Agency

By:  Date: 9/29/09

Ira Leighton
Acting Regional Administrator
Region 1

FIGURES



Impact Area
Groundwater Study Program

LEGEND

MMR Boundary

LOCATION MAP

NOTES & SOURCES

Basemap data from US Geological Survey 7 1/2 minute
Topographic Maps: Source: MassGIS
Aerial Photos: Color Digital Orthophotos; Date Flown: 2002
Source: EarthData International

TITLE

Demolition Area 1 Location

0 6,250
Feet

N

US Army Corps of Engineers
New England District

DRAFT

FIGURE
1

M:\MMR\2008\Demo1\COWR\PSI\MXDs\Fig1_021109.pdf
M:\MMR\2008\Demo1\COWR\PSI\MXDs\Fig1_021109.mxd
February 11, 2009 DWN: MTW CHKD: DW

Impact Area Groundwater Study Program

LEGEND

- Monitoring Well
- Demo 1 RRA Groundwater Contours (4/25/07)
- RRA Soil Excavation Area
- Supplemental Post Screening Investigation

LOCATION MAP

NOTES & SOURCES

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

TITLE

Demolition Area 1 Source Area

0 100 Feet

N

US Army Corps of Engineers
New England District

DRAFT

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M:\MMR\2008\Demo1\COVR\PSIMXDs\Fig2_021109.mxd
February 11, 2009 DWN: MTW CHKD: DW

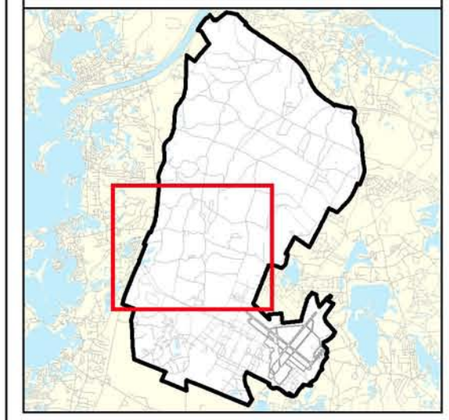
FIGURE 2

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 Photos: Color Digital Orthophotos:
Date Flown: 2002 Source: EarthData International

TITLE

Demolition Area 1 Groundwater Plume
April 2008

0 1,500 Feet

N

US Army Corps of Engineers
New England District

DRAFT

FIGURE 3

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February 13, 2009 DWN: MTW CHKD: DW

371150 371200 371250 371300 371350 371400

4617050 4617000 4616950 4616900 4616850

1 2 3 4 5 6 7 8 9

A B C D E

Note:
Project Remediation Goal: 120 *ug*/kg RDX
Project Remediation Goal: 4.0 *ug*/kg Perchlorate

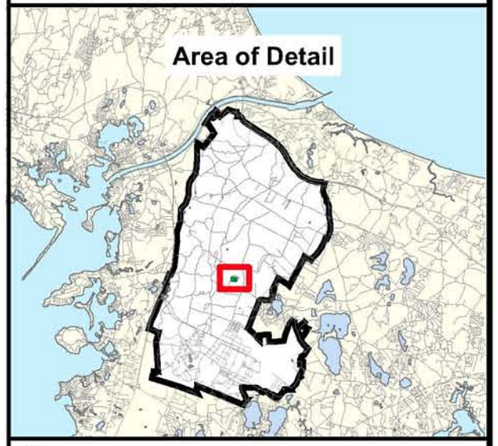
0 50 100 200 Feet

Contract No.	DACW33-02-D-0003
Description	Demo 1 Final Excavation
Coordinate system	NAD 1983, UTM, Zone 19 North in meters
Note	Positional data corrected by Pine Hill Reset LW4668.
Sources	Grids surveyed by Atlantics. MMR boundary and roads provided by MA ARNG.

		Rev.	Date	Approved By
Date	30-NOV-2005			
Drawn By	J. Kim			
Checked By	S. Gangopadhyay			
Approved By				

Legend

- Excavated and met project remediation goals
- Demo 1 Screening Area
- 1 Quad Number
- Excavation Boundary
- 120 ft topographic contour (Pre-excavation)
- 110 ft topographic contour (Pre-excavation)
- Roads
- Grids



Title:

Demo 1
Final Excavation Status Map

Impact Area Groundwater Study Program
Massachusetts Military Reservation
Cape Cod, Massachusetts

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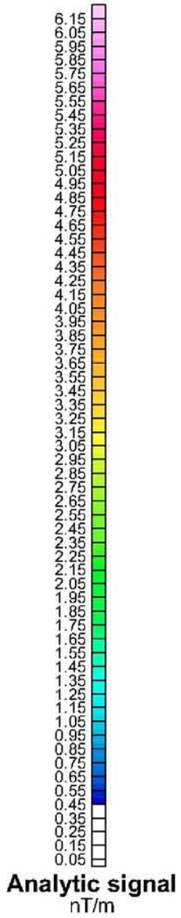
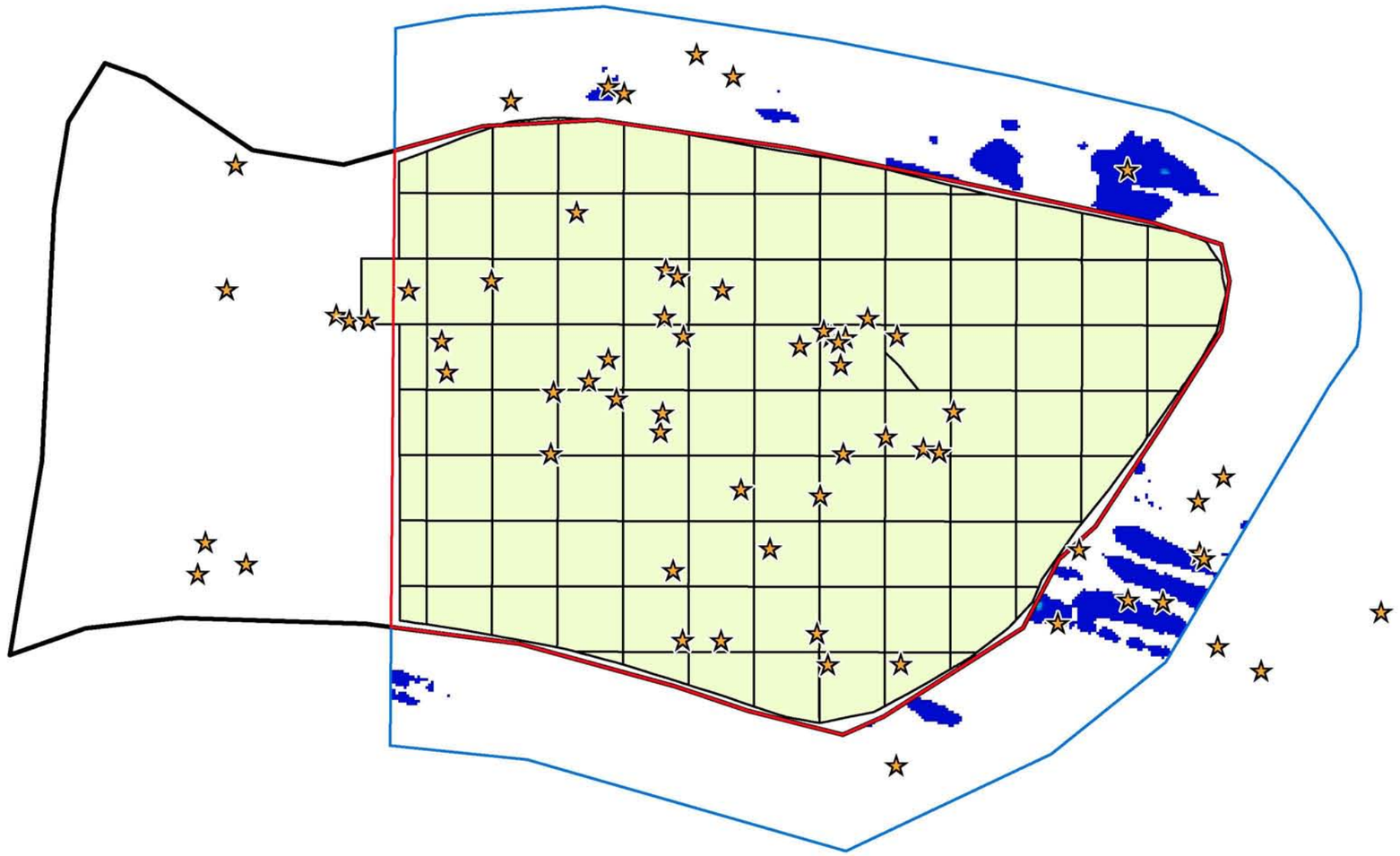


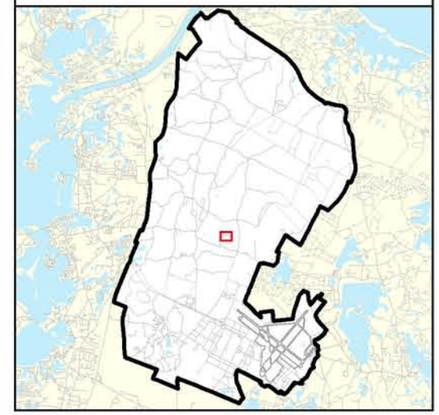


Approximately 190 anomalies were identified outside the perimeter road by the air magnetometer.
Most of these were items on the surface and all metallic items were removed.
Except for one inert 30mm round and some small arms ammunition, the anomalies were wire and scrap steel.

Impact Area Groundwater Study Program

- Excavated Geophysical Anomalies
- Airmag
- RRA Soil Excavation Area
- Supplemental Post Screening Investigation
- Excavated and Met Remediation Goals

LOCATION MAP



NOTES & SOURCES

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

TITLE

Demolition Area 1
Geophysical Anomalies
Outside Perimeter Road

0 100 Feet

N

US Army Corps of Engineers
New England District

DRAFT

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February 24, 2009 DWN: MTW CHKD: DW

FIGURE
5

Impact Area Groundwater Study Program

LEGEND

- 22' x 22' Soil Grid
- Supplemental Post Screening Investigation

LOCATION MAP

NOTES & SOURCES

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

TITLE

Demolition Area 1 Soil Sample Locations for Outside Perimeter Road

0 100 Feet

N

US Army Corps of Engineers
New England District

DRAFT

FIGURE 6

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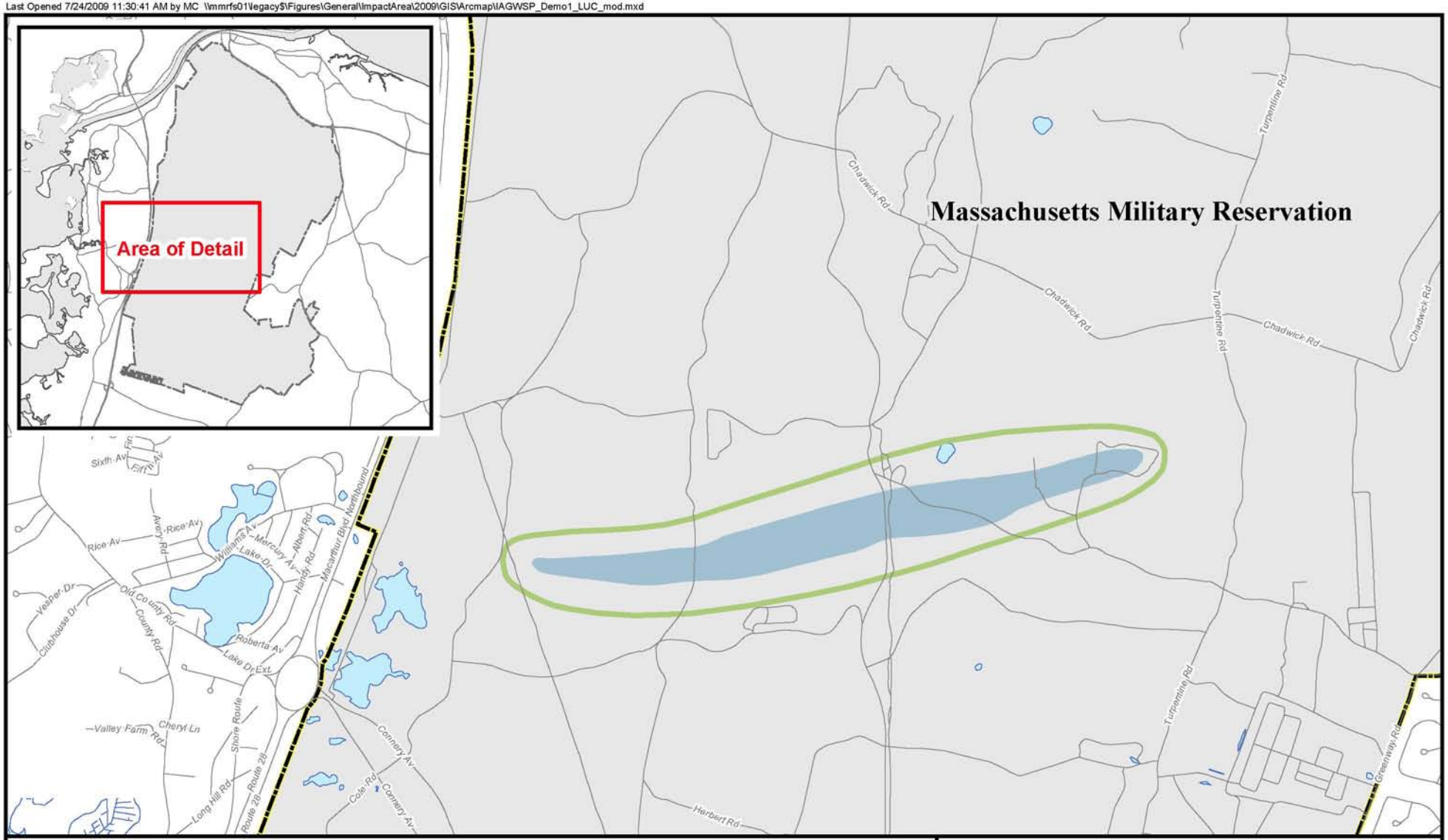

Legend

- Demo Area 1 Plume
- Land Use Control Boundary
- MMR Boundary

Data Source: AFCEE, MMR-AFCEE Data Warehouse and Impact Area Groundwater Study Program

N

0 1,000 2,000 Feet

FIGURE 7

DEMOLITION AREA 1
LAND USE CONTROL AREA
IAGWSP - Massachusetts Military Reservation

CH2MHILL

APPENDIX A.
MassDEP Letter of Concurrence

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST REGIONAL OFFICE
20 RIVERSIDE DRIVE, LAKEVILLE, MA 02347 508-946-2700

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

August 21, 2009

Mr. James T. Owens III, Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency,
New England Office
One Congress Street, Suite 1100
Boston, MA 02114-2023

RE: **BOURNE**
Release Tracking Number: 4-15031
Massachusetts Military Reservation (MMR)
Decision Document Addendum No. 1,
Demolition Area 1 Source Area,
Concurrence

Dear Mr. Owens;

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the document entitled **"Decision Document Addendum No. 1, Demolition Area 1 Source Area"** (DD Addendum), dated August 2009. The DD Addendum presents the response action selected by the U.S. Environmental Protection Agency (USEPA) for the Demolition Area 1 source area, located on Camp Edwards at the Massachusetts Military Reservation (MMR), situated in Bourne, Cape Cod, Massachusetts. The response action was selected by the USEPA in accordance with Section 1431(a) of the Safe Drinking Water Act (SDWA) and USEPA Administrative Order No. SDWA-1-2000-0014 (AO3) 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). The U.S. Army (Army) and the National Guard Bureau (NGB) are Respondents under USEPA AO3.

The source area at Demolition Area 1 is an approximately 7.4 acre site located at Camp Edwards. Contaminants in soil from this area have leached to the groundwater and formed the Demolition Area 1 groundwater plume. The source area was used from the mid 1970s to the late 1980s by the military for the destruction of munitions, demolition training and the destruction of various types of military ordnance using explosives. The predominant explosive compound used in munitions at the site was Royal Demolition Explosive (RDX), followed by 2,4,6 trinitrotoluene. Perchlorate was a component of some munitions, fireworks, rocket propellants, and pyrotechnics that were destroyed at Demolition Area 1. In 2005, Army/NGB performed a Rapid Response Action to remove contaminated soil and munitions items from the Demolition Area 1 source area. Soil was treated on-site by thermal desorption, which uses heat to separate contaminants from the soil and destroy them. Approximately 27,000 tons of contaminated soil was excavated and treated or disposed of off-site. After successful treatment, the soil was staged and eventually used as backfill at Demolition Area 1. The goal of the source area response action was to address contaminated soil, munitions and explosives that could cause contamination of the underlying

groundwater. This included the excavation and treatment of contaminated soil, the removal of burn pits and munitions items and investigation of the area surrounding the excavation. Approximately 44,230 pounds of munitions debris and 11,388 munitions items were detected and removed. A total of 57 potentially explosive munitions items were destroyed by open detonation. Post soil excavation confirmation samples from the base of excavations and burn pits show that no detectable concentrations of RDX remain at the source area. Only one explosive compound, octahydro-1, 3, 5, 7-tetranitro-1, 3, 5, 7-tetrazocine (HMX), was detected in soil remaining at the site. The concentrations of HMX detected are significantly below the MCP Method 1, S-1/GW-1 standard. The highest concentration of perchlorate remaining is below the reporting limit of the analytical method. Based on the investigation results, there are no munitions items and no significant residual contamination in the soil within the excavated area that could potentially pose a threat to human health, safety, welfare or the environment.

In addition, the results of the investigation also support the conclusion that the Demolition Area 1 perimeter road delineates the extent of significant contamination and that the road was an appropriate delineation for the excavation of the source area. Based on the types of contaminants detected and their levels and frequencies of detection, no further assessment or remediation outside the perimeter road is warranted.

MassDEP has reviewed the various response action alternatives and concurs with the USEPA selected response action. MassDEP's review of the analytical results, analysis, and supporting documentation contained in the Administrative Record indicates that no further response actions are necessary at the site in order to achieve the level of protection to public health, safety, welfare and the environment required under M.G.L. c. 21E and the MCP.

MassDEP concurs with the DD Addendum. MassDEP's concurrence with the DD Addendum is based upon representations made to MassDEP by the USEPA and the Army/NGB and assumes that all information provided is substantially complete and accurate. Without limitation, if MassDEP determines that any material omissions or misstatements exist, if new information becomes available, if LUCs are not properly implemented, monitored and/or maintained or if conditions at the Demolition Area 1 Source Area change, resulting in potential or actual human exposure or threats to the environment, MassDEP reserves its authority under M.G.L. c. 21E, the MCP, and any other applicable law or regulation to require further response actions.

In addition, please be advised that MassDEP reserves all rights against the Army/NGB and all other persons to take any civil, criminal, or administrative action including, without limitation, the right to seek injunctive relief, the recovery of money expended or to be expended (plus interest), monetary penalties, criminal sanctions, and/or punitive damages, pursuant to M.G.L. c. 21E, the MCP, or any other applicable law and regulation. Nothing in this letter shall preclude MassDEP from taking any additional enforcement actions, including the issuance of Orders and/or additional actions, as MassDEP may deem necessary, or from requiring the Army/NGB to perform additional activities pursuant to any other applicable law.

Please incorporate this letter into the Administrative Record for the Demolition Area 1 Source Area at Camp Edwards, MMR. If you have any questions regarding this matter, please contact Leonard J. Pinaud, Chief of Federal Facilities Remediation Section, at (508) 946-2871 or Millie Garcia-Serrano, Deputy Regional Director of the Bureau of Waste Site Cleanup at (508) 946-2727.

Sincerely,

Laurie Burt
Commissioner
Massachusetts Department of Environmental Protection

LB/lp

MassDEP Demolition Area 1 DD Addendum Concurrence Letter.doc

ec: David Johnston, Acting Regional Director
Millie Garcia-Serrano, Deputy Regional Director
Leonard J. Pinaud, Chief, Federal Facilities Remediation Section
Rebecca Tobin, Regional Counsel
Mark Begley, Environmental Management Commission
MassDEP Southeast Region
MMR Senior Management Board
MMR Plume Cleanup Team
Upper Cape Boards of Selectmen
Upper Cape Boards of Health

APPENDIX B.
Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS

2,4-DNT	2,4-Dinitrotoluene
AO	Administrative Order
COC	Contaminants of concern
EPA	United States Environmental Protection Agency
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IAGWSP	Impact Area Groundwater Study Program
MassDEP	Massachusetts Department of Environmental Protection
mg	Milligram
mg/Kg	Milligrams per kilogram
MMR	Massachusetts Military Reservation
OU	Operational Unit
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
SDWA	Safe Drinking Water Act
SVOC	Semi-volatile organic compound
TNT	2,4,6-Trinitrotoluene