

DRAFT FINAL

**DECISION DOCUMENT
NO FURTHER RESPONSE ACTION PLANNED
RIFLE RANGE AND NO FURTHER ACTION AREA
MUNITIONS RESPONSE SITES
AT THE
OTIS GUN CLUB MUNITIONS RESPONSE AREA
JOINT BASE CAPE COD, MASSACHUSETTS**

October 2024



Air Force Civil Engineer Center
322 E. Inner Road
Otis Air National Guard Base, Massachusetts 02542

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
AFCEC	Air Force Civil Engineer Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CSE	Comprehensive Site Evaluation
CSM	Conceptual site model
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DMM	Discarded military munitions
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
ft	feet
in.	inches
IRP	Installation Restoration Program
IS	Incremental sampling
JBCC	Joint Base Cape Cod
LUC	Land use control
MAARNG	Massachusetts Army National Guard
MassDEP	Massachusetts Department of Environmental Protection
MC	Munitions constituents
MCP	Massachusetts Contingency Plan
MEC	Munitions and explosives of concern
mg/kg	Milligram per kilogram
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Contingency Plan
NFRAP	No Further Response Action Planned
NGB	National Guard Bureau
NHESP	Massachusetts Natural Heritage and Endangered Species Program
NPL	National Priorities List
RSL	Regional screening level

S-1	Soil-1
SAA	Small arms ammunition
SC	Site Closeout
SI	Site inspection
USAF	U.S. Air Force
U.S.C.	United States Code
UU/UE	Unlimited use/unrestricted exposure
UXO	Unexploded ordnance

DECLARATION

Site Names and Location

Site Name: Rifle Range and No Further Action Area Munitions Response Sites (MRS) at the Otis Gun Club Munitions Response Area (MRA)
Installation/Location: Joint Base Cape Cod (JBCC), Barnstable County, Massachusetts
Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Information System Number for JBCC: MA2570024487

Statement of Basis and Purpose

This selected action addresses two Military Munitions Response Program (MMRP) sites, the Rifle Range MRS and the No Further Action Area MRS at the Otis Gun Club MRA. This decision is based on the results of the Final Comprehensive Site Evaluation (CSE) Phase II Report JBCC, Massachusetts (Air Force Civil Engineer Center [AFCEC] 2018). This Decision Document has been developed for the MMRP in accordance with the Defense Environmental Restoration Program (DERP) statute, 10 U.S. Code (U.S.C.) 2701, et seq. consistent with the CERCLA, 42 U.S.C. 9601, et seq. and Executive Order 12580 (52 Federal Register 2923), and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300.

The Department of Defense (DoD) designed the MMRP to follow the CERCLA process to address the remediation of munitions constituents (MC) and munitions and explosives of concern (MEC). MC, as defined in 10 U.S.C. Section 2710, are any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. MEC includes UXO, DMM, and MC present in high enough concentrations to be an explosive hazard. Defense sites are defined in 10 U.S.C. Section 2710 as locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions.

The CSE Phase II Report is analogous to a CERCLA Site Inspection (SI) Report. The Federal Facility Agreement (FFA) for JBCC (with U.S. Environmental Protection Agency [EPA], amended 2002) states in Section 3.1, (jj): "...If a Site Inspection determination that no further action is warranted, a Decision Document shall be prepared to remove the Study Area from the remedial process."

In accordance with Executive Order 12580, the U.S. Air Force (USAF) is the lead agency for CERCLA response actions at JBCC, including this No Further Response Action Planned (NFRAP) for the Rifle Range MRS and the No Further Action Area MRS at the Otis Gun Club MRA. JBCC (formerly known as the Massachusetts Military Reservation) was added to the National Priorities List (NPL) in 1989 as Otis National Guard/Camp Edwards. The CERCLA Information System number for JBCC is MA2570024487. An FFA, which provided the legal framework for investigating and remediating numerous operable units at the JBCC, was signed

in 1991. In 1996, the FFA was amended to add the USAF as the lead agency for the cleanup at JBCC (EPA et al. 1991, 2002).

The FFA, as amended, requires the USAF to implement CERCLA requirements at JBCC. In addition to the USAF, the EPA and National Guard Bureau are parties to the FFA for the JBCC. The USAF is managing the soil and groundwater contamination sites under the Installation Restoration Program (IRP) and MMRP in accordance with CERCLA as required by the DERP. The Massachusetts Department of Environmental Protection (MassDEP) is not a signatory of the FFA but is an active participant in the cleanup process and provides guidance and input to the remedy selection and oversight process.

Description of the Decision

Based on the conditions at the Rifle Range MRS and the No Further Action Area MRS, the USAF has determined: (1) there is no evidence of MEC or MC and (2) the MRS does not present a risk to human health or the environment (inclusive of soil and groundwater) for MC (metals). Therefore, a no further action decision is appropriate under CERCLA for MEC and MC, and the Rifle Range MRS and the No Further Action Area MRS can be classified as NFRAP.

Determinations

This NFRAP Decision Document represents the selected decision for MEC and MC associated with the Rifle Range MRS and the No Further Action Area MRS at the Otis Gun Club MRA developed in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act and the NCP. The USAF has reviewed the results of site specific MC investigation data and has determined that no further action for MC at the Rifle Range MRS and the No Further Action Area MRS is protective of human health and the environment. Site data confirmed the conceptual site model (CSM) because there was no source of MEC associated with the historic small arms use of the Rifle Range MRS and the No Further Action Area MRS. Therefore, all MEC and MC pathways through soil are incomplete to all receptors (humans), and the USAF recommends no further action and Site Closeout (SC) to unlimited use/unrestricted exposure (UU/UE) for this MRS.

The NFRAP decision points associated with the MMRP have been met, and therefore, both MRSs qualify for SC for MEC and MC. SC signifies that the Rifle Range MRS and the No Further Action Area MRS at the Otis Gun Club MRA meet UU/UE conditions and that no Land Use Controls (LUCs) are required. Note that sites that meet similar closure conditions under the MassDEP Massachusetts Contingency Plan (MCP)¹ are referred to as achieving a “Permanent Solution with No Conditions” (310 Code of Massachusetts Regulations [CMR]40.1041 [1]) for those hazardous substances subject to this Decision Document. The foregoing represents the Draft Final NFRAP decision for MEC and MC at the Rifle Range MRS and the No Further Action Area MRS by the USAF issued after review by EPA and MassDEP. Based on public comments EPA will review the document for concurrence under the terms of the FFA. MassDEP

¹ Massachusetts Department of Environmental Protection (MassDEP) 2020. Massachusetts Contingency Plan, 310 CMR 40. March. <https://www.mass.gov/doc/310-cmr-40-massachusetts-contingency-plan/download>.

will provide a letter either supporting or opposing the final determination after the public comment period (to be included as **Attachment A** to the final document).

The selected action outlined in this NFRAP Decision Document is based upon the assessment of MMRP-related contaminants only and applies only to those hazardous substances subject to the MMRP remedial actions.

U.S. AIR FORCE

_____ Date: _____
KENNY JOHNSON, P.E., GS-15, DAF
Director, Environmental Management
Air Force Civil Engineer Center

U.S. ENVIRONMENTAL PROTECTION AGENCY

_____ Date: _____
BRYAN OLSON
Director
Superfund and Emergency Management Division EPA Region 1

1. INTRODUCTION

This Decision Document provides information on the NFRAP MMRP site decision selected for Rifle Range MRS and the No Further Action Area MRS at the Otis Gun Club MRA (**Figure 1**). This decision is based on the results of the Final CSE Phase II Report (AFCEC 2018). Based on the conditions at the site, the USAF has determined that there is no evidence of MEC. In addition, MC soil data did not indicate the presence of MC (metals) at concentrations which posed an unacceptable risk to human health or the environment, including leaching from soil to groundwater.

This NFRAP decision document has been developed in accordance with DERP, 10 USC 2701, et seq., and Air Force Instruction 32-7020, 14.3, consistent with CERCLA of 1980, 42 USC 9601 and Executive Order 12580 (52 Federal Register 2923), and to the extent practicable with the NCP, 40 CFR Part 300.

1.1 INSTALLATION LOCATION AND REGULATORY FRAMEWORK

JBCC is located in the upper western portion of Cape Cod in Barnstable County, Massachusetts, approximately 60 miles south of Boston, with Cape Cod Bay to the north, Buzzards Bay to the west, and Nantucket Sound to the south (**Figure 1**). JBCC occupies approximately 22,000 acres (34 square miles) within the towns of Bourne, Falmouth, Mashpee, and Sandwich and is a multi-use base with multiple government agencies (Massachusetts Army National Guard [MAARNG] operating Camp Edwards, Air National Guard/Massachusetts Air National Guard operating Otis Air National Guard Base, United States Space Force operating Cape Cod Space Force Station, U.S. Coast Guard operating Air Station Cape Cod and Base Cape Cod, and Veterans Affairs operating the Massachusetts National Cemetery).

JBCC was formally added to the NPL in 1989. An FFA, which provides the legal framework for investigating and remediating numerous operable units at the JBCC, was signed in 1991 (EPA et al. 1991) with the National Guard Bureau (NGB) as the lead agency. In 1996, the FFA was amended to allow the transfer of lead agency status between the NGB and the USAF for the cleanup at JBCC (EPA et al. 2002). The USAF has served as the lead agency since 1996. In addition to the USAF, the EPA and NGB are parties to the FFA for the JBCC. The USAF is managing the soil and groundwater contamination sites under the IRP and MMRP in accordance with CERCLA as required by the DERP. The MassDEP is not a signatory of the FFA but is an active participant in the cleanup process and provides guidance and direction to the process.

Munitions response actions are authorized by the DoD DERP statute (10 U.S.C. Section 2701 et seq.). The DoD designed the MMRP to follow the process established by CERCLA to address the remediation of MC and MEC. “Defense sites” are defined in 10 U.S.C. Section 2710 as “locations that are or were owned by, leased to, or otherwise possessed or used by the DoD.”

1.2 SITE DESCRIPTION

The 78.21-acre Otis Gun Club MRA is located on the west side of JBCC near the intersection of Connery Avenue and Route 28. The MRA encompasses three former small arms ranges,

including a skeet and trap range, rifle range, and pistol range (**Figure 1**) (AFCEC 2024). The MRA is located on property owned by the Commonwealth of Massachusetts and leased by the Department of the Army. Features associated with the former small arms ranges include a skeet house and former train car used for target storage at the skeet and trap range, a timber target butt at the rifle range, and a metal backstop at the pistol range. The MRA has been divided into the following four MRSs:

- Skeet and Trap Range MRS (32.92 acres)
- Pistol Range MRS (0.17 acres)
- Rifle Range MRS (0.38 acres)
- No Further Action MRS (44.74 acres)

The MRA is located within the boundary of the Upper Cape Water Supply Reserve. The Upper Cape Water Supply Reserve is co-located with Camp Edwards' 15,000-acre northern training area and was established by Chapter 47 of the Acts of 2002, as public conservation land dedicated to three primary purposes: water supply and wildlife habitat protection; the development and construction of public water supply systems; and the use and training of military forces of the commonwealth provided that such military use and training is compatible with the natural resource purposes of water supply and wildlife habitat protection.

1.2.1 Adjacent Land Use

The land adjacent to the Otis Gun Club MRA consists of undeveloped woodland and a utility right-of-way and is available for hunting. There is no fence separating the MRA from the surrounding land. There is a state highway corridor approximately 500 feet (ft) west of the MRA.

1.2.2 Location and Distance to Nearby Populations

The closest nearby town is Bourne, located approximately 3.5 miles north of the Otis Gun Club. There is a commercial property approximately 500 ft west of the installation boundary and additional commercial and residential 1,500 ft west of the MRA (AFCEC 2014).

1.2.3 General Surface and Groundwater Resources

There are two freshwater kettle ponds on the MRA. North Pond is 6.39 acres; South Pond is 8.43 acres (**Figure 1**). North Pond is included in the Skeet and Trap Range MRS which is being addressed in separate CERCLA actions. South Pond is included in the No Further Action Area MRS. These palustrine systems are less than 8.2 ft deep at low water. Both ponds are permanently flooded (AFCEC 2024).

JBCC is located over the Sagamore Lens of the Cape Cod aquifer, which is designated as a sole source aquifer by EPA under the Safe Drinking Water Act and is the principal source of drinking water for the towns of the Upper Cape (Sandwich, Bourne, Mashpee, and Falmouth).

1.2.4 Sensitive Environments

Nearly all of JBCC, including the Rifle Range MRS and the No Further Action Area MRS, is identified as Priority Habitat by the Massachusetts Natural Heritage and Endangered Species Program (NHESP). Priority Habitat is based on the known geographical extent of habitat for all state-listed rare species, both plants and animals, and is codified under the Massachusetts Endangered Species Act. Habitat alteration within Priority Habitats may result in a take of a state-listed species and is subject to regulatory review by the NHESP. The federally endangered Northern Long-eared bat (effective 31 March 2023) and state-listed Eastern box turtle are on the Base and may be in the area. (AFCEC 2024).

The wetlands surrounding North Pond and South Pond are classified as forested scrub-shrub, with areas dominated by woody vegetation less than 20 ft tall. Surface water in these wetland areas is present for extended periods (generally for more than a month) during the growing season but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface (AFCEC 2023).

1.3 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Otis Gun Club was originally constructed in the 1950s by the USAF as a Morale, Welfare, and Recreation activity area operated by the Otis Rod & Gun Club. The Otis Rod & Gun Club was closed in 1972 (MAARNG 2006). In 1975, a newly formed Otis Fish & Game Club began using the small arms ranges at the MRA. The range was periodically opened and closed during the 1980s and 1990s in response to range safety fan and external regulatory issues. The site continued to be used for small arms range firing until 2005, when these activities were reportedly suspended by MAARNG. Lead shot was used at the site (for MAARNG use) until the mid-1990s, at which time it was reportedly replaced by steel shot (MAARNG 2006). After 2005, when the firing range was permanently closed, the Otis Fish & Game Club members utilized the MRA for an archery range in the northeast portion of the Skeet and Trap Range until their access agreement was terminated in November 2015 (MAARNG 2006). The entire MRA remains open for recreational hunting; however, access is strictly controlled, and hunters must pre-register and receive a daily pass (MassWildlife 2024). Recreational users typically use a shotgun. The MRA includes three small arms MRSs including the Skeet and Trap Range, Pistol Range, and Rifle Range, which are each defined as a separate MRS². Remaining features include a skeet house and former train car used for target storage at the Skeet and Trap Range MRS and a metal backstop at the Pistol Range MRS. Otis Gun Club MRA acreage which is not part of one of the three former small arms MRSs has been identified as the No Further Action MRS. Note that no removal actions have been conducted at the MRA.

1.4 COMMUNITY PARTICIPATION

AFCEC maintains an Administrative Record, which consists of documents and other printed materials (maps, photographs, engineering drawings, etc.) related to the restoration activities

² The Skeet and Trap Range MRS and the Pistol Range MRS are being addressed in Remedial Investigation and Feasibility Study reports and are not discussed in subsequent sections of this document.

which have occurred at JBCC, and a computer database listing all these documents and materials. The index of the Administrative Record lists the historical data related to JBCC. The Administrative Record is available for public review by appointment at the AFCEC IRP Office (322 East Inner Road, Otis ANG Base, Massachusetts, 02542) Monday - Friday, 8 a.m. to 4 p.m., excluding federal and state holidays, and is also available on-line at <https://ar.afcec-cloud.af.mil> (select Joint Base Cape Cod, MA). The EPA and MassDEP have reviewed the Final CSE Phase II (AFCEC 2018b) and have concurred with the NFRAP designation for the Rifle Range MRS and the No Further Action Area MRS.

In accordance with the JBCC Community Involvement Plan, the NFRAP decision for Rifle Range MRS and the No Further Action Area MRS will be announced via a news release and paid advertisement. A presentation to the JBCC Cleanup Team will also be scheduled. Public notice will be given for a 30-day public comment period on this Decision Document prior to a final decision regarding NFRAP designation. Comments and responses will be included as a Responsiveness Summary which constitute **Attachment B** of this Decision Document. Questions about this Decision Document may be directed to the Remediation Program Manager, JBCC, AFCEC, at 508-968-4670 x4687.

1.5 SCOPE AND ROLE OF RESPONSE ACTION

JBCC was placed on the NPL in 1989 and is administered under the amended FFA. The CERCLA Information System number for JBCC is MA2570024487. The assessment of the Rifle Range MRS and the No Further Action Area MRS has been conducted consistent with CERCLA requirements, and to the NCP, to the extent practicable.

The Otis Gun Club MRA was identified during the CSE Phase I (AFCEC 2014). The CSE Phase I recommended that a CSE Phase II be performed in accordance with USAF Guidance for conducting the CSE Phase II at USAF MRAs under the MMRP. The CSE Phase II found no evidence of MEC at the Rifle Range MRS or No Further Action Area MRS and no evidence of MC at the No Further Action Area MRS. The CES Phase II identified MC (lead) at the Rifle Range MRS soil but at concentrations that did not exceed applicable screening standards. The CSE Phase II recommended no further action for the Rifle Range MRS and No Further Action Area MRS (AFCEC 2018).

The USAF determined that the Rifle Range MRS or No Further Action Area MRS do not represent an unacceptable risk to human health or the environment and selected NFRAP as the decision for these MRSs. Under the amended FFA, no response action for site inspection sites under CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, can be documented in a NFRAP decision document. The NFRAP decision points have been met, and therefore, the sites qualify for SC. SC signifies that the sites meet UU/UE conditions and that no land use controls are required for MC. Note that sites that meet similar closure conditions under the MassDEP MCP are referred to as achieving a “Permanent Solution with No Conditions” (310 CMR 40.1041 [1]) for those hazardous substances subject to this Decision Document.

2. SUMMARY OF SITE CHARACTERISTICS

2.1 CLIMATE

The upper western portion of Cape Cod has a humid continental climate influenced by the proximity to the Atlantic Ocean, resulting in warmer winters and cooler summers than areas farther inland. The average annual temperature is approximately 50° Fahrenheit (°F), with an average monthly temperature in February of 31.2°F and an average monthly temperature in July of 71.3°F (National Oceanic and Atmospheric Administration 2023). Total annual precipitation is approximately 54.7 inches (in.), with precipitation that is generally distributed throughout the year at 4.6 in. per month and a variation of 2.9-6.4 in. per month. July is typically the driest month. Prevailing winds are from the northwest from November to March at an average of 12 miles per hour and from the southwest from April to October with an average of 9 miles per hour (AFCEC 2018).

2.2 TOPOGRAPHY AND HYDROLOGY

2.2.1 Topography

JBCC is in the Seaboard Lowlands of the New England Physiographic Province (AFCEC 2018). The northern and western portions of JBCC are part of the Buzzards Bay Moraine, extending north-south in the western portion, and the Sandwich Moraine, extending west-east in the northern portion. The moraines are ridges characterized by hummocky topography with high rolling hill areas and deep kettle holes, slopes ranging from 0 to 15%, and variations in topographic relief. The highest point on Cape Cod, Pine Hill (318 ft above mean sea level), is situated in this western portion of Camp Edwards in the Buzzards Bay moraine. The Mashpee pitted outwash plain is situated between the moraines and slopes from the moraines toward the Atlantic Ocean (AFCEC 2018).

Topography of the MRA is predominantly rolling, forested hills with some steep-sided hills, depressions, and valleys. Elevations in these areas range from 70 to 120 ft.

2.2.2 Hydrology

The Sagamore Lens of the Cape Cod aquifer is unconfined and recharged by infiltration of precipitation at a rate of approximately 30 in. per year (AFCEC 2018). No major rivers or streams exist within the JBCC boundaries. However, intermittent streams are present during moderate or heavy rainfall events. Freshwater kettle hole ponds are present primarily in the northern and western portions of JBCC.

The ponds located in Camp Edwards, such as North Pond and South Pond on the MRA, are referred to as kettle ponds. Kettle ponds are typically deep ponds formed during the last glacial advance by large chunks of ice breaking off retreating glaciers resulting in depressions in the ground called “kettle holes.” When the hole is deep enough to reach groundwater, it is then filled with water and is called a kettle pond. Seasonal changes in groundwater level are mirrored by changes in the level of these ponds. The fluctuating water levels alternately flood and expose the

shore like a slow-moving tide. These rates and depth of fluctuation determines the types of plants that live along the shoreline (AFCEC 2020).

2.3 SOILS AND VEGETATION

2.3.1 Soils

Soils at the MRA consist of the Plymouth-Gloucester-Eastchop-Carver (s3127) and Eastchop-Carver (s3126) series (AFCEC 2014). The Plymouth-Gloucester-Eastchop-Carver series is formed from glacial till and outwash and occurs in a variety of upland territory, such as hills and ridges on moraines. The Plymouth-Gloucester-Eastchop-Carver series are characterized as soils that are very deep and excessively well drained. Generally found on slopes ranging from 15 to 35 percent, this series is generally overlain by an organic layer and consists of sandy loam with some coarse sand and gravel (AFCEC 2023).

2.3.2 Vegetation

The MRA is primarily wooded with two ponds and multiple shrubby wetland areas. Vegetation, especially in the wetlands, is thick and nearly impassible in some portions of the MRA. Wetland species present include true shrubs, young trees (saplings), and trees or shrubs that are small including woody angiosperms with relatively wide, flat leaves that are shed during the cold or dry season (AFCEC 2020).

2.4 GEOLOGY AND HYDROGEOLOGY

2.4.1 Geology

JBCC is in the Seaboard Lowlands of the New England Physiographic Province. Unconsolidated overburden at JBCC is dominated by glacial deposit. The Buzzards Bay and Sandwich moraines in the western and northern portions of JBCC consist of bouldery ablation till (unsorted material ranging from clay to boulder size) overlying reworked basal till. The Mashpee pitted outwash plain between the moraines consists of unconsolidated outwash deposits of sand, gravel, and cobble overlying fine-grained glaciolacustrine deposits (silts and clays) and basal till. The total thickness of unconsolidated overburden ranges from approximately 175 ft near the Cape Cod Canal to 325 ft beneath the thickest portion of the Buzzards Bay Moraine, and 250 ft near Nantucket Sound to the south. The thickness of outwash sediments ranges from approximately 225 ft near the moraines to 80 ft near the shore of Nantucket Sound.

The Otis Gun Club MRA is located within the outwash plain deposits. The overburden at the MRA is characterized by coarse grained glaciofluvial sands and gravels and finer grained glaciolacustrine deposits. Based on soil borings/wells installed in the area a thin layer of silt with fine sand is observed to overlay approximately 30 ft of fine to coarse sand with fine gravel, 40-50 ft of fine-grained silty sand, and 20-30 ft of gravelly, fine grained sand. Bedrock has been encountered in the area at depths ranging from 200-220 ft bgs (AFCEC 2020).

2.4.2 Hydrogeology

Groundwater at the MRA is shallow (less than 10 ft) due the MRA location within a low-lying area adjacent to kettle ponds. Groundwater flow is predominantly horizontal, with stronger vertical gradients near surface water bodies, including two kettle ponds hydraulically connected to the aquifer. Shallow groundwater likely flows to the west and southwest, and some may directly discharge to the ponds (AFCEC 2020).

2.5 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

2.5.1 Current Site Use

After 2005, when the firing range was closed, the Otis Fish & Game Club members utilized the MRA as an archery range in the northeast portion of the Skeet and Trap Range until their access agreement was terminated in November 2015. Currently, the entire MRA remains open for hunting. Registration is required to hunt in the area. Vehicle access to the MRA is limited by a locked gate; however, there are no other barriers to prevent trespasser access (AFCEC 2020).

2.5.2 Future Site Use

The current projected future land use of the MRA is anticipated to remain consistent with current use (AFCEC 2020).

3. DATA ANALYSIS FOR SITE RISKS

The purpose of the CSE Phase II was to determine the presence or absence of MC in soil from historical use as a small arms range and to subsequently determine if there are potential risks posed to human and ecological receptors from exposure to these constituents. The CSE Phase II Report is analogous to a CERCLA SI Report.

As a result of the investigation activities, the objectives of the CSE Phase II were satisfied. A summary of the CSE Phase II results is presented in **Table 1**.

Table 1 Summary of CSE Phase II Results

Investigation Area	Investigation Methods	SAA Found?	MC Detected?
Rifle Range MRS	Magnetometer-Assisted Visual MEC Survey, soil sampling for lead	Yes (casings)	Yes
NFA Area MRS	Magnetometer-Assisted Visual MEC Survey	No	No
Notes: MC = Munitions constituents. MEC = Munitions and explosives of concern. MRS = Munitions Response Site. SAA = Small arms ammunition.			

3.1 SUMMARY OF COMPREHENSIVE SITE EVALUATION PHASE II ACTIVITIES

CSE Phase II activities at the Rifle Range MRS and the NFA Area MRS included a magnetometer-assisted visual MEC survey and soil sampling at the Rifle Range MRS. No MEC was suspected or identified. The data were reviewed and used to develop and refine the CSM for potential exposures to MC for the two MRSS.

The following sections describe the overall scope and approach of the CSE Phase II investigation at the Rifle Range MRS and the NFA Area MRS.

3.1.1 Magnetometer-Assisted Visual Munitions and Explosives of Concern Survey Observations

The Otis Gun Club MRA was visually surveyed using a White's all-metals detector and handheld GPS unit with pre-loaded boundaries to assess the presence of MEC at the surface. The MRA is primarily wooded with two large ponds and multiple shrubby wetland areas. Vegetation, especially in the wetlands, is very thick and nearly impassible in some portions of the MRA. No evidence of MEC was found during the visual survey. However, SAA casings were identified near the firing line of the Rifle Range MRS. Approximately 4.03 miles of transects were investigated during the visual survey. The surveyed transects are provided in **Figure 2**.

3.1.2 Munitions Constituents Sampling

Incremental Sampling (IS) soil samples (100 increments) were collected from the former target area of the Rifle Range MRS (one native sample and two replicate samples) and submitted for

lead analysis by method SW6010C (AFCEC 2018). **Figure 3** shows the locations of samples collected at the Rifle Range MRS.

The analytical soil sampling results were compared to MassDEP Soil-1 (S-1) standards, USEPA Industrial regional screening level (RSL), and site-specific background for the MRS during the CSE Phase II. This Decision Document also compared results to the EPA Residential RSL, and all comparisons are presented in **Table 2**. Lead (maximum estimated concentration of 101 milligrams per kilogram [mg/kg]) concentrations were detected above the site-specific background of 17 mg/kg in three IS soil samples (including both IS replicate samples) but did not exceed the MassDEP S-1 standard or the EPA Industrial or Residential RSL.

No sampling was required at the NFA Area MRS.

Table 2 Summary of Lead Results

Analyte	Background	MassDEP S-1	EPA RSL Industrial	EPA RSL Residential ^(a)	74-RR-SS-1000	74-RR-SS-1000A	74-RR-SS-1000B	95% UCL ^(b)
Lead	17	200	800	200	101J	86.3J	98.7J	108.7
<p>(a) EPA Office of Land and Emergency Management Memorandum dated January 17, 2024, recommends EPA regions use a residential soil lead RSL of 200 parts per million (mg/kg).</p> <p>(b) Student's t Upper Confidence Limit (UCL) calculated using <i>Interstate Technology & Regulatory Council (ITRC) Incremental Sampling Methodology (ISM) Calculator (v. 3.0, August 2020) for Calculating 95% UCL with ISM Data</i></p> <p>Note: All units are mg/kg. J = estimated</p>								

3.2 CONCEPTUAL SITE MODEL

The CSM was developed to assess potential MC contamination sources and receptors and analyze the exposure pathways that link them. The CSM is used as a planning tool for integrating information from a variety of resources, evaluating the information with respect to project objectives and data needs, and evolving through an iterative process to additional data collection or action. The information collected during the CSE Phase II field activities was used to evaluate and update the CSM for MC at the Otis Gun Club MRA.

3.2.1 Munitions Constituent Exposure Analysis

No source of MC was identified in the NFA Area MRS. A source (SAA) of MC (lead) was identified at the Rifle Range MRS. Although soil sampling results for the Rifle Range MRS identified levels of lead in soil above background, there was no unacceptable risk to human health or the environment identified at the MRS (AFCEC 2018). No groundwater sampling was completed during the CSE Phase II (in accordance with the Final Work Plan); however, since the soil concentrations did not exceed the MassDEP S-1 standard for lead (200 mg/kg), which takes into account the leaching potential from soil to groundwater, it is unlikely that MC is migrating to groundwater from the Rifle Range MRS.

3.3 SELECTED REMEDY

A NFRAP decision is recommended when the site can be classified as an Area of No Suspected Contamination and no significant risk or threat to public health or the environment exists. The CSE Phase II report determined there is no MEC at the Rifle Range MRS or the NFA Area MRS. For the Rifle Range MRS and the NFA Area MRS, no explosive safety hazards or MC risks to human health or the environment have been identified (AFCEC 2018).

Based on these results, No Further Action is the selected remedy for the Rifle Range MRS and the NFA Area MRS at the Otis Gun Club MRA under the MMRP. Under this action, the MRSs would be considered UU/UE for MMRP with no LUCs or Five-Year Reviews. Note that sites that meet similar closure conditions under the MassDEP MCP are referred to as achieving a “Permanent Solution with No Conditions” (310 CMR 40.1041 [1]) (MassDEP 2014) for those hazardous substances subject to this Decision Document.

4. REFERENCES

Air Force Civil Engineer Center (AFCEC). 2024 (July). *Draft Feasibility Study Otis Gun Club Munitions Response Area, Skeet and Trap Range Munitions Response Site, Pistol Range Munitions Response Site Joint Base Cape Cod, Massachusetts*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for AFCEC/JBCC, Installation Restoration Program, Otis Air National Guard Base, MA.

———. 2023 (November). *Final Supplemental Remedial Investigation Report Otis Gun Club Munitions Response Area, Skeet and Trap Range Munitions Response Site, Pistol Range Munitions Response Site, Joint Base Cape Cod, Massachusetts*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for AFCEC/JBCC, Installation Restoration Program, Otis Air National Guard Base, MA.

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Massachusetts Army National Guard (MAARNG). 2006 (December). *Draft Otis Fish & Game Club Skeet and Trap Range Assessment Camp Edwards, Massachusetts*. Prepared by URS Group, Inc. (URS).

Massachusetts Division of Fisheries and Wildlife (MassWildlife). 2024 (August). *Participate in the Camp Edwards controlled hunting program*. <https://www.mass.gov/how-to/participate-in-the-camp-edwards-controlled-hunting-program>.

U.S. Environmental Protection Agency (EPA) Region 1, and the U.S. Department Defense National Guard Bureau. 1991 (and subsequently amended). Federal Facilities Agreement under CERCLA § 120 and RCRA § 7003. *In the Matter of the U.S. Department of Defense, National Guard Bureau, Massachusetts Military Reservation, Cape Cod, Massachusetts*.

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Figures

No Further Response Action Planned Decision Document, Rifle Range and No Further Action MRSS, Otis Gun Club MRA Joint Base Cape Cod, Massachusetts

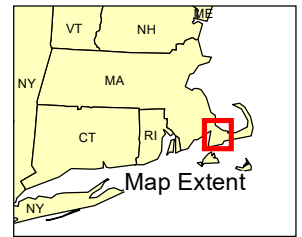
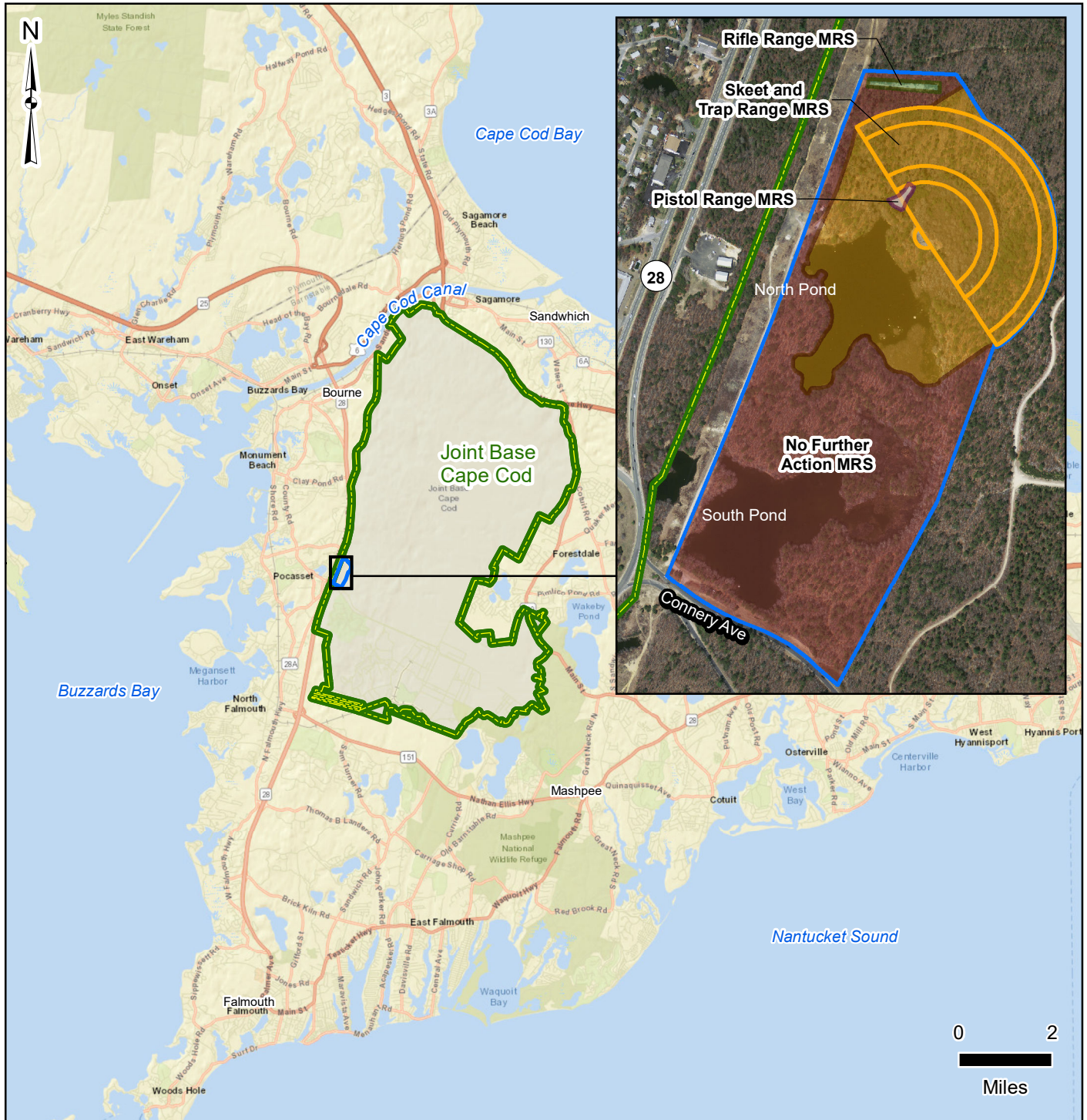


Figure 1 Site Location



Legend

- Installation Boundary
- Otis Gun Club MRA Boundary
- Rifle Range MRS Boundary
- Pistol Range MRS Boundary
- Skeet and Trap Range Fan
- Skeet and Trap Range MRS Boundary
- No Further Action MRS Boundary

MRA = Munition Response Area
MRS = Munitions Response Site

References

- ESRI Street Map, 2016
- AFCEC. 2018. Final CSE Phase II Report for Joint Base Cape Cod, Massachusetts. February.



Figure 2 - Magnetometer-Assisted Visual Survey



Legend

- | | | |
|----------------------------|--|--------------------------------|
| Installation Boundary | Projected PAH fallout zone | MRA Use |
| Otis Gun Club MRA Boundary | Projected Lead fallout zone | Air National Guard |
| Rifle Range | Magnetometer-Assisted Visual Survey Transect | Army National Guard |
| Pistol Range | | Department of Veterans Affairs |
| Skeet Range | | Residential/Commercial |

Notes:
1. MRA = Munitions Response Area
2. PAH = Polynuclear Aromatic Hydrocarbon

Service Layer Credits: Aerial Orthoimagery - MassGIS 2009
AFCEC, 2015A. Final CSE Phase II. Work Plan for Joint
Base Cape Cod, Massachusetts
Parcel data from Office of Geographic Information (MassGIS),
Commonwealth of Massachusetts, MassIT

Source: USGS, Aerial Orthoimagery, 2009; MassGIS, 2009; AFCEC, 2015A. Final CSE Phase II. Work Plan for Joint Base Cape Cod, Massachusetts; MassGIS, 2009; MassIT, 2015. Parcel data from Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT

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Decision Document, Rifle Range and No
Further Action MRSS, Otis Gun Club MRA
Joint Base Cape Cod, Massachusetts

Figure 3
Rifle Range MRS Summary of Soil Sampling



Action Levels	
Lead (mg/kg)	
MassDEP S-1	200
EPA Industrial	800
Background	17

- Notes:
1. Only values exceeding project action levels are provided.
 2. J = Estimated Value
 3. IS = Incremental Sampling
 4. MRA = Munitions Response Area

5. MRS=Munitions Response Site

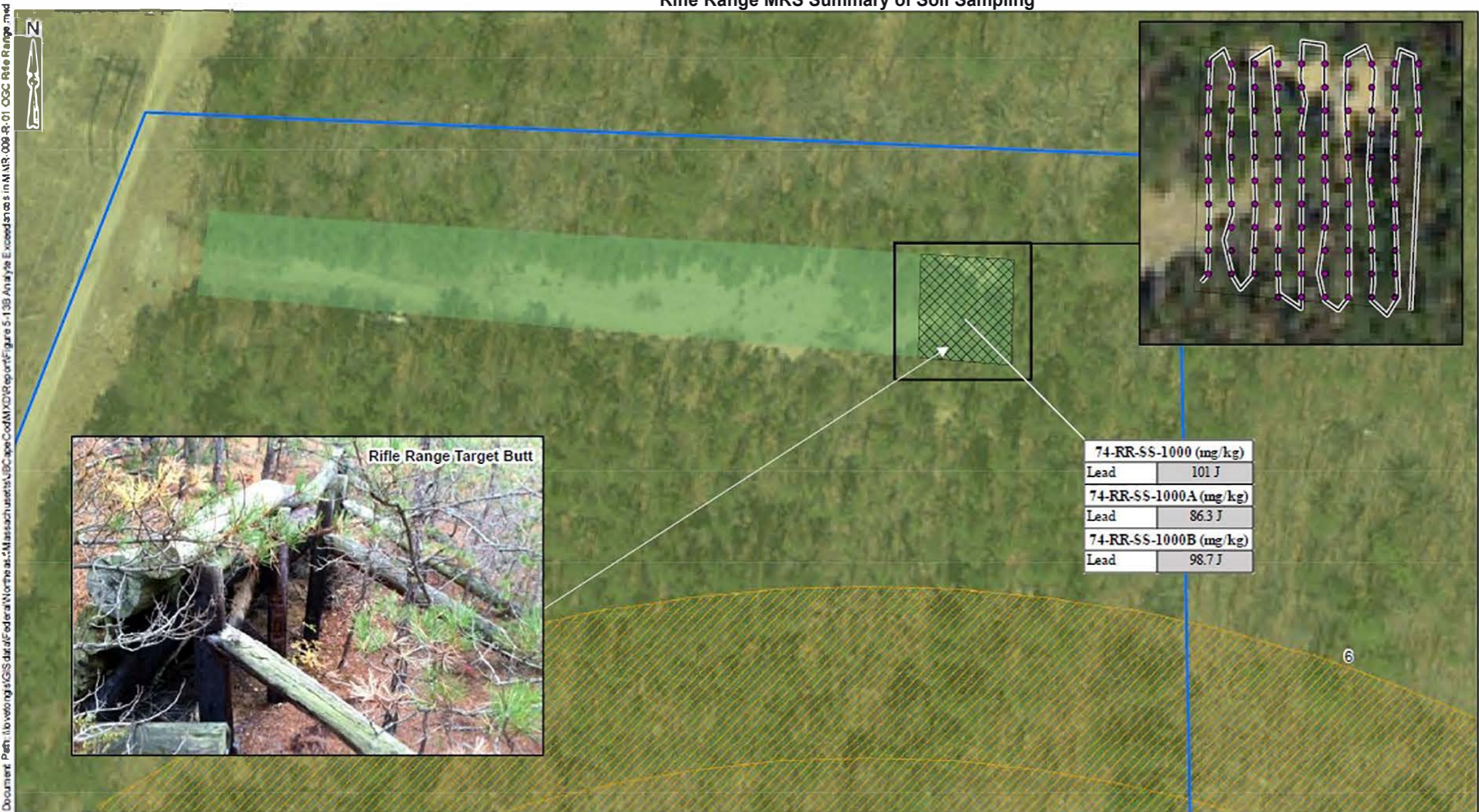
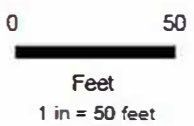
MassDEP MCP Method 1: Soil Category S-1 Standards. 310 CMR 40.0975(6)(a) Table 2, S-1 Soil and GW-1.

EPA Regional Screening Levels for Chemical Contaminants (updated November 2023).

Background •Air National Guard, 1994, Risk Assessment Handbook. Massachusetts Military Reservation. Cape Cod. MA

Values above Background are shaded grey.

Service Layer Credits: Aerial Orthomagey - MassGIS 2009 AFCEC. 2015A. Final CSE Phase II Work Plan for Joint Base Cape Cod, Massachusetts Parcel data from Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT



74-RR-SS-1000 (mg/kg)	
Lead	101 J
74-RR-SS-1000A (mg/kg)	
Lead	86.3 J
74-RR-SS-1000B (mg/kg)	
Lead	98.7 J

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Legend

Obs Gun Club MRA Boundary	Investigation Summary	Army National Guard
Rifle Range	Sampled Decision Unit with Analyte above Screening Values and Background for Lead	
Skeet Range	Visual Survey Transect	
	IS Increment Locations	

Attachments

Attachment A
MassDEP Concurrence
(to be included after Public Comment Period)

Attachment B
Responsiveness Summary
(to be included after Public Comment Period)