

FINAL

# Decision Document

## Area 10

### Former Raritan Arsenal

### Edison, New Jersey

*Prepared for*



**US Army Corps  
of Engineers®**

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# Acronyms and Abbreviations

ASA	Assistant Secretary of the Army
BAP TEQ	benzo(a)pyrene toxic equivalent
BERA	baseline ecological risk assessment
bgs	below ground surface
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CENAN	USACE, New York District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CFR	Code of Federal Regulations
CH2M	CH2M HILL, Inc.
COC	constituent of concern
COPC	constituent of potential concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSM	conceptual site model
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	digital geophysical mapping
DoD	U.S. Department of Defense
EOD	explosive ordnance disposal
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FUDS	Formerly Used Defense Sites
GSA	U.S. General Services Administration
HHRA	human health risk assessment
HI	hazard index
HTW	hazardous and toxic waste
IE&E	Installations, Energy and Environment
IGD	Interim Guidance Document
LEAD	Letterkenny Army Depot
MCC	Middlesex County College
MC	munitions constituent
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter

MRS	munitions response site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
PP	Proposed Plan
PAH	polycyclic aromatic hydrocarbon
RI	Remedial Investigation
RSL	regional screening level
SCS	Soil Conservation Service
SRS	soil remediation standards
SVOC	semivolatile organic compound
TNT	trinitrotoluene
USC	U.S. Code
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UU/UE	unlimited use and unrestricted exposure
VOC	volatile organic compound
Weston	Weston Solutions, Inc.

# Part 1: The Declaration

## 1.1 Site Name and Location

The former Raritan Arsenal is located in Edison, Middlesex County, New Jersey. The former arsenal currently constitutes one munitions response site (MRS) that includes several areas of interest that are in various states of investigation or remediation. Area 10 encompasses approximately 143 acres in the west-central portion of the former arsenal known as the Former Wastewater Treatment and Magazine Areas. The northeastern portion of Area 10 is part of the heavily developed Raritan Center and the remainder is developed as part of Thomas A. Edison County Park.

## 1.2 Statement of Basis and Purpose

This Decision Document (DD) is being presented by the U.S. Army Corps of Engineers (USACE) to describe the selected remedy for Area 10 (soil, sediment and surface water) <sup>1</sup>. The USACE Formerly Used Defense Sites (FUDS) Program is conducting response activities in accordance with the Defense Environmental Restoration Program (DERP) statute (10 U.S. Code [USC] § 2701 et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC § 9601-9675 et seq.), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan, more commonly known as the National Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Part 300).

The USACE executes the FUDS Program on behalf of the Army, including drafting DDs and implementing selected remedial actions. The support agency is New Jersey Department of Environmental Protection (NJDEP).

Area 10 is not a National Priorities List (NPL) site. USACE has adopted the term “Decision Document” for the documentation of remedial action decisions at installations that are not on the NPL. This DD follows the U.S. Environmental Protection Agency (USEPA) document *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA, 1999). A DD is similar to the Record of Decision prepared to document the CERCLA remedy selection process for an NPL site. The information supporting the decision on this selected remedial action is contained in the Administrative Record.

## 1.3 Description of the Selected Remedy

The site is likely to remain under mixed industrial/commercial and recreational use in the foreseeable future; however, a hypothetical residential scenario was included to evaluate an unlimited use and unrestricted exposure (UU/UE) scenario as required by U.S. Department of Defense (DoD) Manual 4715.20. No unacceptable risk to public health or welfare and the environment from actual or threatened DoD-related releases of hazardous substances to soil, sediment or surface water was identified. Potential exposures to groundwater were not evaluated in the human health risk assessment (HHRA) because groundwater at the former arsenal has been evaluated separately (USACE, 2019).

The USACE has determined, as the lead agency, that no action is necessary for Area 10 soil, sediment and surface water with respect to DoD constituents to protect public health or welfare or the environment. Although NJDEP agrees that there is no hazard in Area 10 from munitions and explosives of concern (MEC), NJDEP’s position is that Area 10 has not been sufficiently characterized to address the

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<sup>1</sup> Groundwater at the former Raritan Arsenal has been evaluated as a separate operable unit.

presence of arsenic and polycyclic aromatic hydrocarbons (PAHs) at levels greater than NJDEP nonresidential soil remediation standards (SRS) or potential soil contamination along the railroad corridors (see Section 3.1). NJDEP does not concur with the decision to take no action; however, it is USACE's position that these constituents are not attributable to a DoD-documented release and that no action is protective of public health or welfare and the environment from actual or threatened CERCLA releases of DoD-related hazardous substances.

## 1.4 Statutory Determinations

No remedial action is necessary at this site. No further action allows for UU/UE. Per 40 CFR 300.430(f)(4)(ii), five-year reviews are a requirement only for alternatives not allowing for UU/UE. Therefore, a five-year review will not be required.

## 1.5 Authorizing Signature

The DoD is the lead agency under the DERP for the former Raritan Arsenal FUDS and USACE has developed this DD for DoD. This DD is consistent with CERCLA, as amended, and the NCP. The DD is approved by the undersigned, pursuant to the delegated authority in the Assistant Secretary of the Army (ASA) for Installations, Energy and Environment (IE&E) memorandum dated 24 June 2019, subject: Assignment of Mission Execution Functions Associated with DoD Lead Agent Responsibilities for the FUDS Program, and the 9 February 2017 Memo Interim Guidance Document (IGD) for the FUDS DD Staffing and Approval.

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KAREN J. BAKER

Programs Director

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# Part 2: Decision Summary

## 2.1 Project Name, Location, and Description

The former Raritan Arsenal includes approximately 3,200 acres located along the northern bank of the Raritan River (Figure 2-1). The majority of the former arsenal land area lies within Edison Township, with smaller portions of the site located in Woodbridge Township and the Borough of Sayreville, in Middlesex County, New Jersey, approximately 20 miles southwest of lower Manhattan (Dames & Moore, 1993a).

Currently, most of the former arsenal is privately owned and zoned for industrial use. The majority of the former arsenal has been developed into the Raritan Center Industrial Park, owned by Federal Business Centers and Summit Associates, Inc. Other major current landowners or tenants include Middlesex County College, Thomas Edison County Park, USEPA Region 2, and the U.S. General Services Administration (GSA). Private residences are located to the north of the former arsenal, where land use is zoned as mixed residential and commercial. Currently, over 40 property owners have land within the boundaries of the former arsenal.

Area 10 encompasses approximately 143 acres in the west-central portion of the former arsenal. The northeastern portion of Area 10 is owned by Federal Business Centers Inc. as part of the heavily developed Raritan Center. The westernmost portion of Area 10 is owned by Middlesex County College. The remainder of Area 10 is developed as part of Thomas A. Edison County Park (Figure 2-2) and owned by Middlesex County.

## 2.2 Project MRS History and Regulatory Requirements

The former arsenal was largely agricultural prior to its purchase by the U.S. Government in 1917. Between 1917 and 1918 the U.S. Army erected a major arsenal facility on the strategic New Jersey site. The facility included large cantonment areas, a hospital, barracks, storage and maintenance buildings, and a host of ordnance and munitions-related facilities, including magazines, storage yards, shipping facilities, and disposal areas. Operations at the site included the receipt, storage, shipment, repacking, and decommissioning of ordnance, arms, and machinery. The former arsenal was used extensively by the Army from 1918 to 1963.

Because of changing needs of the DoD, the former arsenal was phased out and closed in 1963. When it closed, many areas were surface cleared to remove ordnance and munitions. In the late 1980s, the USACE initiated environmental investigations. Site Inspections included records reviews, interviews with former employees, and direct inspection of all areas where the former arsenal conducted activities that could have adversely impacted the environment.

Area 10 consists of a portion of the former Arsenal known as the Former Wastewater Treatment and Magazine Areas. During World War II and the postwar period, the magazines in Area 10 were used for storing small arms ammunition, inert material, 20-millimeter (mm) to 105-mm shells, 2,4,6-trinitrotoluene (TNT), and Composition C explosives. In 1919, an explosion at former Magazine Building E-31 destroyed six magazines and scattered ammunition, various caliber cartridge cases, and miscellaneous components over an area now designated as Area 10, Parts I and II (Metcalf & Eddy, 1991).

Area 10 was also reported to have been used for de-priming cartridge cases within former magazines B5 and B6. Former magazines B5 and B6 were located at the east end of railroad line B, and during initial investigations of the area, the presence of small arms ammunition, cartridge cases, and primers found adjacent to the former A-line railroad track were attributed to the de-priming activity. Another minor

source of potential munitions and explosives of concern (MEC) release may have occurred during the transport of items along the historical rail lines. This type of release mechanism is not considered to be significant and is evidenced only by several inert ammunition components and 10 to 15 items related to .50-caliber ammunition that were found in areas along the old railroad beds during the 1974 (items classified as munitions debris [MD]) construction at Thomas A. Edison County Park.

Area 10 housed a sewage disposal plant that was located between railroad lines B and D. The sewage disposal plant is believed to have been constructed between 1934 and 1943, and is believed to have operated until the Arsenal phase-out in the early 1960s. The treatment plant, including its foundation and adjacent buildings, was removed by Middlesex County in 1991 (Roy F. Weston, 1996a).

### 2.2.1 Prior Investigations and Studies

Previous investigation and removal action activities conducted at Area 10 include the following:

- Letterkenny Army Depot (LEAD) Cleanup Operations, 1963
- Construction Activity at Thomas A. Edison County Park, 1974
- Contamination Evaluation, 1987-1988
- Site Visit, Archives Search Report, 1991
- Removal Action, Ordnance Items at Areas 10 Parts I and II, 1991
- Phase I Remedial Investigation (RI), 1992
- Near-surface Soil Sampling at the Middlesex County College (MCC) ballfield area and Thomas A. Edison Park, 1992
- Removal Action, 1992
- Limited Health Risk Assessment, MCC Athletic Field and Thomas A. Edison Park, 1992-1993
- Expedited Phase II RI, 1994
- Sector Density Estimate Investigation, 1998
- Supplemental Phase II RI, 1999
- Baseline Ecological Risk Assessment (BERA), 2005
- Remedial Investigation, 2014

A total of eight separate phases of work performed at Area 10 included some type of MEC investigation or removal. Data are consistent with the conceptual site model (CSM), which suggests that there was one primary MEC release mechanism (the 1919 explosion of Magazine Building E-31). Insignificant additional MEC release mechanisms include the transport of items along the historical rail lines and depriving of cartridge cases within former Magazines B5 and B6. The impacts generated by MEC releases were addressed through subsequent cleanup and construction activities and sampling for munitions constituents (MC) in site media.

In 1963, Area 10 was decontaminated by burning the ground and vegetation to destroy propellant powder, small arms ammunition, and primers. The ground was then disked to a depth of 6 inches, and the ground surface was burned again prior to recommendation of the area for unrestricted use. The LEAD report indicated that there was a likelihood of live ammunition buried beyond the detection capability of the mine detector. Parts I and II were recommended for surface use only, and the remainder of Area 10 was recommended to be released for unrestricted use (O'Brien & Gere, 1989).

During construction of the Thomas A. Edison County Park in 1974, several inert ammunition components and 10 to 15 items related to 50-caliber ammunition (items classified as MD) were found scattered over the entire park, but were concentrated primarily in the area along the old railroad beds. This debris was considered to be from former Arsenal operations (Metcalf & Eddy, 1991).

A visual inspection of the undeveloped portion of Area 10 in 1988 revealed no apparent ordnance on the ground surface. Spot checks with an ordnance locator encountered one ordnance fragment (the

remains of a 35-mm cartridge base) at a depth of 6 inches adjacent to the rear (north) wall of Magazine Building 447 (O'Brien & Gere, 1989).

One inert 37-mm cartridge casing was found on the surface of a pile of debris generated during demolition of Magazine Building 447 (located within Area 10 Part I) and Magazine Building 448 (located northeast of Area 10 Part I). Subsequently, 13 French rifle grenades and several grenade fuzes within Area 10 Parts I and II were located and removed, and the area was cleared of ordnance under the direction of the U.S. Army Engineering and Support Center, Huntsville (CEHNC). Fencing was placed around the uncleared area (Part I and a small portion of Part II) (IT Corporation, 1992). In 1992, a removal action was completed in the fenced portions of Parts I and II of Area 10. More than 1,700 ordnance items were recovered, including 178 French rifle grenades, 100 Mk II hand grenades (unfuzed), three 75-mm projectiles, and three large projectiles (type unknown). The items were recovered from within five concrete-capped barrels and destroyed by Army Explosive Ordnance Disposal (EOD). Additional surveys were performed across 29.93 acres of Area 10 in the areas surrounding Parts I and II and in the developed portions of the park. Of the 407 anomalies investigated, none were MEC.

A sector density estimate investigation performed in 1998 concluded that MEC density was minimal across most of Area 10 due to historical cleanup efforts and the lack of MEC found during more recent investigations. However, the study identified the marsh area adjacent to the former magazine as Area 10C (consisting of a 3.5-acre section of Area 10 adjacent to Thomas A. Edison County Park, northeast of Parts I and II) as having potential for high density of MEC based on the lack of available magnetometer data. Therefore, in 2001 a mag-and-dig investigation of Area 10C was conducted and included 11,082 digs to approximately 3 feet below ground surface (bgs), with no MEC discovered (EHSI, 2001).

Surface and subsurface soil, soil gas, surface water, sediment, and groundwater samples that were collected at Area 10 between 1992 and 2005 were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls, metals, and explosives. Samples were collected from areas of former magazines, observed debris, and areas planned for recreational use. Analytical results were evaluated primarily against the NJDEP criteria in effect at the time of the investigation.

Potentially complete ecological exposure pathways identified for soil, sediment, and surface water were quantitatively evaluated in a facility-wide BERA (Weston Solutions, Inc. [Weston], 2008). No evidence of ecological risks to freshwater or terrestrial habitats representative of conditions present in Area 10 were identified.

The documents associated with the previous investigations are part of the Administrative Record. In addition, summaries of data, results, and recommendations associated with these reports were extracted from the individual reports and incorporated into an RI report (CH2M HILL, Inc. [CH2M], 2017) to provide a comprehensive summary of the site-specific investigation activities conducted at Area 10. The RI is summarized below.

### Remedial Investigation

Historical records documenting the phases of investigation and removal actions conducted at Area 10 from 1963 to 2005 provided adequate characterization data to estimate the potential exposure-related risks for Area 10, and these data were used to develop an updated CSM. Analytical data collected from 1992 through 2005 were used to estimate the potential exposure-related risks in an RI specifically focused on Area 10 (CH2M, 2017).

A MEC field investigation was conducted from October 2013 to June 2014, focusing on Area 10 Part I, where Part I is fenced to restrict access due to MEC found during previous investigations. The investigation included conducting digital geophysical mapping (DGM) along 10-meter separated transects. A total of 205

point-source anomalies were identified along the DGM transects. Based on the statistical assessment performed, 135 of the 205 anomalies identified were intrusively investigated to confirm if the anomalies were related to MEC and/or material potentially presenting an explosive hazard. Of the 135 anomalies, nine were identified as MD items. Seven items were classified as expended grenade fuzes, and two items were classified as fragments. The remaining 126 anomalies consisted of construction debris and scrap metal (CH2M, 2017). No MEC was identified. Based on the previous investigations and removal actions, MEC has been removed from and has not been identified outside of the identified MEC release areas, and there is no longer an explosive risk at Area 10.

### Remedial Investigation Conclusions and Recommendations

Because no evidence of MEC contamination and no unacceptable risks associated with potential exposures to DoD-related constituents of potential concern (COPCs) were identified, the RI did not recommend a feasibility study for Area 10. Based on the evaluation of data previously collected as presented in the RI, no action was recommended for Area 10 soil, sediment or surface water (groundwater is being evaluated for the former arsenal as a separate operable unit).

### Proposed Plan

A Proposed Plan (PP) was prepared to summarize and document the RI, as well as the USACE rationale for recommending a no action remedy at Area 10. The PP was made available to the public on August 12, 2019, followed by a public meeting on August 20, 2019. The comments from the public received during the public comment period and at the public meeting are summarized in the Responsiveness Summary which is contained in Part 3.0 of this DD.

## 2.2.2 Regulatory Background

The DoD has the responsibility to remediate former DoD facilities under the DERP for FUDS and, therefore, is responsible for site investigation and remediation activities at the Site. USACE's goal is to achieve regulatory closure for the Site. FUDS program policy requires USACE to:

- Comply with DERP, CERCLA, the NCP, and Army policies for the FUDS program;
- Coordinate with the lead regulator, which is the NJDEP;
- Conduct an RI with a baseline risk assessment to evaluate the need for remediation; and
- Attain standards and meet requirements that are consistent with CERCLA and NCP processes and criteria.

Site investigation and remediation activities must follow federal laws, guidance, and methods. The NJDEP has participated by providing regulatory oversight of the FUDS investigation. The RI was conducted under the DERP for FUDS, and performed in accordance with the CERCLA and NCP.

## 2.3 Community Participation

The scope of community participation activities performed was consistent with the USEPA CERCLA guidance for community involvement (USEPA, 2020), Section 300 of the NCP, and USACE guidance Engineering Pamphlet 200-3-1 (USACE, 2011).

USACE completed the following activities as part of its public outreach effort:

- Prepared a Community Relations Plan for the former Raritan Arsenal in March 2013 (CH2M, 2013);
- Conducted a technical project planning meeting in November 2011 with stakeholders, including NJDEP;

- Provided project materials, including a history, location maps, and fact sheets, for the USACE website, Administrative Record, and Information Repository; and
- Solicited public comment on the PP (USACE, 2019) through an August 2019 public notice and a public meeting held on August 20, 2019 at the Edison Senior Citizen Center. The PP was released to the public on the USACE New York District website for the former Raritan Arsenal: <http://www.nan.usace.army.mil/Raritan> and at the information repository locations:

Information Repository:

U.S. Army Corps of Engineers, New York District  
2890 Woodbridge Avenue  
Edison, NJ 08837

Central Information Repository

USACE New York District Office  
26 Federal Plaza  
New York, NY 10278

A public comment period occurred from August 12, 2019, through September 16, 2019. USACE published a public notice in the *Home News Tribune* and *Middlesex County News/Star Ledger* the week of August 5 announcing the PP public meeting and the availability of the PP for public comment.

## 2.4 Scope and Role of Response Action

The RI concluded that no evidence of MEC contamination was found and no unacceptable risks associated with potential exposures to COPCs associated with DoD operations were identified within Area 10 soil, sediment or surface water. Based on the results of the RI and previous investigations, no further investigative or response actions are necessary for Area 10 soil, sediment, or surface water. Groundwater at the former Raritan Arsenal is being evaluated as a separate Operable Unit.

## 2.5 Summary of Site Characteristics

### 2.5.1 Conceptual Site Model

A CSM describes the contaminant sources, release and transport mechanisms, the exposure media, exposure pathways, and potentially exposed human populations for a site. The primary source of potential contamination at Area 10 is MEC resulting from the explosion of Magazine Building E-31 in 1919. MEC debris that was scattered during the explosion was historically found on the ground surface and shallow subsurface within Parts I and II of Area 10. Exposure pathways associated with Area 10 include site receptors in contact with impacted surface and shallow subsurface soil, sediment, or surface water (groundwater has been evaluated as a separate operable unit).

Land use in the western portion of the former arsenal where Area 10 is located is currently primarily industrial/commercial, with structures including large industrial buildings. The northeastern portion of Area 10 is part of the heavily developed Raritan Center. The remainder of Area 10 is developed as part of Thomas A. Edison County Park. Based on the anticipated future use of Area 10, it is reasonable to assume that industrial/commercial receptors would be present in the future either as customers or as personnel. Construction/utility workers would also be present under the future development scenario. The anticipated future use of the site is for continued active mixed industrial/commercial and recreational use; however, a hypothetical residential scenario was also evaluated for the 2017 RI.

Few munitions items have been found during extensive MEC investigations implemented following clearance of Area 10 Parts I and II in 1988 and a subsequent removal action in 1992 (see Section 2.2.1). No hazardous or nonhazardous MEC-related items were identified on the surface or in the subsurface during investigation of the almost 30-acre area surrounding Area 10 Parts 1 and II, the developed portion of the park, the 3.5-acre section of Area 10 adjacent to Thomas A. Edison County Park northeast of Parts 1 and II, and during investigation of the fenced portion of Part 1 for the 2017 RI. Therefore, exposure pathways for MEC are considered incomplete.

## 2.5.2 Site Overview

The physical and cultural characteristics of Area 10 are presented in this section. No areas of historical or archaeological importance are known to exist on site.

### Physical Setting

Area 10 is within the former Raritan Arsenal, which includes approximately 3,200 acres located along the northern bank of the Raritan River. The majority of the former Raritan Arsenal is located in Edison Township, with a portion of the site located in Woodbridge Township, in Middlesex County, New Jersey, approximately 20 miles southwest of lower Manhattan (Figure 2-1).

Area 10 is located in the west-central portion of the former Arsenal and encompasses 134 acres. It comprises the Thomas A. Edison County Park and a small portion of the Raritan Center. The County Park portion of Area 10 is zoned for recreational use and is owned by Middlesex County. The Raritan Center portion of Area 10 is used for light industrial development, is completely developed, and is owned by Federal Business Centers.

Surface water runoff in the County Park portion of Area 10 flows generally to the south-southeast, following the slope of topography to the Western Boundary Ditch, the Open Lawn Ditch, and the Maintenance Area Ditch. Other drainage ditches that are present within the County Park, are dry most of the time, and only contain surface water after rain fall events. Surface water flow in the Raritan Center Portion of Area 10 is controlled by a storm sewer system which discharges to surface water bodies in the southern portion of the former arsenal (Roy F. Weston, 1996a).

### Geology

The geology across the former arsenal is characterized by an overburden layer, approximately 10 to 80 feet thick, composed of unconsolidated sediments underlain by bedrock consisting of shales, metamorphosed shales, and an igneous diabase sill (Weston, 2008).

Bedrock consisting of weathered shale, was encountered at 22 feet bgs within the County Park portion of Area 10 and between approximately 22 and 71 feet bgs in the Raritan Center portion of Area 10 (Roy F. Weston, 1996a).

### Soils

The soils present within the former arsenal study area reflect extensive human activity in the northern sections. Cut and fill activities, clay pits, and fluvial alterations within the former arsenal have led to inconsistent subsurface profiles. Soils identified within the former arsenal are mapped into three general groups by the U.S. Department of Agriculture, Soil Conservation Service (SCS). The SCS mapped soils consist of the following:

Urban land-Boonton-Haledon: Urban land and nearly level to strongly sloping, deep, well-drained to somewhat poorly-drained soils that have a firm or very firm loamy subsoil on uplands.

**Klej-Atsion-Evesboro:** Nearly level to strongly sloping, deep, excessively well-drained and moderately well-drained to poorly-drained soils with a sandy subsoil and substratum on terraces and uplands.

**Sulfaquents-Sulfihemists-Psamments:** Nearly level, deep, excessively drained to very poorly-drained mineral and organic soils with a grayish or black subsoil on tidal flats. Surface material typically grades gently from tidal marsh material near the Raritan River to sands and sandy loams between 1 to 2 miles inland.

Based on Area 10 site-specific boring logs associated with site investigations, shallow soils beneath Area 10 consist of reworked native soils, classified as poorly-graded sand with variable amounts of silt and gravel, and these soils range up to 8 feet thick. The fill was placed during extensive regrading that occurred during construction of the former Arsenal and later construction of Raritan Center and Thomas A. Edison County Park. The fill is underlain by silty sands containing lenses of silt, clay, and peat (Roy F. Weston, 1996a).

### Hydrology

Groundwater hydrology at the former arsenal is characterized by separate aquifers in the overburden and bedrock. Groundwater within the overburden and bedrock aquifers flows southeastward toward the Raritan River. The occurrence and depth to groundwater in the overburden zone varies from 2 to 30 feet bgs. Groundwater levels in the Upper Sand unit are not tidally influenced, whereas those in the Lower Sand unit may be tidally influenced up to 2,500 feet from the Raritan River. The differing hydrogeologic characteristics of these units may be explained in part by the presence of the Meadowmat Formation, which acts as a semi-confining unit of silt and clay between the Upper and Lower Sand units. The Lower Sand unit is the primary water-bearing unit within the overburden, and it may exhibit both confined and unconfined characteristics (Weston, 1996).

Based on a review of the drilling logs for the monitoring wells installed at the site, groundwater at Area 10 is found from approximately 5 to 8 feet bgs. Groundwater flow direction is to the southeast beneath Area 10 (Roy F. Weston, 1996a, 1996b).

### Nature and Extent of Contamination

The primary source of potential contamination at Area 10 is MEC resulting from the explosion of magazine E-31 in 1919. The findings of the RI and the previous removal actions indicate that the impacts generated by that MEC release were addressed through subsequent cleanup and construction activities. The data suggest that the MEC have been removed from this area, so there is no longer an explosive risk at Area 10.

A baseline HHRA was conducted to estimate the potential risks to human receptors associated with exposures to constituents detected in surface and subsurface soil, surface water, and sediment within Area 10. The potential receptors evaluated under a current land use scenario were recreational users/trespassers, industrial workers, and maintenance workers at the former arsenal. Under a future land use scenario, the potential receptors evaluated included construction workers and hypothetical residents (although the site is likely to remain under industrial use for the foreseeable future). The HHRA did not identify an unacceptable risk associated with exposure of current or future receptors at Area 10 to COPCs associated with DoD releases.

A BERA addendum was completed to evaluate the potential for ecological risk from DoD-related activities at Area 10. The site-wide BERA results (Weston, 2008) did not indicate any site-related potential for ecological risk directly associated with Area 10, with the possible exception of arsenic in soil at the Middlesex County Park portion of Area 10. The RI confirmed that elevated arsenic concentrations were detected downgradient of historical arsenic-based herbicide application areas and

the presence of arsenic was therefore not identified as a CERCLA release (CERCLA § 107[i]; 42 United States Code [U.S.C.] § 9607[i]). Accordingly, no evaluation of arsenic was recommended. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) defines pesticide to include herbicides (see 7 U.S.C. 136). As the historical arsenic-based herbicide was applied normally, it is not considered a release of a hazardous substance under CERCLA; if there is no CERCLA release, then the DoD has no authority to act under the FUDS program.

## 2.6 Current and Potential Future Land Use

Area 10 encompasses approximately 143 acres of land. The northeastern portion of Area 10 is part of the heavily developed Raritan Center. The remainder of Area 10 is developed as part of Thomas A. Edison County Park. Land use within Area 10 is currently primarily industrial/commercial and recreational. Current receptors include maintenance workers, industrial/commercial workers, recreational users/trespassers, and construction/utility workers. Future land use is anticipated to be the same as the current land use, where Area 10 remains under mixed industrial/commercial and recreational use; however, a hypothetical residential scenario was also evaluated (although the site is reasonably anticipated to remain under industrial use for the foreseeable future).

## 2.7 Summary of Project MRS Risks

Removal actions and investigations at Area 10 from 1963 to 2005 are consistent with the CSM that suggests there was one primary MEC release mechanism (i.e., the 1919 explosion of magazine Building E-31), and that the impacts generated by that MEC release were addressed through subsequent cleanup and construction activities. Ordnance items were removed during investigation in 1988 and a removal action in 1992, but no additional MEC items were identified during subsequent phases of MEC investigations performed at Area 10. As summarized below, both an HHRA and BERA were conducted during the RI based on data collected during historical environmental investigations. The HHRA and BERA evaluated potential exposure pathways for the receptors identified at the site. The HHRA showed no unacceptable risks associated with exposure to COPCs from potential CERCLA releases caused by military operations. Additionally, no evidence of ecological risks from release of a hazardous substance under CERCLA was found during the BERA.

For these reasons, USACE recommended no action.

### 2.7.1 Baseline Human Health Risk Assessment

A baseline HHRA was conducted for Area 10 as part of the 2017 RI using data collected from 1992 through 2005. COPCs at Area 10 were identified for surface soil (0 to 2 feet bgs), subsurface soil (2 to 10 feet bgs), sediment, and surface water. If a maximum detected chemical concentration exceeded the USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA, 2014), it was retained as a COPC. Chemicals that were not detected in any of the samples within an environmental medium, as well as commonly occurring essential nutrients such as calcium, magnesium, potassium, and sodium, were not selected as COPCs. COPCs identified for Area 10 are summarized below:

- Surface Soil (0 to 2 feet bgs) – One pesticide (dieldrin), six inorganic chemicals (antimony, arsenic, cobalt, iron, manganese, and mercury) and carcinogenic PAHs (cPAHs) as benzo(a)pyrene toxic equivalents (BAP TEQs) were identified as COPCs in surface soil.
- Subsurface Soil (2 to 10 feet bgs) – Six inorganic chemicals (aluminum, arsenic, cobalt, iron, thallium, and vanadium) and cPAHs as BAP TEQs were identified as COPCs in subsurface soil.



- Surface Water – Five inorganic chemicals (aluminum, cadmium, cobalt, iron, and manganese) were identified as COPCs in surface water.
- Sediment – Four inorganic chemicals (arsenic, cobalt, copper, and iron) and cPAHs as BAP TEQs.

Potential exposure pathways that were evaluated for soil included ingestion, dermal contact, and inhalation exposures; potential exposure pathways that were evaluated for surface water and sediment included ingestion and dermal contact.

Potential carcinogenic risks and noncarcinogenic hazards were estimated for the COPCs within the identified media for various receptors. The estimated risks and hazard indices (HIs) were compared to the acceptable cancer risk range and HI values. The DERP considers an acceptable excess lifetime cancer risk range for a site to be within one in ten thousand and one in a million ( $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ ) and an acceptable noncarcinogenic hazard index to be 1 or less (DoD Manual 4715.20). The purpose of the HHRA was to estimate the potential risks to human receptors associated with exposures to constituents detected in surface and subsurface soil, surface water, and sediment within Area 10. The potential receptors evaluated under a current land use scenario were recreational users/trespassers, industrial workers, and maintenance workers at the former arsenal. Under a future land use scenario, the potential receptors evaluated included construction workers and hypothetical residents (although the site is likely to remain under industrial use for the foreseeable future). The estimated cancer risks and HIs from exposure to site soil COPCs for recreational users/trespassers, industrial workers, maintenance workers, construction workers, and hypothetical adult and adult/child aggregate residents were within acceptable limits. Also, the estimated cancer risks and HIs from exposure to site surface water and sediment COPCs for recreational users/trespassers were within acceptable limits. The estimated HIs from exposure to site soil COPCs for future hypothetical child residents (although the site is reasonably anticipated to remain under industrial use for the foreseeable future) exceeded acceptable limits primarily due to arsenic and cobalt that also are associated with background soils, and are not specific to DoD activities. Therefore, no DoD-related constituents of concern (COCs) were identified. The majority of the calculated cancer risks and HIs were from chemicals that were present at levels consistent with site background (arsenic and PAHs). Some of the elevated arsenic levels may be derived from DoD use of arsenical-based herbicides around the magazine areas, but use of such materials in accordance with FIFRA does not constitute a CERCLA release. The PAHs are likely from nonpoint anthropogenic sources, such as vehicular traffic or asphalt pavements, and are consistent with background levels, which are excepted under CERCLA. Cobalt is not associated with former DoD operations at the site and no known cobalt releases have occurred in Area 10 that are regulated under CERCLA. It is possible cobalt is associated with either fill material or non-DoD-related permitted uses. Overall, the presence of cobalt in site soils is not considered to be a human exposure concern under current and anticipated land uses for Area 10. The arsenic, cobalt and PAHs detected in site soil were not the result of a CERCLA release during former operations at Area 10, which means that there is no authority to remediate them under the FUDS program. Furthermore, DoD-related constituents do not present an unacceptable risk for any of the exposure scenarios evaluated for current and foreseeable future land use conditions. Therefore, Area 10 was recommended for no action based on the results of the HHRA.

## 2.7.2 Baseline Ecological Risk Assessment

A BERA addendum was completed to evaluate the potential for ecological risk from DoD-related activities at Area 10. Ecological risks for aquatic habitats at the former Arsenal were characterized by investigating the surface water and sediment, the benthic macroinvertebrate community, and fish, frog, fiddler crab, and plant communities, as well as exposure pathways to higher-level avian and mammalian receptors. Ecological risks for terrestrial habitats were characterized by investigating the soil, soil

invertebrate and small mammal communities, as well as exposure pathways to higher-level avian and mammalian receptors. Biological sampling included measurement endpoints such as frog, fish, fiddler crab, and plant communities, and included benthic macroinvertebrate communities analysis.

The results of these studies were collectively assessed in a weight-of-evidence approach to determine whether significant ecological risks were present at the former Arsenal compared to site reference areas. The site-wide BERA results (Weston, 2008) did not indicate any site-related potential for ecological risk associated with Area 10, with the possible exception of arsenic in the soil. The RI confirmed that elevated arsenic concentrations were detected downgradient of historical arsenic-based herbicide application areas, and the presence of arsenic was therefore not identified as a CERCLA release.

## 2.8 Documentation of Significant Changes

The PP recommends a no action remedy for Area 10. Since publication of the PP, no changes to the recommendation of no action have been made.

# Part 3: Responsiveness Summary

The public comment period extended from August 12, 2019 through September 16, 2019. A notice identifying the date and time of a public meeting, as well as the availability of the PP, was published in the *Home News Tribune* and the *Middlesex County News/Star Ledger* during the week of August 5, 2019. A meeting was held to discuss the PP on August 20, 2019 at the Edison Senior Center from 7 PM to 8 PM. Representatives of CENAN, CEHNC, CH2M, and members of the public attended. The meeting transcript has been placed in the Administrative Record at the CENAN office in Edison, New Jersey. No written comments were received during the public comment period.

NJDEP concurs with the USACE decision for No Action at Area 10 with regard to MEC (letter dated May 1, 2019), but does not concur with the USACE decision for No Action with regard to hazardous, toxic and radioactive waste (letter dated June 28, 2019). The June 28, 2019 letter states that it is NJDEP's position that insufficient characterization has been performed along the railroad lines used by DoD at the former arsenal, and that arsenic and PAH concentrations exceeding NJDEP's non-residential soil remediation standards warrant additional remedial action. All referenced correspondence is included in Appendix A.

The issues raised in NJDEP's June 28, 2019 letter are the same as those raised during NJDEP's review of the RI Report. USACE has documented in the Final RI Report (USACE, 2019) and in letters to NJDEP that arsenic and PAHs are attributed to background, anthropogenic sources and historic application of arsenic-based herbicides/pesticides, none of which are the responsibility of the government under the FUDS program.

## 3.1 Stakeholder Issues and Lead Executing Agency Responses

### **Summary of NJDEP Comments on the PP:**

NJDEP reviewed the PP and provided comments in letters dated May 1, 2019 and June 28, 2019 (Appendix A). NJDEP agrees that a MEC hazard in Area 10 is not likely to exist. However, it is NJDEP's position that Area 10 has not been sufficiently characterized to address the presence of arsenic and PAHs at levels greater than NJDEP nonresidential SRS and potential soil contamination along the railroad corridors.

### **USACE Response to NJDEP Comments:**

#### 1) CERCLA vs. NJDEP Soil Remediation Standards

NJDEP states that the NJDEP soil remediation standard (SRS) values should be used to trigger remedial actions in various forms. The RI for these areas was prepared in accordance with USACE guidance and uses a CERCLA-based approach to the data evaluation, using human health and ecological risk assessments to draw site conclusions. The USACE did perform an evaluation of the data against NJDEP standards and determined that arsenic and PAHs are the constituents that exceed the SRS values. However, these constituents are not attributable to a DoD documented release. The occurrence and distribution of PAHs in excess of the SRS values suggest that they are attributable to ubiquitous Diffuse Anthropogenic Pollution, which NJDEP's own guidance recognizes as a source of pollution. Some of the elevated arsenic levels may be derived from DoD use of arsenical-based herbicides around the magazine areas, but use of such materials in accordance with FIFRA does not constitute a CERCLA release.

## 2) Data Evaluation

NJDEP does not concur with how the existing data are being evaluated against background data in the Area 10 RI. The RI does account for uncertainty in the background levels by presenting numerical and graphical representations of the site excess lifetime cancer risks and hazard index values both with and without contributions from the potential background sources. These comparisons consistently show that with the exception of the conservative future residential land use scenarios, the total site risk is within acceptable levels. Regardless of the position on background levels, the fact remains that arsenic and PAHs are the compounds that consistently drive unacceptable risk, typically under very conservative future land use scenarios. As stated above, these constituents are not attributable to a DoD documented release and their presence does not constitute a CERCLA release.

## 3) Environmental Impacts Associated with Rail Lines

NJDEP contends that hazardous and toxic waste (HTW) releases along the former rail lines associated with the Raritan Arsenal have not been adequately evaluated. No pattern of HTW impacts associated with the rail lines has been identified based on the hundreds of surface and subsurface soil samples have been collected across the entire former magazine area encompassed by Area 10, inclusive of the former rail lines, and no specific pattern of impacts associated with the rail lines has been identified. The only documented, DoD-related, release mechanism identified during the RI for Area 10 is the explosion at Magazine Building E-31, which may have released metals and/or explosives into the environment. These constituents were evaluated and no MC-driven risks are associated with this DoD release. There is no known DoD release associated with the historical rail lines that would warrant an evaluation of residual contamination along the rail lines. The FUDS program is designed to investigate and remediate CERCLA releases for which DoD is responsible. The areas along the former rail lines do not have a history of a CERCLA release nor does the government bear the legal burden to produce such evidence. Based on information available to the government to date, there is no evidence that DoD is responsible for contaminants associated with the rail-beds. It is known that there are some elevated metals and PAHs along former and existing rail-beds. However, we believe these are attributed to the fill and material that was used to construct the rail-beds and not the result of a CERCLA release. Urban fill used to construct a rail-bed or other building roadway, parking lot, etc., does not constitute a CERCLA release and is not actionable. Historical evidence informed us that in the past, arsenic compounds were used in addition to creosote to inhibit/control the attack of bugs as the rail ties were treated to resist decay. There is reason to believe that arsenic-based material (herbicides) may have been used for weed control along the rail-beds and the creosote may have been used as an insecticide. CERCLA expressly states that no person may recover under CERCLA 107 (42 U.S.C. 9607) for any response costs or damages resulting from the application of a registered pesticide. FIFRA defines pesticide to include herbicides (see 7 U.S.C. 136). This means that the arsenic and creosote are not considered hazardous substances under CERCLA, and that there is no CERCLA release. If there is no CERCLA release, then there is no authority to act under the FUDS program. For the foregoing reasons, USACE cannot and will not take any further samples along rail-beds and the Army should not be responsible for contaminated fill that may have been used to construct these areas, absent any evidence of a DoD-documented release.

### **Summary of Comments Received During the Public Comment Period:**

No comments were received during the public comment period.

## 3.2 Technical and Legal Issues

The public participation requirements set out in the NCP at 40 CFR 300.430(f)(3) have been met for Area 10. There were no significant technical or legal issues raised in the process of developing this Decision Document.

# Part 4: References

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- CH2M HILL, Inc. (CH2M). 2018. *Memorandum for the Record, Issues of Non-Concurrence with NJDEP Remedial Investigation/Feasibility Studies, Former Raritan Arsenal, Edison, New Jersey*. February.
- CH2M HILL, Inc. (CH2M). 2017. *Area 10 Remedial Investigation Report, Former Raritan Arsenal, Edison, New Jersey*. August.
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- EOD Technology, Inc. (EODT). 1993. *Final Report for the Removal Action of UXO and Investigation in Areas 10, 11, 5, and 3 at the Former Raritan Arsenal, Edison, New Jersey*. November.
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- Roy F. Weston, Inc. 1996a. *Final Report of Investigation, Former Raritan Arsenal, Area 10 Investigation*. March.
- Roy F. Weston, Inc. 1996b. *Final Site-Wide Hydrogeological Report Former Raritan Arsenal Phase II Remedial Investigation*. June.
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U.S. Environmental Protection Agency (USEPA). 1999. *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. July.

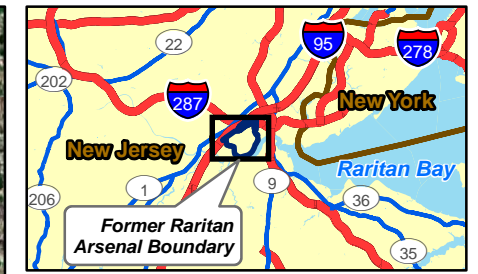
U.S. Environmental Protection Agency (USEPA). 2014. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. May. <http://www.epa.gov/region9/superfund/prg/>.

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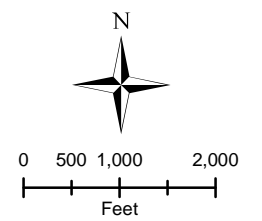
Weston Solutions, Inc. (Weston). 2007. *Revised Draft Management Action Plan for the Former Raritan Arsenal, Edison, New Jersey*. January.

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# Figures

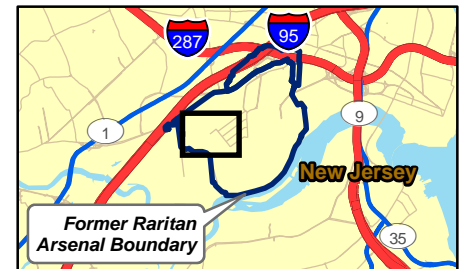
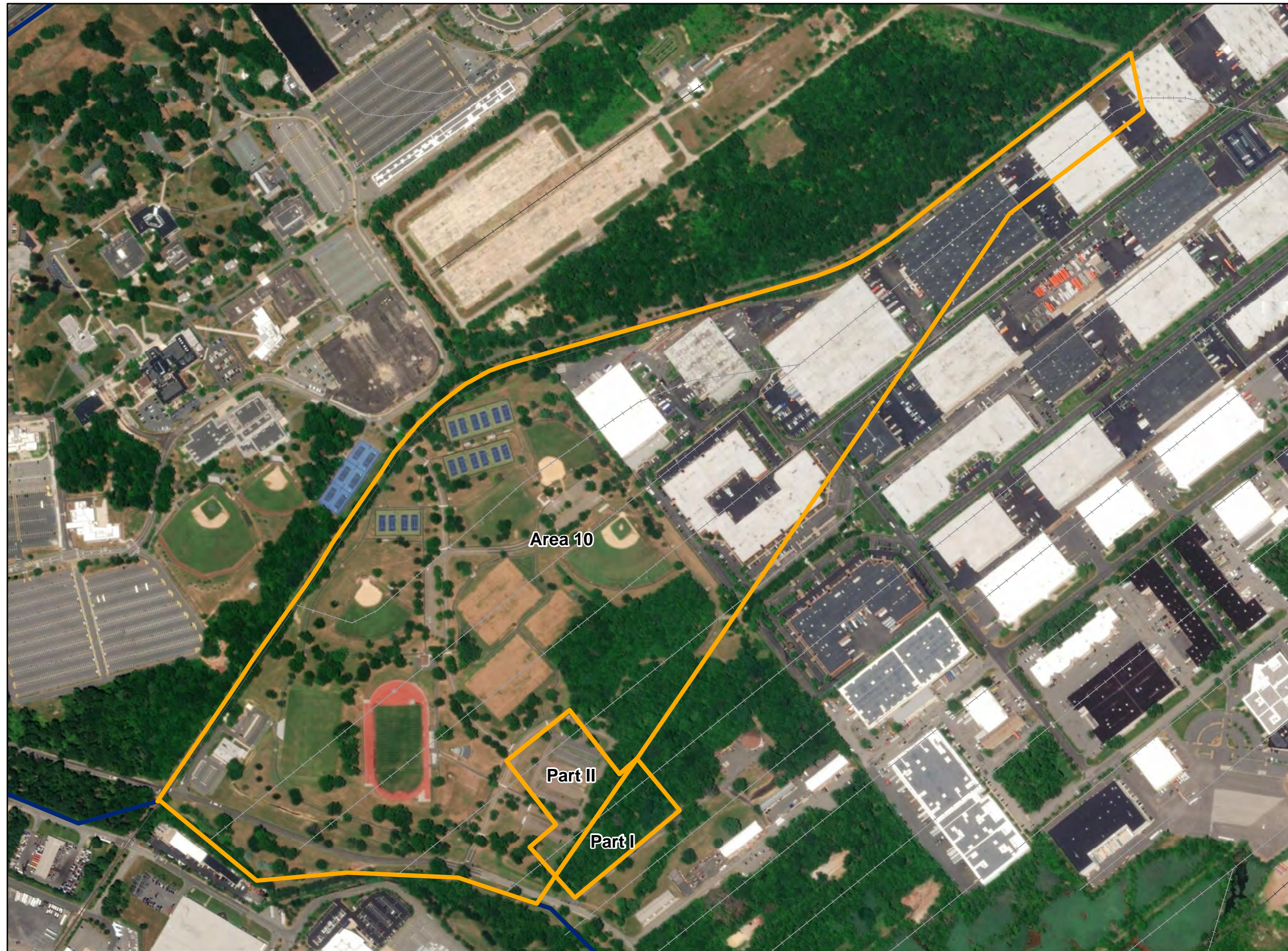


- LEGEND**
- Former Raritan Arsenal
  - Area Boundary
  - Railroads
  - Historical Railroads

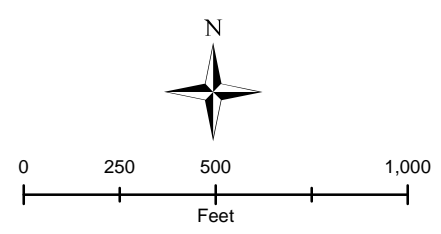


**Figure 2-1**  
**Area 10 General Site Location**  
 Area 10 Decision Document  
 Former Raritan Arsenal, Edison, NJ





- LEGEND**
- Former Raritan Arsenal
  - Area Boundary
  - Railroads
  - Historical Railroads



**Figure 2-2**  
**Area 10 General Site Layout**  
 Area 10 Decision Document  
 Former Raritan Arsenal, Edison, NJ

# Appendix A

## NJDEP Comments on Proposed Plan



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Emergency Management Program  
Mail Code 440-03  
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609-633-2168

PHILIP D. MURPHY  
*Governor*

SHEILA Y. OLIVER  
*Lt. Governor*

CATHERINE R. McCABE  
*Commissioner*

May 1, 2019

Matthew Creamer, Project Manager  
Environmental, Interagency & International Services Branch  
U.S. Army Corps of Engineers  
New York District  
26 Federal Plaza; Room 1811  
New York, New York 10278-0090

Re: Proposed Plan (PP) for Area 10  
Former Raritan Arsenal  
Woodbridge Avenue  
Edison Township, Middlesex County, New Jersey  
SRP PI# 006021

Dear Mr. Creamer:

The New Jersey Department of Environmental Protection's (Department), Emergency Management Program has completed its review of the Proposed Plan (PP) for Area 10, submitted by the United States Army Corps of Engineers (USACE) pursuant to the Department of Defense State Memorandum of Agreement (DSMOA) executed on April 3, 1992 and the Technical Requirements for Site Remediation (N.J.A.C. 7:26E). The PP for Area 10 proposes a no action determination for the area. Based on the investigations and characterization performed in Area 10 regarding munitions and explosives of concern (MEC), the Department's Emergency Management Program concurs with the proposal for no action in this area. Based on the review of the PP for Area 10, the Department is providing the following comments for consideration:

### **General Comments**

1. The Department recommends bolding terms when used for the first time that are included in the Glossary of Terms. Please provide a footnote to the first boldened term directing the reader to the Glossary of Terms to review the terms description or definition.

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## Specific Comments

1. **Page 5, Munitions and Explosives of Concern Investigations, first paragraph, second sentence.** The sentence states that the remedial investigation (RI) findings determined a “negligible concern for MEC,” however this is not specified in the RI Report. Please note that the RI Report properly states the following: "The data suggest that the MEC have been removed from this area, and so there is no longer an explosive **risk** (risk should be revised to hazard) at Area 10." Please use the language agreed to in the RI Report and revise the PP accordingly.
2. **Page 8, Remedial Investigation Conclusions and Recommendations, first sentence.** Please revise the first sentence to: “Because there is no evidence of an explosive hazard and no unacceptable risks associated ...”
3. **Page 8, Ecological Risks, first sentence.** Please note that the first sentence is not an accurate statement and should be revised. Previous evidence of MEC has been discovered to include the last RI which produced MD. MD is evidence of MEC. The Department has concurred with the RI Report that an explosive hazard no longer exists at Area 10; therefore, please revise to align with the findings in the RI Report.

If you have any questions regarding these comments, please contact me at 973-631-6376 or at [ralph.rodriques@dep.nj.gov](mailto:ralph.rodriques@dep.nj.gov).

Sincerely,



Ralph Rodriguez,  
New Jersey Department of Environmental Protection  
Emergency Management Program

cc: Robert VanFossen, NJDEP/Emergency Management  
Gary Pearson, NJDEP/Emergency Management  
Scott Vondy, NJDEP/Bureau of Case Management  
Jay Elliot, Edison Health Department  
Thomas Bourque, UXO Pro  
Ms. Jean Leone, Summit Associates, Inc.  
John Visceglia, Summit Associates, Inc.  
Nicole Visceglia Rodgers, Federal Business Centers  
John Orozco, Federal Business Centers  
Lester Jones, Middlesex County Office of Health Services



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Site Remediation and Waste Management Program  
Mail Code 401-05A  
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Trenton, New Jersey 08625-0420  
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June 28, 2019

Matthew Creamer, Project Manager  
Environmental, Interagency & International Services Branch  
U.S. Army Corps of Engineers  
New York District  
26 Federal Plaza, Room 1811  
New York, NY 10278-0090

RE: Proposed Plan Former Raritan Arsenal Area 10  
Former Raritan Arsenal  
Edison Township, Middlesex County  
SRP PI #: 006021

Dear Mr. Creamer:

The New Jersey Department of Environmental Protection (Department) has completed a review of the Proposed Plan for Area 10 dated January 2019, submitted pursuant to the Department of Defense State Memorandum of Agreement (DSMOA) executed on April 3, 1992 and the Technical Requirements for Site Remediation at N.J.A.C. 7:26E.

Area 10 of the Former Raritan Arsenal encompasses 143 acres and includes portions of the Raritan Center and Thomas A. Edison County Park. The plan proposes no action for Area 10.

The Department cannot concur with the proposed plan's no action proposal for the following reasons:

1. The presence of arsenic and polycyclic aromatic hydrocarbons (PAHs) at levels greater than NJDEP's Non-Residential Soil Remediation Standards warrant additional remedial action in accordance with N.J.A.C. 7:26E, the Technical Requirements for Site Remediation, Subchapter 5.1 – 5.2.
2. Insufficient investigation has been performed along former railroad lines that were used by the DoD during operation of the former Raritan Arsenal. The US Army Corps of Engineers (USACE) contends that no pattern of hazardous and toxic waste (HTW) exists. However, the limited investigations performed in these areas within Area 10 have revealed the presence of DoD-related munitions debris (MD), munitions and explosives of concern (MEC) and soil contamination and existing RI studies did not target railroad lines. Therefore, the railroad corridors warrant further investigation and possible remedial

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action since soil contamination in excess of Department Soil Remediation Standards may exist.

For these reasons, the Department cannot agree with the no action proposal for Area 10.

If you have any questions, please call Scott Vondy at (609) 292-2403, or email at Scott.Vondy@dep.nj.gov.

Sincerely,



Wayne C Howitz  
Assistant Director  
Remediation Oversight Element

cc: Jay Elliot, Edison Health Department  
Nicole Visceglia Rodgers, Federal Business Centers  
John Orozco, Federal Business Centers  
Jean Leone, Summit Associates  
John Visceglia, Summit Associates  
Kwong Cho, USEPA, Region II

# Responses to Comments Received on the Draft Final Area 10 Remedial Investigation Report, Former Raritan Arsenal, Edison, New Jersey

PREPARED FOR: New Jersey Department of Environmental Protection (NJDEP)  
 PREPARED BY: CH2M HILL, Inc. (CH2M)  
 DATE: August 16, 2018  
 PROJECT NUMBER: 427946

The following table contains CH2M’s responses to comments received from NJDEP on the *Draft Final Area 10 Remedial Investigation Report, Former Raritan Arsenal, Edison, New Jersey*, which was submitted for review on April 6, 2016. In addition to the original comments received, NJDEP’s most recent comments on the document received by the U.S. Army Corps of Engineers (USACE) on March 22, 2018, are also presented in the table, followed by CH2M responses.

No.	Ref. Page / Para.	NJDEP Comment	CH2M Response
<b>General Comments</b>			
1.	General	As with other draft final Remedial Investigation Reports submitted by the USACE to the Department during this past year, the USACE propose no further action despite soil contaminant levels in excess of NJDEP Soil Remediation Standards, N.J.A.C. 7:27D. The USACE compare Area 10 soil data to the Department’s Soil Standards in Section 4, but stops short of application of NJDEP SRWMP rules and implementing guidance for remedial decision-making. Instead, the USACE present a CERCLA risk assessment evaluation in Section 7 for human health, utilizing the CERCLA benchmarks of: a carcinogenic risk range (1 excess cancer risk in a population of 1 million to 1 excess cancer risk in a population of 10,000) and b. non-cancer hazard index of greater than 1. As a result, in Section 9, Conclusions, the USACE recommend no further action.	<i>USACE recognizes this point of non-compliance with NJDEP Site Remediation Program Rules and Guidance. This discrepancy arises because it is a policy of the U.S. Army to implement munitions response actions under the Military Munitions Response Program (MMRP) in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Additionally, government funds can only be spent per Department of Environment Restoration Program (DERP) regulations, which does not include State requirements beyond CERCLA. The evaluation of Area 10, conducted in accordance with CERCLA processes, is sufficient to identify the potential risk associated with munitions and explosives of concern (MEC) or munitions constituents (MC) at this site. The overall risk assessment findings (conducted in accordance with CERCLA) concluded that there were no unacceptable risks associated with the constituents of potential concern (COPCs) that are</i>

No.	Ref. Page / Para.	NJDEP Comment	CH2M Response
			<p><i>potentially related to former Department of Defense (DoD) operations and above background levels; therefore, no constituents of concern (COCs) were identified for Area 10 based on the current and planned future land use for the area.</i></p> <p><i>Although USACE’s programmatic requirements dictate that remedial decisions be based on the CERCLA process, we do see value in addressing NJDEP’s concerns by incorporating elements into the Remedial Investigation (RI) report that align with NJDEP guidance per the information provided in the March 12, 2014 email. Specifically, USACE enhances the discussion of the nature and extent of contamination at Area 10 by comparison of analytical results from Area 10 to the NJDEP SRS values, which are promulgated standards per N.J.A.C. 7:26D, and by addressing polycyclic aromatic hydrocarbon (PAH) concentrations detected at the site through reference to NJDEP’s Diffuse Anthropogenic Pollution (DAP) guidance.</i></p>
2.	General	<p>The following contaminants in surface soil (depths of less than 2 feet) are reported at concentrations in excess of NJDEP soil Remediation Standards: arsenic (65 locations; maximum level of 1,310 ppm at location 10178); carcinogenic PAHs (several locations with relatively low concentrations, i.e., less than 2 ppm) with mixtures including benzo(a)pyrene, dibenzo (a,h) anthracene, benzo (a) anthracene, benzo (b) fluoranthene and indeno (1,2,3-c,d)pyrene; and the pesticide, dieldrin (only 1 location).</p> <p>For subsurface soil (depths greater than 2 feet), only arsenic is reported at concentrations in excess of NJDEP soil Remediation Standards, with a maximum level of 258 ppm at location 1064.</p> <p>In accordance with NJDEP SRWMP rules and implementing guidance, these contaminant levels warrant some form of remedial action. For contamination that exceeds the non-residential soil standards, engineering</p>	<p><i>See response to General Comment No. 1. Additionally, DERP policy limits the government to investigate/remediate only DoD-related CERCLA releases. The government cannot recommend deed notices when the RI concludes there is no actionable risk.</i></p> <p><i>As NJDEP noted, arsenic is the primary risk driver at the site. However, it may be attributed to historic pesticide/herbicide use at the former Raritan Arsenal and is not considered a CERCLA release.</i></p> <p><i>There is reason to believe that arsenic-based material (herbicides) may have been used for weed control at the former Raritan Arsenal. CERCLA expressly states that no person may recover under CERCLA 107 (42 U.S. Code [U.S.C.] 9607) for any response costs or damages resulting from the application of a registered pesticide. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) defines pesticide to include herbicides (see 7 U.S.C. 136). This means that the arsenic is not considered a hazardous substance under CERCLA, and that there is no CERCLA release. If there is no CERCLA release, then there is no</i></p>



No.	Ref. Page / Para.	NJDEP Comment	CH2M Response
		<p>controls and deed notice are required, at a minimum. For contamination that exceeds the residential soil standards, a deed notice is required, at a minimum. Remedial actions per NJDEP regulations would not be required if the reported contamination is shown to be representative of either regional or area-specific background conditions (i.e., demonstration through a site-specific background study). However, some of the reported arsenic concentrations in surface soil are unlikely to be attributable to either regional or background conditions (i.e., especially concentrations ranging from greater than 100 to 1,310 ppm). In addition, due to Area 10's site history during former Arsenal operations, the possibility of future encounters with unexploded ordnance (UXO), although somewhat limited due to UXO surveys and removal actions, still exists and warrants use of site-wide institutional controls for this concern.</p>	<p><i>authority to act under the Formerly Used Defense Sites (FUDS) program.</i></p> <p><i>If any DoD-related contamination is found in the future, then DoD will address the contamination in accordance with the current laws.</i></p>
<b>Specific Comments</b>			
1.	Section 4, Site Characterization	<p>Within Section 4.1, the text states that much of Area 10 has been developed into industrial, commercial and residential use. The NJDEP is unaware of any residential use or zoning within the footprint of Area 10. It is likely the text should state recreational. Clarification regarding this issue is requested.</p>	<p><i>Concur. There are no plans for residential development within Area 10. The text will be revised to state that much of Area 10 has been developed for industrial, commercial, and recreational use.</i></p>
2.	Section 4.2.6, BERA	<p>This section only provides a general overview of Baseline Ecological Risk Assessment (BERA) scope. However, a short statement on the significant findings should be presented, along with a specific reference to the BERA document, for readers to access for greater detail.</p>	<p><i>USACE will add specific reference to the BERA document, and, as applicable, will incorporate additional site-specific information for Area 10 as presented in the BERA.</i></p>
3.	Section 4.3.1	<p>This section mentions "BAP equivalent" as exceeding NJDEP soil standards. For clarification, NJDEP does not have a soil standard for this parameter; instead, NJDEP lists</p>	<p><i>The text will be revised to exclude the benzo(a)pyrene toxic equivalent (BAP TEQ) comparison in Section 4, Site Characterization. BAP TEQ is retained in the Human Health Risk Assessment (HHRA).</i></p>

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		individual soil remediation standards for individual PAH compounds.	
4.	Section 4.3.1.4, Sediment	<p>The USACE compare sediment sample results to NJDEP and USEPA screening levels and NJDEP soil standards, both of which are intended for human health direct contact/incidental ingestion exposure. If the area represented by these sediment samples are dry much of the year and this exposure scenario is feasible, comparison of sediment data to criteria or standards established for protection of human health may be appropriate. However, the primary benchmark for evaluation should be sediment screening criteria meant for protection of ecological receptors. Although sediment standards do not exist, the USACE may access recommended sediment ecological criteria found within the NJDEP Ecological Screening Criteria Table, available at <a href="http://www.nj.gov/dep/srp/guidance/ecoscreening/">http://www.nj.gov/dep/srp/guidance/ecoscreening/</a>. In addition, since a site-wide BERA was performed for the former Raritan Arsenal (Weston, 2008), the chemical specific preliminary remediation goals established as part of the BERA should be used for this evaluation in this report.</p>	<p><i>The site-wide BERA evaluated potential ecological risk for contaminants in sediment at the former Arsenal. With the possible exception of arsenic in Area 19 sediments, no evidence was found of ecological risk to freshwater habitats at the former Arsenal. As stated in Section 8.3 of the RI report, the site-wide BERA results did not indicate any site-related potential for ecological risk directly associated with Area 10, and because no additional samples were collected for Area 10, no further evaluation of risk to ecological receptors were conducted as part of the MEC investigation.</i></p> <p><i>The HHRA for Area 10 assumed potential recreational users could access the site and contact sediment through ingestion and dermal contact. The majority of the sediment samples were collected from the Western Boundary Ditch, the Open Lawn Ditch, and the Maintenance Area Ditch. It is possible potential recreational users could contact exposed sediments while wading in the drainages. Consistent with the Remedial Investigation/Feasibility Study (RI/FS) Work Plan, the sediment analytical data were conservatively compared to the residential soil screening levels from the U.S. Environmental Protection Agency (EPA) and NJDEP, and potential risks were estimated for recreational users exposed to sediment at Area 10.</i></p>
5.	Historical rail lines	<p>Historical rail lines within Area 10 may also be a source of UXO or munitions and explosive compounds (MEC) in these corridors. The USACE have yet to address the potential for former Arsenal-related UXO, MEC or hazardous and toxic waste (HTW) residual contamination along rail lines formerly used for Arsenal operations.</p>	<p><i>The only documented, DoD-related, release mechanism identified during the RI for Area 10 is the explosion at Magazine Building E-31, which may have released metals and/or explosives into the environment. These constituents were evaluated and no MC-driven risks are associated with this DoD-release. There is no known DoD release associated with the historical rail lines that would warrant an evaluation of residual contamination along the rail lines.</i></p> <p><i>The FUDS program is designed to investigate and remediate CERCLA releases for which DoD is responsible. The areas along the former rail lines do not have a history of a CERCLA release nor does the</i></p>

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			<p><i>government bear the legal burden to produce such evidence. Based on information available to the government to date, there is no evidence that DoD is responsible for contaminants associated with the rail-beds. It is known that there are some elevated metals and PAHs along former and existing rail-beds. However, we believe these are attributed to the fill and material that was used to construct the rail-beds and not the result of a CERCLA release. Urban fill used to construct a rail-bed or other building roadway, parking lot, etc., does not constitute a CERCLA release and is not actionable.</i></p> <p><i>Historical evidence informed us that in the past, arsenic compounds were used in addition to creosote to inhibit/control the attack of bugs as the rail ties were treated to resist decay. There is reason to believe that arsenic-based material (herbicides) may have been used for weed control along the rail-beds and the creosote may have been used as an insecticide. CERCLA expressly states that no person may recover under CERCLA 107 (42 U.S.C. 9607) for any response costs or damages resulting from the application of a registered pesticide. FIFRA defines pesticide to include herbicides (see 7 U.S.C. 136). This means that the arsenic and creosote are not considered hazardous substances under CERCLA, and that there is no CERCLA release. If there is no CERCLA release, then there is no authority to act under the FUDS program.</i></p> <p><i>For the foregoing reasons, USACE cannot and will not take any further samples along rail-beds and the Army should not be responsible for contaminated fill that may have been used to construct these areas, absent any evidence of a DoD-documented release.</i></p> <p><i>If any DoD-related contamination is found in the future, then DoD will address the contamination in accordance with the current laws.</i></p>
6.	Section 7.2.3, Screening Criteria and Background Levels and	The USACE use CERCLA-based risk assessment methods to evaluate site conditions for remedial decision-making. Although NJDEP SRWMP regulations and implementing	<i>Please see the response to Specific Comment No. 1.</i>

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	Appendix E, Human Health Risk Assessment	<p>guidance largely mirror the principles and approaches used within CERCLA, there are important differences reflected within NJDEP regulations. For this reason, NJDEP cannot concur with remedial decisions based solely on CERCLA, unless NJDEP rules and implementing guidance are appropriately accounted for within the remedial decision-making process. For soil evaluations, several important differences include:</p> <p>a. Use of “point compliance”, unless other acceptable methods are utilized as outlined in the Department’s technical guidance entitled <i>Attainment of Remediation Standards and Site-Specific Criteria</i>, dated Sept. 2012 and found at: <a href="http://www.state.nj.us/dep/srp/guidance/srra/attainment_compliance.pdf">http://www.state.nj.us/dep/srp/guidance/srra/attainment_compliance.pdf</a>.</p> <p>b. Use of State Standards based on a carcinogenic target risk level of 1x10<sup>-6</sup> (1 excess cancer in a population of 1 million).</p> <p>c. Evaluation of soil contamination regardless of vertical depth of contamination (i.e., the USACE limit soil evaluations to depths of less than 10 feet.)</p> <p>d. For situations where soil is determined to be impacted with contamination at levels greater than Department Soil Remediation Standards, remedial measures must be implemented. This may involve either removal or treatment to attain levels below standards, or, at a minimum, use of engineering and/or institutional controls to guide restricted use of the affected area.</p>	
7.	Section 7.2.3, Background Levels	Currently, a New Jersey soil background contamination study suitable for use State-wide does not exist. Therefore, the Department allows use of site-specific background studies for evaluation of contaminated sites (N.J.A.C. 7:26E, Subchapter 3.8). Within Section 7, the	<i>Arsenic and PAHs are the constituents that most frequently exceed the NJDEP criteria. USACE attributes exceedances of these constituents to the historical use of herbicides during facility operations and to DAP, respectively. Neither of these sources constitute a CERCLA release CERCLA 107 (42 U.S.C. 9607). The Area 10 RI does not</i>

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		<p>USACE cite studies which have evaluated metals or PAH compounds within New Jersey. However, these studies, although quite useful and informative, were not designed to be representative of soil conditions State-wide in a manner suitable for contaminated site remedial decision-making.</p>	<p><i>directly attribute calculated risk or exceedances of NJDEP criteria to background conditions; therefore, a site-specific background study is not warranted.</i></p>
8.	Tables 4-2 and 4-4	<p>Both tables display a column entitled: "Number of Background Exceedances". For arsenic in surface soil, 65 are reported; for subsurface soil, 12 are reported. However, it is unclear what this information represents, a footnote to describe the information for this column is needed. (For example, does this represent the number of on-site soil samples which exceed a designated "background" concentration for arsenic? If so, this should be stated in a footnote along with the "background" value used, and citation for same).</p>	<p><i>Both tables already include a footnote as follows: Background soil values are the 95th percentile for New Jersey Urban Coastal Plain Soils. Source: Prepared for NJDEP by BEM Systems, Inc. (1998). Characterization of Ambient Levels of Selected Metals and Other Analytes in New Jersey Urban Coastal Plain Region Soils. Final Report to NJ Dept. of Environmental Protection, Division of Science and Research, Trenton, NJ.</i></p> <p><i>The background level for arsenic is the NJDEP Soil Remediation Standard, which is based on natural background conditions. Background value for antimony is from Elements in North American Soils (Dragun and Chiasson, 1994).</i></p>
9.	Section 5.2.1	<p>This section documents that the geophysical investigation and anomaly investigation were designed to demonstrate, within + or – 5% error that 95% of the anomalies in the investigated area are not MEC. This was successfully accomplished, but another way to represent these results is, "it is likely that there is a very low amount of MEC in this area". This is confirmed in Section 5.2 which says that there is 95% confidence (+ or – 5%) that the anomalies on the investigation transects consist of 6.6% munitions-related objects and 93.4% non-munitions-related objects. In addition, some MD was found in the investigation transects and a significant amount of MEC was found in the area in the past (see Section 6 which says that over 1,700 MEC have been found in the past) confirming that Area 10 received kick-outs from the magazine explosion.</p>	<p><i>USACE has evaluated Area 10 and has concluded that adequate characterization has been performed and that there is little to no remaining MEC hazard in this area. The characterization determined no unacceptable risk.</i></p> <p><i>USACE does not agree that the statistics evaluation can be summarized as "it is likely that there is a very low amount of MEC in this area."</i></p> <p><i>The statistics say that "Based on these results, there is a 95 percent confidence (± 5 percent) that the entire population of anomalies represented on the transects consists of 6.6 percent munitions-related items and 93.4 percent non-munitions-related items."</i></p> <p><i>It should be noted that 6.6 percent munitions-related items are non-explosive munition debris and do not constitute a MEC hazard. This clarification will be made in Section 5.2 of the RI report.</i></p> <p><i>Munitions-related objects or munitions debris are not MEC and are not considered a hazard. A MEC Hazard Assessment is only</i></p>

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		<p>Based on this analysis, NJDEP does not agree with the statement in Section 6 that “minimal potential exists for MEC exposure” and “there is no longer an explosive risk at Area 10”, because “low risk” is not “zero risk”. The statistical sampling and analysis performed in the RI supports the determination of “low risk” but it doesn’t support the statement that there is “no longer an explosive risk at Area 10, therefore, a MEC Hazard Assessment is not required” and NJDEP does not concur with the determination in Section 6 that” no further action is recommended for MEC”.</p> <p>NJDEP concurs with the analysis in the report that it is likely that there is a low quantity of MEC in the site. However because the RI has determined that there is low MEC risk, CERCLA requires that the risk must be assessed in a MEC HA and appropriate methods to mitigate the risk of remaining MEC must be evaluated, such as the placement of a deed notice on the property.</p>	<p><i>conducted when there is reason to believe that MEC remains at the site. Based on past removal actions, investigations, and redevelopment of the site, USACE has concluded that there is no MEC hazard remaining.</i></p>
10.	Section 9, Summary and Conclusions	NJDEP cannot concur with the conclusions and recommendations in Section 9 until comments described above and below are addressed to the satisfaction of the Department.	<p><i>See response to General Comment No. 2 and Specific Comment No. 9.</i></p>
11.	Section 9.1	<p>This section references the LUCs implemented by the Township of Edison. NJDEP agrees that these LUCs represent a good process to mitigate the remaining MEC hazard at Area 10 however a deed notice, in accordance with NJ regulations, is still required. However, if these LUCs are referenced in USACE documents they are, in fact, LUCs and not NFA. As such, they should be selected and their implementation should be required by a decision document and there should be five-year reviews to ensure that they continue to be implemented and are still effective. In addition to NJDEP’s requirement</p>	<p><i>The land use controls (LUCs) implemented by the township are not the result of an Army RI or Decision Document. These measures were implemented as a safety measure until the RIs of all areas of the former Arsenal were completed and determination could be made. The RI for Area 10 has concluded there is No Action required for MEC.</i></p> <p><i>The township and NJDEP may continue to require LUCs for Area 10 if it feels they are warranted.</i></p>

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		for a deed notice it is also recommended to evaluate the "Township LUCs" and documenting them for the entire former Raritan Arsenal so they can be universally applied, monitored and potentially updated periodically and subject to evaluation for continued effectiveness in CERCLA five-year reviews.	