



# SITE 20/24 RECORD OF DECISION

NOVEMBER 2001

FINAL

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## LIST OF ATTACHMENTS

### *Attachment*

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- 1 Land Use Control Implementation Plan for Site 20/24
- 2 Certificate of Publication for Public Notices

## LIST OF ACRONYMS

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AR	Army Regulation
ARAR	Applicable or Relevant and Appropriate Requirement
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COC	Contaminant of Concern
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane
DSERTS	Defense Site Environmental Restoration Tracking System
EOD	explosive ordnance disposal
EPC	exposure point concentration
ESD	Explanation of Significant Differences
FS	Feasibility Study
ft	feet
HDPE	High Density Polyethylene
IRP	Installation Restoration Program
K <sub>oc</sub>	carbon/water partition coefficient
K <sub>ow</sub>	octanol/water partition coefficient
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
mg/kg	milligrams per kilogram
msl	mean sea level
NCP	National Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
PAERAB	Picatinny Arsenal Environmental Restoration Advisory Board
PAH	Polycyclic Aromatic Hydrocarbon
PCB	polychlorinated biphenyl
PPE	Personal Protective Equipment
PTA	Picatinny Arsenal
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RG	Remedial Goal
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SVOC	Semivolatile Organic Compound
TBC	To-Be-Considered
TSCA	Toxic Substance Control Act
UCL	upper confidence limit
USACE	United States Army Corps of Engineers
USCHPPM	United States Army Center for Health Promotion and Preventative Medicine
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VOC	volatile organic compound
WWI	World War I
WWII	World War II

## **1.0 PART 1: DECLARATION**

### **1.1 SITE NAME AND LOCATION**

Facility Name and Location: Picatinny Arsenal, United States Army Tank – Automotive and Armaments Command Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey 07806-5000. The facility is located as follows:

- Morris County
- Congressional District II
- EPA Region 2
- CERCLIS - EPA ID# NJ3210020704

This Record of Decision (ROD) specifically addresses all media with the exception of groundwater<sup>1</sup> at Site 20/24, the Pyrotechnic Testing Range/Sanitary Landfill at Picatinny Arsenal (PTA), Rockaway Township, New Jersey (see **Figure 1-1**). This area is designated Site 20/24 and consists of the U.S. Army Installation Restoration Program (IRP) Defense Site Environmental Restoration Tracking System (DSERTS) PICA-063 (Site 20) and PICA-066 (Site 24). PICA-063 has been combined with PICA-066 and both are being addressed concurrently under PICA-066. Thus, PICA-063 is considered response complete. Response complete refers to the site status in the DSERTS. The Army considers a site to be response complete when a CERCLA end point has been reached and no additional expenditure is planned for the site.

Site 20/24 is approximately 28 acres in size and is located in Area B in the southwestern corner of PTA between Phipps Road and Green Pond Brook (**Figure 1-2**). Site 20/24 is located in the valley region of PTA and is bounded by Green Pond Mountain to the northwest, Green Pond Brook to the southeast, Shinkle Road to the northeast, and Route 15 to the southwest.

### **1.2 STATEMENT OF BASIS AND PURPOSE**

This ROD presents the selected remedy for Site 20/24 located in PTA in Rockaway Township, New Jersey. The remedial action is selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The information supporting the decisions on the selected remedial action is contained in the administrative record, which is available at the information repositories listed in Section 2.3.

The New Jersey Department of Environmental Protection (NJDEP) and the U.S. Environmental Protection Agency (USEPA) Region 2 concur with the selected remedy.

### **1.3 ASSESSMENT OF THE SITE**

Releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this Record of Decision, may present an imminent and substantial threat to public health or welfare or the environment. Investigations at this site have determined that contaminants are present in soil at concentrations that are associated with unacceptable risks to human health and ecological receptors. In addition, contaminants may be transported to surface water bodies during rain events.

### **1.4 DESCRIPTION OF THE SELECTED REMEDY: INSTALLATION OF A VEGETATED SOIL COVER AND CONTINUED IMPLEMENTATION OF LAND USE AND ACCESS RESTRICTIONS**

The remediation of Site 20/24 is part of a comprehensive environmental investigation and remediation process currently being performed at PTA. The remaining areas in PTA are being considered separately and remedies for these areas are presented in separate documents.

The majority of the soil contamination above remedial goals at Site 20/24 is present in an approximate two-acre area south of Horney Road. In addition, approximately 900 cubic yards of soil contaminated with

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<sup>1</sup> Groundwater issues at the site are being addressed separately under the Area B Operable Unit.

polychlorinated biphenyls (PCBs), lead, and 4,4'-dichlorodiphenyltrichloroethane (4,4'-DDT) above the remedial goals are present to the east-southeast of this area (see **Figure 1-3**).

The remedial alternative that has been selected to protect human health and the environment for Site 20/24 consists of the following:

- Containment of soil contaminated with PCBs, lead, and 4,4'-DDT using a vegetated soil cover;
- Excavation<sup>1</sup> of soils that lie outside of the area to be capped and that contain contaminants above the remedial goals (RGs) and placement of those soils within the area proposed for capping; and,
- Enforcement of access restrictions designed to prevent disturbance of the soil cover and to prevent any non-industrial use of the site.

The actions described in this ROD are intended to eliminate the potential for human or ecological contact with contaminant concentrations that could cause unacceptable risks to human health or the environment at Site 20/24. The remedial action will be considered complete upon agreement with the USEPA Region 2, PTA, and the U.S. Army.

### 1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, is compliant with Federal and State applicable or relevant and appropriate requirements (ARARs) for this remedy, and is cost effective. The remedy does not satisfy the statutory preference for treatment as a principal element as the Selected Remedy is more cost effective than the technologies that do utilize treatment. Because this remedy will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unrestricted exposure, statutory reviews will be conducted every five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment until such time as it may be determined that the site qualifies for unrestricted use.

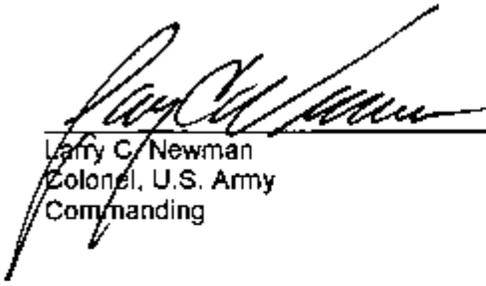
### 1.6 RECORD OF DECISION DATA CERTIFICATION CHECK LIST

The following information is included in the Decision Summary (Section 2.0) of this ROD. Additional information can be found in the Administrative Record for this site.

Criterion	Section	Page Number
Chemicals of Concern and Their Respective Concentrations	2.5.2	2-5
Baseline Risk Represented by the Chemicals of Concern	2.7	2-7
Cleanup Levels Established for Chemicals of Concern and the Basis for These Levels	2.4	2-3
How Source Materials Constituting Principal Threats will be Addressed	2.11	2-13
Current and Reasonably Anticipated Future Land Use Assumptions Used in Baseline Risk Assessment and ROD	2.7.1	2-7
Potential Land and Groundwater Use Available as a Result of the Selected Remedy	2.8	2-8
Estimated Capital, Annual Operation and Maintenance (O&M) and Total Present Worth Costs, Discount Rate, and the Number of Years Over Which the Remedy Cost Estimates are Projected	2.9	2-8
Key Factors Leading to Selection of Selected Remedy	2.12	2-13

<sup>1</sup> The remedy selection for soils with elevated concentrations of lead and/or 4,4'-DDT located outside of the area to be capped (see Figure 3-3) is excavation and placement under the capped area.

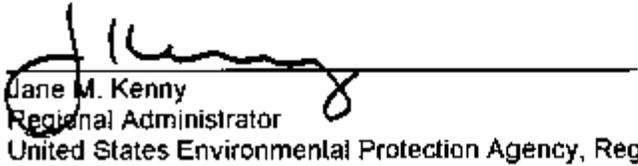
1.7 AUTHORIZING SIGNATURE



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Larry C. Newman  
Colonel, U.S. Army  
Commanding

29 May 2002  
Date



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Jane M. Kenny  
Regional Administrator  
United States Environmental Protection Agency, Region 2

6/4/02  
Date

## **2.0 PART 2: DECISION SUMMARY**

### **2.1 SITE NAME, LOCATION, AND DESCRIPTION**

This ROD describes the selected action to reduce human health and environmental risks associated with elevated concentrations of PCBs, lead, and 4,4'-DDT that are present in soil at PTA Site 20/24 in Rockaway Township, New Jersey. PTA is a National Priorities List (NPL) site and is registered under the Comprehensive Environmental Compensation, Response, and Liability Information System (CERCLIS) number NJ3210020704.

PTA is located approximately four miles north of the City of Dover in Rockaway Township, Morris County, New Jersey. The location of PTA is presented in **Figure 1-1**. Some of the nearby populous areas are Morristown, Morris Plains, Parsippany, Troy Hills, Randolph Township, and Sparta Township. The PTA land area consists of 6,491 acres of improved and unimproved land. The arsenal is situated in an elongated classic U-shaped glacial valley, trending northeast-southwest between Green Pond Mountain and Copperas Mountain on the northwest and an unnamed hill on the southeast (Sims, 1958). Most of the buildings and other facilities at PTA are located on the narrow valley floor or on the slopes along the southeast side.

Sites 20 (DSERTS Site PICA-063) and 24 (DSERTS Site PICA-066) occupy approximately 28 acres in the southwestern corner of the arsenal. Because Site 20 is completely contained within the boundaries of Site 24, these two sites are considered one site (Site 20/24). Site 20 is currently utilized for testing of pyrotechnic flares. Site 20/24 is located in the valley region of PTA and is surrounded by the following landmarks: Green Pond Mountain to the northwest; Green Pond Brook to the southeast; Shinkle Road to the northeast; and Route 15 to the southwest. The entire site is located within the 100- and 500-year floodplains of Green Pond Brook. A general map for Site 20/24 is provided as **Figure 1-2**.

The remedial alternative was selected by the Army in partnership with the NJDEP and the USEPA, Region 2. The remedial action is funded by the U.S. Department of the Army. The action was selected in accordance with CERCLA as amended by the SARA, the NCP, Resource Conservation and Recovery Act (RCRA), and Army Regulation (AR) 200-1, Environmental Protection and Enhancement, as applicable.

Elevated levels of PCBs, lead, and 4,4'-DDT in the surface soil in Site 20/24 have been detected. Through entrainment in flowing surface water, the contaminated soil has the potential to migrate to adjacent uncontaminated areas. Unacceptable human exposure is possible based on industrial or residential site uses. Residential use of the site is currently restricted by existing PTA institutional controls and will be further controlled by the implementation of a Land Use Control Implementation Plan (LUCIP, see **Attachment 1**). Future industrial uses of the area in accordance with the LUCIP provisions are anticipated. The decision was made to contain contaminants on-site, preventing unacceptable human and ecological exposures to contaminants.

### **2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES**

#### **2.2.1 Picatinny Arsenal Background**

PTA is owned and operated by the U.S. Army. The arsenal was a major source of munitions for World War I (WWI), World War II (WWII), the Korean War, and the Vietnam Conflict. During those periods, PTA was involved in the production of explosives, rocket and munition propellants, pyrotechnic signals and flares, fuzes, and metal components. Currently, the primary mission of PTA is research, development, and engineering of munitions and weapons.

#### **2.2.2 Site 20/24 Background**

Approximately 7 acres of Site 20/24 have been used for miscellaneous waste and debris disposal that began in the 1960s and continued until 1972.

Site 20 consists of an approximately 3-acre, flat, cleared area located entirely within the boundary of Site 24. A wooden structure (Building S-72) and a metal shed are located within the northern portion of Site 20. Building S-72 and the metal shed may have been used to control and view pyrotechnic testing activities at the site.

A review of historical aerial photographs indicates that in 1940, Site 20 was undeveloped wetlands. By 1951, drainage ditches were present at the site. Trailer-sized structures, possibly for storage and observation of pyrotechnic displays, were evident in 1957. Smoke, coming from the western edge of Site 20, was observed in a 1966 aerial photograph, indicating activity at the site. Few records exist regarding landfilling activities; however, reports indicate that sanitary waste, fly ash, ordnance, industrial waste, and sludge from the water treatment plant may have been dumped at Site 20/24 prior to 1972.

Site 24 consists of cleared, reclaimed/filled wetlands containing several small, mobile buildings/sheds, ponds, and man-made drainage ditches. Several miscellaneous debris piles, two abandoned skid-mounted trailers, a 3,150-square-foot gravel pad, and several gravel piles are located within Site 24. Several six-foot diameter cylinders of concrete sewer line are also located within the site. The most prominent feature of Site 24 is a shallow pond that occupies an area of approximately three acres and is typically referred to as the landfill pond.

In 1940, Site 24 was an undeveloped wetland area. Historical aerial photograph review indicates the slow expansion of the site from two small clearings to the current site area of approximately 28 acres. Drainage ditches and an access road constructed diagonally across the site are apparent in 1951 aerial photographs. Debris piles and filling activities are evident in 1961 aerial photos. Filling and disposal operations are apparent in 1963 and 1966 aerial photographs. Records on landfilling activities are scarce; however, sanitary waste, fly ash, ordnance, industrial waste, and water treatment plant sludge were reportedly placed at the site until 1972.

The landfill pond was previously a swampy area used for dumping of miscellaneous material and debris, including old wooden railroad boxcars. A small clearing, 200 to 250 feet south of Site 20, was excavated to approximately 30 to 40 feet, and used for dumping wastes and debris. Parts of the cleared areas were re-vegetated and the landfill pond separated the east and west sections of Site 24. Currently, an old naval gun turret is located adjacent to the landfill pond.

Additional information regarding these topics can be found in the Phase I Remedial Investigation (Dames and Moore, 1999), *Site 20/24 Data Report and Additional Investigation Work Plan* (ICF Kaiser, 1998), and in the *Final Feasibility Study for Site 20/24* (IT, March 2000).

### **2.2.3 Enforcement Activities**

No formalized enforcement activities have occurred at Site 20/24. PTA is working in cooperation with the USEPA and NJDEP to apply appropriate remedies that will preclude the necessity of formalized enforcement actions, such as Notices of Violation.

## **2.3 COMMUNITY PARTICIPATION**

Site 20/24 has been the topic of presentations to the Picatinny Arsenal Environmental Restoration Advisory Board (PAERAB). PAERAB members have provided comments regarding the proposed remedial alternative. A courtesy copy of the Proposed Plan was given to the PAERAB's co-chair and a complimentary copy was offered to any PAERAB member who requested it. A final Proposed Plan for Site 20/24 was completed and released to the public in June 2001 at the information repositories listed below:

ARDEC Installation Restoration Program Office  
Building 319  
Picatinny Arsenal, NJ 07806

Rockaway Township Library  
61 Mount Hope Road  
Rockaway Township, NJ 07866

Morris County Library  
30 East Hanover Ave  
Whippany, NJ 07981

Multiple newspaper notifications were made to inform the public of the start of the Proposed Plan comment period, solicit comments from the public, and announce the public meeting. The notification was run in the Star Ledger on June 14 and 20, 2001 and in the Daily Record on June 14 and 15, 2001. A public

comment period was held from Thursday, June 14, 2001 to Friday, July 13, 2001 during which comments from the public were received. A public meeting was held on June 21, 2001 to inform the public about the Selected Remedy for Site 20/24 and to seek public comments. At this meeting, representatives from the U.S. Army, NJDEP, USEPA, and the U.S. Army Corps of Engineers (USACE) were present to answer questions about the site and alternatives under consideration.

## **2.4 SCOPE AND ROLE OF RESPONSE ACTION**

Over the years, environmental investigations into the operations and waste management procedures for PTA production activities have indicated the potential for contamination. Because PTA has a large number of former production operations, the operations were organized into various sites to help manage the investigative work. More than 175 site numbers were given for the buildings and surrounding land that supported each operation. To ensure the investigation and cleanup of the sites was addressed in an organized manner and that the sites with the greatest potential for environmental contamination were investigated first, the Army categorized all of the sites into 16 areas named A through P. The Army anticipated that Area A had the greatest chance for environmental contamination and Area P the least. Areas A through P were then grouped into phases. Area A was investigated separately because of its high priority. The first phase of investigation included Areas B through G, the second phase H through K, and the third and last L through P. Site 20/24, being the only site in Area B, was investigated in Phase I. A site layout map for PTA, which displays each area, is presented as **Figure 2-1**.

This ROD addresses the selection of the remedial action for the PCB, lead, and 4,4'-DDT-contaminated surface soil in Site 20/24 of PTA. Total PCBs, lead, and 4,4'-DDT were selected as contaminants of concern (COCs) based on the results of the human health and ecological risk assessments. RGs, which are risk-based concentrations that are protective of human health and ecological receptors, were calculated for the COCs. Since the calculated RG for total PCBs was nearly identical to the New Jersey Department of Environmental Protection Non-Residential Direct Contact Soil Clean-up Criteria of 2.0 milligrams per kilogram (mg/kg) for total PCBs, 2.0 mg/kg was selected as the RG for total PCBs. Remedial goals for lead and 4,4'-DDT were calculated based on the results of the baseline ecological risk assessment. The RGs for lead and 4,4'-DDT are 580 mg/kg and 5.1 mg/kg, respectively.

Lead, PCBs, and 4,4'-DDT have been detected in surface soil at concentrations exceeding the RGs. The lead agency for this action (the Army) is proposing that remedial action for Site 20/24 soil is necessary to prevent human and ecological contact with concentrations of PCBs, lead, and 4,4'-DDT above RGs in soil. It is the Army's current judgment that the Selected Remedy identified in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The remedial actions described in this ROD represent the final phase of work to be completed for soil, surface water, and sediment at Site 20/24. The action selected will be consistent with additional actions that may be applied in the future in other areas of PTA.

The proposed action for the site consists of containment of soil contaminated with PCBs, lead, and 4,4'-DDT using a vegetated soil cover. In addition, the property will be subject to access restrictions designed to prevent disturbance of the soil cover and to prevent any non-industrial use of the site. The area to be contained by the soil cover is approximately two-acres and is shown on **Figure 1-3**. In addition to the area proposed for capping, soils that lie outside of the area to be capped and that contain contaminants above the RGs will be excavated and placed within the area proposed for capping. The edges of the soil cover would be protected with rip-rap to reduce the potential for washout of the contaminated materials beneath the soil cover. The volume of contaminated soil to be excavated and placed within the area proposed for capping is estimated to be 900 cubic yards.

Upon agreement between the Army, PTA, USEPA, and NJDEP that remediation is complete (i.e., that containment is no longer required to provide sufficient protection of human health and the environment), maintenance of the cap will be discontinued and a ROD amendment issued. This condition would be met if both ecological and human health remedial goals for site COCs are increased above the concentrations

found at the site. Additionally, during the five-year review process, newly available technologies may be considered for the site and voluntary remediation by the Army could be undertaken and a ROD amendment issued.

## **2.5 SITE CHARACTERISTICS**

### **2.5.1 Physical Characteristics**

#### **2.5.1.1 Topography/Surface Water Hydrology**

The eastern two-thirds portion of Site 20/24 is flat and constitutes a floodplain associated with Green Pond Brook. The western third portion of Site 20/24 is situated adjacent to a ridge that defines the western edge of PTA, and slopes gently to the east.

Most of Site 20/24 is essentially flat and is approximately 690 to 700 feet above mean sea level (msl). Surface water runoff is anticipated to be minimal and controlled by a system of man-made drainage ditches (**Figure 2-2**). Surface water flow is influenced by both the system of drainage ditches at the site and the landfill pond. The drainage ditches lead into Green Pond Brook, although one ditch leads directly into the landfill pond. The entire site is located within the 100- and 500-year floodplains of Green Pond Brook. However, it should be noted that the limits of the 100-year floodplain were determined in the 1940's prior to the installation of drainage ditches at the site (1950). Therefore, the limit of the 100-year floodplain is presented as an estimation.

#### **2.5.1.2 Geology and Soils**

The geology of Site 20/24 consists of the folded and faulted Leithsville Dolomite Formation overlain by flat-lying, Pleistocene glacial sediments. Bedrock elevation drops steeply from approximately 650 feet msl at the northeastern boundary to approximately 485 feet msl in the center of the valley. Although the overall bedrock topography at PTA dips from the northeast to the southwest along the strike of the valley, the bedrock topography at Site 20/24 is essentially flat, from the northeast to the southwest, with an elevation of 490 feet msl. The Leithsville Formation consists of a light gray, micritic dolomite weathered to a yellow silty clay, with less weathered quartzitic dolomite layers. Less weathered dolomite layers are highly fractured and exhibit stylolitic features perpendicular to bedding. The dominant fracture set observed in rock core samples is oriented vertically; secondary fractures do not show any regularity in orientation.

The Pleistocene glacial sediments overlying bedrock increase in thickness from 40 feet along the ridge of Green Pond Mountain at the northwestern boundary of Site 20/24 to approximately 210 feet in the center of the valley. Three sequences were recognized in the glacial sediments based on sediment grain size. The lowest sequence of glacial sediments is a poorly sorted till consisting of sand and gravel, with variable amounts of clay, silt, cobbles, and boulders. The till is encountered at depths ranging from 40 to 157 feet below ground surface (bgs) and ranges in thickness from 0 feet along the northwestern boundary, where it pinches out against bedrock, to 163 feet in the center of the valley.

This lower till sequence is overlain by a fine-grained layer of silty sand, which is approximately 30 feet thick in the central portion of the valley and increases to a thickness of 102 feet at the southwestern boundary. This middle fine-grained sequence is encountered at depths ranging from 10 to 55 feet bgs.

The middle fine-grained sequence is overlain by a coarser-grained sequence, which is the youngest glacial deposit. This coarser-grained sequence consists of poorly sorted sand and silt, with variable amounts of gravel and clay. This sequence increases in thickness from 4 feet in the central-valley of PTA to 55 feet at the southern boundary.

#### **2.5.1.3 Hydrogeology**

Based on the geology of Site 20/24, geotechnical testing, and aquifer slug test data collected during the Phase I Remedial Investigation (RI), four separate aquifers have been identified. The aquifers include an unconfined/water table glacial aquifer (the depth to the bottom of which ranges from 4 to 55 feet bgs and corresponds to the coarse-grained upper sequence of glacial sediments), an upper semi-confined glacial aquifer (encountered at depths ranging from 10 to 55 feet bgs and corresponding to the intermediate fine-grained sequence), a lower semi-confined glacial aquifer (occurring at depths ranging from 40 to 157 feet bgs and corresponding to the lower sequence of glacial sediments), and a bedrock aquifer. The upper semi-confined glacial aquifer consists of predominantly less permeable silts and clays. The upper semi-

confined glacial aquifer is finer-grained than the overlying and underlying aquifers; therefore, this aquifer retards downward groundwater flow to the lower semi-confined and bedrock aquifers.

Hydraulic conductivities estimated from slug tests of the lower semi-confined aquifer (average 78 feet per day [feet/day]) were higher than those of the unconfined/water table aquifer (average 4 feet/day) and the bedrock aquifer (average 29.6 feet/day).

Depth to groundwater within the unconfined/water table glacial aquifer at Site 20/24 ranges from less than 1 foot in the swampy, ponded areas of Site 24 to 16 feet at the southern boundary of PTA. Local artesian conditions have been encountered. This is a result of seasonal groundwater mounding, possibly caused by less compacted, permeable landfill material overlying a relatively less permeable substratum. Groundwater in the unconfined aquifer flows southeast towards Green Pond Brook with an average flow velocity of 0.05 feet/day.

The groundwater flow velocity has not been determined for the upper semi-confined aquifer. Arsenal-wide groundwater flow maps indicate that groundwater in the upper semi-confined aquifer flows towards Green Pond Brook.

Depth to groundwater within the lower semi-confined glacial aquifer at Site 20/24 ranges from 4 feet in the northeastern part of Site 20/24 to 23 feet at the southern boundary of PTA. Arsenal-wide groundwater flow maps indicate that groundwater in the lower semi-confined glacial aquifer flows toward the Southern Boundary. The natural groundwater flow velocity in the lower semi-confined aquifer is estimated to average 1.25 feet/day.

Arsenal-wide groundwater flow maps suggest that groundwater flows southwest towards the terminal moraine in the dolomitic bedrock aquifer. Flow directions in the bedrock aquifer are not affected by the change in the course of Green Pond Brook.

Vertical gradients throughout Site 20/24 are downward. Groundwater flows downward from the northeast ridge through Site 20/24 and into the bedrock at the center of the valley.

## **2.5.2 Summary and Findings of Site Investigations**

Seven investigations were previously conducted at Site 20/24. Surface soil, subsurface soil, surface water, sediment, and groundwater samples have been collected at Site 20/24 as part of previous investigations. Surface soil, subsurface soil, surface water, and sediment contamination were the focus of the Site 20/24 Feasibility Study (FS). A separate FS was conducted for groundwater at Site 20/24. The field investigations completed for Site 20/24 have identified contaminants, including metals, PCBs, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and pesticides, in the soil, surface water and sediment. However, as further discussed in Section 2.7, only PCBs, lead and 4,4'-DDT contributed significantly to site risk and were identified as COCs. These compounds were detected at maximum concentrations of 297 mg/kg, 2000 mg/kg, and 24.4 mg/kg respectively. Detailed data tables and discussion of historical data can be found in the *Site 20/24 Data Report and Additional Investigation Work Plan – Picatinny Arsenal Phase I Area B*, and the *Feasibility Study for Site 20/24, 2000*, both of which are available in the PTA Administrative Record. A summary of the analytical data and fate and transport information for PCBs, lead, and 4,4'-DDT is presented in this section. **Figure 2-3** presents the sampling locations for soil and the analytical data that exceeded RGs in surface soil at Site 20/24.

### **2.5.2.1 4,4'-DDT**

4,4'-DDT was detected in four samples at concentrations greater than its RG (5.1 mg/kg). One exceedance was observed in grid sample F-13. The second exceedance for 4,4'-DDT was observed in grid sample B-11, which was collected in the southern portion of the site near the 6-inch diameter concrete cylinders. The third exceedance was registered in grid sample H-7, located near the northwest corner of the open area of Site 24. The last detection of 4,4'-DDT was recorded in soil boring SB24-5, south of sample H-7. **Figure 2-3** presents the RG exceedances for 4,4'-DDT in surface soil at Site 20/24.

4,4'-DDT bioaccumulates in organisms and may biomagnify in food chains. A common characteristic of this compound is extreme hydrophobicity. The hydrophobic nature of the compound translates to a very low solubility and high adsorbency rate to soil. Leaching of this compound into groundwater is, therefore, unlikely. The Henry's Law constant for DDT is within the range of  $10^{-4}$ . The adsorption of 4,4'-DDT to soil

may reduce the rate of volatilization from soil and water. Therefore, volatilization of 4,4'-DDT is likely to be slow.

Another means of contaminant transport involves the wind erosion of soil particles that have contaminants sorbed to them. The extent to which this occurs is dependent upon such factors as wind velocity, soil particle size, and the percent of vegetative cover.

### 2.5.2.2 PCBs

PCBs were detected in surface soil, subsurface soil, and sediment samples collected at Site 20/24. In the original RI investigation, PCBs exceeded the RG of 2 mg/kg in five surface soil samples. No RG exceedances for PCBs were observed in sediment. One subsurface soil sample, SB20-5C contained PCBs at concentrations greater than the RG. The maximum PCB concentration detected in surface soil at Site 20/24 was 296 mg/kg. The majority of the PCB exceedances were observed in the central portion of the Site, within the grid area sampled during the 1997 additional investigation. **Figure 2-3** presents the PCB contours for surface soil at Site 20/24.

PCBs are relatively inert compounds. PCBs have low vapor pressures, low water solubilities, and high log  $K_{oc}$  and  $K_{ow}$  values. The organic carbon/water partition coefficient ( $K_{oc}$ ) is a measure of the tendency of a chemical to be sorbed to the organic fraction of soil. The octanol/water partition coefficient ( $K_{ow}$ ) gives an indication of whether a compound will dissolve in a solvent (i.e., n-octanol) or water. The high log  $K_{oc}$  values indicate that PCBs will tend to stay bound to the organic fraction of soil instead of leaching to groundwater or surface water runoff. The high log  $K_{ow}$  values support this argument indicating that PCBs prefer nonpolar soil particles to a polar water phase.

PCBs are very persistent in the environment and are extremely resistant to oxidation and hydrolysis. The properties that made PCBs applicable for industrial use are the same properties that cause its persistence in the environment: chemical stability; thermal stability; resistance to hydrolysis by water, alkalis, and acids; and low flammability. Based on the high log  $K_{oc}$  and  $K_{ow}$  values, PCBs will tend to remain sorbed to soil once released into the environment. Once bound to soil, PCBs may persist for years with slow desorption. PCBs can be photolyzed by ultraviolet light, but this process is extremely slow (Dames and Moore, 1999).

The fate and transport characteristics of PCBs discussed above have been observed at Site 20/24. The majority of the PCB detections at Site 20/24 are in surface soil. Although there are eight detections of PCBs in subsurface soil, one only was above RGs. During the Phase I RI in 1994, 13 monitoring wells and 9 surface water locations were sampled for pesticides/PCBs. There were no detections of PCBs in any of these samples. Only 2 of the 17 sediment samples analyzed for pesticides/PCBs in Area B have exhibited detections of PCBs. Both of the sediment detections were registered in samples collected during the Phase I RI in 1995. Both of these samples were collected from the western portion of the site adjacent to the surface soil grid that exhibited elevated levels of PCBs. Numerous sediment samples collected from the eastern portion (downgradient) of the site had no PCB detections, indicating the PCB contamination of sediment is localized and low level. The PCBs detected in sediment were likely due to surface water run-off. The parameters used to predict fate and transport characteristics and the 20/24 data set for all media indicate that the PCB contamination is localized and has not left the site.

### 2.5.2.3 Lead

Lead was detected in six surface soil samples at concentrations greater than its RG (580 mg/kg). Concentrations of lead ranged from 621 mg/kg (SB20-4A) to 2,000 mg/kg (I-16). **Figure 2-3** presents the RG exceedances for lead in surface soil at Site 20/24.

In soil, lead is dissolved in the soil solution, adsorbed or ion-exchanged on inorganic soil constituents, complexed with soluble soil organic matter, and precipitated as pure or mixed solids. Lead in the soil solution is subject to movement with soil water and may be transported through the vadose zone to groundwater, taken up by plants and aquatic organisms, or volatilized. Unlike organic constituents, lead cannot be degraded. Lead participates in chemical reactions with the solid soil phase. Immobilization of lead by adsorption, ion exchange, complexation and precipitation can prevent the movement of lead to groundwater. Changes in soil conditions due to various remediation schemes or to natural weathering

processes also may change lead mobility in soil. Such changes may include degradation of organic matrices and changes in pH, redox potential or soil solution composition.

## 2.6 CURRENT AND POTENTIAL FUTURE LAND USES

Site 20/24 is an active U.S. Army Industrial Site. The site is used primarily for the testing of pyrotechnic flares but is also designated as a safe haven parking area and is periodically used for hunting purposes. The Safe Haven Plan allows for temporary parking of explosives laden vehicles and is large enough to accommodate two 18-wheel trucks. During use as a safe haven, the area to be covered is currently used as a truck turnaround. The soil cover will be constructed such that this use can continue without compromising the cover. Soil cover maintenance will identify and repair damage to the cover from these vehicles if any were to occur. The site is located within Hunting Area 18. Hunting Area 18 is open to all game and hunting activities that take place between early October through February. In addition to the current uses of this site, the Army has plans to install a small weather station, which will involve the construction of a 6-foot-by-6-foot concrete pad. The station will not be located on the area proposed for remediation and will be used intermittently by PTA personnel.

## 2.7 SUMMARY OF SITE RISKS

Site 20/24 has been the subject of several investigations including risk assessments designed to evaluate the potential impact to human health and the environment. A summary of the results of the human health and environmental risk assessments are presented in the following sections.

### 2.7.1 Human Health Risk Assessment

The assumptions used to calculate the carcinogenic risk for Site 20/24 are presented in **Tables 2-1 through 2-3**. **Table 2-1** presents the COCs and exposure point concentration (EPC) for each of the COCs detected in soil (i.e., the concentration that will be used to estimate the exposure and risk from each COC in the soil). The table includes the range of concentrations detected for each COC, as well as the frequency of detection, the EPC, and how the EPC was derived. The 95% upper confidence limit (UCL) – Lognormal on the arithmetic mean was used as the EPC for total PCBs. **Table 2-2** provides carcinogenic risk information that is relevant to the COCs in soil at Site 20/24. At this time, dermal slope factors are not available for the dermal routes of exposure. Thus, the dermal slope factors used in the assessment have been extrapolated from oral values. An adjustment factor is sometimes applied, and is dependent upon how well the chemical is absorbed via the oral route. Adjustments are particularly important for chemicals with less than 50% absorption via the ingestion route. However, adjustment is not necessary for the chemicals evaluated at this site. Therefore, the same values are presented for both the dermal and ingestion exposure routes. **Table 2-3** provides risk estimates for the significant routes of exposure. These risk estimates were based on a reasonable maximum exposure and were developed by taking into account various conservative assumptions about the toxicity of the COC (i.e., total PCBs). The total risk from direct exposure to contaminated soil at this site to an industrial/research worker is estimated to be  $4 \times 10^{-5}$  using a 250-day annual exposure scenario assuming industrial/research worker future-use<sup>1</sup>.

The non-carcinogenic risk at the site, represented by the Hazard Index, was calculated to be 0.4, which is below the USEPA guidance of 1.0. The USEPA maintains that the PCB levels in surface soil at Site 20/24 result in a Hazard Index greater than 1.0, that is, 2.2. The difference in the two calculated hazard quotients is primarily due to calculating the Hazard Index based on individual Aroclors (Army's approach) versus total PCBs (USEPA's approach). Based on the Hazard Index (2.2) calculated using total PCBs, it is USEPA's position that action at Site 20/24 is mandated. According to the USEPA Office of Solid Waste and Emergency Response (OSWER) Directive Role of Baseline Risk Assessment in Superfund Remedy Selection Decisions (USEPA, 1991), action is generally not required for sites exhibiting elevated cancer risks less than  $1 \times 10^{-4}$ . However, specific responses for sites exhibiting elevated cancer risks between  $1 \times 10^{-4}$  and  $1 \times 10^{-6}$  are discussed in the NCP. Remediation at a site can also be initiated if the non-cancer Hazard Index calculated for the site is greater than 1.0.

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<sup>1</sup> It should be noted that the Army believes the actual usage of the site will not exceed 100 days per year. The Army estimates the carcinogenic risk resulting from an industrial/research worker using the site for 100 days per year would be  $1 \times 10^{-5}$ , which is less than the estimate of  $4 \times 10^{-5}$  for 250 days of use. The USEPA does not agree with the 100-day usage scenario.

Although remedial action is not mandated based on the  $4 \times 10^{-5}$  calculated risk, the Army chose to actively remediate the site because the risks posed by the site were considered by the USEPA to be high enough to warrant action. The USEPA maintained that the performance of a feasibility study is mandated because of the level of risk calculated for the site.

The NJDEP maintained that engineering and/or institutional controls were necessary for this site because the NJDEP soil criteria were exceeded. The Army does not concur with this opinion. However, the Army has decided that action to address the State standard will be incorporated into the decision for the site. This Army decision is fully detailed in correspondence from the Commander of the Armament Research Development and Engineering Center (PTA) to the Chief of the NJDEP Agency, Division of Responsible Party Site Remediation, Bureau of Federal Case Management. This letter is provided in Appendix A of the Final Feasibility Study for Site 20/24. NJDEP's concurrence with this concept is documented in a January 1999 letter from Mr. Bruce Venner, Chief of NJDEP Bureau of Case Management, to the Army. As a result, the Army completed a FS and evaluated active remediation at Site 20/24 in its efforts to protect human health and the environment.

### **2.7.2 Ecological Risk Assessment**

A baseline ecological risk assessment (BERA) was performed to provide an estimate of ecological risk associated with contaminants found at Site 20/24. The results of the BERA contributed to the overall characterization of the site and served as part of the FS process in the development, evaluation, and selection of appropriate remedial alternatives.

The ecological assessments for Site 20/24 indicated no impacts to the plant community, toxicity to earthworms, or impact to small mammal populations. Risk modeling indicated a potential risk to the veery (a small bird) and woodcock from 4,4'-DDT and lead in soil (primarily from incidental soil ingestion and from the ingestion of invertebrates which have bioaccumulated these constituents) and to a minor extent from exposure to aluminum and PCBs.

In general, Site 20/24 appears to be a greater potential risk to terrestrial species than aquatic species. There are more potential risks to veery and woodcock, resulting from chemicals in soil than there are to the great blue heron, mink, and fish from chemicals in surface water and sediment.

## **2.8 REMEDIAL ACTION OBJECTIVES**

The remedial action objectives for Site 20/24 have been developed to assure the protection of human health, ecological receptors, and the environment for the intended land use of the site. Site 20/24 will continue to be used in an industrial capacity for the completion of PTA's active missions. The objectives are specific to contaminated surface soils, subsurface soils, surface water, and sediment originating from Site 20/24. The remedial action objectives for this site are as follows:

- Prevent exposure to contaminated media by human and biological receptors
- Protect uncontaminated media for future use
- Minimize migration of contaminants to adjacent media
- Protect environmental receptors

## **2.9 DESCRIPTION OF ALTERNATIVES**

Site 20/24 has undergone an RI and FS according to the CERCLA RI/FS process. The RI phase is the mechanism for collecting data to characterize the site and assess potential human health and ecological risk. The RI phase is followed by the FS phase, which involves the development, screening, and detailed evaluation of remedial alternatives. Based on the findings of the *Picatinny Arsenal Phase I Remedial Investigation Report, 1999*, an FS was prepared to determine applicable treatment technologies and to assemble these technologies into remedial alternatives. Six alternatives were considered in the FS and were preliminarily screened based on effectiveness, implementability and cost to determine if they warranted detailed evaluation. This information is provided in detail in the *Feasibility Study for Site 20/24, 2000*. The six alternatives are as follows:

- Alternative 1: No Action

- Alternative 2: Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions
- Alternative 3: Installation of a MatCon Asphalt Cap and Continued Implementation of Land Use and Access Restrictions
- Alternative 4: Installation of an Asphalt Cap and Continued Implementation of Land Use and Access Restrictions
- Alternative 5: Installation of a Soil Cover and Continued Implementation of Land Use and Access Restrictions
- Alternative 6: Excavation of Soil with PCB, lead, and 4,4'-DDT Concentrations Exceeding Site RGs and Off-Post Landfilling

Based on this screening, two of the alternatives (Alternatives 3 and 5) were removed from further evaluation due to elevated costs relative to the benefits they provided as compared to the other alternatives. In summary, the preliminary screening of alternatives using effectiveness, implementability, and cost as criteria, resulted in the following remedial alternatives retained for detailed analysis:

- Alternative 1: No Action
- Alternative 2: Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions
- Alternative 4: Installation of an Asphalt Cap and Continued Implementation of Land Use and Access Restrictions
- Alternative 6: Excavation of Soil with PCB, lead, and 4,4'-DDT Concentrations Exceeding Site RGs and Off-Post Landfilling

A description of the alternatives retained for detailed analysis with estimated costs is presented in this section.

### 2.9.1 Alternative 1: No Action

Capital Cost:	\$ 0
Operations and Maintenance (O&M) Cost:	\$ 0
Present Worth	\$ 0

CERCLA and the NCP require that a No Action alternative be evaluated at every site to establish a baseline for the comparison of other remedial alternatives. Under this alternative, no remedial action would take place.

### 2.9.2 Alternative 2: Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions

Estimated Capital Cost:	\$ 296,728
Estimated O&M Cost:	\$ 95,409
Present Worth:	\$ 392,137 (Calculated using a 7% interest rate)

Alternative 2 involves containment of soil contaminated with PCBs, lead, and 4,4'-DDT using a vegetated soil cover. In addition, the property will be subject to access restrictions designed to prevent disturbances of the soil cover and to prevent any non-industrial use of the site. The area to be contained by the soil cover is approximately two-acres and is shown in **Figure 1-3**. In addition to the area proposed for capping, soils that lie outside of the area to be capped and that contain contaminants above the RGs will be excavated and placed within the area proposed for capping. The edges of the soil cover would be protected with rip-rap to reduce the potential for washout of the contaminated materials beneath the soil cover. The volume of contaminated soil to be excavated and placed within the area proposed for capping is estimated to be 900 cubic yards. If an active remediation technology is chosen for Site 20/24

groundwater, a section of the cover may be required to be removed temporarily until installation and/or operation is completed.

### **2.9.3 Alternative 4: Installation of an Asphalt Cap and Continued Implementation of Land Use and Access Restrictions**

Estimated Capital Cost: \$ 443,094

Estimated O&M Cost: \$ 40,049

Present Worth: \$ 483,143 (Calculated using a 7% interest rate)

Alternative 4 involves containment of soil contaminated with PCBs, lead, and 4,4'-DDT using a rigid asphalt cap. In addition, the site will be subjected to continued land use and access restrictions to prevent disturbance of the capping system and to prevent non-industrial use of the site. The area to be contained by the asphalt cap is approximately 82,900 square feet, and is shown on **Figure 1-3**. In addition to the area proposed for capping, soils that lie outside of the area to be capped and that contain contaminants above the RGs will be excavated and placed within the area proposed for capping. The volume of contaminated soil to be excavated and placed within the area proposed for capping is estimated to be 900 cubic yards. The proposed area of the cap overlies Site 20/24 VOC-contaminated groundwater. If an active remediation technology is chosen for Site 20/24 groundwater, a section of the cap may be required to be removed temporarily until installation and/or operation is completed.

### **2.9.4 Alternative 6: Excavation and Off-Post Disposal of Soil With PCB, Lead, and 4,4'-DDT Concentrations Exceeding the Site RGs with Continued Implementation of Land Use and Access Restrictions**

Estimated Capital Cost: \$ 829,047

Estimated O&M Cost: \$ 18,316

Present Worth: \$ 847,363 (Calculated using a 7% interest rate)

This remedial alternative would involve excavation of the site soils that contain PCB concentrations above the RG of 2 mg/kg (approximately 3,700 cubic yards); transportation and off-Post disposal of non-hazardous and non-Toxic Substance Control Act (TSCA)-regulated soils (i.e., PCB concentrations less than 50 ppm) in a RCRA Subtitle D landfill, and transportation and off-Post disposal of TSCA-regulated PCB soils (PCB concentrations greater than 50 ppm) in a TSCA-permitted landfill. **Figure 2-4** shows the proposed areas of excavation. This alternative would also include excavation and off-Post disposal of soil with lead and 4,4'-DDT concentrations exceeding the site RGs for ecological risk (approximately 600 cubic yards), and off-post disposal of these soils in a RCRA Subtitle D landfill.

## **2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES**

Section 300.430(e) of the NCP lists nine criteria against which the remedial alternatives must be assessed. The acceptability or performance of each alternative against the criteria is evaluated individually so that relative strengths and weaknesses may be identified. The criteria are as follows:

1. Protection of human health and the environment
2. Compliance with ARARs
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. Regulatory acceptance
9. Community acceptance

The NCP [Section 300.430(f)] states that the first two criteria, protection of human health and the environment and compliance with ARARs, are "threshold criteria" which must be met by the selected remedial action unless a waiver can be granted under Section 121(d)(4) of CERCLA. Criteria three through seven are "primary balancing criteria," and the trade-offs within this group must be balanced. The preferred alternative will be the alternative that is protective of human health and the environment, is ARAR-compliant, and provides the best combination of primary balancing attributes. The final two criteria, regulatory and community acceptance, are "modifying criteria" that are evaluated following the comment period on the Proposed Plan.

The following discussion provides a synopsis of the detailed evaluation of the remedial alternatives presented in the *Feasibility Study for Site 20/24, 2000*.

### **2.10.1 Overall Protection of Human Health and the Environment**

Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternative 1 will not meet this criterion because no actions are taken to eliminate, reduce or control exposure pathways.

Alternatives 2 and 4 would meet this criterion by covering the contaminated soils, thus preventing human exposure as long as the integrity of the cover is maintained and the land use and access restrictions are enforced (See Site 20/24 LUCIP **Attachment 1**). The cover proposed in Alternatives 2 and 4 would also reduce infiltration of surface water into contaminated soils, thereby reducing the possibility of contaminants leaching into the groundwater and subsurface soils and would also prevent the transport of contaminated soils to surface water bodies during rain events.

Alternative 6 provides an acceptable level of protection of human health and the environment through removal of contaminants and off-site disposal. This alternative would eliminate the potential for direct contact with contaminants.

### **2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements**

Compliance with ARARs addresses whether or not a remedy will meet all of the ARARs of Federal and State environmental statutes and other requirements or provides grounds for invoking a waiver. The ARARs and To-Be-Considered (TBC) guidance for the Site 20/24 alternatives are presented in **Tables 2-4, 2-5, and 2-6**.

Alternative 1: Location-specific and action-specific ARARs do not apply to this remedial alternative and there are no chemical-specific ARARs for soils or sediment. However, the chemical-specific TBC guidance (the RGs for soil) will not be met by this alternative.

Alternatives 2 and 4: Although there are no chemical-specific ARARs for soils or sediment, these alternatives would meet the objective of providing a barrier. Compliance with action-specific ARARs would be required during construction. Compliance with location-specific ARARs would be required and considered during the remedial design.

Alternative 6: Although there are no chemical-specific ARARs for soils or sediment, this alternative would meet the chemical-specific TBC guidance by removing all soil with contaminants above RGs from the site. Compliance with location-specific and action-specific ARARs would be required and considered during construction.

### **2.10.3 Long-term Effectiveness and Permanence**

Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

Alternative 1: The site cleanup levels derived for protection of human health and the environment would not be met, since impacted soils would remain on-site and untreated. However, the existing security gate, access restrictions, and current zoning are somewhat effective in protecting human health.

Alternatives 2 and 4: These alternatives reduce the long-term risks associated with the site soils by eliminating direct contact exposure pathways and mitigating contaminant migration. Permanent reduction of risks could be accomplished through proper construction, appropriate and extended maintenance of the cap, and proper enforcement of institutional controls (See Site 20/24 LUCIP **Attachment 1**).

Alternative 6: Removal and off-site disposal is a permanent remedy because contaminated soil (soil exceeding RGs) is permanently removed from the site. Further reduction of risk could be accomplished with the proper enforcement of institutional controls (See Site 20/24 LUCIP **Attachment 1**).

#### **2.10.4 Reduction of Toxicity, Mobility, or Volume through Treatment**

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies a remedy may employ.

Alternative 1: This remedial alternative does not include any actions that would reduce the mobility, toxicity, or volume of contaminants present in soils at the site.

Alternatives 2 and 4: These alternatives do not reduce toxicity or volume of contamination. Mobility of contaminants would be reduced through containment. Wind dispersion and erosion of contaminated particulate matter would be eliminated.

Alternative 6: This alternative does not reduce toxicity or volume of contamination. Excavation would result in reduction of mobility, as would disposal of media in a Subtitle D or TSCA landfill.

#### **2.10.5 Short-term Effectiveness**

Short-term effectiveness addresses the period of time needed to achieve protection from any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Alternative 1: Short-term effectiveness does not apply to Alternative 1, as no actions are associated with the no action alternative.

Alternative 2 and 4: These alternatives can be implemented quickly to reduce the potential site risks. Short-term risks resulting from implementation of the alternatives would be low. Construction of the vegetated soil cover or asphalt cap would require limited handling of contaminated soils and may result in some dust generation. However, these risks could be controlled through the use of suitable protective equipment, good construction practice, and standard dust suppression techniques.

Alternative 6: This remedial alternative could be implemented quickly to reduce short-term site risks. Although construction activities would result in significant material handling requirements and some dust generation, the potential for exposure could be reduced through the use of suitable protective clothing and equipment, good construction practice, and standard dust suppression techniques.

#### **2.10.6 Implementability**

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Alternative 1: This remedial alternative has effectively already been implemented.

Alternatives 2 and 4: From a technical perspective, these remedial alternatives are easily implemented. The required equipment, materials, and services are readily available and vegetated or asphalt covers are frequently used at hazardous waste sites.

Alternative 6: This remedial alternative is readily implementable. The required construction materials, services and equipment are readily available.

#### **2.10.7 Regulatory Acceptance**

This document was prepared in partnership with USEPA and NJDEP representatives. USEPA and NJDEP support the Army's selection of Alternative 2 although USEPA preferred Alternative 6.

### 2.10.8 Community Acceptance

A final Proposed Plan for Site 20/24 was completed and released to the public in June 2001 at the information repositories listed in Section 2.3. The notice of availability of this document was published on June 14, 2001 in the Daily Record and the Star Ledger. A public comment period was held from Thursday, June 14, 2001 to Friday, July 13, 2001 during which comments from the public were received. In general, the community appears to be in support of the Selected Remedy. Responses to written comments received during the public comment period are presented in the Responsiveness Summary (see Section 3.0). A public meeting was held on June 21, 2001 to inform the public about the Selected Remedy for Site 20/24 and to seek public comments.

### 2.10.9 Cost

The present worth (discount rate of 7%) for each alternative is presented below. With the exception of Alternative 1, Alternative 2 results in the lowest costs.

**Alternative 1:** No Costs associated with this alternative.

**Alternative 2:**

Present Worth \$ 392,137

Capital Cost \$ 296,728

**Alternative 4:**

Present Worth \$ 483,143

Capital Cost \$ 443,094

**Alternative 6:**

Present Worth \$ 847,363

Capital Cost \$ 829,047

### 2.11 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that USEPA will use treatment to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure.

The source materials present at Site 20/24 meet the USEPA's definition of mobile source material (i.e., surface soil or subsurface soil containing high concentrations of chemicals of concern that are or potentially are mobile due to wind entrainment, volatilization, surface runoff, or subsurface transport. The alternatives presented in Section 2.10 address the principal threat waste in the following manner:

- Alternative 1: No Action – Does address the principal threat waste.
- Alternative 2: Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions – Provides protection to human health and the environment by preventing contact with the source materials and preventing migration of the contaminants through wind entrainment, volatilization, surface runoff, or subsurface transport.
- Alternative 4: Installation of an Asphalt Cap and Continued Implementation of Land Use and Access Restrictions – Provides protection to human health and the environment by preventing contact with the source materials and preventing migration of the contaminants through wind entrainment, volatilization, surface runoff, or subsurface transport.

- Alternative 6: Excavation of Soil with PCB, lead, and 4,4'-DDT Concentrations Exceeding Site RGs and Off-Post Landfilling – Source materials are removed from the site to a permitted landfill, thereby eliminating risks.

## 2.12 SELECTED REMEDY

This ROD represents the Selected Remedy for the Site 20/24 at PTA, in Rockaway Township, New Jersey, developed in accordance with CERCLA as amended and consistent with the NCP. This decision is based on the administrative record for the site. The Selected Remedy for this site is Alternative 2: Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions. A detailed description of the preferred remedial action is provided in this section.

The total project cost, if approved, is estimated to be \$392,100, the sum total of which will be paid by the United States Army for the Department of Defense.

Alternative 2 is the preferred alternative for Site 20/24 because it provides the best balance between the assessed criteria while still providing overall protection of human health and the environment. In addition, this action can be implemented with readily available equipment and materials.

### 2.12.1 Detailed Description of Alternative 2: Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions

Alternative 2 involves containment of soil contaminated with PCBs, lead, and 4,4'-DDT using a vegetated soil cover. In addition, the property will be subject to continued land use and access restrictions to prevent disturbance of the soil cover. The area to be contained by the soil cover is approximately 82,900 square feet, as shown on **Figure 1-3**. The proposed area of the cover overlies Site 20/24 VOC-contaminated groundwater. If an active remediation technology is chosen for Site 20/24 groundwater, a section of the cover may temporarily need to be removed until installation and/or operation is complete.

This alternative will include the following major elements, which are discussed in further detail below:

- Additional limited delineation sampling. Additional sampling will be performed in those areas where delineation of PCB, lead, and 4,4'-DDT contamination has not been completed. This will include areas in the northern and southwestern portion of the existing PCB grid. It is estimated that approximately 30 samples will be collected to complete the delineation. If results of this sampling show that soil is contaminated above 296 ppm for total PCBs (the highest concentration found during the previous investigations) those soils will be excavated and disposed of per the TSCA and Army Regulation. If a removal of soil is conducted it will be documented in a post closure report.
- Design and permitting. A remedial design will be prepared prior to remedy implementation. This will include a site-specific work plan describing the remediation activities, quality assurance/control procedures, technical specifications, and a site health and safety plan. The design documents will be submitted for review and approval by the appropriate reviewing agencies prior to initiation of remedial activities.
- Contractor and Material Procurement. This will include preparation of bid packages for the remedial activities, solicitation of bids, bid review and contractor selection. Materials and equipment required to complete the remedial activities will also be selected and procured.
- Mobilization. The personnel, facilities, and equipment required to complete the work will be mobilized to the project site. Facilities may include office trailers, support and tool trailers, sanitary facilities, and utilities. Equipment will include heavy construction equipment and small equipment required for sampling and monitoring.
- Site Preparation. This includes construction of a temporary equipment and materials staging area and decontamination area, and implementation of erosion and sedimentation controls.
- Clearing and Grubbing. This includes removal of trees, brush, vegetation, and debris in the areas where remediation will be performed and in areas where support facilities will be located. Any PCB-contaminated soils that are displaced during clearing and grubbing will be properly disposed.

- Excavation of Lead, 4,4'-DDT, and PCB Soil Outside the Cover. Soils containing lead, 4,4'-DDT, and PCB concentrations in excess of the RGs that are located outside of the proposed cover area (see **Figure 1-3**) will be excavated and placed within the PCB-contaminated area for capping. USEPA has indicated that this relocation of PCB-contaminated soil will not invoke the TSCA provisions. Confirmatory sampling will be performed to ensure that all soils containing PCBs, lead, and 4,4'-DDT concentrations in excess of the RGs have been removed. Based on the existing data, it is estimated that approximately 900 cubic yards of soil will be excavated and relocated.
- Vegetated Soil Cover Construction. Vegetated soil cover construction will include grading to promote positive drainage, placement and compaction of common fill and topsoil, and seeding. The edges of the soil cover will be protected with rip-rap to reduce the potential for washout of the contaminated materials beneath the soil cover.
- Grading. The area around the cover will be graded, as necessary, to ensure proper drainage. Surface water conveyance systems may also be constructed, as necessary, based on design requirements.
- Disposal of Work-Related Residuals. This includes transportation and off-Post disposal of decontamination waters, Personal Protective Equipment (PPE), and other waste items generated during the remediation.
- Site Cleanup and Demobilization. Once the remedial activities have been completed, the site will be cleaned up and all personnel, facilities, and equipment will be removed from the site.
- Maintenance. This includes inspection of the soil cover on a quarterly basis, preparation of inspection reports, and maintenance as necessary.
- Institutional Controls.

#### Design and Permitting

The initial phases of the work will consist of design and permitting, and preparation of a site-specific health and safety plan. The health and safety plan will outline the physical and chemical hazards associated with the work to be performed at the site and will serve as the instrument of control for ensuring the health and safety of personnel working on the site.

Critical design and engineering considerations include design to minimize settlement and erosion, stormwater and sedimentation controls, design life of the soil cover, and effects of environmental factors on the soil cover. Permit equivalents that may be required include a general stormwater permit equivalent (New Jersey Pollution Discharge Elimination System), and a permit equivalent for work performed within a floodplain area. Preparation of an erosion and sedimentation control plan will also likely be required.

The area impacted by PCBs at Site 20/24 is a flat open area that has been historically filled. The likely intent of the historic fill of this area was to use the area as an equipment and waste container staging area. Current land use activities in this area consist primarily of pyrotechnic testing. This area is filled with stone aggregate and is routinely driven on by cars and light trucks in the process of testing operations. The Picatinny Arsenal Safety Office has indicated that there is no need for an unexploded ordnance (UXO) safety survey for non-intrusive activities. Based on the existing site use and the determination by the Picatinny Arsenal Safety Office, there are no explosive ordnance disposal (EOD) activities associated with the non-intrusive portions of this remedial alternative.

### Mobilization and Site Preparation

The first phase of the vegetated soil cover construction will include mobilization of the required personnel, equipment, and facilities, and site preparation. During the site preparation task, a vehicle decontamination pad will be constructed to allow for the decontamination of heavy equipment used on-site during construction activities. The vehicle decontamination pad will be constructed using a 100-mil High-Density Polyethylene (HDPE) liner to contain liquids generated during the decontamination activities. Sand will be used on top of and beneath the liner to smooth existing terrain and to protect the liner from being punctured by equipment. Liquids generated during decontamination activities will collect in an HDPE sump located at the lowest point of the pad. Decontamination water will be pumped periodically from the sump to a holding tank and will be sampled, analyzed, and disposed of at an appropriate, permitted facility.

A material stockpile and staging area will also be constructed during site preparation to provide an area for storage of soils, materials, and miscellaneous equipment to be used in constructing the vegetated soil cover. A "clean" access road constructed of crushed stone may also be required to allow the trucks carrying the soils and materials to enter and exit the site without requiring decontamination.

Any existing monitoring wells located within the proposed capping areas will be abandoned per applicable State and Federal requirements prior to initiating the capping activities.

Prior to the commencement of clearing and soil cover installation, all sediment and erosion controls that are required to meet applicable local, State, and Federal guidelines will be installed. These sediment controls will be properly maintained during soil cover installation, and will be removed at the conclusion of construction. At a minimum, the sediment controls will consist of installing a silt fence and straw bale barriers, and providing a stabilized construction entrance through which construction traffic will enter and exit the site.

### Clearing and Grubbing, Excavation of Lead, 4,4'-DDT, and PCB Soil "Hot Spots," Vegetated Soil Cover Construction, and Grading

Prior to construction of the vegetated soil cover over the primary PCB-contaminated area, soils with lead, 4,4'-DDT, and PCB concentrations exceeding the ecological RGs that are located outside of the proposed cover area (approximately 900 cubic yards) will be excavated (see **Figure 1-3**). These soils will be placed within the primary PCB-contaminated area for subsequent capping.

Since this alternative will require some intrusive activity to allow for excavation of lead-, 4,4'-DDT- and PCB contaminated soil outside of the area to be capped, a UXO survey will be required. The site-specific requirements and procedures to be followed with respect to UXO will be established in the Remedial Design and Health and Safety Plan to be prepared during the design phase. However, it is anticipated that the following general procedures will take place during the lead, 4,4'-DDT, and PCB soil excavation. Based upon the Picatinny Safety Office determination and current site use, it is anticipated that no exclusion zone will be required during this project. Should the discovery of ordnance require the development of an exclusion zone, only qualified EOD personnel will be allowed in the exclusion zone during the UXO search and excavation activities.

The UXO team will perform a surface and subsurface search of the excavation areas. All subsurface magnetic anomalies will be flagged and marked for hand excavation. Each of the anomalies will be hand excavated and identified as being a UXO item or a non-UXO item. After the completion of this task, the excavation will be advanced in 6 to 12 inch lifts. As each 6-to-12 inch lift is removed, the UXO team will inspect the material removed as well as the newly exposed area. Should the confirmatory sampling indicate that excavation to a greater depth is required, the excavation will be rechecked with the MK26 ordnance locator, and the procedures discussed above will be repeated.

In constructing the vegetated soil cover, the existing ground surface will first be cleared and grubbed of any vegetation, and then a proper grade (i.e., one that promotes positive drainage as required by the design) will be created by properly placing the relocated PCB-contaminated soils or extra fill material, if necessary. Clearing and grubbing at the site may displace some contaminated soil, roots, etc. If the potential exists for the material to be contaminated, it will be separated from the non-contaminated waste

and will be properly disposed. USEPA indicated that relocation of the Site 20/24 PCB “hot spots” to the area of the proposed cover would not invoke TSCA provisions.

A common earth fill layer will then be placed to a thickness of 18 inches. This fill layer will be placed in uniform six-inch lifts and will be compacted to at least 90 percent of maximum dry density. This layer may consist of certified clean fill from an off-site borrow source. Next, a 6-inch layer of topsoil will be installed. The topsoil layer will also be compacted to 90 percent of maximum dry density, and seeded to provide a vegetative cover that will aid in reducing surface water runoff and surface soil erosion. Since portions of the area to be covered are located within the 100-year floodplain (see **Figure 1-3**), the slopes located at the edge of the soil cover will be protected with rip-rap (see **Figure 2-5**) to limit the damage due to flooding. In addition, suitable vegetation will be placed at the edges of the soil cover and at any other areas subject to increased surface water flow, as an added protective measure against increased surface water runoff.

A vegetative cover will be planted immediately following installation of the topsoil layer in accordance with the site erosion and sedimentation control plan. The vegetative cover will provide surface stability by minimizing potential for surface erosion and will consist of seed mixture (e.g., wild rye, redbud, small grain, bluestems, switchgrass, and Indian grass) and straw mulch. The seed and mulch will be placed by mechanical means, using equipment such as a hydroseeder. Grading of the area surrounding the soil cover will be performed as necessary to ensure proper drainage of surface runoff. Runoff collection and conveyance will be considered during the design phase to comply with all location- and action-specific ARARs, and may consist of lined ditches and culverts. Additional appropriate vegetation will be planted to provide additional protection to surface soils as a result of increased surface water runoff.

#### Site Cleanup and Demobilization

The final phase of the work will involve site cleanup and demobilization of personnel, facilities and equipment.

#### Maintenance

The vegetated soil cover will require maintenance in the form of mowing and periodic repairs to areas that are prone to surface erosion. This includes a detailed inspection four times a year, preparation of inspection reports, replacement of eroded topsoil, and stabilization of regraded areas with grass seeding and straw mulch.

#### Institutional Controls

Land use restrictions were implemented for Site 20/24 in order to prevent human exposure to contaminated soil and to protect the vegetated soil cover. Details of the provisions and requirements of land use control necessary to assure that land use remains safe and appropriate for the level of protection afforded by the remedial alternative are presented as **Attachment 1**.

### **2.12.2 Summary of the Estimated Remedial Action Costs**

The estimated costs associated with the preferred alternative for Site 20/24 are as follows:

#### **CAPITAL COSTS**

- Institutional Controls = \$27,000
- Extent of Contamination Sampling = \$7,000
- Clearing and Grubbing = \$18,000
- Site Preparation = \$6,000
- Layout and Construction Survey = \$7,000
- Excavation and Relocation of Soil = \$23,000
- Certified Clean Common Fill Layer = \$69,000
- Soil Veneer = \$25,000
- Revegetation = \$5,000
- Rip Rap Placement = 2,000
- Mobilization/Demobilization = \$16,000
- Contingency = \$31,000 (15% of the construction costs)

- Legal = \$20,000 (10% of the construction costs)
- Engineering and Design = \$41,000 (20% of the construction costs)
- **Total Capital Costs: \$ 297,000**

#### **O&M COSTS**

- Quarterly Inspections = \$6,000
- Five-year Review and Reporting = \$10,000 (cost occurs on years 5, 10, 15, 20, 25, and 30)
- Soil Veneer Repair = \$3,000 (cost occurs on years 10, 20, and 30)
- **Total 30-year Present Worth O&M Costs at 7% Interest: \$ 95,000**

#### **30-YEAR PRESENT WORTH OF COSTS AT 7% INTEREST: \$392,000**

The costing information in this section is based on the best available information regarding the anticipated scope of the remedial alternative. Details on the above cost items are presented in Appendix E of the Final FS for Site 20/24. Changes in the cost elements are likely to occur as a result of new information and data collected during the work plan phase and the 5-year review(s). Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

#### **2.12.3 Expected Outcomes of the Selected Remedy**

It is anticipated that implementation of Alternative 2 will reduce risks to human and ecological receptors to within acceptable levels. In addition, migration of contaminants to groundwater, subsurface soils, and surface water will be prevented. However, as contaminants may remain in the soil at levels exceeding the RGs, uncontrolled use of the site is not provided by completing this action.

### **2.13 STATUTORY DETERMINATIONS**

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment and permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

#### **2.13.1 Protection of Human Health and the Environment**

The Selected Remedy, Alternative 2, will protect human health and the environment by containing the PCB-, lead-, and 4,4'-DDT-contaminated soils within a vegetated soil cover. This will prevent human exposure to the contaminated soil as long as the integrity of the cover is maintained and the land use and access restrictions are enforced. In addition, the soil cover will prevent the transport of contaminated soils to surface water bodies during rain events.

The Selected Remedy will ensure that risks remain below the  $1 \times 10^{-6}$  cancer risk level and a Hazard Index of less than 1.0. This level falls at the lower end of the USEPA's target risk range of  $10^{-4}$  to  $10^{-6}$ . There are no short-term threats associated with the Selected Remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the Selected Remedy.

#### **2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements**

The Selected Remedy will comply with all ARARs. The ARARs are presented in detail in **Tables 2-4, 2-5, and 2-6**.

#### **2.13.3 Cost Effectiveness**

In the lead agency's judgement, the Selected Remedy is cost-effective and represents a reasonable value in the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those

alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; short-term effectiveness; regulatory acceptance; and, community acceptance). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy is \$392,000. Although Alternative 1 is less expensive, risks to human health and the environment are not addressed, and therefore Alternative 2 is cost effective. The Army believes that the Selected Remedy's additional cost provides a significant increase in protection to human health and the environment and is cost-effective.

#### **2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable**

The Army has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site. The Army has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering regulatory and community acceptance.

The Selected Remedy does not employ treatment to eliminate contaminants present at the site. PCB-, lead- and 4,4'-DDT-concentrations in soil will not be reduced over time. The Selected Remedy satisfies the criteria for long-term effectiveness by eliminating direct contact exposure pathways and mitigating contaminant migration. In addition, permanent reduction of risks could be accomplished through proper construction, appropriate and extended maintenance of the cover, and proper enforcement of institutional controls. The Selected Remedy does not reduce toxicity or volume of contamination; however, the mobility of COCs will be reduced through containment. In addition, wind dispersion and erosion of contaminated particulate matter will be eliminated. The Selected Remedy does not present short-term risks that cannot be effectively controlled through safe work practices. There are no special implementability issues that set the Selected Remedy apart from any of the other alternatives evaluated.

#### **2.13.5 Preference for Treatment as a Principal Element**

The Selected Remedy does not address principal threats posed by the site through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is not satisfied. However, the Selected Remedy has the advantage of not introducing polycyclic aromatic hydrocarbons (PAHs) into the environment (associated with Alternative 4 capping materials) and is much more cost effective than the technologies that do utilize treatment.

#### **2.13.6 Five-year Review Requirements**

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, statutory reviews will be conducted every five years after remedial action initiation. Five-year reviews will ensure that the remedy is, or will be, protective of human health and the environment.

### **2.14 DOCUMENTATION OF SIGNIFICANT CHANGES**

The Proposed Plan presents the selected remedial action as the preferred alternative. No significant changes have been made.

### 3.0 PART 3: RESPONSIVENESS SUMMARY

The final component of the ROD is the Responsiveness Summary. The purpose of the Responsiveness Summary is to provide a summary of the stakeholders' comments, concerns, and questions about the Selected Remedy for Site 20/24 and the Army's responses to these concerns.

In general, the community is accepting of the selected alternative. Some community concern has been expressed because contamination will be controlled on-site as opposed to off-site. All comments and concerns summarized below have been considered by the Army, USEPA, and NJDEP in selecting the final cleanup methods for Site 20/24 at PTA.

#### 3.1 PUBLIC ISSUES AND LEAD AGENCY RESPONSES

As of the date of this ROD, the Army endorses the preferred alternative for Site 20/24 of Installation of a Vegetated Soil Cover and Continued Implementation of Land Use and Access Restrictions. The USEPA and the NJDEP support the Army's plan. Comments received during the Site 20/24 public comment period on the Proposed Plan are summarized below. The comments are categorized by source.

##### 3.1.1 Summary of Comments Received during the Public Meeting on the Proposed Plan and Agency Responses

Nine comments specific to the Selected Remedy were received during the public meeting held on 21 June 2001. Transcripts from the public meeting were completed and submitted into the Administrative Record (located at the information repositories listed in Section 3.2) for the site.

The comments received on the Selected Remedy are summarized as follows:

**Comment 1:** Mr. Michael Glaab, PAERAB Co-chair, wondered why the public notice was placed in the papers only three weeks prior to the meeting. He felt more people would have come if more advanced notice was given. He also felt Thursday evening was a poor choice, because it was a weekday, and many people would not be able to attend a meeting held during the workweek. He asked who made that final decision and why. He also wanted assurances that the three-week notification period was in accordance with USEPA guidelines.

**Reply:** Three weeks notice is consistent with EPA guidance which suggests at least 2 weeks notice in advance of events. The PAERAB was informed at the May 23, 2001 PAERAB meeting of this pending public meeting. At that time, the PAERAB as a body stated they did not care when the public meeting was held. In addition, the date, time and place was incorporated with the minutes and mailed to each PAERAB member. The final decision to have the PAERAB meeting June 21st was made by the Ted Gabel, Project Manager for Picatinny Arsenal, with input from his staff and the USEPA. The USEPA Project Manager, Bill Roach, also added that the USEPA preferred to have the meeting in the middle of the comment period, because it gives the public the maximum amount of time to get and read the material, and an equal amount of time to prepare and submit comments.

**Comment 2:** A comment was made by Mr. Glaab, that in 1998, Picatinny Arsenal discussed with the PAERAB that they thought the appropriate decision for Site 20/24 was to remove the PCB soils to a landfill. However, the Army relooked at that and said the risk at the site was acceptable as is, and there was no need to do a removal action.

**Reply:** The reply was made by Ted Gabel, Project Manager, Picatinny Arsenal. Mr. Gabel acknowledged that there was an Army proposal to conduct an interim action to excavate and dispose of PCB contaminated soil at the site. The Army has a risk assessment expert group, called U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM). They looked at the risk assessment Picatinny provided the USEPA and asked for a change in the risk assessment. Picatinny recalculated the risk assessment and submitted it to the regulators and discussed the matter with the PAERAB. The revised risk assessment report indicated that there was an acceptable level of risk.

**Note:** Mr. Glaab expressed gratitude to Mr. Gabel concerning his statement. Mr. Glaab stated he was content that this change is on record.

**Comment 3:** Mr. Crothers, a PAERAB representative from Denville expressed his objection to the Army selecting Alternative B, capping and monitoring Site 20/24.

Mr. Crothers stated that the cost of maintaining a cap and monitoring it for 30 years or more is by far less preferable than removing the PCB contaminated soils to meet at least State industrial levels. He acknowledged the Army's calculations that removal was about twice as expensive as capping and monitoring; however, he felt the true cost of the selected remedy was never truly calculated since it would go on and on. He preferred removal because once it's gone, it's gone. In addition, he felt the cost differential, compared with the total cost of cleanup at Picatinny, is relatively insignificant. He wanted to know if the Army's decision to cap and monitor was based solely on cost.

**Reply:** Mr. Gabel, Picatinny, replied. Mr. Gabel stated that although funding was a factor in selecting the remedy for the site, removal is not justified because site risks were found to be acceptable given the site's restricted use.

**Comment 4:** Mr. Crothers expressed another concern that Site 20/24 was in a flood zone. There is a lot of moisture. The area from time to time has a very high water table, and that water comes up from underneath the ground.

**Reply:** The area does have a high water table and parts are in the 100-year floodplain. Therefore, the soil cover will be designed to handle a 100-year flood and will be monitored four times a year (see p 2-17 maintenance). Cap design requires rip-rap armor protection to maintain its stability (see p 2-16 and figure 2-5).

**Comment 5:** Another concern from Mr. Glaab was that if the arsenal-wide Land Use Control Assurance Plan (LUCAP) and LUCIP, required under Federal regulations, require the military have in place an arsenal-wide LUCAP and LUCIP. This document is incomplete. For the LUCIP for Site 20/24 to be effective, it is vital that it be incorporated into the arsenal-wide LUCAP. Therefore in his opinion, this remedy is premature. In addition he was concerned about other unknown factors; for example, how long would Picatinny pay for monitoring the site – 10, 20, 30 years?

**Reply:** Mr. Gabel stated that Picatinny agreed to develop a LUCAP as part of the ROD for the 13 sites with institutional controls, and there is a specific LUCIP for Site 20/24, which will be incorporated into the arsenal-wide LUCAP. The USEPA and NJDEP agreed to this approach. In addition, it is in Army's guidance and USEPA guidance to develop those documents. Picatinny realizes that the monitoring will continue until agreement is reached between PTA, the Army, the USEPA, and NJDEP that it is no longer warranted.

**Comment 6:** Mr. Glaab stated that he felt monitoring soil sampling as well as groundwater sampling should be part of any LUCAP for the whole arsenal, and part of the LUCIP for this particular site. He also stated that the public should be given a guideline for what sort of groundwater monitoring would be conducted. In addition he stated the public should be given a general description of the groundwater plan – how long will the monitoring be done, 10, 20 30 years, how often will it be conducted.

Mr. Glaab summarized by stating the public should have an assured maintenance program, which the public should be made aware of. The public should also know how long will it take for the contamination to degrade by natural attenuation to the level that will no longer be over State standards. At that point, it would be justifiable to stop groundwater monitoring and soil sampling he stated. Until that point is reached, there should be sampling and monitoring – either remove it, clean it, or at the very least cap it properly and then monitor it so we don't have seepage from under it or into it.

**Reply:** Land use control assurance and implementation plans are component remedies for Site 20/24. Site inspections are required four times per year (p 2-17 maintenance). Mr. Gabel stated Picatinny would be monitoring for as long as is necessary. The Army conducted a site specific risk assessment for its current, limited exposure, use and determined that risk from the Site 20/24 soils is acceptable, even uncovered. Capping per the selected remedy will qualify the site for more general (although still restricted) non-residential use. As for monitoring for PCBs in groundwater, concentration levels of PCBs in soil were below NJDEP "Impact to Groundwater" criteria. The Army will investigate the groundwater to include PCBs as part of groundwater action for the groundwater. There are a number of innovative technologies for cleaning up the plume, from iron filings into the aquifer that we are presently testing to using other chemicals to treat the groundwater. When the groundwater is treated, it is most likely that we will at the same time also monitor the groundwater to include PCBs if needed with a strategy approved by

the USEPA and NJDEP. That strategy will be presented to the PAERAB. The program will most likely end when we get down to the acceptable groundwater levels.

**Comment:** Mr. Glaab expressed a more positive attitude about using this innovative technology.

**Comment 7:** Mr. Glaab wanted to know if there was ever an inquiry from the Secretary of the Army, or an inquiry from Senator Lautenberg's office, concerning Site 20/24

**Reply:** Mr. Frank Misurelli from the Public Affairs Office responded that he was not aware of an inquiry.

**Comment 8:** Mr. Glaab commented that there was discussion with the PAERAB of a possibility of a hot spot removal action in a small localized area within Site 20/24. He mentioned he believed that such a removal action was actually funded. He asked if there was a removal action of the hot spot, would that bring the entire area down to State standards?

**Reply:** Both Mr. Doug Schicho from IT Corporation and Mr. Ted Gabel from Picatinny Arsenal replied. There was a discussion of a hot spot removal action. The State standards (New Jersey Non-Residential Direct Contact Soil Clean-Up Criteria) are soil concentrations. Removing soil from a hot-spot at Site 20/24 would not reduce the maximum soil concentration to below these State criteria because soil outside the hot-spot is contaminated slightly above the State criteria. Additionally, the State requires that a remedy at a site be protective to one in one million cancer risk level. If Picatinny did a removal action for that smaller localized hot spot, it would still be insufficient to bring down the entire site to meet the one-in-one-million standard. Originally the Army had considered removing the PCB contaminated soil to below the New Jersey Non-Residential Criteria, not a hot spot removal action. However, this soil cover was determined to be protective at a lower cost.

**Comment 9:** Mr. Glaab asked why the State is accepting lower than State levels.

**Reply:** Mr. Greg Zalaskus from the NJDEP replied that the State requires that the site be rendered protective to a risk level of one in a million. That is consistent with State statute. The State will endorse a remedy that leaves contamination in place under a cap or protected through engineering controls, as long as it renders the site protective to the State risk level. The only other criteria that would trigger a removal action would be exceedance of impact to groundwater, and at this site; the PCBs are not leaching to the groundwater as evidenced in the monitoring wells. Therefore, that trigger is gone.

### **3.1.2 Summary of Comments Received during the Public Comment Period and Agency Responses**

Two written comments were received during the comment period on the Proposed Plan. The comments are summarized as follows:

**Written Comment 1:** Y(y)our alternatives should include first of all a cessation of all pollution in Picatinny on all areas of Picatinny Arsenal – every single inch, no more pollution.

**Reply:** The Army understands your concerns with regard to the cessation of all pollution at Picatinny. It should be clarified that this document specifically address the soil contamination at Site 20/24. Soil contamination is addressed in accordance with the National Contingency Plan (NCP) of the Comprehensive Environmental Restoration and Liability Act (CERCLA) and the Defense Environmental Restoration Program (DERP). This document address only past contamination in the environmental media and does not address the ongoing sources or potential sources of contamination at Picatinny, which are addressed under other regulations including the Resource Conservation and Recovery Act (RCRA). However, it should be noted that Picatinny does make it a high priority on complying with State and Federal regulations and Army-related policies in regard to sources and makes every effort to comply with those requirements.

**Written Comment 2:** I favor Alternative 6. Take out all the polluted soil you have introduced to this area of Morris County.

**Reply:** The alternatives for Site 20/24 were assessed based on conditions at the site, including the results of a risk assessment, and it was determined that the placement of the vegetated soil cover provides the best balance among the nine criteria of the NCP for protection of human health and the environment.

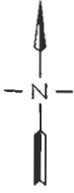
### **3.2 TECHNICAL AND LEGAL ISSUES**

No technical or legal issues were raised on the Selected Remedy.

#### **4.0 PART 4: REFERENCES**

- Dames and Moore. 1999. *Phase I Remedial Investigation Report Vol.8, Human Health Assessment for Picatinny Arsenal, New Jersey*. Prepared by Dames and Moore, Bethesda, MD for Army Total Environmental Program Support (ATEPS) Aberdeen Proving Ground, Maryland.
- ICF Kaiser. 1998. *Site 20/24 Data Report and Additional Investigation Work Plan – Picatinny Arsenal Phase I Area B*, Prepared by ICF Kaiser Engineers, Mt. Arlington, New Jersey for the U.S. Army Corps of Engineers-Baltimore District Total Environmental Restoration Contract (TERC), May 1998.
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- IT Corporation (IT). 2000. Final Feasibility Study of Site 20/24, *Picatinny Arsenal New Jersey*, Prepared by IT Corporation, Mt. Arlington, New Jersey for the US Army Corps of Engineers-Baltimore District Total Environmental Restoration Contract (TERC), March.
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- U.S. Environmental Protection Agency (USEPA). 1991. *Role of Baseline Risk Assessment in Superfund Remedy Selection Decisions*. OSWER Directive 9355.0-30. Memo from Don R. Clay. April 22, 1991.

SITE LOCATION



PENNSYLVANIA

PHILADELPHIA

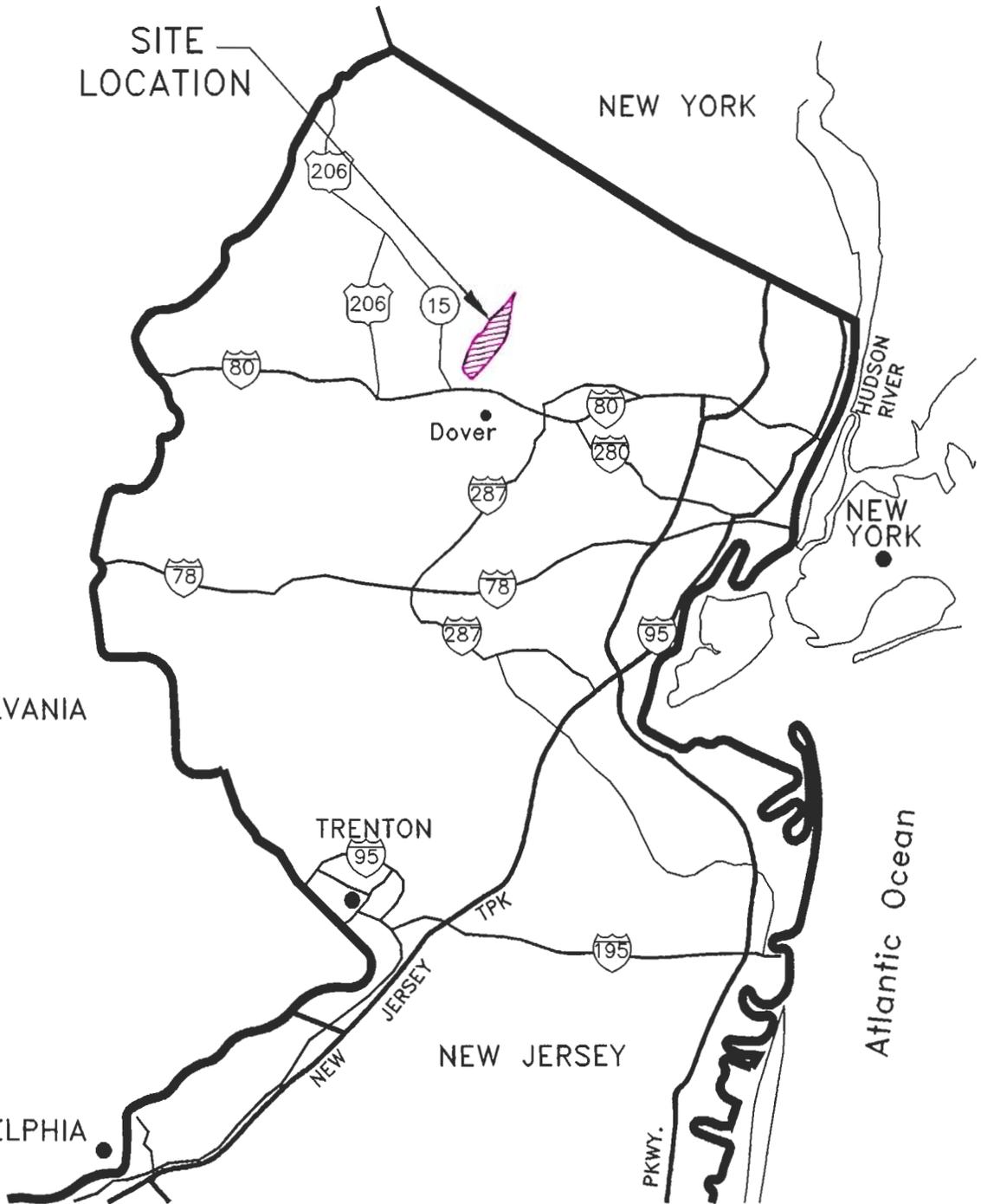
TRENTON

NEW JERSEY

NEW YORK

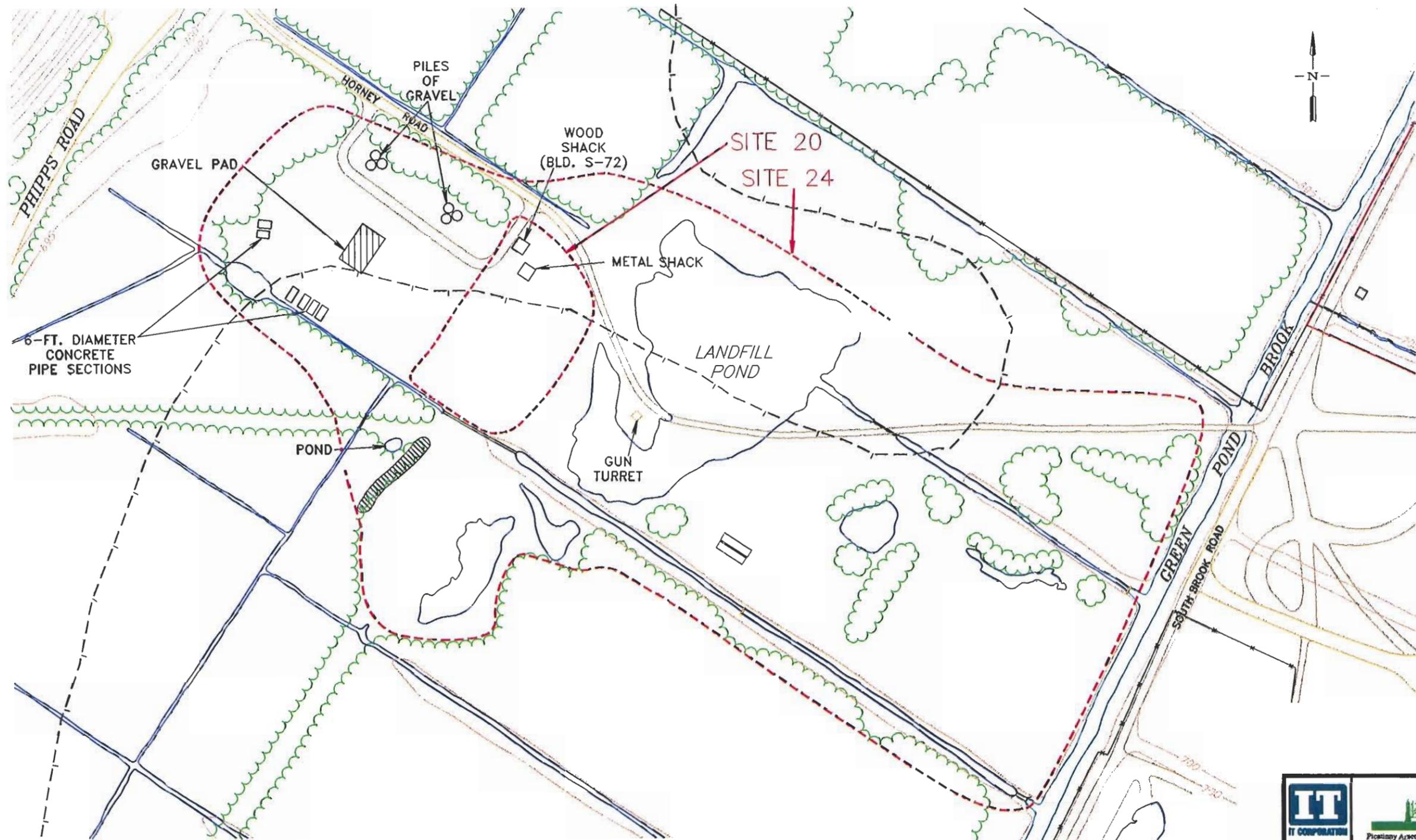
NEW YORK

Atlantic Ocean



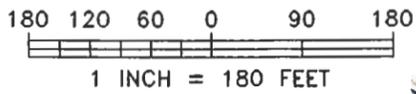
					
REVISION NO:		DATE:		ACAD FILE:	
f		10/12/01		SITEMAP.dwg	
<p><b>PICATINNY ARSENAL SITE LOCATION MAP DOVER, NJ</b></p>					
DET'D:	CLIENT:			PROJECT NO.:	
CK	PICATINNY ARSENAL			66717-408-00	
CHK'D:	LOCATION:			FIGURE NO.:	
EM	DOVER, NEW JERSEY			1-1	

PLOT DATE: 10/27/01



**LEGEND:**

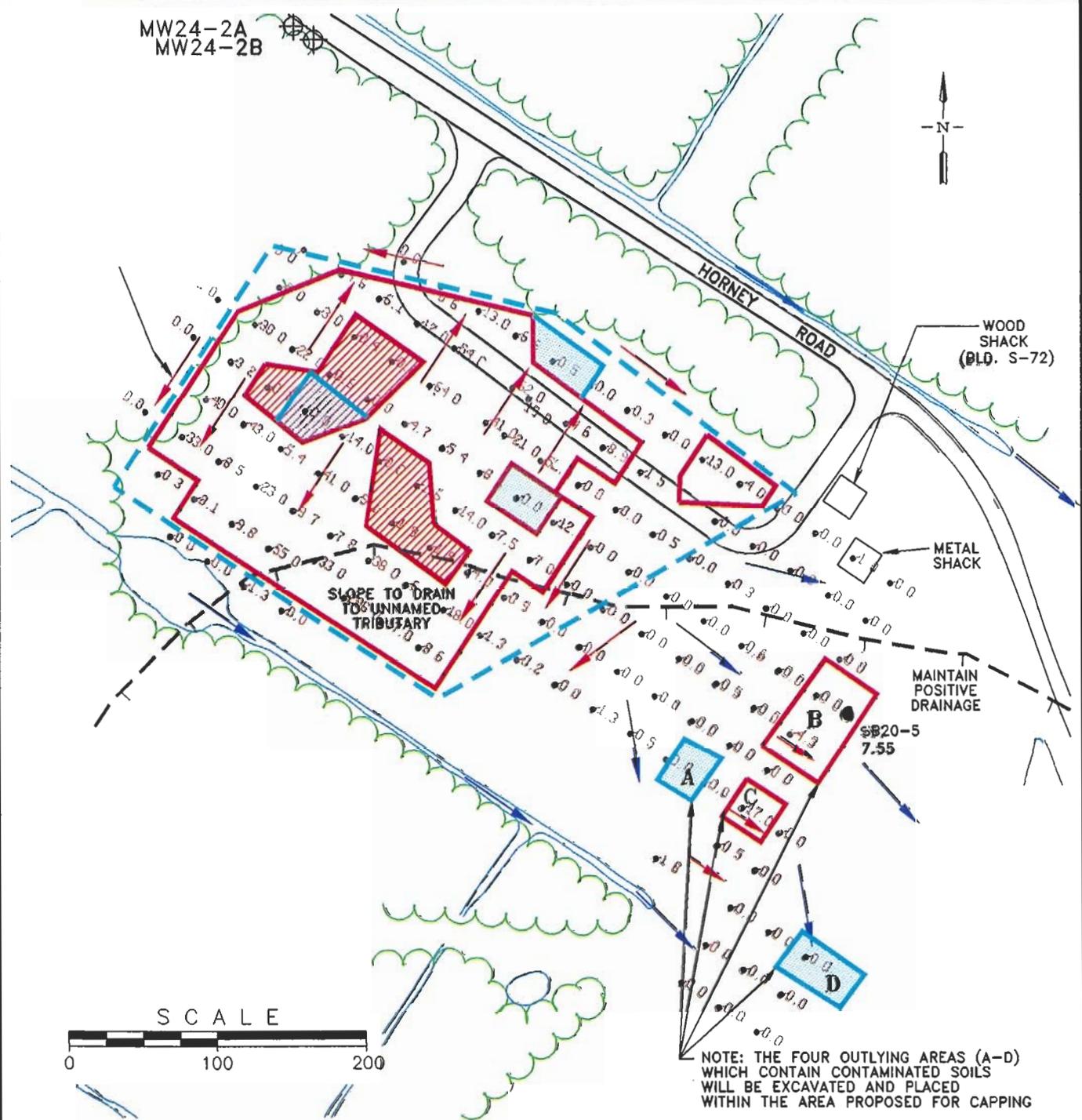
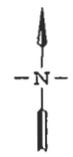
100 YEAR FLOOD PLAIN	EARTH MOUND
RAILROAD	BUILDING
TREE LINE	FORMER BUILDING
FENCE	COVERED WALKWAY
TRANSFORMER	SWAMP
BLAST WALL	WATER
STORM SEWER	
SANITARY SEWER	



ITT CORPORATION Picatinny Arsenal Installation Restoration Program U.S. Army Corps of Engineers		
REVISION NO.: 1	DATE: 10/25/99	ACAD FILE: 102599SAMPB.dwg
<b>SITE 20/24 - PYROTECHNIC TESTING RANGE/ SANITARY LANDFILL</b>		
DET'D: AS	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66719-203-00
CHK'D: LM	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 1-2

PLOT DATE: 10/25/99

MW24-2A  
MW24-2B

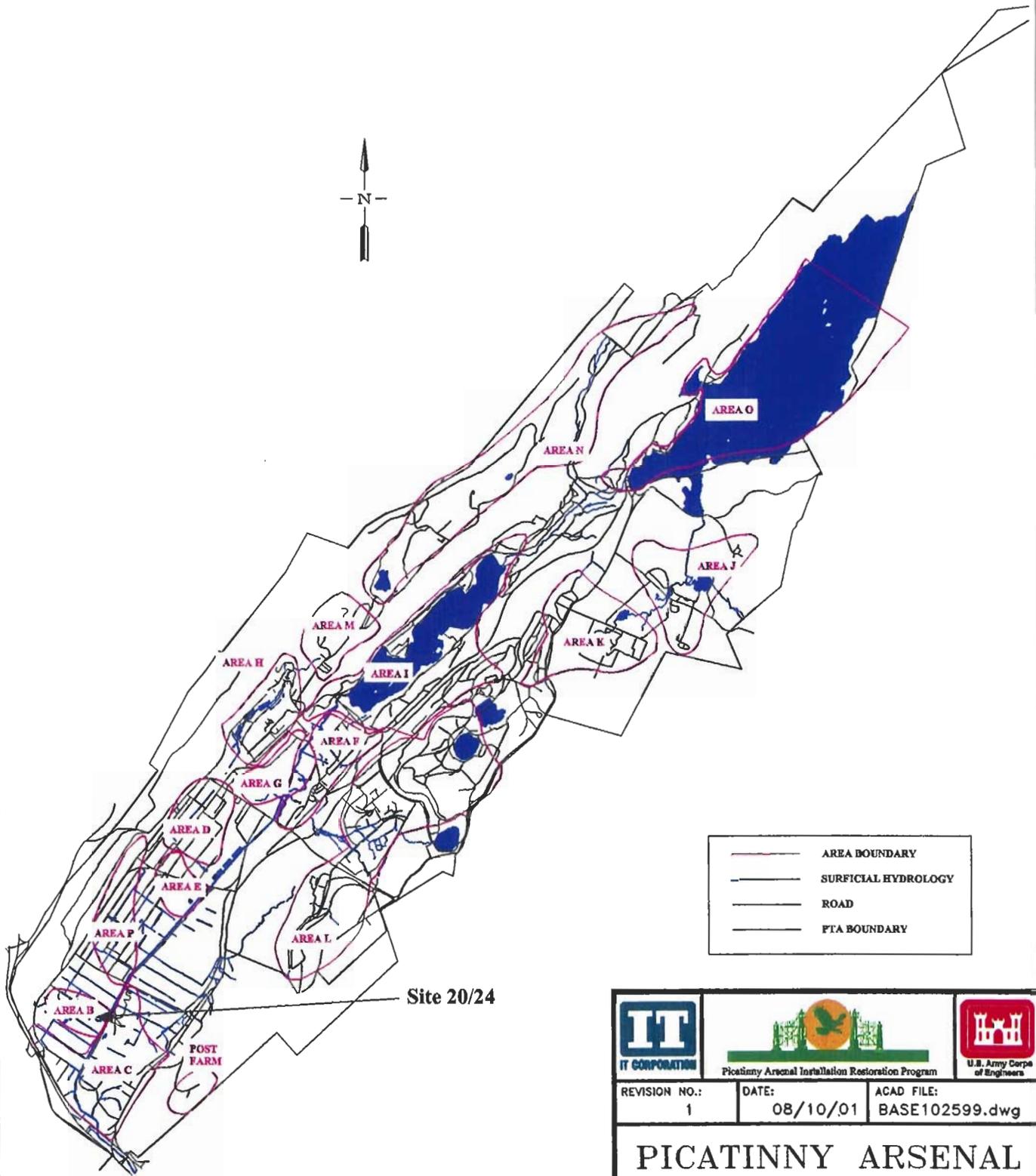
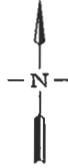


**LEGEND:**

- PROPOSED AREA OF CAPPING
- AREA CONTAINING PCBs GREATER THAN 2 ppm
- 100 YEAR FLOOD PLAIN
- EXISTING SURFACE WATER RUNOFF
- PROPOSED SURFACE WATER RUNOFF ESTABLISHED WITH CAP CONSTRUCTION
- PCBs CONCENTRATIONS BELOW 2 ppm TO BE CAPPED DUE TO LOCATION WITHIN CONTAMINATED AREAS.
- AREAS WITH ELEVATED DETECTIONS OF LEAD AND/OR 4,4'-DDT NOT LOCATED IN AREAS OF ELEVATED PCB

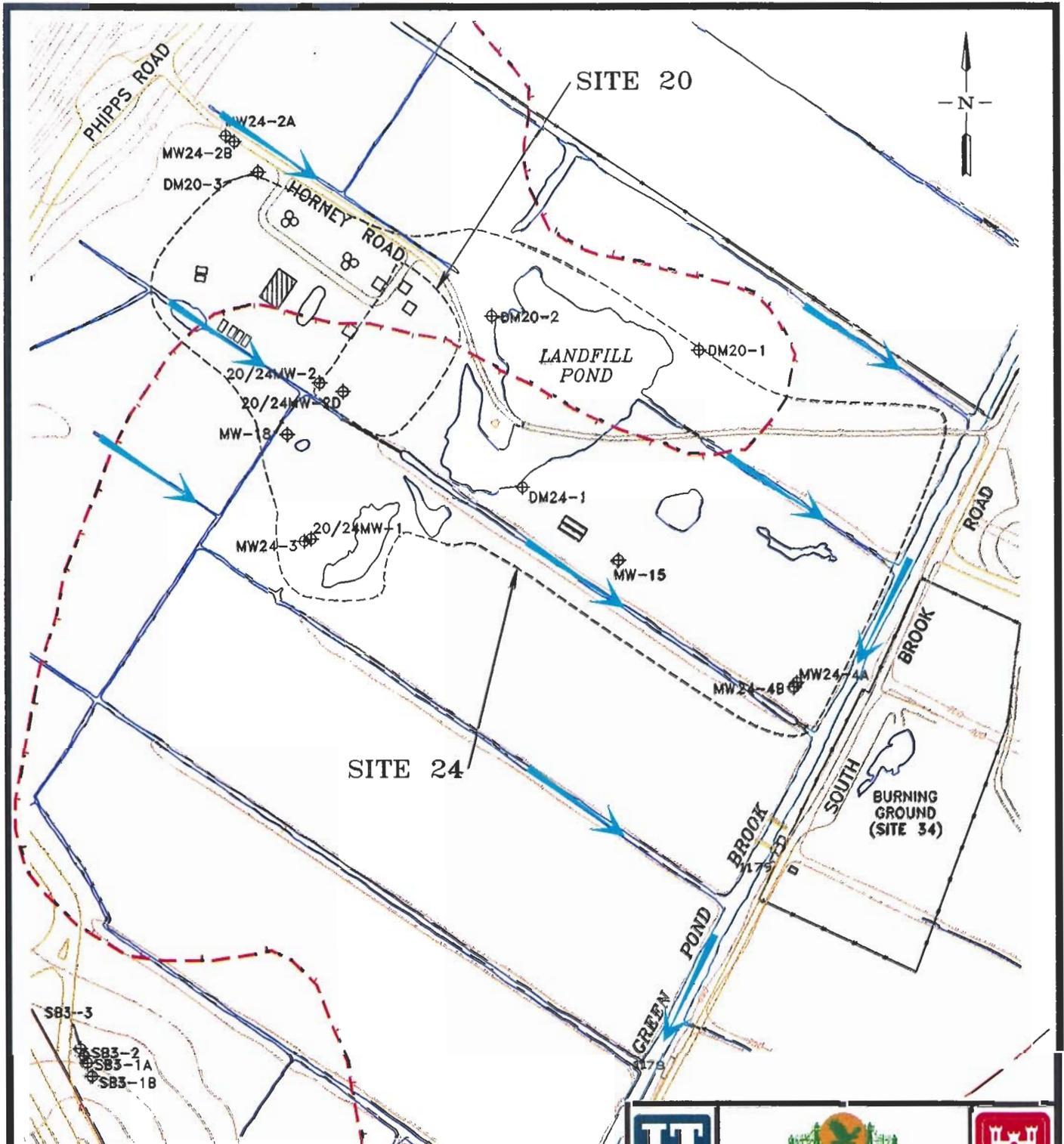
NOTE: THE FOUR OUTLYING AREAS (A-D) WHICH CONTAIN CONTAMINATED SOILS WILL BE EXCAVATED AND PLACED WITHIN THE AREA PROPOSED FOR CAPPING

REVISION NO.: 0	DATE: 11/26/01	ACAD FILE: 112601PCAPF.dwg
<b>SITE 20/24 PROPOSED AREA OF CAPPING</b>		
DET'D: RG	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66719-203-00
CHK'D: DS	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 1-3



PLOT DATE: 08/10/01

 ITT CORPORATION	 Picatinny Arsenal Installation Restoration Program	 U.S. Army Corps of Engineers
REVISION NO.: 1	DATE: 08/10/01	ACAD FILE: BASE102599.dwg
<b>PICATINNY ARSENAL SITE LAYOUT MAP</b>		
DET'D: CK	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66717-712-00
CHK'D: EM	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 2-1



PLOT DATE: 10/26/99

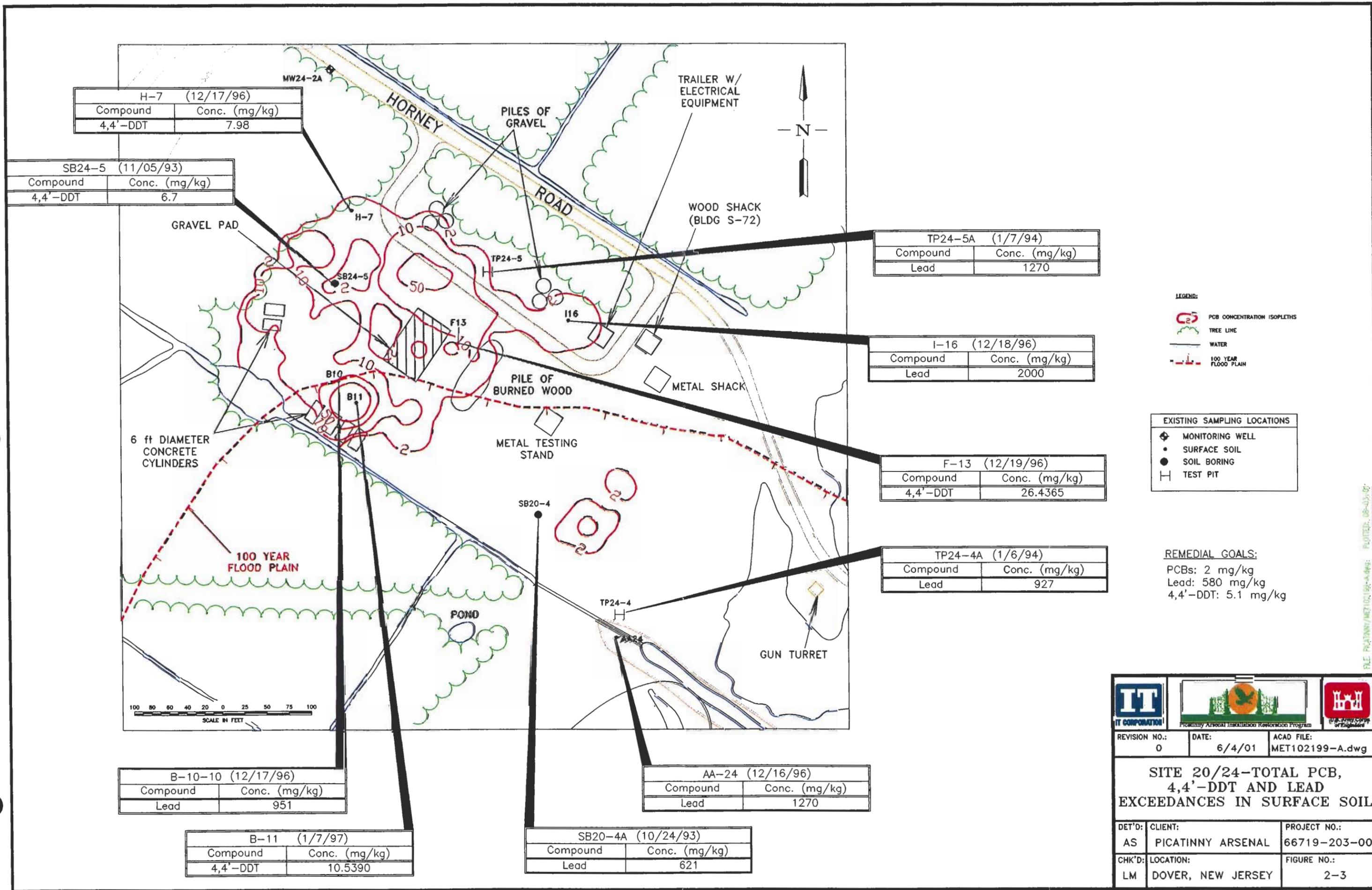
**LEGEND**

SURFACE WATER FLOW DIRECTION	100 YEAR FLOOD PLAIN	STORM SEWER
RAILROAD	BUILDING	SANITARY SEWER
TREE LINE	FORMER BUILDING	COVERED WALKWAY
FENCE	EARTH MOUND	SWAMP
TRANSFORMER		WATER
BLAST WALL		MONITORING WELL

1 INCH = 300 FEET

NOTE: Monitoring Well DM20-3 Has Been Grouted Closed.

REVISION NO.: 1	DATE: 10/31/00	ACAD FILE: BH20102099.dwg	
<b>SITE 20/24 TOPOGRAPHY AND SURFACE WATER HYDROLOGY</b>			
DET'D: CK	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66717-712-00	
CHK'D: EM	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 2-2	



H-7 (12/17/96)	
Compound	Conc. (mg/kg)
4,4'-DDT	7.98

SB24-5 (11/05/93)	
Compound	Conc. (mg/kg)
4,4'-DDT	6.7

TP24-5A (1/7/94)	
Compound	Conc. (mg/kg)
Lead	1270

I-16 (12/18/96)	
Compound	Conc. (mg/kg)
Lead	2000

F-13 (12/19/96)	
Compound	Conc. (mg/kg)
4,4'-DDT	26.4365

TP24-4A (1/6/94)	
Compound	Conc. (mg/kg)
Lead	927

B-10-10 (12/17/96)	
Compound	Conc. (mg/kg)
Lead	951

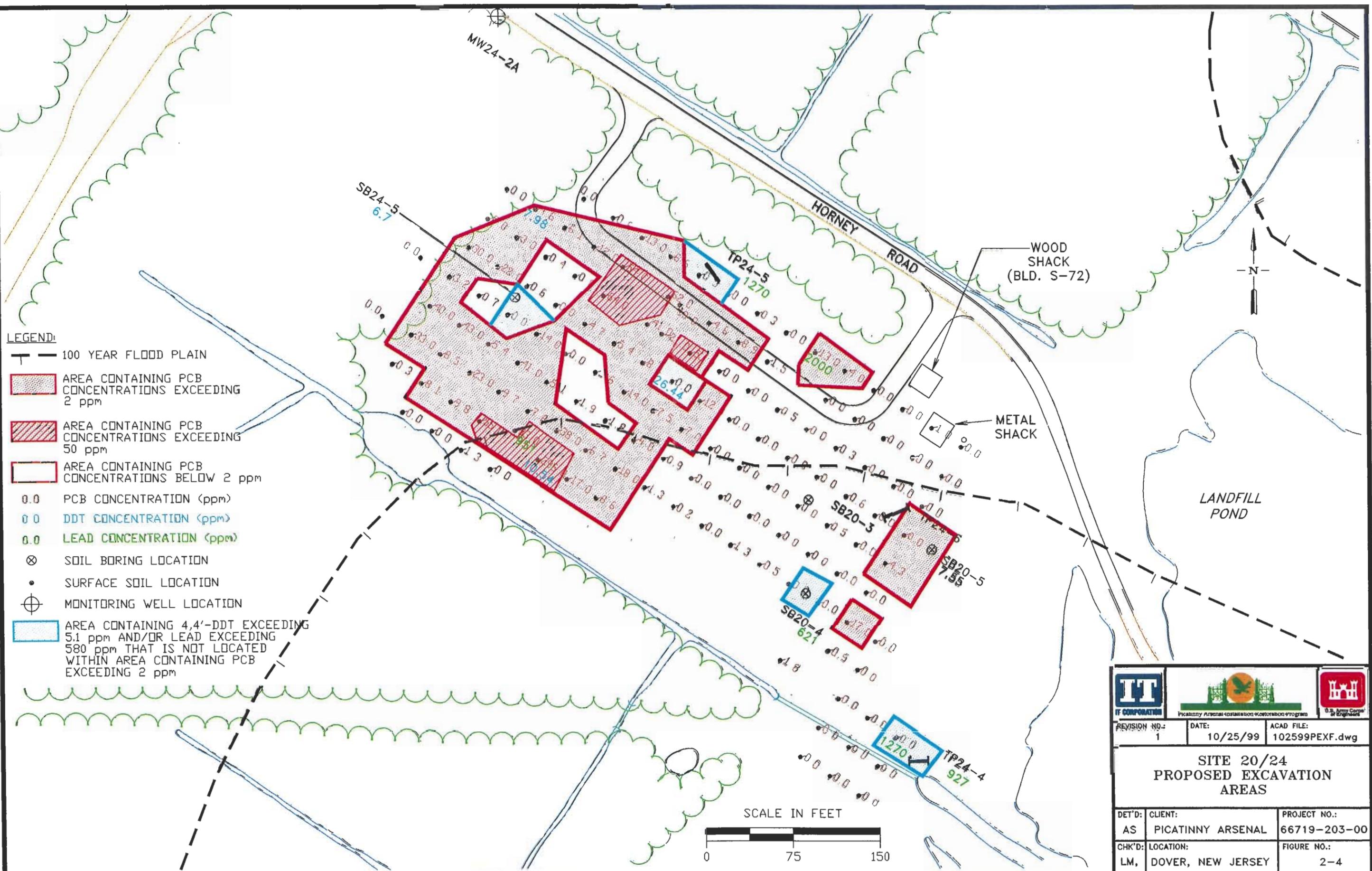
AA-24 (12/16/96)	
Compound	Conc. (mg/kg)
Lead	1270

B-11 (1/7/97)	
Compound	Conc. (mg/kg)
4,4'-DDT	10.5390

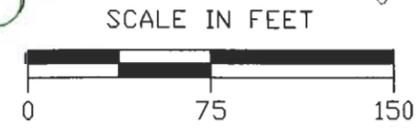
SB20-4A (10/24/93)	
Compound	Conc. (mg/kg)
Lead	621

FILE: PICATINNY/ME102199-A.dwg; PLOTED: 08-10-01

REVISION NO.: 0	DATE: 6/4/01	ACAD FILE: MET102199-A.dwg
<b>SITE 20/24-TOTAL PCB, 4,4'-DDT AND LEAD EXCEEDANCES IN SURFACE SOIL</b>		
DET'D: AS	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66719-203-00
CHK'D: LM	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 2-3

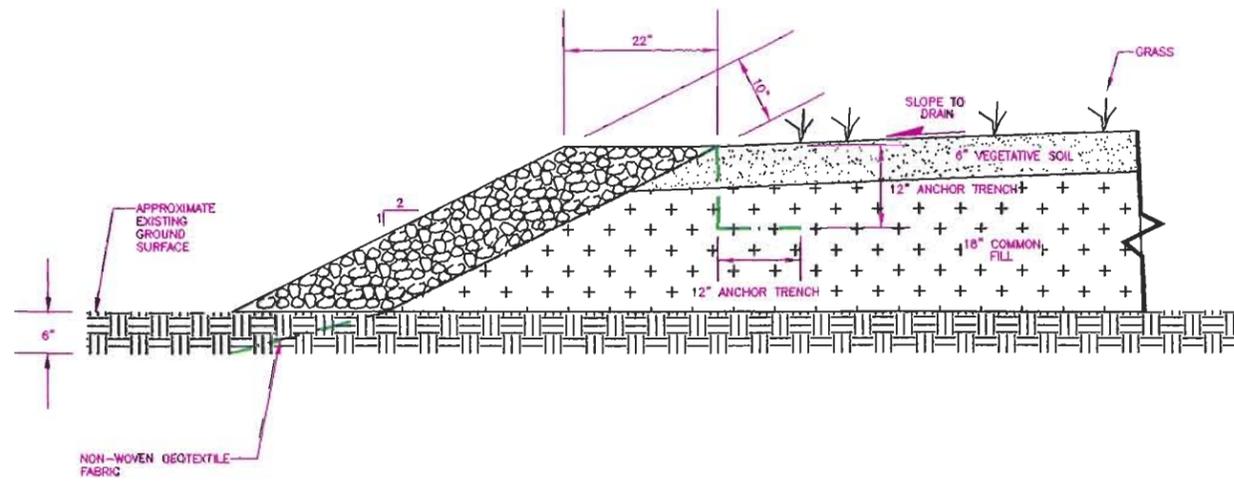


- LEGEND:**
- 100 YEAR FLOOD PLAIN
  - AREA CONTAINING PCB CONCENTRATIONS EXCEEDING 2 ppm
  - AREA CONTAINING PCB CONCENTRATIONS EXCEEDING 50 ppm
  - AREA CONTAINING PCB CONCENTRATIONS BELOW 2 ppm
  - 0.0 PCB CONCENTRATION (ppm)
  - 0.0 DDT CONCENTRATION (ppm)
  - 0.0 LEAD CONCENTRATION (ppm)
  - ⊗ SOIL BORING LOCATION
  - SURFACE SOIL LOCATION
  - ⊕ MONITORING WELL LOCATION
  - AREA CONTAINING 4,4'-DDT EXCEEDING 5.1 ppm AND/OR LEAD EXCEEDING 580 ppm THAT IS NOT LOCATED WITHIN AREA CONTAINING PCB EXCEEDING 2 ppm



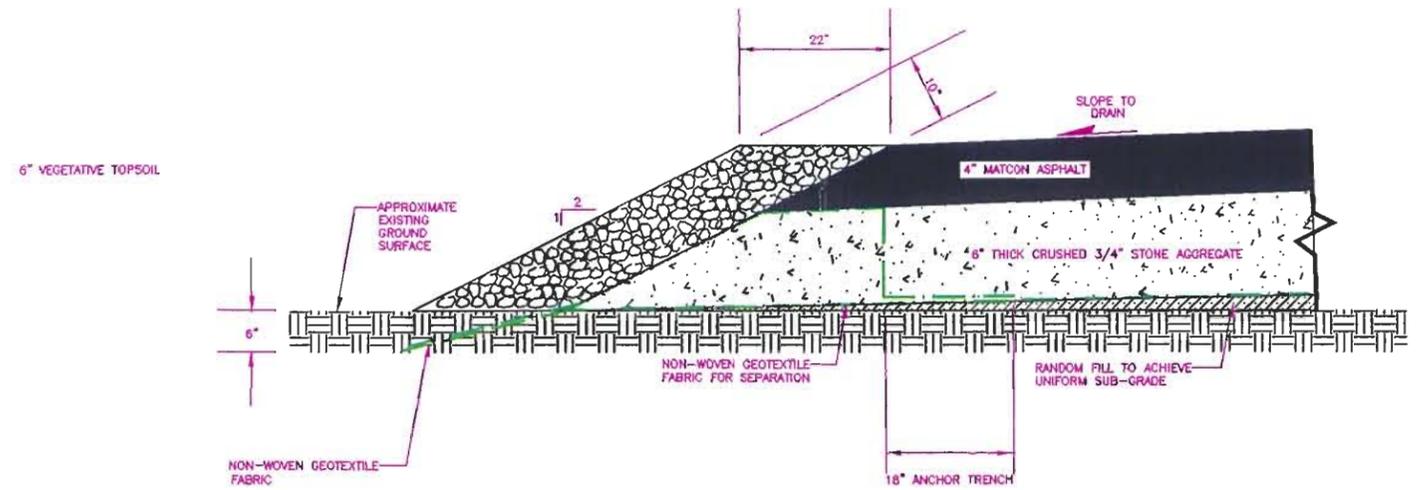
REVISION NO.: 1	DATE: 10/25/99	ACAD FILE: 102599PEXF.dwg
<b>SITE 20/24 PROPOSED EXCAVATION AREAS</b>		
DET'D: AS	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66719-203-00
CHK'D: LM,	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 2-4

PLOT DATE: 10/28/01



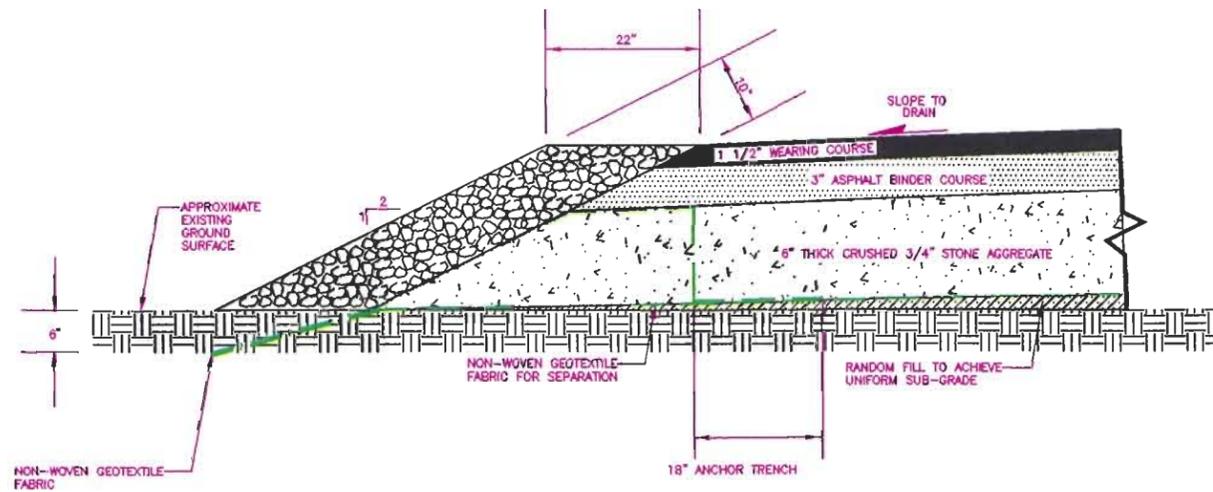
ALTERNATIVE NO. 2  
VEGETATED SOIL COVER

NTS



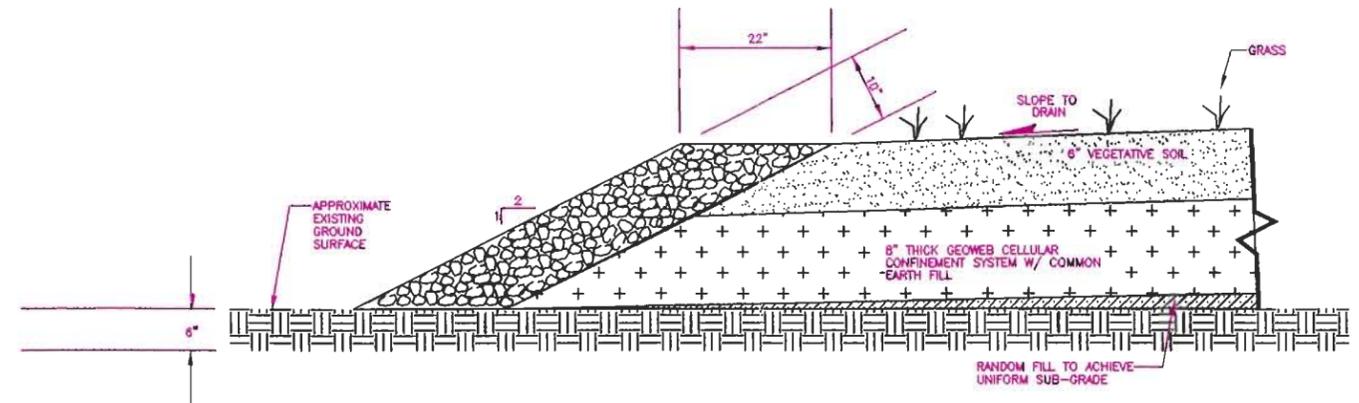
ALTERNATIVE NO. 3  
MATCON ASPHALT CAP

NTS



ALTERNATIVE NO. 4  
ORDINARY ASPHALT CAP

NTS



ALTERNATIVE NO. 5  
REINFORCED VEGETATED  
SOIL COVER

NTS

PLOT DATE: 10/26/99

REVISION NO.: 1	DATE: 10/26/99	ACAD FILE: 102699ASSCAP.dwg
<b>SITE 20/24</b> <b>SOIL COVER/ASPHALT CAP</b> <b>CROSS SECTIONS</b>		
DET'D: AS	CLIENT: PICATINNY ARSENAL	PROJECT NO.: 66719-304-00
CHK'D: LM	LOCATION: DOVER, NEW JERSEY	FIGURE NO.: 2-5

Table 2-1

Summary of Human Health Chemicals of Concern and Medium-Specific Exposure Point Concentrations

<b>Scenario Timeframe:</b>		Current						
<b>Medium:</b>		Soil						
<b>Exposure Medium:</b>		Shallow Soil						
Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil, On-site Direct Contact	Total PCBs	5.49E-01	2.97E+02	mg/kg	87/156	1.32E+01	mg/kg	95% UCL - Lognormal

<b>Scenario Timeframe:</b>		Current						
<b>Medium:</b>		Soil						
<b>Exposure Medium:</b>		Total Soil						
Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil, On-site Direct Contact	Total PCBs	2.40E-02	2.97E+02	mg/kg	92/173	1.13E+01	mg/kg	95% UCL - Lognormal

95% UCL - 95% Upper Confidence Level, Lognormal Distribution

Table 2-2

Sample Cancer Toxicity Data Summary

**Pathway: Ingestion, Dermal**

Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline Description	Source	Date (MM/DD/YYYY)
Total PCBs	2.0	2.0	mg/kg-day <sup>-1</sup>	B2	IRIS	1998

**Pathway: Inhalation**

Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/Cancer Guidance Description	Source	Date (MM/DD/YYYY)
Total PCBs	---	µg/m <sup>3</sup>	2.0	mg/kg-day <sup>-1</sup>	B2	IRIS	1998

**Key**

IRIS - Integrated Risk Information System, U.S. EPA

B2 - Probably human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans

---: Toxicity criteria are not available to quantitatively address this route of exposure

**Table 2-3**

**Risk Characterization Summary - Carcinogens**

**Scenario Timeframe:** Current  
**Receptor Population:** Outdoor Maintenance Worker  
**Receptor Age:** Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site Direct Contact	Total PCBs	4E-07	5E-09	5E-06	5E-06
<b>Sum Risk Total:</b>							<b>5E-06</b>

**Scenario Timeframe:** Future  
**Receptor Population:** Industrial/Research Worker (ED =250 days)  
**Receptor Age:** Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site Direct Contact	Total PCBs	5E-06	7E-08	3E-05	4E-05
<b>Sum Risk Total:</b>							<b>4E-05</b>

**Scenario Timeframe:** Future  
**Receptor Population:** Construction/Excavation Worker  
**Receptor Age:** Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Soil On-site Direct Contact	Total PCBs	1E-06	2E-07	8E-07	2E-06
<b>Sum Risk Total:</b>							<b>2E-06</b>

TABLE 2-4

CHEMICAL-SPECIFIC ARARs AND TBCs FOR SITE 20/24 SOILS

Chemical	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
PCBs	Soil cleanup criteria NJAC 26:D, Tables 3-1 and 7-1	Proposed rule for residential, nonresidential, and impact to groundwater soil cleanup criteria.	TBC Cleanup criteria for soils containing PCBs. Currently is 2 ppm for nonresidential.
Lead and 4,4'-DDT	Site-specific risk assessment	Site-specific preliminary remediation goals (RG) were developed in the ecological risk assessment.	TBC Preliminary RG values from the ecological site-specific risk assessment report. <sup>1</sup> These preliminary RGs are: Lead = 580 mg/kg 4,4-DDT = 5.1 mg/kg

<sup>1</sup> Source: Ecological Risk Assessment, IT Corporation, August 1999

TABLE 2-5

LOCATION-SPECIFIC ARARs AND TBCs FOR SITE 20/24

Location	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
Flood plains	Protection of flood plains as defined in Executive Order 11988 § 6(c) and 40 CFR 6, Appendix A § 4(d)	Federal agencies shall take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of flood plains. Federal agencies shall evaluate potential effects of actions in flood plains and ensure consideration of flood hazards and flood plain management. If action is taken in flood plains, federal agencies shall consider alternatives to avoid adverse effects, and potential	ARAR Applicable to removal activities since a very small area is within the 100-year flood plain of Green Pond Brook.
Endangered Species Act (Rare, Threatened, or Endangered Species)	Within 100 year flood plain as defined in 40 CFR 264.18(b) and NJAC 7:13 (New Jersey Flood Hazard Area Control Regulations).	Facility must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by flooding.	ARAR Applicable since a very small area of Site 20/24 is within the 100-year flood plain of Green Pond Brook.
Endangered Species Act (Rare, Threatened, or Endangered Species)	Presence of those species listed in the following acts and regulations: - Endangered Species Act (16 U.S.C. 1531 <i>et seq</i> ) - Fish and Wildlife Coordination Act (16 U.S.C. 661 <i>et seq</i> ) - 40 CFR 6.302(h) - 50 CFR 402 - CWA § 404 - 40 CFR 231.10(b) - RSN 37-430 to -438 - NJAC 7:25-4 as being rare, threatened, or endangered species.	Whenever possible, federal agency actions must avoid or minimize adverse impacts on rare, threatened, or endangered species and act to preserve and enhance their natural and beneficial values. Agencies should particularly avoid new construction in those areas containing these species unless there are no practicable alternatives. Federal agencies shall incorporate rare, threatened, or endangered species protection consideration into planning, regulating, and decision-making processes.	ARAR Potentially applicable since clearing, grubbing and/or excavation activities could impact habitat typical of several sensitive species listed within the Endangered Species Act. Protected species which are resident at Picatinny Arsenal are the barrel owl, blue heron, bog turtle, wood turtle, timber rattlesnake, and brook trout.

TABLE 2-6

ACTION SPECIFIC ARARs AND TBCs FOR SITE 20/24

Action	Applicable Alternatives	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
Generation of Hazardous Wastes and Testing of Excavated Materials	2, 4, 6	RCRA methods for identification and evaluation of solid and hazardous wastes - 40 CFR 261 Subpart C	Specific requirements for identifying hazardous wastes. Establishes analytical requirements for testing and evaluating solid, hazardous, and water wastes	ARAR Applicable. TCLP analysis and testing results indicative of hazardous wastes.
Generation of PCB Remediation Waste	6	TSCA Definition of PCB Remediation Waste - 40 CFR 761.3	Specific requirements for identifying PCB remediation waste.	ARAR Relevant and appropriate. PCB remediation waste is defined as any environmental media containing PCBs, such as soil, gravel, dredged materials, sediments, settled sediment fines and aqueous decantate of sediment. This definition also encompasses waste containing PCBs as a result of: 1) Spill, release or unauthorized disposal at the following concentrations: a) > = 50 ppm current concentration of material disposal prior to April 18, 1978 b) > = 500 ppm PCBs beginning on April 18, 1978 or > = 50 ppm PCBs beginning on July 2, 1979 c) Any concentrations of PCBs which are not authorized.  TSCA is administered by the USEPA and site specific decisions regarding the applicability of TSCA is made by the Regional Administrator.
Excavation and Capping	2, 4	40 CFR 264.310(a) New Jersey Soil Erosion and Sediment Control Act, NJAC 7:13-3 and NJAC 2:90	Requirements for the placement of fill for a soil cover and soil erosion and sediment controls.	ARAR Applicable to the placement of a soil cap on site.

**Remedial Alternatives**

- 1 No Action
- 2 Installation of an armored vegetated soil cover and continued implementation of land use restrictions
- 4 Installation of a asphalt cap and continued implementation of land use and access restrictions
- 6 Excavation of soil with PCB, lead, and 4,4'-DDT concentrations greater than the RGs and off-post disposal and continued implementation of land use and access restrictions

**TABLE 2-6  
(Continued)**

**ACTION SPECIFIC ARARs AND TBCs FOR SITE 20/24**

Action	Applicable Alternatives	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
Military Munitions Identification, Treatment, and Disposal	2, 4, 6	40 CFR 266.200 – 266.206, Subpart M [reference 40 CFR 260-270]	Regulations which identify when military munitions become a solid waste and if hazardous.	ARAR Potentially applicable if UXOs are discovered during excavation activities at the site.
	2, 4, 6	40 CFR 300.120	DOD will have removal response authority and Remedial Project Manager (RPM) will be the prime contact for incidents involving military weapons and munitions under control of DOD.	ARAR Potentially applicable if UXOs are discovered during excavation activities at the site. DOD and RMP will be contacted.
General Remediation	2, 4, 6	Technical Requirements for Site Remediation - NJAC. 7:26E 1, 4-7	Specifies the minimum technical requirements to investigate and remediate contamination on any site.	ARAR Relevant and appropriate for onsite removal activities.
	2, 4, 6	40 CFR 122.26(c) New Jersey Soil Erosion and Sediment Control Act, NJAC 7:13-3 and 4:24	Requires the implementation of soil and erosion and sediment control measures for activities disturbing over 5,000 square feet of surface area of land.	ARAR Applicable for site activities involving excavation, grading, or other soil disturbance activities exceeding 5,000 square feet.
	2, 4, 6	USEPA OSWER Publication 9345.3-03FS, January 1992	Investigation-derived wastes generated from remedial activities (e.g., drilling muds, purged water, etc.) are required to be properly stored, managed and disposed. Guidance given in the publication includes waste material containment, collection, labeling, etc.	TBC for wastes generated during clearing, grubbing and excavation activities.

**Remedial Alternatives**

- 1 No Action
- 2 Installation of an armored vegetated soil cover and continued implementation of land use and access restrictions
- 4 Installation of a asphalt cap and continued implementation of land use and access restrictions
- 6 Excavation of soil with PCB, lead, and 4,4'-DDT concentrations greater than the RGs and off-post disposal and continued implementation of land use and access restrictions

**TABLE 2-6  
(Continued)**

**ACTION SPECIFIC ARARs AND TBCs FOR SITE 20/24**

Action	Applicable Alternatives	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
Discharge of Aqueous Waste to Surface Water	2, 4, 6	New Jersey Water Pollution Control Act – New Jersey Pollutant Discharge Elimination System (NJPDES) (NJAC. 7:14A)	Discharge of pollutants to surface water and groundwater from remediation sites is regulated via NJPDES requirements. NJPDES requirements include obtaining a discharge to surface water or groundwater permit equivalent and meeting substantive requirements of the permit. Requirements include effluent limitations, water quality based limitations, monitoring, and monitoring techniques.	ARAR Potentially applicable to the substantive requirements of the permit program for storm water discharge and water from dewatered soils to surface water during clearing, grubbing and excavation activities.
Air Emissions	2, 4, 6	Air Quality Regulations - New Jersey NJAC 7:27-13	Provides requirements applicable to ambient air pollution sources.	ARAR Potentially applicable to the onsite generation and emission of ambient air pollutants. Air monitoring will be performed and if the following air quality standards are exceeded, then requirements are applicable. Primary air quality standard is 75 µg/m <sup>3</sup> (not to exceed 260 µg/m <sup>3</sup> more than once) and secondary standard of 60 µg/m <sup>3</sup> (not to exceed 150 µg/m <sup>3</sup> more than once), both for geometric mean value of all 24-hour average concentration standard over 12 consecutive months.
Decontamination	2, 4, 6	TSCA decontamination standards and procedures for removing PCBs - 40 CFR 761.79	Requirements for regulating PCBs from water, organic liquids, non-porous surfaces, concrete, and non-porous surfaces covered with a porous surface	ARAR Relevant and appropriate to decontamination of equipment during remedial activities at the site.

Remedial Alternatives

- 1 No Action
- 2 Installation of an armored vegetated soil cover and continued implementation of land use and access restrictions
- 4 Installation of a asphalt cap and continued implementation of land use and access restrictions
- 6 Excavation of soil with PCB, lead, and 4,4'-DDT concentrations greater than the RGs and off-post disposal and continued implementation of land use and access restrictions

**TABLE 2-6  
(Continued)**

**ACTION SPECIFIC ARARs AND TBCs FOR SITE 20/24**

Action	Applicable Alternatives	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
Storage for Disposal	6	TSCA storage for disposal of PCBs at concentration of < = 50 ppm. - 40 CFR 761.65	Sets stringent criteria for storage based on accumulation time, proper facility and storage containers.	<u>ARAR</u> May be relevant and appropriate if soils, are staged and stored at the site. (Note that storage may not exceed 1 year from the date it was determined to be a PCB waste). Temporary storage of up to 30 days in the proper DOT labeled container (49 CFR 171-180) may be done if PCBs are in a nonliquid form.  Bulk PCB wastes may be stored only for 180 days at the cleanup site. The pile must be lined and covered appropriately.
Disposal Off-site	2, 4, 6	RCRA Land Disposal Restrictions 40 CFR 268, Subparts A, B, C, D, and E NJAC 7:26-11 <i>et seq.</i>	Identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise restricted waste may continue to be land disposed.	<u>ARAR</u> Applicable if hazardous waste is transported off-site to a landfill.
	6	TSCA Land Disposal of PCBs - 40 CFR 761.50(a)(5)	Non-liquid PCBs to be land disposed may be > = 500 ppm (or > = 100 µg/100 cm <sup>2</sup> if no free-flowing liquids are present).	<u>ARAR</u> Relevant and appropriate if PCBs are transported off site to an appropriate landfill.
	6	TSCA Identification of alternate disposal methods, traditional (performance based) and risk-based methods for disposal. - 40 CFR 761.50 (alternate disposal method) - 40 CFR 761.75 (chemical waste landfill) - 40 CFR 761.61 (self-implementing, traditional and risk based options) - 40 CFR 761.77 (approval)	Applicable to disposal of material: 1) containing < 50 ppm PCBs; 2) managed under a 404 CWA or equivalent permit USACE under 33 CFR 320; 3) getting prior approval from USEPA based on risk assessment and site specifics.	<u>ARAR</u> Relevant and appropriate. Spills and other uncontrolled discharges of PCBs at concentrations of > = 50 ppm constitute disposal of PCBs.  Applicable to disposal > 50 ppm PCBs may be sent to a TSCA approved landfill compliant with 40 CFR 761.75.  Applicable to disposal of < 50 ppm PCBs may be sent to a RCRA approved landfill.

**Remedial Alternatives**  
1 No Action  
2 Installation of an armored vegetated soil cover and continued implementation of land use and access restrictions  
4 Installation of a asphalt cap and continued implementation of land use and access restrictions  
6 Excavation of soil with PCB, lead, and 4,4'-DDT concentrations greater than the RGs and off-post disposal and continued implementation of land use and access restrictions

**TABLE 2-6  
(Continued)**

**ACTION SPECIFIC ARARs AND TBCs FOR SITE 20/24**

Action	Applicable Alternatives	Law/Regulation	Requirement of Law/Regulation	ARAR/TBC Status
Verification	6	TSCA Cleanup Verification - 40 CFR 761.61, Subpart R - 40 CFR 761.300 – 761.359 (Subpart Q)	Specifies cleanup verification criteria through sampling for PCB remediation waste characterization for storage and off-site disposal.	<u>ARAR</u> Relevant and appropriate for waste characterization for storage and off-site disposal during removal activities at the site.
Packaging, Labeling and Storage	2, 4, 6	RCRA Hazardous Waste Generation - 40 CFR 262, Subparts A, B, C, D and E - NJAC 7:26G-6	Specifies requirements for hazardous waste packaging, labeling, manifesting and storage.	<u>ARAR</u> Potentially applicable for the off-site transportation of hazardous waste.
	6	TSCA Labeling Requirements - 40 CFR 761.40	Specifies requirements for labeling and shipping of PCBs.	<u>ARAR</u> Relevant and appropriate for labeling and transportation of PCBs off-site.

Remedial Alternatives

- 1 No Action
- 2 Installation of an armored vegetated soil cover and continued implementation of land use and access restrictions
- 4 Installation of a asphalt cap and continued implementation of land use and access restrictions
- 6 Excavation of soil with PCB, lead, and 4,4'-DDT concentrations greater than the RGs and off-post disposal and continued implementation of land use and access restrictions

**ATTACHMENT 1**  
**LAND USE CONTROL IMPLEMENTATION PLAN FOR SITE 20/24**

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**LAND USE CONTROL IMPLEMENTATION PLAN  
FOR  
PICATINNY ARSENAL  
SITE 20/24 Pyrotechnic Testing Range/ Sanitary Landfill  
Picatinny Arsenal, New Jersey**

## **1.0 INTRODUCTION**

This Land Use Control Implementation Plan (LUCIP) has been developed by the Army as a means of assuring that proposed land use controls (LUCs) are maintained and implemented at Site 20/24. Site 20/24 is located at Picatinny Arsenal, Rockaway Township, New Jersey. The Army recognizes that long term LUC assurance and implementation is an integral part of any of the remedial alternatives proposed for Site 20/24 and have designed this LUCIP to address suggestions and guidance provided by USEPA and NJDEP. This LUCIP for Site 20/24 addresses the following general LUC provisions:

1. *The identification of the PTA point-of-contact designated responsible for monitoring, maintaining, and enforcing the site specific LUCIP.*
2. *A commitment to request funds for maintaining LUCs in budget allocation requests.*
3. *A commitment to provide notification to EPA and state regulators of major changes in land use.*
4. *A commitment to conduct field inspections periodically to assess the conditions of Site 20/24.*
5. *Requirement for PTA to certify the continued compliance with all LUCIPs provisions.*
6. *A requirement for PTA to notify EPA and the State immediately upon discovery of any unauthorized major change in land use.*
7. *A requirement for advance notification to EPA and the State in the event of the contemplation of real estate transfer.*
8. *Substantive requirements of the NJDEP Deed Notice, Exhibits A through D and the Draft NJDEP/U.S. Department of the Army Engineering and Institutional Controls for Active Property.*

As documented in the Proposed Plan, the preferred alternative for Site 20/24 is the placement of an armored vegetated soil cover over the contaminated soil. Land use restrictions will continue to be implemented for Site 20/24 in order to prevent human exposure to contaminated soil and to protect the armored vegetated soil cover. To ensure that the institutional and land use controls are met and implemented, this LUCIP will detail the procedures and requirements of land use control necessary to assure that land use remains safe and appropriate for the level of protection afforded by the remedial alternative. Picatinny Arsenal has some institutional controls in place and one other in development. Elements of institutional controls already in place at the arsenal are presented along with site-specific LUC provisions and procedures. This LUCIP shall also be attached to the anticipated ROD for Site 20/24.

## **2.0 SITE DESCRIPTION AND LAND USE**

Site 20/24 is currently utilized for testing of pyrotechnic flares. The site is located in the valley region of PTA and is surrounded by the following landmarks: Green Pond Mountain to the northwest, Green Pond Brook to the southeast, Shinkle Road to the northeast, and Route 15 to the southwest. The entire site is located within the 500-year floodplains of Green Pond Brook. Site 20/24 is an active U.S. Army Industrial Site. The site is used primarily for the testing of pyrotechnic flares but is also designated as a safe haven parking area and is periodically used for hunting purposes. The Safe Haven Plan allows for temporary parking of explosives laden vehicles and is large enough to accommodate two 18-wheel trucks. Trucks will not be parked or move over areas proposed for remediation. The site is located within hunting area 18. Hunting Area 18 is open to all game and hunting activities take place in this area between early October through February. In addition to current use of this site, the Army has plans to install a small weather station, which will involve the construction of a 6-ft. by 6-ft. concrete pad. The station will not be located on the area proposed for remediation and will be used intermittently by PTA personnel.

Environmental investigations at the site have identified contaminants, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, metals, and polychlorinated biphenyls (PCBs) in the soil, surface water and sediment. Of these contaminants, only PCBs, lead and 4,4-DDT were identified as contaminants of Concern (COCs) and determined to result in risk at the site.

Detailed data tables and discussion of this data can be found in the *Picatinny Arsenal Phase I Remedial Investigation Report, 1999*, and the *Feasibility Study for Site 20/24, 2000*, both of which are available in the PTA Administrative Record.

## **2.1 Description of Proposed Remedial Action at Site 20/24**

The preferred alternative for Site 20/24 is the placement of an armored vegetated soil cover over the contaminated soil. The area to be contained by the soil cover is approximately 82,900 s.f. In general, the armored vegetated soil cover construction would include grading to promote positive drainage, placement and compaction of common fill and topsoil and seeding. Grading will be accomplished through the application of excavated materials or fill materials to raise the grade. No regrading of the contaminated soils will take place. The edges of the soil cover would be armored with rip-rap to reduce the potential for washout of the contaminated materials beneath the soil cover.

This planned cap would cover the contaminated soils and would thus prevent exposure to humans based on the assumption that only non-residential activities occur at the site. A Human Health Risk Assessment was conducted for the site and is fully documented in the Phase I Remedial Investigation (Dames and Moore, and in the *Addendum to the Phase I Human Health Assessment for Site 20/24* (Dames and Moore, 1998). The carcinogenic risk identified in the Human Health Risk Assessment was  $1 \times 10^{-5}$  for exposure to shallow soil assuming industrial/research worker future-use using 100 days as an annual exposure scenario. Using a 250 day exposure scenario, the risk was calculated to be  $4 \times 10^{-5}$ . PCBs contributed to 84% of the calculated risk for these exposure scenarios. Nearly all of the risk from PCBs was as a result of potential dermal absorption, or absorption through the skin. The cancer risk calculated for the site is not unacceptable based on the National Contingency Plan (NCP) and on Risk Assessment Guidance for Superfund (RAGS). It should be noted that the contaminated soil at Site 20/24 will be covered and the cap maintained through a system of institutional controls. However, there is some measure of risk remaining due to contaminated soil remaining outside of the cover and the potential that a damaged cover could lead to unintended exposure. Controlling the occupancy of the site is one effective way of minimizing this residual risk. The shorter the duration of the exposure to the residual risks the lower the potential risk to human health. Although soil contaminants of concern have not impacted groundwater, the cover will also reduce infiltration of surface water into contaminated soils, thereby reducing the possibility of contaminants leaching into the groundwater and subsurface soils and will also prevent the transport of contaminated soils to surface water bodies during rain events.

Details concerning the exact location, as-built drawings and dimensions of the cap will be attached to this LUCIP following the Final Remedial Design.

## **3.0 OVERVIEW OF PTA INSTITUTIONAL CONTROLS**

This section presents an overview of Institutional Controls currently in place or proposed to be implemented at Picatinny Arsenal. Army/PTA ICs will continue at the site following construction of the cap. The ICs present a series of interlocking protective measures that safeguard human health and the environment. Authorized personnel conducting site visits and work will be trained to minimize all unnecessary exposure to potential contaminants. Any untrained personnel required to conduct a site visit will be accompanied by authorized personnel, to ensure that potential exposure incidents are minimized. As at all military bases, base access regulations and an Army Safety Program are in place and enforced. These ICs in conjunction with site specific land use controls will provide adequate assurance that controls are implemented and maintained. The various PTA Offices responsible for administering and implementing the ICs will be included as participant signatories on the annual certification of compliance of this LUCIP, which will be submitted to NJDEP and USEPA. The PTA ICs are briefly described as follows:

### **3.1 Site Clearance/Soil Management Procedures – IC1**

PTA established a Site Clearance/Soil Management Procedure on August 2, 1991. The procedure applies to all construction projects affecting soil movement at PTA. Under this procedure, the Master Planning Office of Public Works at PTA must contact the Environmental Affairs Office for approval. The procedure provides safeguards against inadvertent, unplanned exposure of potentially contaminated

soils, assures that soils will be handled properly, provides notification of site workers through the PTA Safety Office and ensures compliance with environmental regulations.

### **3.2 UXO Clearance Procedures – IC2**

A series of explosions destroyed many of the structures at PTA on July 10, 1926. Unexploded ordnance and explosives (UXO) were scattered over approximately one-third of PTA as a result of the explosions. Historical and current explosives testing and firing have resulted in the need to exercise care while conducting activities in many PTA areas. PTA, together with additional Army commands, has established procedures for the clearing of all Army property suspected of containing any potential UXO. Requirements for UXO work are outlined in the July 30, 1996, update for Personnel and Work Standards for Ordnance Response. PTA Office of Chief of Safety, Public Safety and Environmental Affairs Directorate is responsible for maintaining this procedure.

### **3.3 Master Plan Regulations, Army Regulation 210-20 – IC3**

The Army issued a new regulation, Master Planning for Army Installations, AR 210-20, on July 13, 1987, updating an earlier regulation dated January 26, 1976. AR 210-20 “establishes the requirement for an installation master plan and planning board and specifies procedures for developing, submitting for approval, updating, and implementing the installation master plan.” IC3 provides for comprehensive planning at Army installations and not only allows, but requires, incorporation of existing land-use and conditions into the Master Plan.

IC3 provides a framework for comprehensive planning through the use of component plans, which include, but are not limited to, the following:

- Natural Resources Plan
- Environmental Protection Plan
- Installation Layout and Vicinity Plan
- Land-use Plan
- Future development Plan

The overall objective is to provide each installation with a master plan through the integration of each component plan into the installation master plan. The component plans form a series of narrative, tabular and graphic plans. Their integration into an installation master plan provides many benefits as outlined in AR 210-20, including “the mechanism for ensuring that installation projects are sited to meet operational, safety, physical security, and environmental requirements.”

PTA Office of the Chief Engineer in the Public Works Directorate is in charge of the master plan. A key component of the PTA master plan is the Arsenal Land-use map.

### **3.4 PTA GIS Database – IC4**

PTA is currently developing a comprehensive base-wide GIS database. The database will include descriptions of existing land and environmental restrictions and locations of known contamination on base. This information will be made usable for rapid response and will permit rapid inquiries regarding sites within PTA. Existing wells, chemical contamination, building restrictions, UXO concerns, and many other lines of inquiry, will quickly be available to support the decision making process. PTA Office of the Installation Restoration Program Manager, Public Safety and Environmental Affairs Directorate is responsible for maintaining this database.

### **3.5 PTA Base Access Regulations – IC5**

As on most military facilities, access regulations are in place at PTA. PTA is not closed to the public but does control access to various buildings and areas. Although security guards are not continually posted at the PTA entrance, security personnel are present on a 24-hour basis to enforce any suspected security violations. Trespassing and unauthorized activities on PTA are illegal. PTA Office of the Chief of Security Division, Public Safety and Environmental Affairs Directorate is in charge of enforcing these regulations.

### 3.6 PTA Safety Program – IC6

Army regulation AR 385-10 outlines safety requirements for Army installations. TACOM Supplement 1 to AR 385-10 provides PTA specific requirements for the Safety Program, IC6. AR 385-10 establishes an occupational safety and health program, and integrates “Hazard Risk Management into all command business processes.” The Safety Program establishes the Hazard Communication (HAZCOM) Program and Hazardous Materials Information System (HMIS), maintains a central Material Safety Data Sheets (MSDSs) file in the Installation Safety Office, and provides a safety review of all construction projects. The Safety Program also establishes “the appropriate medical surveillance program” for personnel working with hazardous materials or otherwise performing hazardous operations. The Installation Safety Office is the point of contact for the Safety Program, and has the authority to stop work where unsafe work conditions are present. PTA Office of the Chief of Safety, Public Safety and Environmental Affairs Directorate is responsible for this program.

### 3.7 Army Military Construction Program Development and Execution – IC8

Army regulation AR 415-15 outlines pre-construction environmental survey procedures. Prior to construction activities, the Army categorizes the proposed construction site based on an environmental survey. Under this regulation, the Army must determine wetland status of the site, historical significance, and endangered species habitat identification. PTA Office of the Resident Engineer US Army Corps of Engineers, New York District coordinating with the Chief Engineer in the Public Works Directorate is responsible for maintaining this program.

## 4.0 ASSURANCE OF GENERAL LUC PROVISIONS

This LUCIP has been developed to address the general LUC provisions as provided by USEPA and NJDEP. The LUC provisions represent USEPA’s concept of required LUC components as presented in the September 1, 1998 correspondence from USEPA Region II to the Army at PTA. In addition, this LUCIP has been designed to address the substantive requirements of Exhibits A through D of the NJDEP Deed Notice and the Draft NJDEP/U.S. Department of the Army Engineering and Institutional Controls for Active Property.

This section has been organized to provide each general LUC provision and the corresponding PTA implementation approach.

### 4.1 General LUC Provisions and Corresponding PTA Approach

1. *The identification of the PTA point-of-contact designated responsible for monitoring, maintaining, and enforcing the site specific LUCIP.*

The person responsible for LUC management is the Project Manager for Installation Restoration at PTA. The Project Manager is the point-of-contact and can be reached as follows:

ARDEC Installation Restoration Program Office  
AMSTA-AR-PSR, Building 319  
Picatinny, NJ 07806  
(973) 724-6748

Any change in point-of-contact personnel will be reported to USEPA and NJDEP as part of the annual certification of compliance for LUCs at Site 20/24.

2. *A commitment to request funds for maintaining LUCs in budget allocation requests.*

1. PTA anticipates that all obligations arising under this LUCIP will be fully funded through DOD appropriations. Estimated costs associated with maintenance of the cap have been included as O&M in the Site 20/24 FS and are expected to be funded. PTA will take all necessary steps and use its best effort to obtain timely funding to meet its obligations for the continued maintenance of LUCs, including, but not limited to, the submission of timely budget requests. There are three major types of funding that could be applied to action required to comply with this LUCIP as

follows: Environmental Restoration Dollars (ER-A), Environmental Compliance Dollars and Army Construction Funding Dollars.

ER-A Funding: Maintenance of the cover, signs and other aspects that are outlined in or implied by the remedial design or descriptions included in the feasibility study cost-estimate are fundable by Environmental Restoration – Army funding. These anticipated ER-A fundable requirements would be included in the Army Cost-to-Complete as well as the specific applicable Fiscal Year (FY) ER-A Obligation Plan. The anticipated needs are now suggested by the cost-estimate in the FS. ER-A funding may be also be used for sampling and analysis of soils and other media and other investigative testing if the resultant information would be required to comply with the LUCIP for a future project or change in land use of 20/24. The funding would need to be programmed in the Cost-to-Complete or a change made to the FY ER-A Obligation Plan. Certain policies allow the use of ER-A funding for remediation of contaminated soils for future projects if the land-use changes. Picatinny would need to ensure that requests for these ER-A funds are done appropriately.

Environmental Compliance Assessment Program (ECAP) Funding: These funds may be applied to present-use installation projects to ensure that compliance with Environmental Regulations is maintained. For example, Picatinny Arsenal has developed an A106 (ECAP funding request form) for Soil Management issues to comply with the NJ Technical Regulations for Picatinny.

Construction Funding: The PTA Master Plan Procedures, Soil Clearance /Soil Management Procedures, as well as all the existing Institutional Controls, will generate requirements for any intended future project at the site. These requirements will be included and described in the project design. The cost estimate for the project will therefore, be inclusive of those design elements.

If appropriate funds are not available to fulfill this obligation, USEPA and NJDEP will be notified as soon as PTA is aware of the potential shortfall.

3. *A commitment to provide notification to EPA and state regulators of major changes in land use.*

*PTA Master Plan:* The continuation of Site 20/24 as an Industrial Site will be specified in the Record of Decision. Site 20/24 is an active U.S. Army Industrial Site and is currently used for the testing of pyrotechnic flares, as a safe haven for explosives laden vehicles and will contain a small weather station. There are no known plans for other uses of the area. This LUCIP will be referenced in the Picatinny Master Plan, which provides a framework for comprehensive planning through the use of component plans, which include Land-Use. *Notification Requirements:* In the event that PTA anticipates any "significant changes in land use" for site 20/24, the Project Manager for Installation Restoration shall determine whether the contemplated changes will or will not necessitate the need for re-evaluation of the selected remedy or implementation of specific measures to ensure continued protection of human health and the environment. The Project Manager for Installation Restoration will notify USEPA and NJDEP in writing of such changes at least sixty (60) days prior to the initiation of such changes. Each notification shall include:

- a) an evaluation of whether the anticipated land use change will pose unacceptable risks to human health and the environment or negatively impact the effectiveness of the remedy;
- b) an evaluation of the need for any additional remedial action(s) resulting from the anticipated land use changes; and
- c) a proposal for any necessary changes to the selected remedial action and identification of documentation requirements.

- d) Upon notification by the Project Manager for Installation Restoration of an anticipated significant land use change, USEPA and NJDEP shall evaluate the information provided and shall issue comments within sixty (60) days so as to minimize any potential adverse impacts to PTA activities or operations.

Any proposed land use change that the Army determines would make the remedy selected unprotective or would result in the selected remedy no longer meeting the remedial action objectives will not be implemented until a response and concurrence is obtained from USEPA and NJDEP.

The Parties agree that "significant changes in land use" are defined as:

A change in land use that is inconsistent with the exposure assumptions in the risk assessment that was the basis for the LUCs.

Any proposed land use change that would make the selected remedy unprotective or no longer meet the remedial action objectives

Any new construction proposed for the site.

Any movement of soil from within a site.

4. *A commitment to conduct field inspections periodically to assess the conditions of Site 20/24.*

*Inspections:* Site inspections will be conducted and documented by PTA on a quarterly basis. All inspections will involve a walk over with emphasis on any visual signs of cap deterioration.

The person responsible for all site inspections, documentation, and document control will be the Project Manager for Installation Restoration. Any significant damage to the cap will be reported to PTA Public Works and repaired by PTA in a timely manner. Inspection reports will be provided annually to USEPA and NJDEP along with the certification of compliance. All past inspection reports will be available for regulatory review at the PTA Installation Restoration Program Office.

5. *Requirement for PTA to certify the continued compliance with all LUCIP provisions.*

PTA will provide to USEPA and NJDEP an annual certification of compliance with regard to the maintenance and implementation of LUCs at the site. The various PTA Offices responsible for administering and implementing the ICs will be included as participant signatories on the annual certification of compliance.

6. *Requirement for PTA to notify EPA and the State immediately upon discovery of any unauthorized major change in land use.*

The Project Manager for Installation Restoration will notify USEPA and NJDEP in writing of any unauthorized use of Site 20/24. However, unauthorized use of this property is highly unlikely due to the existing PTA access restrictions, Base Security, Base Master Plan Regulations and the anticipated posting of signs at the site. All annual certifications will be combined into a single arsenal-wide report for submission to the regulatory community.

7. *Requirement for advance notification to EPA and the State in the event of the contemplation of real estate transfer.*

In the event that the Army determines to enter into any contract for the sale or transfer of Site 20/24, the Project Manager for Installation Restoration will notify USEPA and NJDEP of any such sale or transfer at least ninety (90) days prior to such sale or transfer.

8. *Requirement to comply with the substantive requirements of the NJDEP Deed Notice, Exhibits A through D and the Draft NJDEP/U.S. Department of the Army Engineering and Institutional Controls for Active Property*

Currently, there is no known plan to transfer or sell the PTA property containing Site 20/24. However, since contaminants will remain in soils beneath the cap and LUCs are imposed as a significant component of the remedial action at this site, the Army will comply with the substantive requirements of Exhibits A through D of the NJDEP Deed Notice. In addition, the recent Draft

agreement between the NJDEP and the U.S. Department of the Army concerning engineering and institutional controls provides a list of requirements similar to the NJDEP Deed Notice. This list of requirements is for the most part addressed by the general LUC Provisions listed above in items 1 through 7. As a result, only those requirements which have not been addressed by the LUC Provisions are listed as requirements.

Requirement: Metes and Bounds Description of Property:

Requirement: Description of Affected Areas:

A detailed map prepared by a licensed surveyor, showing the location of the site and the vegetative cap will be provided following the construction of the cap. Additional maps generated as part of the RI showing the depth and concentration of contaminants will also be included. In addition, a data list from the RI identifying contaminants will be included.

Requirement: Include narratives describing institutional and engineering controls and the monitoring and maintenance activities for the institutional and engineering controls. This LUCIP serves as the narrative description of institutional controls for the site.

Requirement: Include maps and diagrams of as-built engineering controls. These maps and diagrams must show the location of the engineering controls. Maps shall be compatible with the Department's Geographic Information System.

1. The United States Geological Survey Quadrangle map where the site is located with the site clearly identified on this map will be provided.
2. A map that identifies by name, roads in the vicinity of the site will be provided.  
A map of the site to scale that includes as-built diagrams will be provided following the construction of the cap.

Requirement: Provide the NJDEP's identification number.

Requirement: A table that clearly identifies each affected area and the restrictions associated with each area. This requirement will be addressed following the Remedial Design.

Requirement: Immediately notify the NJDEP of an emergency that requires suspension of the institutional and/or engineering control.

Requirement: Provide the NJDEP, its agents and representatives access to the property to inspect and evaluate the continued effectiveness and protectiveness of the institutional and/or engineering controls

Requirement: Provide notice to any person who intends to excavate or in any way be in contact with contaminated media in the affected area or adjacent to the affected area, the nature and location of any contamination existing on the property and of any conditions or measures necessary to prevent exposure to contaminants. The reader is referred to the PTA Soil Clearance/Soil Management Procedures-IC1.

## **5.0 IMPLEMENTAION OF SITE-SPECIFIC LUCs**

This section presents a description of site-specific LUCs developed to maintain the integrity of the Site 20/24 cap and to minimize any potential contact with site contaminants. Based on the USEPA Memorandum titled "Assuring Land Use at Federal Facilities", this section has been organized to present site-specific LUC objectives along with the corresponding controls and mechanisms to meet the objectives.

The objectives of the site-specific LUCs and the controls and mechanisms designed to achieve the objectives are as follows:

### **5.1 LUC Objective: Restriction of Site to Industrial Use**

Controls:

- *PTA Master Plan:* The continuation of Site 20/24 as an Industrial Site will be specified in the Record of Decision. Site 20/24 is an active U.S. Army Industrial Site and is currently used for the testing of pyrotechnic flares, as a safe haven for explosives laden vehicles and will contain a small weather station. There are no known plans for other uses of the area. This LUCIP will be referenced in the Picatinny Master Plan, which provides a framework for comprehensive planning through the use of component plans, which include Land-Use.
- *Notification Requirements:* In the event that PTA anticipates any "significant changes in land use" for site 20/24, the Project Manager for Installation Restoration shall determine whether the contemplated changes will or will not necessitate the need for re-evaluation of the selected remedy or implementation of specific measures to ensure continued protection of human health and the environment. The Project Manager for Installation Restoration will notify USEPA and NJDEP in writing of such changes at least sixty (60) days prior to the initiation of such changes.

In the event that the Army determines to enter into any contract for the sale or transfer of Site 20/24, the Project Manager for Installation Restoration will notify USEPA and NJDEP of any such sale or transfer at least ninety (90) days prior to such sale or transfer.

## 5.2 LUC Objective: To Ensure the Integrity of the Vegetative Cap

### Controls:

- *Inspections:* Site inspections will be conducted and documented by PTA on a quarterly basis. All inspections will involve a walk over with emphasis on any visual signs of cap deterioration. Any signs of significant erosion, vegetative stress, unwanted vegetation such as trees which could breach the cap or penetration of the cap as the result of human or animal activity will be accurately recorded and documented on a site map. As described in the Site 20/24 FS, March 2000, maintenance and associated costs are a significant component of this remedial action and will be documented in the Record of Decision.

The person responsible for assuring site inspections, documentation, and document control will be the Project Manager for Installation Restoration. Any significant damage to the cap will be reported to PTA Public Works and repaired by PTA in a timely manner. All past inspection reports will be available for regulatory review at the PTA Installation Restoration Program Office. PTA will also provide to USEPA and NJDEP an annual certification of compliance with regard to the maintenance and implementation of LUCs at the site.

- *Access Restriction through PTA Base Access Regulations – IC5:* Site Access is typically limited to PTA industrial staff, security, and environmental staff. A locked car gate is maintained at the site and prohibits unauthorized vehicle entry. Although security guards are not posted at the site, security personnel are present on a 24-hour basis to enforce any suspected security violations. Trespassing and unauthorized activities on PTA are illegal.
- *Posted Signs:* Following the construction of the cap, several signs will be posted indicating that contaminated soils are present at the site. The signs will also indicate the location of the cap, restrictions prohibiting excavation and unauthorized vehicle entry, and will provide the phone numbers of the Safety, Security and Installation Restoration Offices at PTA for pertinent information regarding safety issues, security and damage.
- *Site Clearance/Soil Management Procedures –* This procedure applies to all construction projects affecting soil movement at PTA and requires the approval by the Environmental Affairs Office (EAO). The procedure provides safeguards against inadvertent, unplanned exposure of potentially contaminated soils. The excavation, drilling, or other disturbance of soils within the cap area will be prohibited without prior approval from the Project Manager for Installation Restoration. This IC will help to ensure that the cap and underlying contaminated soils are not disturbed. The point of contact for implementing the procedure is the Project Manager for Installation Restoration.

### 5.3 LUC Objective: Protection of Site Workers

#### Controls:

- *Site Specific Health and Safety Plan:* Prior to construction of the cap, a detailed Health and Safety Plan will be developed. As stated in the Site 20/24 FS, the Health and Safety Plan will outline the physical and chemical hazards associated with the work to be performed at the site and will serve as the instrument of control for ensuring the health and safety of personnel working on the site. Following the construction of the cap, site workers performing maintenance and other tasks, which might result in exposure to soil at the site, will maintain and refer to this Health and Safety Plan. This Health and Safety Plan will be available at the Installation Restoration Office.
- *PTA Safety Program – IC6* As stated previously, the Safety Program establishes the Hazard Communication (HAZCOM) Program and Hazardous Materials Information System (HMIS), maintains a central Material Safety Data Sheets (MSDSs) file in the Installation Safety Office, and provides a safety review of all construction projects. The Safety Program also establishes “the appropriate medical surveillance program” for personnel working with hazardous materials or otherwise performing hazardous operations. The Installation Safety Office is the point of contact for the Safety Program, and has the authority to stop work where unsafe work conditions are present.
- *Posted Signs:* Following the construction of the cap, several signs will be posted indicating that contaminated soils are present at the site. The signs will also indicate the location of the cap, restrictions prohibiting excavation and unauthorized vehicle entry, and will provide the phone numbers of the Safety, Security and Installation Restoration Offices at PTA for pertinent information regarding safety issues, security and damage.

## 6.0 REFERENCES

- ICF Kaiser. 1999a. *Data Report and Groundwater Investigation Work Plan for Site 20/24, Phase I, Picatinny Arsenal New Jersey*, Prepared by ICF Kaiser Engineers, Mt. Arlington, New Jersey for the U.S. Army Corps of Engineers-Baltimore District Total Environmental Restoration Contract (TERC), April.
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**ATTACHMENT 2**

**CERTIFICATE OF PUBLICATION OF PUBLIC NOTICES**

The United States Army at Picatinny Arsenal, New Jersey

Proposes Cleanup for the  
Pyrotechnic Testing Range/Sanitary Landfill (Site 20/24)  
and Institutional Controls for Soils at 13 Selected Sites

**PURPOSE:**

To invite public comment on the Proposed Plans for Site 20/24, the Pyrotechnic Testing Range/Sanitary Landfill; and the Institutional Control for Soils at 13 Sites at Picatinny Arsenal, Rockaway Township, New Jersey.

**BACKGROUND:**

From the latter part of the 1800's until the Vietnam conflict, Picatinny Arsenal (PTA) has been used as a military facility for the production of ordnance and weapons systems. It is located approximately four miles north of the Town of Dover in Rockaway Township, Morris County, New Jersey and consists of 6,491 acres of improved and unimproved land. Based on an U.S. Environmental Protection Agency Hazards Ranking Score, the Site was placed on the National Priorities List in March 1990.

**SUMMARY**

The U.S. Army, in consultation with the U.S. Environmental Protection Agency and the New Jersey Department of Environmental Protection, invites public comment on the above referenced documents for Picatinny Arsenal, New Jersey. Before selecting the final remedy, the U.S. Army will consider all written comments received during the Public Comment Period. The preferred alternative is a preliminary determination. The preferred alternative could be modified to any of the other options based on public comment, new information, or a re-evaluation of existing information. A public meeting will be held to discuss the Proposed Plans.

**THE PUBLIC MEETING TIME AND LOCATION:**

June 21, 2001 at 7:30 p.m.  
Sheraton Four Points Hotel  
15 Howard Boulevard  
Mt. Arlington, NJ 07856

THE 30-DAY PUBLIC COMMENT PERIOD IS FROM  
JUNE 14, 2001 UNTIL JULY 13, 2001

**WRITTEN COMMENTS MAY BE SUBMITTED TO THE FOLLOWING  
ADDRESS:**

Commander  
U.S. Army Tank-Automotive and Armaments Command  
Armament, Research, Development and Engineering Center  
ATTN: AMSTA-AR-PSE/Mr. Ted Gabel Building 319  
Picatinny Arsenal, NJ 07806-5000  
tgabel@pica.army.mil

**THE PROPOSED PLAN FOR SITE 20/24:**

Based on the findings of the Phase I Remedial Investigation-Feasibility Study(R/FS), six alternatives were considered and screened based on effectiveness, implementability and cost:

Based on site investigations and findings of the Human Health and Ecological Risk Assessments, and with concurrence from the USEPA and NJDEP, *Armored Vegetated Soil Cover with Land Use and Access Restrictions is the Preferred Alternative*. This alternative is protective of human health, ecological receptors and the environment, and represents the best balance of the seven evaluation criteria considered in the FS.

**THE PROPOSED PLAN FOR INSTITUTIONAL CONTROL FOR SOILS AT 13  
SELECTED SITES:**

Based on site investigations and the Administrative Record (which contains all applicable records and data for each of the 13 Sites), *Land Use Control (LUC)* was selected as the Preferred Remedy for all 13 sites. A Human Health Risk Assessment (HHRA) identified no unacceptable risks to human health from soil under current exposure conditions at the 13 Sites. This *Preferred Remedy* manages risk to acceptable levels for both human health and the environment, and is the final remedy planned under current site conditions.

**FOR MORE INFORMATION:**

You may review the above-referenced document, as well as other environmental documents for Picatinny Arsenal, at the following Information Repositories:

ARDEC Installation Restoration Program Office, Building 319 Picatinny Arsenal, NJ 07806 Phone: 973-724-6713 Hours: M-F 9 a.m. - 4 p.m. Sat-Sun Closed	Rockaway Township Library 61 Mount Hope Road Rockaway Township, NJ 07866 Phone: 973-627-2344 Hours: M-F 9 a.m. - 9 p.m. Sat 9 a.m. - 5 p.m. Sun Closed
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Morris County Library  
30 East Hanover Avenue  
Whippany, NJ 07981  
Phone: 973-285-6930  
Hours: M-Th 9 a.m. - 9 p.m.  
F-Sat 9 a.m. - 5 p.m.  
Sun 12 p.m. - 5 p.m.

STATE OF NEW JERSEY } SS  
COUNTY OF ESSEX }

*Michael J. Jansen*  
Being duly sworn, according to law, on his oath sayeth that  
He is *Clerk* of the  
Star-Ledger, in said County of Essex, and that the notice, of  
which the attached is a copy, was published in said paper  
on the 20 day of June 2001  
and continued therein for \_\_\_\_\_  
successively, at least once in each \_\_\_\_\_  
for \_\_\_\_\_

Sworn to and subscribed

before me this 21  
day of June, 2001

*Donna M. Clement*  
NOTARY PUBLIC of NEW JERSEY

DONNA M. CLEMENT  
NOTARY PUBLIC OF NEW JERSEY  
My Commission Expires Mar 5, 2003

STATE OF NEW JERSEY, } S.S.  
 Morris County

LINDA LEAMY

Of full age, being fully sworn according to law,  
 doth depose and say that she ~~is~~ is employed  
 in the Advertising Marketing Services Dept. of  
 Morris County's **Daily Record** a newspaper  
 printed and published in the County of Morris,  
 in this State, and generally circulating in Morris,  
 Warren, Sussex, Essex, Union, Passaic and  
 Somerset counties, and the notice, of which  
 the annexed is a printed copy, has been  
 published in said newspaper 2x  
 Publication being made the 14th & 15th

v of June A.D. 20 01

*Linda Leamy*  
 Sworn to and subscribed before me

this 15th day of June A.D. 2001

*Sharon Glover*  
 Notary Public  
 SHARON GLOVER  
 NOTARY PUBLIC OF NEW JERSEY  
 My Commission Expires Nov. 28, 2004



The United States Army  
 at Picatinny Arsenal, New Jersey

INVITES  
 Public Comment



ON THE PROPOSED PLANS FOR SITE 20/24,  
 INSTITUTIONAL CONTROL FOR SOILS AT 13 SELECTED SITES  
 U.S. ARMY GARRISON, PICATINNY ARSENAL, NEW JERSEY

*The U.S. Army, Picatinny Arsenal, New Jersey Proposes Clean up for the  
 Pyrotechnic Testing Range/Sanitary Landfill (Site 20/24) and  
 Institutional Controls for Soils at 13 Selected Sites*

PURPOSE:

To invite public comment on the Proposed Plans for Site 20/24, the Pyrotechnic Testing Range/Sanitary Landfill; and the Institutional Control for Soils at Sites 19, 28, 44, 49, 86, 106, 124, 135, 141, 143, 163, 182 and 183 at Picatinny Arsenal, Rockaway Township, New Jersey.

BACKGROUND:

From the latter part of the 1800's until the Vietnam conflict, Picatinny Arsenal (PTA) has been used as a military facility for the production of ordnance and weapons systems. It is located approximately four miles north of the Town of Dover in Rockaway Township, Morris County, New Jersey and consists of 6,491 acres of improved and unimproved land. Based on an U.S. Environmental Protection Agency (USEPA) Hazards Ranking Score, the Site was placed on the National Priorities List (NPL) in March 1990.

SUMMARY

The U.S. Army, in consultation with the U.S. Environmental Protection Agency (USEPA) and the New Jersey Department of Environmental Protection (NJDEP), invites public comment on the above referenced documents for Picatinny Arsenal, New Jersey. Before selecting the final remedy, the U.S. Army will consider all written comments received during the Public Comment Period. The preferred alternative is a preliminary determination. The preferred alternative could be modified to any of the other options based on public comment, new information, or a re-evaluation of existing information. A public meeting will be held to discuss the Proposed Plans.

THE PUBLIC MEETING TIME AND LOCATION:

June 21, 2001 at 7:30 p.m.  
 Sheraton Four Points Hotel  
 15 Howard Boulevard  
 Mt. Arlington, NJ 07856

THE 30-DAY PUBLIC COMMENT PERIOD IS FROM  
 JUNE 14, 2001 UNTIL JULY 13, 2001

WRITTEN COMMENTS MAY BE SUBMITTED TO THE FOLLOWING ADDRESS:

Commander  
 U.S. Army Tank-Automotive and Armaments Command  
 Armament, Research, Development and Engineering Center  
 ATTN: AMSTA-AR-PSE/Mr. Ted Gabel Building 319  
 Picatinny Arsenal, NJ 07806-5000  
 tgabel@pica.army.mil

THE PROPOSED PLAN FOR SITE 20/24:

Based on the findings of the Phase I Remedial Investigation-Feasibility Study(RI/FS), six alternatives were considered and screened based on effectiveness, implementability and cost:

- Alternative 1: No Action
- Alternative 2: Installation of an Armored Vegetation Soil Cover and Continued Implementation of Land Use and Access Restrictions
- Alternative 3: Installation of a Modified Asphalt Technology for Waste Containment Cap and Continued Implementation of Land Use and Access Restrictions
- Alternative 4: Installation of an Asphalt Cap and Continued Implementation of Land Use and Access Restrictions
- Alternative 5: Installation of an Armored Reinforced Soil Cover and Continued Implementation of Land Use and Access Restrictions
- Alternative 6: Excavation of Soil with PCR, lead and 4,4-DDT Concentrations Exceeding Site Remedial Goals and disposal off-post to a certified landfill site

Based on site investigations and findings of the Human Health and Ecological Risk Assessments, and with concurrence from the USEPA and NJDEP, *Alternative 2: Armored Vegetated Soil Cover with Land Use and Access Restrictions is the Preferred Alternative.* This alternative is protective of human health, ecological receptors and the environment, and represents the best balance of the seven evaluation criteria considered in the FS.

THE PROPOSED PLAN FOR INSTITUTIONAL CONTROL FOR SOILS AT 13 SELECTED SITES:

Based on site investigations and the Administrative Record (which contains all applicable records and data for each of the 13 Sites), *Land Use Control (LUC)* was selected as the Preferred Remedy for all 13 sites. A Human Health Risk Assessment (HHRA) identified no unacceptable risks to human health from soil under current exposure conditions at the 13 Sites. This *Preferred Remedy* manages risk to acceptable levels for both human health and the environment, and is the final remedy planned under current site conditions.

FOR MORE INFORMATION:

You may review the above-referenced document, as well as other environmental documents for Picatinny Arsenal, at the following Information Repositories:

ARDEC Installation Restoration Program Office Building 319 Picatinny Arsenal, NJ 07806 Phone: (973) 724-6713 Hours: M - F 9 a.m. - 4 p.m. Sat-Sun Closed	Rockaway Township Library 61 Mount Hope Road Rockaway Township, NJ 07866 Phone: 973-627-2344 Hours: M - F 9 a.m. - 9 p.m. Sat 9 a.m. - 5 p.m. Sun Closed	Morris County Library 30 East Hanover Avenue Whippany, NJ 07981 Phone: 973-285-6930 Hours: M - Th 9 a.m. - 9 p.m. F - Sat 9 a.m. - 5 p.m. Sun 12 p.m. - 5 p.m.
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The United States Army  
at Picatinny Arsenal, New Jersey

**INVITES  
Public Comment**



**ON THE PROPOSED PLANS FOR SITE 20/24,  
INSTITUTIONAL CONTROL FOR SOILS AT 13 SELECTED SITES  
U.S. ARMY GARRISON, PICATINNY ARSENAL, NEW JERSEY**

*The U.S. Army, Picatinny Arsenal, New Jersey Proposes Clean up for the  
Pyrotechnic Testing Range/Sanitary Landfill (Site 20/24) and  
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**PURPOSE:**

To invite public comment on the Proposed Plans for Site 20/24, the Pyrotechnic Testing Range/Sanitary Landfill; and the Institutional Control for Soils at Sites 19, 28, 44, 49, 86, 106, 124, 135, 141, 143, 163, 182 and 183 at Picatinny Arsenal, Rockaway Township, New Jersey.

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**SUMMARY**

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Armament, Research, Development and Engineering Center  
ATTN: AMSTA-AR-PSE/Mr. Ted Gabel Building 319  
Picatinny Arsenal, NJ 07806-5000  
tgabel@pica.army.mil

**THE PROPOSED PLAN FOR SITE 20/24:**

Based on the findings of the Phase I Remedial Investigation-Feasibility Study(RIVFS), six alternatives were considered and screened based on effectiveness, implementability and cost:

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STATE OF NEW JERSEY }  
COUNTY OF ESSEX } SS

Being duly sworn, according to law, on this \_\_\_\_\_ day of \_\_\_\_\_, 2001, I, \_\_\_\_\_, do hereby swear that \_\_\_\_\_ is \_\_\_\_\_ of the

Star-Ledger, in said County of Essex, and that the notice, of which the attached is a copy, was published in said paper on the \_\_\_\_\_ day of \_\_\_\_\_, 2001, and continued therein for \_\_\_\_\_

successively, at least once in each \_\_\_\_\_ for \_\_\_\_\_

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 2001

*Donna M. Clement*  
NOTARY PUBLIC of NEW JERSEY

**DONNA M. CLEMENT**  
NOTARY PUBLIC OF NEW JERSEY  
My Commission Expires Mar. 5, 2003