



DEPARTMENT OF THE ARMY
INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON, PICATINNY
PICATINNY ARSENAL, NEW JERSEY 07806-5000

April 15, 2014

ATTENTION OF
Environmental Affairs Division

SUBJECT: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Interagency Agreement (IAG) Administrative Docket No. II-CERCLA-FFA-001-04: Submittal of **Draft Final Feasibility Study (FS) PICA 097, 131, and 149 (Sites 118, 131, and 149)** and the **Proposed Plan (PP) PICA 097, 131, AND 149 (SITES 118, 131, AND 149)**: Reviews are ER,A-eligible

Mr. William Roach
U.S. Environmental Protection Agency Region 2
290 Broadway, 18th Floor
New York, NY 10007-1866

Ms. Anne Pavelka, Case Manager
New Jersey Department of Environmental Protection
Division of Responsible Party Site Remediation
Bureau of Case Management,
401 East State Street, Floor 5 P. O. Box 420. Mail Code 401-05F
Trenton, New Jersey 08625-0028

Dear Sir and Madam:

Enclosed for your review and comment are copies of both the **Draft Final Feasibility Study (FS) PICA 097, 131, and 149 (Sites 118, 131, and 149)** and **Draft Proposed Plan (PP)**. The documents were developed by ARCADIS and approved by the Army team. The Army team is ready to public notice the Proposed Plan.

As a result of the dispute process with USEPA, the FS and PP reflect the agreement that where "an unacceptable soil risk has been identified for a current or reasonably anticipated future land use, that any NJDEP soil cleanup standard which is promulgated, more stringent than the Federal standard, identified in a timely manner, and is legally applicable or relevant and appropriate, must be attained (or waived) by the remedial action, regardless of whether the contaminant has been designated as a risk driver or not" It was also agreed that the remediation at two sites of the five sites in the original FS will not be necessary as the concentration levels of manganese in the soils, the trigger for the unacceptable risk, were below the current EPA cleanup goal. These two sites will be most likely be included in a revised "45-Site FS".

Although I had hoped that the remediation could occur under the ARCADIS contract, it appears it will not unless we get a very proactive regulator response and this proposed plan would be public

noticed and the subsequent Record of Decision would be signed by the end of June. I do ask for your cooperation so we can public notice the Proposed Plan.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ted Abel".

Project Manager for Environmental
Restoration

Enclosures

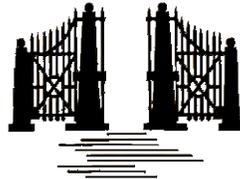
CC:

Ms. Barbara Dolce, TAPP Contractor (FTP Site only)

Mr. Jim Kealy, NJDEP

Mr. Joe Marchesani, NJDEP

US Army Garrison



Picatinny Arsenal, NJ



Draft Proposed Plan

PICA-097, -131, and
-149 (Sites 118, 131,
and 149)

U.S. Army Garrison
Picatinny Arsenal,
New Jersey

April 2014



**PROPOSED PLAN PICA-097, -131, AND -149 (SITES 118, 131, AND 149)
PICATINNY ARSENAL, NEW JERSEY**

April 2014

INTRODUCTION AND PURPOSE

This Proposed Plan (PP) provides information necessary to allow the public to participate with the United States (U.S.) Department of the Army (Army), the Lead Agency, in selecting appropriate remedial alternatives (RAs) for surface and subsurface soil contamination at the following three sites: Site 118/PICA-097, Site 131/PICA-131, and Site 149/PICA-149, located at Picatinny Arsenal (PTA), Rockaway Township, New Jersey.

A list of acronyms and abbreviations is provided at the end of this PP. Additionally, a glossary of select terms, which are written in *italic, bold type* throughout this PP, is also provided at the end of this document to define the terminology used.

The PICA Sites addressed within this PP consist of three Remedial Investigation Concept Numbers that are maintained in the Army Environmental Database - Restoration system [formerly the Defense Sites Environmental Restoration Tracking System]. The Remedial Investigation Concept Number Sites (referred to collectively as the Sites) are defined within PICA Sites as follows:

- Site 118/PICA-097 – Building 41, Pesticide Storage Facility
- Site 131/PICA-131 – Building 266, Former Ordnance Manufacturing Facility
- Site 149/PICA-149 – Propellant Plant (Former Building 541)

This PP summarizes information found in detail in the **Remedial Investigation** (RI) and other reports, which are available for review as part of the **Administrative Record** for this site. This PP highlights the recommended RA for the aforementioned sites.

The Army and U.S. Environmental Protection Agency (USEPA) will present the selected RA for the site in a **Record of Decision** (ROD). The final selection of the RA will not occur until after the public comment period to allow for the possibility of new information, or concerns that may be expressed during this time. New information or arguments provided to the Army or USEPA during the public comment period could result in the selection of a final RA that differs from the recommended RA described herein and the public is encouraged to provide comments. Information about how to submit comments may be found in the "Community Participation" section of this PP.

The Army at Picatinny, with input from USEPA and the New Jersey Department of Environmental Protection (NJDEP) input, issues this PP in order to fulfill public participation requirements under Section

IMPORTANT DATES AND LOCATIONS

Public Comment Period: **TBD**

The Army will accept written comments on the Proposed Plan during the public comment period.

Public Meeting: **TBD**

The Army will hold a public meeting to explain the Proposed Plan. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Hilton Garden Inn, 375 Mount Hope Avenue, Rockaway, New Jersey at 6:30 PM.

The Administrative Record, containing information used in selecting the Recommended RA, is available for public review at the following location:

Installation Restoration Program Office
Building 319
Picatinny, NJ 07806

Limited information is maintained at the following locations:

Rockaway Township Library 61 Mount Hope Road Rockaway Township, NJ 07866	Morris County Library 30 East Hanover Avenue Whippany, NJ 07981
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117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act** of 1980 (CERCLA), as amended by the **Superfund Amendments and Reauthorization Act** of 1986 (SARA) and the **National Oil and Hazardous Substances Pollution Contingency Plan** (NCP) Section 300.430(f)(2). The Army, USEPA, and NJDEP encourage the public to review all of the documents relevant to activities conducted at Site 118/PICA-097, Site 131/PICA-131, and Site 149/PICA-149 in order to assist in the selection of an appropriate RA for the three sites addressed herein.

RESPONSE ACTIONS

Response Action SL-1: No Action

Response Action SL-2: Soil Cover with Land Use Controls (LUCs)

Response Action SL-3: Asphalt Cover with LUCs

Response Action SL-4: Removal, Off-Site Disposal, and LUCs

The Army's Preferred RA for the three sites discussed in this PP is:

- SL-4 - Removal, Off-Site Disposal, and Land Use Controls (LUCs)

The preferred RA presented in this PP was selected over other RAs because it provides the best combination of primary balancing attributes, is protective of human health and the environment meeting the CERCLA threshold criteria, and is compliant with **Applicable or**

Relevant and Appropriate Requirements (ARARs) or **To-Be-Considered** (TBC) criteria in the absence of promulgated standards.

Relevant documents used in the preparation of this PP are listed in the "References" section found at the end of this document.

PICATINNY SITE BACKGROUND

Picatinny is located in Rockaway Township, Morris County, New Jersey, as presented in **Figure 1**. The area surrounding Picatinny was once predominantly rural with many summer homes, forested areas, lakes, and mountains. Since initial production activities began at Picatinny, the surrounding area has changed, with suburban growth occurring as a consequence of urban sprawl along the I-80 corridor. Neighboring communities include Mount Hope, Rockaway Borough, Rockaway Township, Wharton, Dover, Denville, and Jefferson Township.

Picatinny consists of 5,900 acres of improved and unimproved property. Picatinny is located in an elongated, U-shaped valley between Green Pond Mountain and Copperas Mountain to the northwest and an unnamed hill to the southeast. Most of the buildings and other facilities at Picatinny are located on the valley floor or on the slopes along the southeast side of the property. Several firing and testing ranges are located on Green Pond Mountain.

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

Picatinny is not closed to the public but access to the Arsenal is controlled. Trespassing and unauthorized activities on Picatinny are illegal. Picatinny has seven elements of site controls including Site Clearance and Soil Management Procedures; Munitions and Explosives of Concern Clearance Procedures; Master Plan Regulations; Picatinny Geographic Information System (GIS) Database; Picatinny Base Access Restrictions; Picatinny Safety Program; and Army Military Construction Program Development and Execution. These controls have been developed with consideration of all reasonably anticipated land uses at the Arsenal; these include administrative and industrial military operations and outdoor recreation/golf course. Picatinny Office of the Chief of Security Division, Public Safety and Environmental Affairs Division, are in charge of enforcing these regulations.

Over the years, environmental investigations into Picatinny operations and waste management activities have indicated the potential for contamination on site.

In March 1990, Picatinny was included on the **National Priorities List**.

Because Picatinny has a large number of buildings and former production operations, investigating all of the operations at one time would have been unmanageable. To help manage the environmental studies, the Army organized these operations into 16 areas and assigned site numbers to the buildings and surrounding land that were of concern within these areas.

To ensure that the areas with the greatest potential for environmental contamination were addressed first, the Army categorized the 16 parts of the base into Areas labeled A (greatest potential) through P (least potential). The Army further categorized these Areas into three phases. Phase I included Areas A through G, Phase II included Areas H through K, and Phase III included Areas L through P. The three sites addressed in this PP are located within Areas D, H, and I, as designated in the Argonne National Laboratory RI Concept Plan (Argonne, 1991).

Further descriptions of the site backgrounds and site characteristics for the three sites addressed within this PP are provided below.

SITE BACKGROUNDS

The RI study sites addressed herein are as follows: one site in Area D (Site 118/PICA-097); one site in Area H, (Site 131/PICA-131); and one site in Area I (Site 149/PICA-149). Area D covers approximately 89 acres and is located in the west-central portion of Picatinny. Area H is in a small valley bounded to the west by Green Pond Mountain and to the east-southeast by a slightly elevated hill. Area I is located at the approximate center of Picatinny and consists of Picatinny Lake and production and storage facilities located around the shore of the lake. **Figure 2** presents the site locations. The site descriptions are included below, as provided from the RI.

Area D Site

Site 118/PICA-097

Site 118 is approximately 0.1 acres in size and includes Building 41. Site 118 is located at the eastern end of Dunn Avenue in the middle of the golf course. Building 41, constructed in 1956, is approximately 3,150 square feet (ft²) and is a one-story hollow-tile wall building built on a concrete foundation. The rail spur served storage magazines located 350 feet (ft) northwest of Building 41. **Figure 3** shows the layout of Site 118.

A historical PTA document indicates that prior to 1964, Building 41 was maintained by PTA's Supply Division and may have been used for storage. In 1964, this building was reassigned to the Plant Engineering—Buildings, Roads, and Ground Branch for storage of fertilizer, lime, and miscellaneous inert materials. Up until recently, the building was predominantly used for storage of pesticides and herbicides, which were applied on the golf courses and the lawn surrounding Site 118.

According to PTA personnel, the roof of Building 41 has leaked during rainfall events over the years. Until 1988, it was reportedly a common occurrence for open bags of pesticides and herbicides stored at Building 41 to leak onto the floor. During a 2004 site reconnaissance, several holes were observed in the roof of Building 41. However, all pesticides and herbicides had been removed from the building, and the building is only used for the storage of golf course maintenance equipment and food processing equipment that were covered with plastic sheets.

Area H Site

Site 131/PICA-131

Site 131 is approximately 1.2 acres in size. Building 266, a former ordnance manufacturing facility (Site 131), was originally constructed in 1903 and has a concrete foundation, brick piers, brick load-bearing walls with four truck-loading dock doors, and a corrugated asbestos roof. Building 266 served as an explosives production facility from the time of its construction until the early 1950s. Explosives production ceased here sometime before 1953 when the building was converted to its current use as a wind tunnel research facility. The wind tunnel research facility has been used to simulate and study the flight characteristics of small projectiles. **Figure 4** shows the layout of Site 131.

The types of material used and/or wastes generated from explosives production operations are not known, except for Class 7 pyrotechnic compositions. However, based on the knowledge of explosives operations in Area H, materials used and/or derivative wastes generated in appreciable quantities would likely have included scrap explosives waste and possibly pyrotechnics, solvent contaminated rags, and explosives-contaminated wastewater. All of the waste materials, except for the explosives-contaminated wastewater, were generally placed in red cans and disposed of at the PTA Burning Ground.

Materials known to be used in wind tunnel operations included compressor oils, lubricating oils, and uranium-containing valves and gauges. PTA personnel indicated that operation of the wind tunnel has resulted in the generation and dispersion of mercury condensate in and around the wind tunnel exhaust area. The mercury release was the subject of a previous investigation and has been removed.

Oil-contaminated wastewater generated by wind tunnel activities at Building 266 was conveyed to an oil-water separator and discharged to Bear Swamp Brook (BSB) in the past. The oil-water separator is known to have malfunctioned on at least one occasion, and untreated wastewater was discharged directly to BSB. According to PTA personnel, wastewater from the building presently discharges to the sanitary sewer while all remaining wastes are disposed of off-site.

Four 75-kilovolt amps (KVA) and two 200-KVA pad-mounted transformers (TR-266) were located on the west side of Building 266. According to the PTA transformer database, all of the transformers were in fair to good condition and did not contain polychlorinated biphenyls oils. All six transformers were removed in the 1990s as part of a facility-wide transformer removal action.

Area I Site

Site 149/PICA-149

Site 149/PICA-149 is located along the southeast shore of Picatinny Lake. The site covers 0.8 acre of forested habitat. Building 541 was a rectangular structure formerly located on the eastern shore of Picatinny Lake. The building was constructed in 1943 to perform the water drying process to harden explosive powder grains. Operations ceased in the mid-1950s, and the building was used to house two Plymouth gas locomotives during the 1960s. Building 541 was demolished in 1983. The site layout is shown on **Figure 5**.

During its use as a water-drying process facility, Building 541 received shipments of explosive powder transported by railroad from Building 533. The explosive powder was unloaded inside the building. An elevator was used to hoist the powder to 12 wooden cypress tanks, where the water drying process hardened the grains and removed excess solvents. The water and powder mixture was discharged from the tanks directly into carts. These carts moved on a small interior tracking system that ran the length of the building. Screening to remove foreign objects or large clumps concluded this phase of processing.

Picatinny Arsenal personnel reported that a vat in Building 541 ruptured, causing liquid containing propellant to leak onto the building floor and to the outside area. The solution was reported to be single-base propellant grains dissolved in solvents. The energetic compounds were nitrocellulose and/or nitroglycerine. The solvents were ether, alcohol, and/or acetone.

CURRENT AND FUTURE USE

Picatinny's Master Plan designates future use of Areas D, H, and I as military and industrial conducted in a secured area. There are no plans to change this land-use in the foreseeable future.

IDENTIFICATION OF ENVIRONMENTAL CONTAMINATION

The initial field investigation of the sites included herein was performed under the purview of the Army, USEPA Region 2, and NJDEP. **Table 1** provides a chronology of events related to the Preliminary Assessment/Site Investigation (PA/SI), Phase I RI, Phase II RI, and Phase III RI efforts.

Levels of Concern

For soils, the promulgated NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) were used as the **Level of Concern** (LOC) for preliminary screening criteria unless the NRDCSRS is based on inhalation risk calculation (such as NRDCSRS for manganese). In the absence of state criteria, the USEPA Industrial Regional Screening Levels (IRSLs) were used as screening criteria.

Figures 6 through 8 show the LOC exceedances for all media at the three Sites addressed within this Proposed Plan: Site 118/PICA-097, Site 131/PICA-131, and Site 149/PICA-149, respectively.

Table 1
Chronology of Investigatory Events

EVENT	DATE RANGE
1. Preliminary Assessments/Site Investigations (PA/SI)	1998
2. Remedial Investigations (RI)	1991-2005
3. Follow up activities on RI (additional sampling and/or focused remedial actions)	2004-2007
4. <i>Feasibility Study</i> (FS)	2007-2014

SUMMARY OF THE SITE RISKS

Baseline human health risk assessments (HHRA), lead blood models (for sites where lead was present), and ecological risk assessments (ERAs) were conducted for the sites as part of the various RIs that evaluated these sites. Additional evaluation/reevaluation of some of the HHRA/lead blood levels was conducted for some of the sites since the RI due to the availability of revised/current toxicity values. As discussed previously, the sites are currently used for military/industrial purposes with no plans to change the use in the foreseeable future. The risk assessments were conducted to evaluate the potential risk associated with exposure to chemicals in soil, sediment, groundwater, and surface water. Risks were calculated for the reasonably anticipated future use as well as hypothetical use scenarios. Potential receptors considered during the risk evaluations for current and future exposure scenarios are the industrial/research worker, the construction excavation worker, the on-site visitor, the adult resident, the child resident and the combined adult and child resident. However, the adult resident, child resident, and combined adult/child resident scenarios are not reasonably anticipated future use scenarios.

A summary of the results of the HHRAs and ERAs and the lead blood model are included below for each of the sites evaluated within this PP. Conclusions regarding ecological risk as some sites were not based on an ERA.

Area D Site

Site 118/PICA-097

Based on the risk assessments performed for this site, for current and reasonably anticipated future use:

- The carcinogenic risk range is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1, except for industrial/research worker and construction/excavation worker site use which attained hazard index values of 10 and 86 respectively, both driven by thallium and manganese;
- Lead blood model results concluded that lead is not a concern at this site; and
- The preliminary ERA conducted as part of the Phase I Investigation suggested a potential risk to avian species due to metals and 4,4'-dichlorodiphenyltrichloroethane concentrations, however site use (golf course, with regular mowing) limits formation of wildlife habitat at this site, therefore potential for significant exposure was determined to be limited and a baseline ERA was deemed unnecessary.

Area H Site

Site 131/PICA-131

Based on the risk assessments performed for this site for current and reasonably anticipated future use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06, except for industrial/research work site use which attained a carcinogenic risk value of 2E-4 driven by arsenic;
- The noncarcinogenic hazard is less than 1;
- Lead is not a concern at this site; and
- The Phase II ERA identified elevated concentrations of Polynuclear (or polycyclic) Aromatic Hydrocarbon (PAH), arsenic, and beryllium however results from a toxicity bioassay and environmental effects quotients study deem there is minimal risk to populations of terrestrial receptors.

Area I Site

Site 149/PICA-149

Based on the risk assessments performed for this site, for current and reasonably anticipated future use:

- The carcinogenic risk range is within the generally acceptable range of 1E-04 and 1E-06, except for industrial/researcher worker site use which attained a carcinogenic risk value of 2E-4 driven by 2,4- dinitrotoluene (DNT);

- The noncarcinogenic hazard is less than or equal to 1;
- Lead is not a concern at this site; and
- This site was not evaluated as part of the Phase II ERA but based on risk analysis completed for other nearby sites with a similar habitat there is little potential ecological risk at this site.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline HHRA is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a reasonable maximum exposure scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines exposure information and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a one-in-ten-thousand excess cancer risk; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). For non-cancer health effects, a hazard index (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a threshold level (measured as an HI of less than or equal to 1) exists below which non-cancer health effects are not expected.

BASIS FOR ESTABLISHING REMEDIAL ACTION OBJECTIVES

A statutory goal of the *Defense Environmental Restoration Program* is for the Army to take appropriate actions to investigate and, where necessary, address releases of hazardous substances or pollutants that create an imminent and substantial endangerment to the public health or welfare, or to the environment. The Army is required to select remedies that attain a degree of cleanup that assures protection of human health and the environment.

It is the Army's current judgment that the preferred RAs identified in this PP, or one of the other measures considered in the PP, will provide protection to human health and the environment from actual or threatened releases of hazardous substances into the environment.

IDENTIFICATION OF CONTAMINANTS OF CONCERN AND SITE CLEANUP LEVELS

As part of the *Final Feasibility Study* (ARCADIS, 2014), the contaminants detected in each media at the sites were screened to identify contaminants of concern (COCs). The screening process is described in detail in Section 4.4 of the FS. In summary, COCs are defined as contaminants that:

- 1) Contribute to the majority of site-specific human health or ecological risk based on the HHRA or ERA; or
- 2) Exceed the LOC values determined for that media.

COCs identified for each of the three sites are identified as follows:

Area D Site

- Site 118/PICA-097 – thallium, manganese, arsenic, lead, dieldrin, and heptachlor epoxide

Area H Sites

- Site 131/PICA-131 – Arsenic and PAHs (benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene)

Area I Sites

- Site 149/PICA-149 – 2,4-DNT and PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene)

The NJDEP NRDCSRS are identified as ARARs unless the NRDCSRS is based on inhalation risk calculations (such as the NRDCSRS for manganese). **Table 2** presents the cleanup goals established for site COCs.

**Table 2
Site Specific Cleanup Goals**

Contaminant of Concern	Cleanup Goal (mg/kg)
Site 118/PICA-097	
Arsenic	19
Dieldrin	0.2
Heptochlor epoxide	0.3
Lead	800
Manganese	23,000
Thallium	79
Site 131/PICA-131	
Arsenic	19
benzo(a)anthracene,	2
benzo(a)pyrene,	0.2
benzo(b)fluoranthene,	2
Site 149/PICA-149	
2,4-DNT	3
benzo(a)anthracene,	2
benzo(a)pyrene,	0.2
benzo(b)fluoranthene,	2
dibenz(a,h)anthracene	0.2
indeno(1,2,3-c,d)pyrene	2

mg/kg – milligrams per kilogram

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are based on human health and environmental factors, which are considered in the formulation and development of RAs. Such objectives are developed based on the criteria outlined in Section 300.430(e)(2) of the NCP and Section 121 of CERCLA.

The proposed remedial action objectives (RAOs) for the sites included in this PP are:

- Address soil with contaminants driving the risk or hazard index for the site greater than 1E-4 or 1, respectively, and
- Eliminate exposure to soil contaminants to the extent required to reduce the exposure point concentrations below the contaminants respective New Jersey Non-Residential Soil Remediation Standards (NRSRS) regardless of whether the contaminant has been designated a risk driver or not.

The RAOs have been developed in such a way that attainment of these goals will result in the protection of human health, ecological receptors, and the environment.

SCOPE AND ROLE OF THE REMEDIAL ACTION

This PP provides a summary of the RAs considered for the sites and identifies a preferred RA. The sites have undergone an RI and FS in accordance with the CERCLA process. The following paragraphs provide the preferred RA based upon the entire body of investigative work.

SUMMARY OF RESPONSE ACTIONS EVALUATED

The types of RAs considered in the FS for the Sites included:

- No action;
- LUCs;
- Containment (soil and asphalt);
- Removal; and
- Off-site disposal.

These measures were then further refined into the four RAs listed below. The RAs are described below with their respective estimated **capital costs**, estimated cost for **operation and maintenance** (O&M) activities, and an estimate of the **present worth costs** for the RA. The “Preferred Response Action” for all sites is alternative SL4 – Removal and Off-Site Disposal.

Response Action SL-1: No Action

Estimated Capital Cost: \$0
Estimated O&M Cost Over 30 Years: \$0
Estimated Present Worth Cost: \$0

CERCLA and the NCP require that a No Action RA be evaluated at every site to establish a baseline for comparison of other RAs. Under this RA, all administrative controls would cease, no further site monitoring or oversight would be performed, and no remedial action would take place. In order to be eligible for selection, a RA must meet the threshold criteria to adequately eliminate, reduce, and/or control unacceptable risks to human health or the environment. Response Action SL-1 would be an appropriate RA only in the instance that there was no unacceptable risk identified at a site under an unrestricted use scenario.

Site 118/PICA-097
Estimated Capital Cost: \$0
Estimated O&M Cost Over 30 Years: \$0
Estimated Present Worth Cost: \$0

Site 131/PICA-131
Estimated Capital Cost: \$0
Estimated O&M Cost Over 30 Years: \$0
Estimated Present Worth Cost: \$0

Site 149/PICA-149
Estimated Capital Cost: \$0
Estimated O&M Cost Over 30 Years: \$0
Estimated Present Worth Cost: \$0

Response Action SL-2: Soil Cover with LUCs

Estimated Capital Cost: \$256,000
Estimated O&M Cost Over 30 Years: \$506,000
Estimated Present Worth Cost: \$464,000

Under Alternative SL-2, surface soil at a targeted area of the site will be covered by implementation of a clean soil cover. This will remove the exposure pathway for areas that exceed ARARs and eliminate unacceptable human health risks and hazards for the current and reasonably

anticipated future use (military/industrial). LUCs at the sites will be required for the soil covers to ensure they are maintained and not disturbed in the future.

Because sufficient data is unavailable to fully delineate the area of the RA, pre-design sampling would be conducted to determine the extent of the RA. This delineation sampling will be conducted concurrent with the finalization of the ROD.

The soil cover would consist of a soil layer of 12 inches overlain by 6 inches of topsoil that would be seeded to establish vegetation. Soil testing, such as geotechnical, agronomic, chemical, and compaction testing, would be conducted to verify the soil materials and placement specifications. Prior to initiation of remedial activities site clearing and grubbing will take place. Erosion and sediment controls, such as silt fence, would be installed along the downgradient side of the area of disturbance to minimize sediment transport. Engineering controls would be used to reduce fugitive dust emissions throughout construction. The site would be surveyed for engineering control during cover construction. It is assumed that construction activities would be conducted in Level D personal protective equipment (PPE) with on-site munitions and explosives of concern (MEC) construction support.

Long-term monitoring and maintenance of the cover areas would be conducted for a period of 30 years after implementation. Long-term maintenance would include performing and documenting annual inspections and maintenance of the cover to ensure the integrity of effectiveness of the cover. Maintenance would include annual mowing and erosional/subsidence repairs, as necessary.

LUCs would be maintained to restrict future land use in the areas of the soil covers. LUCs are administrative measurements put in place to effect human activity, in order to control future land use. The LUCs are incorporated into the master plan and managed through the PTA GIS database. The four general categories of Institutional Controls (ICs) screened for or already in use at the PTA, which provide layers of protection and/or methods of management are as follows: governmental controls, proprietary controls, enforcement and permitting, and informational devices. Most of these measures have been addressed in seven elements of the Land Use Restriction policy for PTA. The six elements are Site Clearance and Soil Management Procedures; Unexploded Ordnance Clearance Procedures; Master Plan Regulations; PTA Base Access Restrictions; PTA Safety Program; and Army Military Construction Program (detailed below). These controls have been developed with a consideration of all reasonably anticipated land uses at the Arsenal; these include administrative and industrial military operations, and outdoor recreation/golf course.

Annual Inspections will be performed to confirm existing land use and establish that all engineering controls are in good condition. The inspections will be documented in annual reports and during the 5-year CERCLA reviews.

Site 118/PICA-097

Estimated Capital Cost: \$91,000

Estimated O&M Cost Over 30 Years: \$170,000

Estimated Present Worth Cost: \$161,000

Figure 9 shows the estimated extent of soil cover at Site 118/PICA-097. Based on the physical and chemical distribution of the data, an Area of Attainment (AA) of approximately 3700 ft² will be covered; however, the actual area will be determined from pre-design sampling, as described above. Soils will be compacted and a clean soil cover will be installed to remove exposure pathways for humans at this site. LUCs will be maintained at the site.

Site 131/PICA-131

Estimated Capital Cost: \$85,000

Estimated O&M Cost Over 30 Years: \$170,000

Estimated Present Worth Cost: \$154,000

Figure 10 shows the estimated extent of soil cover at Site 131/PICA-131. Based on the physical and chemical distribution of the data, an AA of approximately 2500 ft² will be covered; however, the actual area will be determined from pre-design sampling as described above. Soils will be compacted and a clean soil cover will be installed to remove exposure pathways for humans at this site. LUCs will be maintained at the site.

Site 149/PICA-149

Estimated Capital Cost: \$80,000

Estimated O&M Cost Over 30 Years: \$167,000

Estimated Present Worth Cost: \$149,000

Figure 11 shows the estimated extent of soil cover at Site 149/PICA-149. Based on the physical and chemical distribution of the data, an AA of approximately 1100 ft² will be covered; however, the actual area will be determined from pre-design sampling, as described above. Soils will be compacted, and a clean soil cover will be installed to remove exposure pathways for humans at this site. LUCs will be maintained at the site.

Response Action SL-3: Asphalt Cover with LUCs

Estimated Capital Cost: \$516,000

Estimated O&M Cost Over 30 Years: \$810,000

Estimated Present Worth Cost: \$851,000

Under Alternative SL-3, surface soil within the AA will be excavated and graded/prepared to a depth that would allow placement of subbase material for an asphalt cover. The excavation depth would be determined during the remedial design, but is assumed to be 12 inches. The excavation is assumed to be backfilled with 6 inches of crushed 3/4-inch stone overlain by a wearing course of 4 inches, which is the subbase for the asphalt. A layer of 4 inches of asphalt would be placed over the subbase. Materials testing would be conducted to verify the stone and asphalt materials and placement specifications of the design. Prior to initiation of remedial

activities site clearing and grubbing will take place, and erosion and sediment controls and engineering controls will be implemented as outlined in RA SL-2. The site will be surveyed for engineering control during cover construction. It is assumed that construction activities will be conducted in Level D PPE with on-site MEC construction support. Because sufficient data is unavailable to fully delineate the extent of the asphalt cover, pre-design sampling will be conducted concurrent with the finalization of the ROD.

This cover will remove the exposure pathway for areas that exceed ARARs and eliminate unacceptable human health risks and hazards for the current and reasonably anticipated future use (military/industrial). LUCs at the sites will be established, and annual reporting to document no changes in land use across the remainder of the site and the condition of the asphalt cover will be conducted, as outlined in RA SL-2.

Site 118/PICA-097

Estimated Capital Cost: \$213,000

Estimated O&M Cost Over 30 Years: \$311,000

Estimated Present Worth Cost: \$342,000

Similar to SL-2, the asphalt cover will be installed over the AA as shown in **Figure 9**. The actual area will be determined based upon pre-design sampling.

Site 131/PICA-131

Estimated Capital Cost: \$182,000

Estimated O&M Cost Over 30 Years: \$283,000

Estimated Present Worth Cost: \$299,000

Similar to SL-2, the asphalt cover will be installed over the AA as shown in **Figure 10**. The actual area will be determined based upon pre-design sampling.

Site 149/PICA-149

Estimated Capital Cost: \$121,000

Estimated O&M Cost Over 30 Years: \$217,000

Estimated Present Worth Cost: \$210,000

Similar to SL-2, the asphalt cover will be installed over the AA as shown in **Figure 11**. The actual area will be determined based upon pre-design sampling.

Response Action SL-4: Removal, Off-Site Disposal, and LUCs

Estimated Capital Cost: \$505,000

Estimated O&M Cost Over 30 Years: \$492,000

Estimated Present Worth Cost: \$707,000

Response Action SL-4 is the Preferred Alternative. Under this alternative, the soils which exceed ARARs or drive an unacceptable human health risks and hazards for the current and reasonably anticipated future use (military/industrial) would be removed utilizing conventional earthmoving equipment. The excavated soil would be transported off site to an appropriate landfill permitted to accept the material. Based on the nature of the waste mass, this material may be disposed at a permitted Resource

Conservation and Recovery Act Subtitle D (municipal waste) landfill. Excavated materials would be transported by truck to the receiving landfill after pre-acceptance of the material. It is assumed that excavation activities would be conducted in Level D PPE with on-site MEC construction support.

Because sufficient data is unavailable to fully delineate the area of the RA, pre-design sampling would be conducted to determine the area of the RA. This delineation sampling will be conducted concurrent with the finalization of the ROD. One sample would be collected from each sidewall of the planned excavation and analyzed for the COCs. The maximum excavation depth will be determined by cleanup levels and documented by pre-design sampling and post excavation sampling but for costing purposes is assumed to be 2 feet. If soil concentrations remain above cleanup goals at the excavation floor, the resulting backfill will be maintained as a soil cover (engineering control). Backfilling would be required to stabilize the site. A topsoil layer of 6 inches in thickness would be applied to the excavated, backfilled, and regraded area, and the area would be seeded to re-establish vegetative cover.

Prior to initiation of remedial activities site clearing and grubbing will take place. Engineering and erosion and sediment controls as outlined in Alternative SL-2 would be incorporated into this alternative. LUCs at the sites will be established and annual reporting to document no changes in land use across the remainder of the site and the condition of the soil cover (if ultimately required) will be conducted, as outlined in Alternative SL-2.

Site 118/PICA-097

Estimated Capital Cost: \$210,000

Estimated O&M Cost Over 30 Years: \$164,000

Estimated Present Worth Cost: \$277,000

Similar to SL-2, the excavation will be conducted over the AA shown in **Figure 9** to a depth of 2 ft below ground surface (bgs). The actual extent and depth of excavation will be determined from pre-design sampling.

Site 131/PICA-131

Estimated Capital Cost: \$178,000

Estimated O&M Cost Over 30 Years: \$164,000

Estimated Present Worth Cost: \$245,000

Similar to SL-2, the excavation will be conducted over the AA shown in **Figure 10** to a depth of 2 ft bgs. The actual extent and depth of excavation will be determined from pre-design sampling.

Site 149/PICA-149

Estimated Capital Cost: \$118,000

Estimated O&M Cost Over 30 Years: \$164,000

Estimated Present Worth Cost: \$185,000

Similar to SL-2, the excavation will be conducted over the AA shown in **Figure 11** to a depth of 2 ft bgs. The actual extent and depth of excavation will be determined from pre-design sampling.

EVALUATION OF RESPONSE ACTIONS

Nine criteria are used to evaluate the different RAs individually and against one other in order to select a remedy. These criteria are as follows:

Threshold Criteria – Must be met for the RA to be eligible for selection as a remedial option.

1. Overall Protectiveness of Human Health and the Environment – Determines whether a RA eliminates, reduces, or controls threats to public health and the environment through ICs, engineering controls, or treatment.
2. Compliance with ARARs – Evaluates whether the RA meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified. Identification of ARARs is dependent on the hazardous substances present at the site, site characteristics, the site location, and the actions recommended to remediate the site. Thus, requirements may be chemical-, location-, or action-specific.

Primary Balancing Criteria – Used to weigh major trade-offs among response actions.

3. Long-term Effectiveness and Permanence – Considers the ability of a RA to maintain protection of human health and the environment over time.
4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment – Evaluates a RA's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. Short-term Effectiveness – Considers the length of time needed to implement a RA and the risks the RA poses to workers, residents, and the environment during implementation.
6. Implementability – Considers the technical and administrative feasibility of implementing the RA, including factors such as the relative availability of goods and services.
7. Cost – Includes estimated capital and annual O&M costs, as well as present worth cost. Present worth cost is the total cost of a RA over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of –30 to +50 percent.

Modifying Criteria – May be considered to the extent that information is available during the FS, but can be fully considered only after public comment on this Proposed Plan.

8. State/Support Agency Acceptance – Considers whether the State agrees with the

Army's analysis and recommendations, as described in the RI/FS and PP.

9. Community Acceptance – Considers whether the local community agrees with the Army's analysis and preferred RA. Comments received on the PP are an important indicator of community acceptance.

A detailed evaluation of RAs compared to threshold and primary balancing criteria is presented in the FS. A summary of cost for each RA is presented in **Table 3**.

Table 3
Summary of Response Action Costs

Response Action	Estimated Capital Cost	Present Worth
SL-1⁽¹⁾	\$0	\$0
SL-2	\$256,000	\$464,000
Site 118/PICA-097	\$91,000	\$161,000
Site 131/PICA-131	\$85,000	\$154,000
Site 149/PICA-149	\$80,000	\$149,000
SL-3	\$516,000	\$851,000
Site 118/PICA-097	\$213,000	\$342,000
Site 131/PICA-131	\$182,000	\$299,000
Site 149/PICA-149	\$121,000	\$210,000
SL-4	\$505,000	\$707,000
Site 118/PICA-097	\$210,000	\$277,000
Site 131/PICA-131	\$178,000	\$245,000
Site 149/PICA-149	\$118,000	\$185,000

(1) There are no costs associated with this RA as it represents no action.

State Acceptance

During NJDEP's review of the Draft FS, NJDEP stated concerns with alternatives that did not address soils with concentration of contaminants above the NJNRDCSRS. The RAs presented in the Final FS and the preferred RA described herein does eliminate exposure to soils with contaminant concentrations above New Jersey NRDCSRS, with the exception of manganese, where an alternative clean up goal has been accepted by the USEPA. Because New Jersey NRDCSRS are recognized as ARARs, NJDEP approval of the preferred RA is expected, and will be further evaluated in the ROD following the public comment period.

Community Acceptance

Community acceptance of the preferred RA will be evaluated at the conclusion of the public comment period. Community acceptance will be addressed in the **Responsiveness Summary** prepared for the ROD.

COMPARATIVE ANALYSIS OF RESPONSE ACTIONS

This section summarizes the comparative analysis of the expected performance of each RA relative to the other alternatives to identify their respective advantages and

disadvantages. A comparative analysis of the alternatives for the addressed in this PP is presented within this section.

Protection of Human Health and the Environment

All alternatives except for Alternative SL-1 are protective of human health and the environment in the short term and long term. Alternatives SL-2, SL-3, and SL-4 remove the exposure pathway of the contaminated soils driving an unacceptable risk for the current site use. LUCs would be used to maintain and protect the capped areas in the future.

Compliance with ARARs

Alternative SL-1 does not achieve ARARs. Alternatives SL-2, SL-3, and SL-4 will meet chemical specific ARARs by removing the exposure pathway to contaminants remaining on site or removing the soils. Location-specific and action-specific ARARs will be met by Alternatives SL-2, SL-3, and SL-4.

Long-term Effectiveness and Permanence

Alternatives SL-2, SL-3, and SL-4, are effective in reducing risk to human health because they remove the pathway of exposure over the long term. Of these three alternatives, Alternative SL-4 will be most effective in the long term as it removes contaminant concentrations from the site to a depth of 2 feet, and any concentrations remaining below that are protected by the 2 feet of fill placed after excavation. For Alternatives SL-2 and SL-3, the cover would be installed in an inactive area that currently has vegetative ground cover. Unstressed asphalt deteriorates faster than stressed asphalt, so the long-term effectiveness of Alternative SL-3 would be reduced compared to a soil cover. However, Alternatives SL-2, SL-3, and SL-4 are each expected to provide a reliable means of meeting RAOs in the long term.

Reduction in Toxicity, Mobility, or Volume through Treatment

Alternative SL-1 does not contribute to the reduction in the toxicity, mobility, or volume of wastes present at the site. Alternatives SL-2 and SL-3 reduce the mobility of wastes present at the site, and Alternative SL-4 reduces the volume of waste at the site by excavation and off-site disposal; however, the waste volume is transferred from the site to the disposal facility.

Short-term Effectiveness

Alternatives SL-2, SL-3, and SL-4 have minor short-term effectiveness issues due to the active nature of the alternative compared to Alternative SL-1. Workers involved in implementation of Alternatives SL-2, SL-3, and SL-4 will utilize protective equipment and clothing and engineering controls to prevent exposure to potential site risks.

Implementability

The most readily implementable alternative is Alternative SL-1. Alternatives SL-2, SL-3, and SL-4 may require site clearing, which may only be performed during the winter in order to avoid disturbing the Indiana Bat.

Cost

Alternative SL-3 is the most costly RA considered followed by SL-4 and SL-2, respectively. There is no cost associated with Alternative SL-1.

SUMMARY OF THE PREFERRED RESPONSE ACTIONS

The preferred RA is selected based on the best balance between the selection criteria for treatment of contamination at the Sites.

The Army's Preferred RA is:

- SL-4 – Removal, Off-Site Disposal, and LUCs

The recommended response action will meet the RAOs while providing the optimum balance among alternatives with respect to the evaluation criteria. This alternative is implementable, the most effective in meeting the RAOs, and provides good value. A detailed description of the selected remedy will be provided in the Remedial Design for the Sites.

COMMUNITY PARTICIPATION

Public participation is an important component of remedy selection. The Army, USEPA, and NJDEP are soliciting input from the community on the recommended RA. The comment period extends from **TBD until TBD** (30 days). This period includes a public meeting at which the Army will present the PP. The Army will accept both **oral and written** comments at this meeting.

A critical component of Picatinny's program to keep the public informed about the environmental cleanup activities and be involved in decision-making is the Picatinny Arsenal Environmental Restoration Advisory Board (PAERAB). The PAERAB gives community members, particularly those who may be affected by the cleanup activities, and government representatives a chance to exchange information and participate in meaningful dialogue.

Public Comment Period

The Army is providing a 30-day comment period from **TBD to TBD**, to provide an opportunity for public involvement in the decision-making process for the proposed action. If any significant new information or public comments are received during the public comment period, the Army, in consultation with NJDEP and USEPA, may modify the recommended RA outlined in this PP. The public is encouraged, therefore, to review and comment on this document. During the public comment period, the public is encouraged to review reports and other documents pertinent to this site and the Superfund process. This information is available at

the Picatinny Installation Restoration Program Office, located in Building 319 at Picatinny. To obtain further information, the following representatives may be contacted:

Mr. Ted Gabel
Environmental Affairs Division
U.S. Army Installation Management Agency
Northeast Regional Garrison Office
Building 319
Picatinny, New Jersey 07806-5000
(973) 724-6748

Mr. William Roach
Remedial Project Manager - USEPA Region II
290 Broadway
New York, NY 10007-1866
(212) 637-4335

Ms. Anne Pavelka
NJ Department of Environmental Protection
Bureau of Case Management
P.O. Box 028, Mail Code 401-05F
401 East State Street,
Trenton, NJ 08625-0028
(609) 292-3007

Written Comments

If the public would like to comment in writing on the PP or other relevant issues, comments should be delivered to the Army at the public meeting or mailed (postmarked no later than **TBD**) to Mr. Ted Gabel at the address above.

Public Meeting

The Army will hold a public meeting to accept comments on this PP on **TBD** at the Hilton Garden Inn, located at 375 Mount Hope Avenue, Rockaway, New Jersey. This meeting will provide an opportunity for the public to comment on the proposed action. Comments made at the meeting will be transcribed. A copy of the transcript will be included in the ROD Responsiveness Summary and will be added to the Picatinny Administrative Record file and information repositories.

Army's Review of Public Comment

The Army will review the public's comments as part of the process in reaching a final decision on the most appropriate action to be taken. The Army's final choice of action will be issued in a ROD. A Responsiveness Summary, documenting and responding to written and oral comments received from the public, will be issued with the ROD. Once community response and input are received and the Army and USEPA sign the ROD, it will become part of the Administrative Record.

ACRONYMS AND ABBREVIATIONS

2,4-DNT	2,4-Dinitrotoluene
AA	Area of Attainment
ARAR	Applicable or Relevant and Appropriate Requirement
ARCADIS	ARCADIS U.S., Inc.
Army	United States Department of the Army
bgs	Below Ground Surface
BSB	Bear Swamp Brook
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
ERA	Ecological Risk Assessment
FS	Feasibility Study
ft	feet
ft ²	Square feet
GIS	Geographic Information System
HHRA	Human Health Risk Assessment
HI	Hazard Index
IC	Institutional Control
IRSL	Industrial Regional Screening Levels
KVA	Kilovolt -amps
LOC	Level of Concern
LUC	Land Use Control
MEC	Munitions and Explosives of Concern
mg/kg	Milligrams per Kilogram
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standard
NRSRS	Non-Residential Soil Remediation Standards
O&M	Operational and Maintenance
PA	Preliminary Assessment
PAERAB	Picatinny Arsenal Environmental Restoration Advisory Board
PAH	Polynuclear (or polycyclic) Aromatic Hydrocarbon
PP	Proposed Plan
PPE	Personal Protective Equipment
PTA	Picatinny Arsenal
RA	Remedial Alternative
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act (1986)
SI	Site Investigation
TBC	To-Be-Considered
U.S.	United States
USEPA	United States Environmental Protection Agency

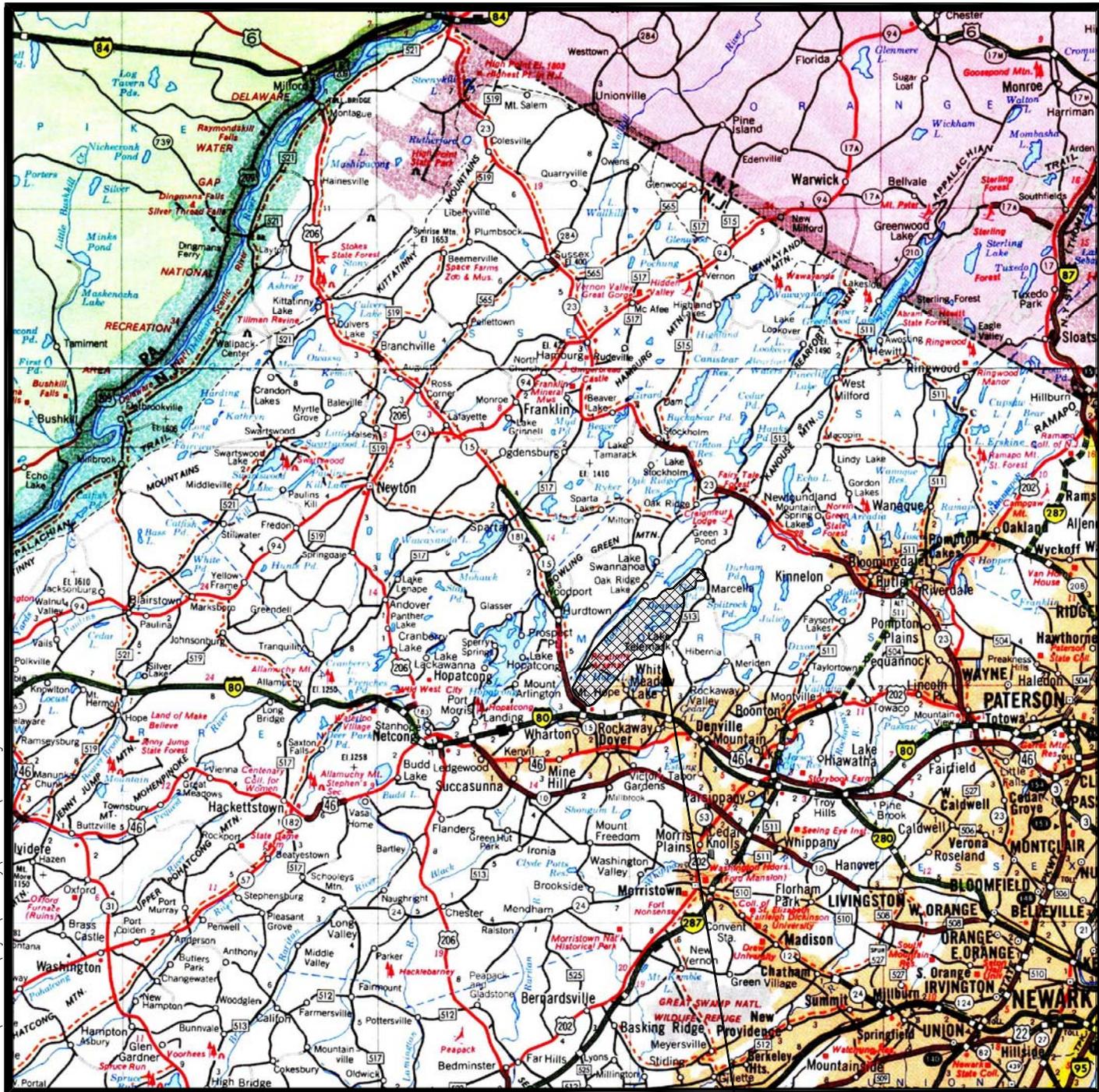
GLOSSARY OF TERMS

- Administrative Record:** This is a collection of documents (including plans, correspondence and reports) generated during site investigation and remedial activities. Information in the Administrative Record is used to select the Preferred Response Actions and is available for public review.
- Applicable or Relevant and Appropriate Requirements (ARARs):** The Federal and State requirements that a selected remedy will attain. These requirements may vary among sites and response actions.
- Capital Costs:** This includes costs associated with construction, treatment equipment, site preparation, services, transportation, disposal, health and safety, installation and start-up, administration, legal support, engineering, and design associated with response actions.
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** This federal law was passed in 1980 and is commonly referred to as the Superfund Program. It provides for liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous waste disposal sites that endanger public health and safety or the environment.
- Defense Environmental Restoration Program:** This purpose of this program is to identify, assess, and cleanup or control hazardous waste contamination that originated from past Department of Defense activities.
- Feasibility Study (FS):** This CERCLA document reviews the contaminants of concern at a site, and evaluates multiple remedial technologies for use at the site. It identifies the most feasible response actions.
- Level of Concern (LOC):** The lowest value based on either human or ecological concern that is used to screen the detected chemicals for further consideration during the RI and FS process.
- National Contingency Plan (NCP):** The National Oil and Hazardous Substances Pollution Contingency Plan. These CERCLA regulations provide the federal government the authority to respond to the problems of abandoned or uncontrolled hazardous waste disposal sites as well as to certain incidents involving hazardous wastes (e.g., spills).
- National Priorities List:** A list of sites that are qualified to receive expenditures of CERCLA funds.
- Operation and Maintenance (O&M):** Annual post-construction cost necessary to ensure the continued effectiveness of a remedial action.
- Present Worth Costs:** Used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year. This allows the cost of the response actions to be compared on the basis of a single figure representing the amount of money that would be sufficient to cover capital and O&M costs associated with each remedial action over its planned life.
- Record of Decision (ROD):** This legal record is signed by the Army and the USEPA and will be reviewed by the NJDEP for concurrence. It provides the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, responses to comments, and the estimated cost of the remedy.
- Remedial Investigation (RI):** An investigation under CERCLA that involves sampling environmental media such as air, soil, and water to determine the nature and extent of contamination and human health and environmental risks that result from the contamination.
- Responsiveness Summary:** A part of the ROD in which the Army documents and responds to written and oral comments received from the public and the State about the Proposed Plan.
- Superfund Amendments and Reauthorization Act (SARA):** A congressional act that modified CERCLA. SARA was enacted in 1986 and again in 1990 to authorize additional funding for the Superfund Program.
- To-Be-Considered:** Information such as nonpromulgated criteria, advisories, guidance, and proposed standards issued by federal or state governments that may be considered in remedial actions. TBCs may be used to interpret ARARs, or to determine preliminary remediation goals when ARARs do not exist for particular contaminants.

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Figures

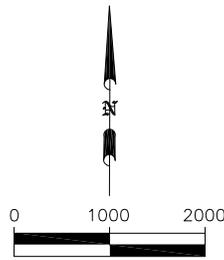


MAP SOURCE: RAND McNALLY, NEW JERSEY STATE ROAD MAP 1991



NEW JERSEY

SITE LOCATION



SCALE: FEET



1114 Benfield Boulevard, Suite A
 Millersville, Maryland 21108
 Tel (410) 987-0032 Fax (410) 987-4392

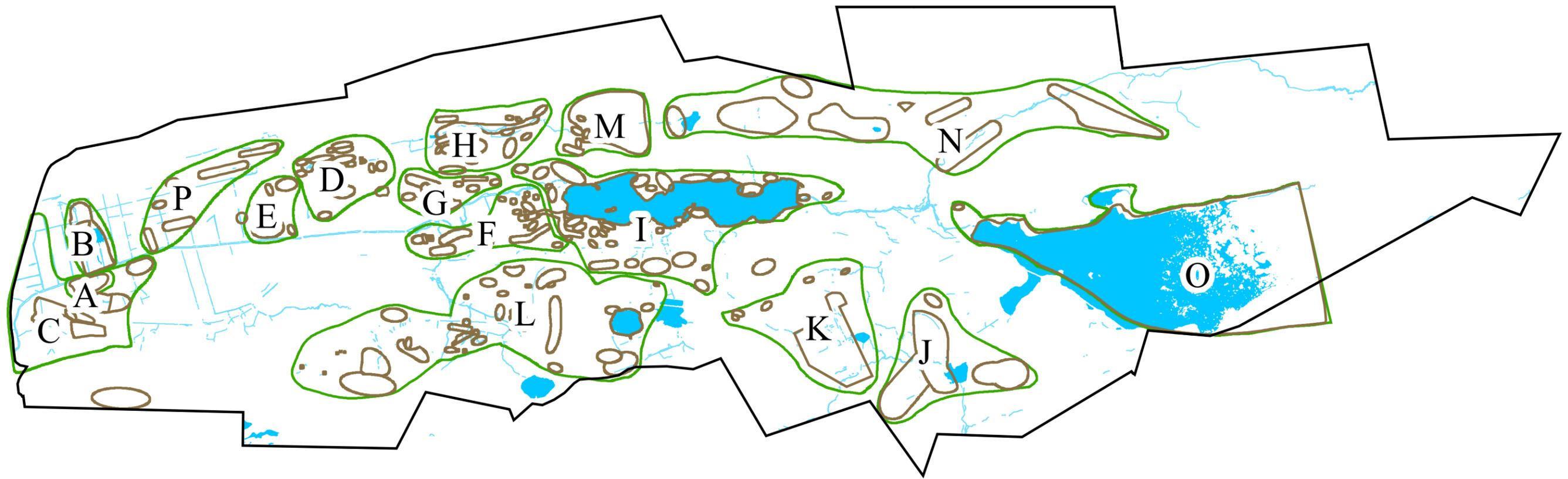
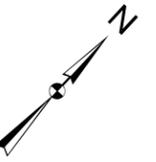
SITE LOCATION MAP

PICATINNY ARSENAL
 NEW JERSEY

PROJECT MANAGER TL	DEPARTMENT MANAGER PJS
DRAFTER JSC	CHECKED GSK
PROJECT NUMBER GP06PICA.001	DRAWING NUMBER 1

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Legend

- Boundary
- Approximate Site Locations
- ANL RI Concept Plan Areas
- Surface Water Features
- Water Bodies

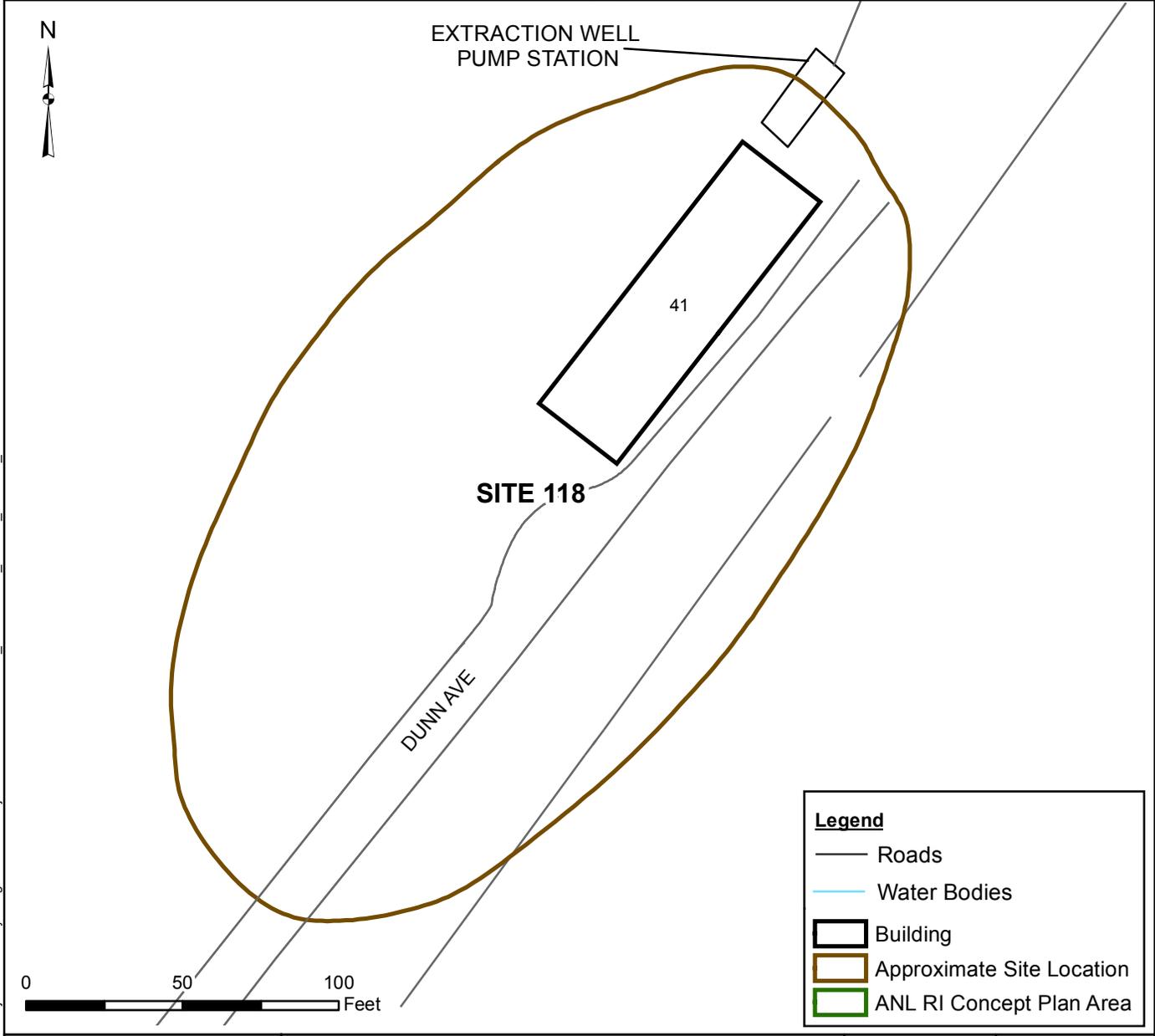
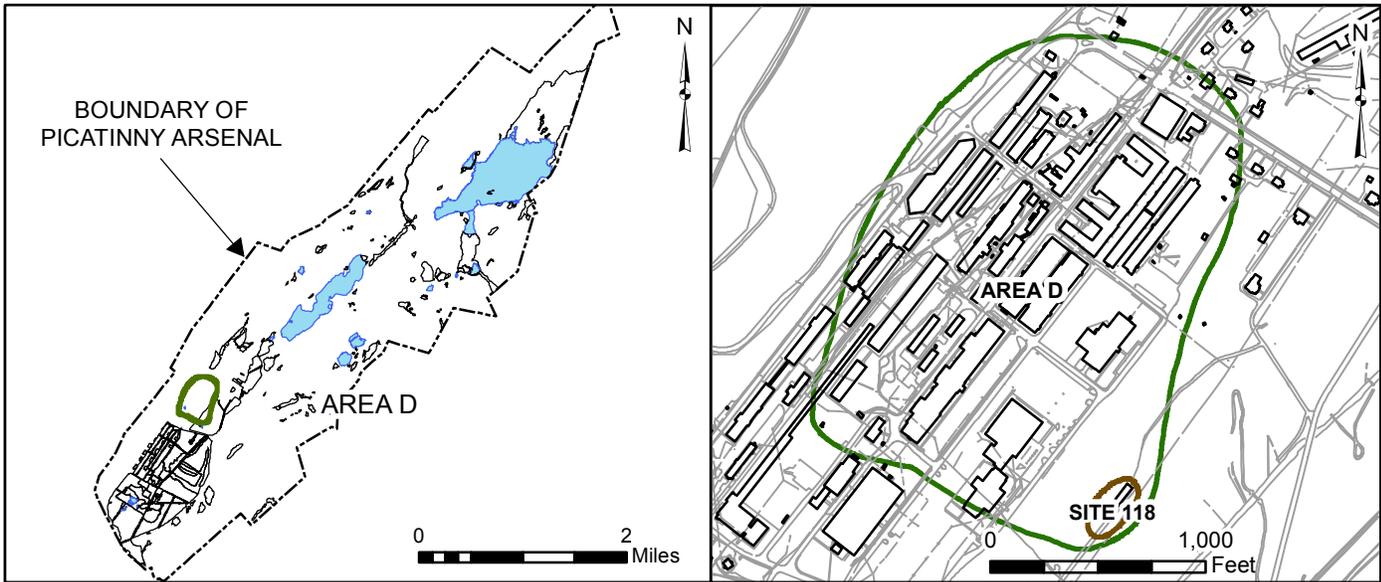


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ARCADIS
 ARCADIS - Edison, NJ
 101 Fieldcrest Avenue, Suite 5E
 Edison, NJ 08817
 Phone: (732) 225-5061
 Fax: (732) 225-5067

**PICATINNY RI CONCEPT PLAN STUDY AREAS
 FOCUSED FEASIBILITY STUDY
 PICATINNY ARSENAL, DOVER, NEW JERSEY**

PROJECT MANAGER <u>T. LLEWELLYN</u>	DEPARTMENT MANAGER <u>M. MOHIUDDIN</u>
DRAWN <u>W. JASLANEK</u>	CHECKED <u>K. TIPTON</u>
PROJECT NUMBER GP06PICA.P020.NJ001	DRAWING NUMBER 2



Legend	
	Roads
	Water Bodies
	Building
	Approximate Site Location
	ANL RI Concept Plan Area

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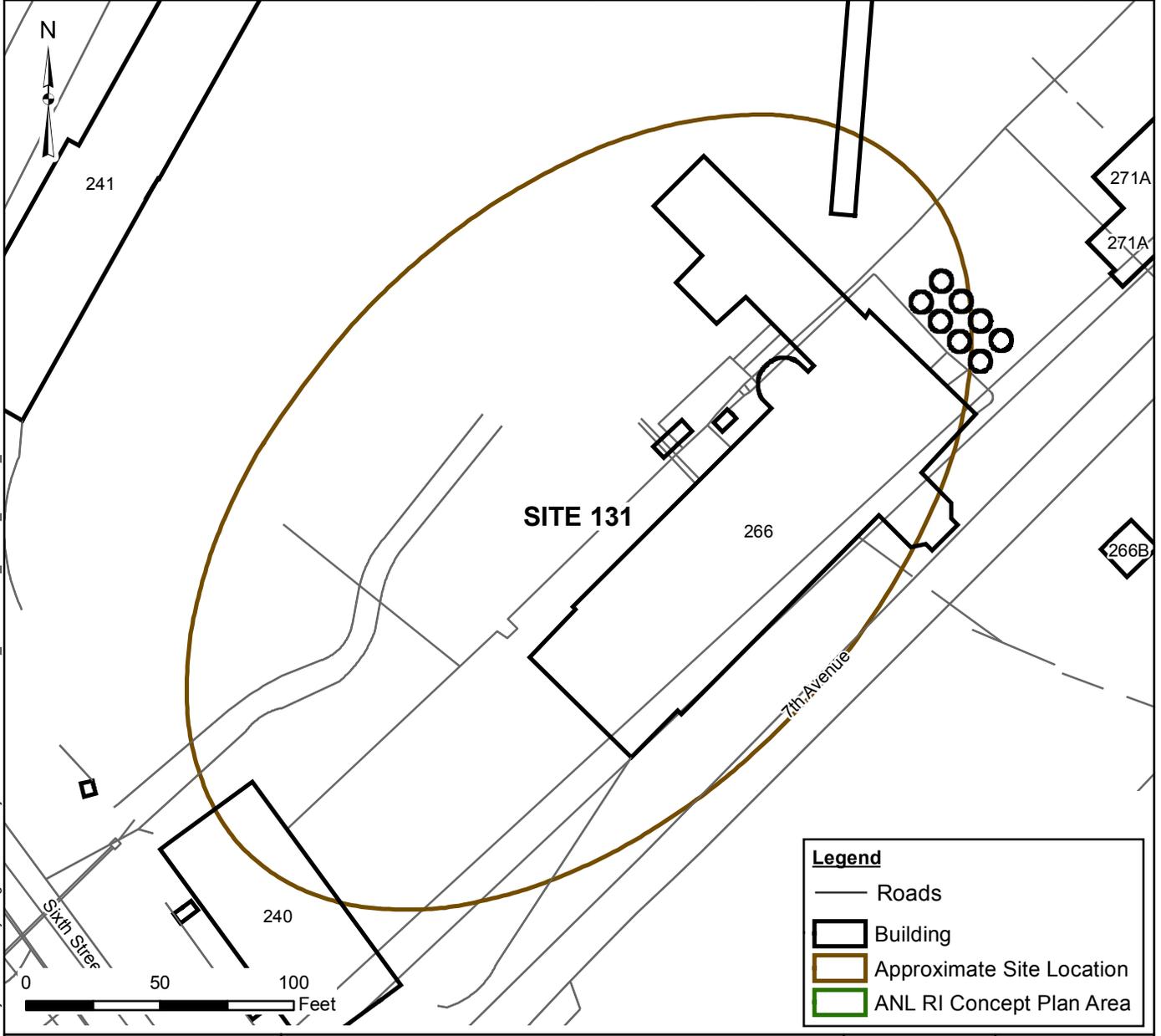
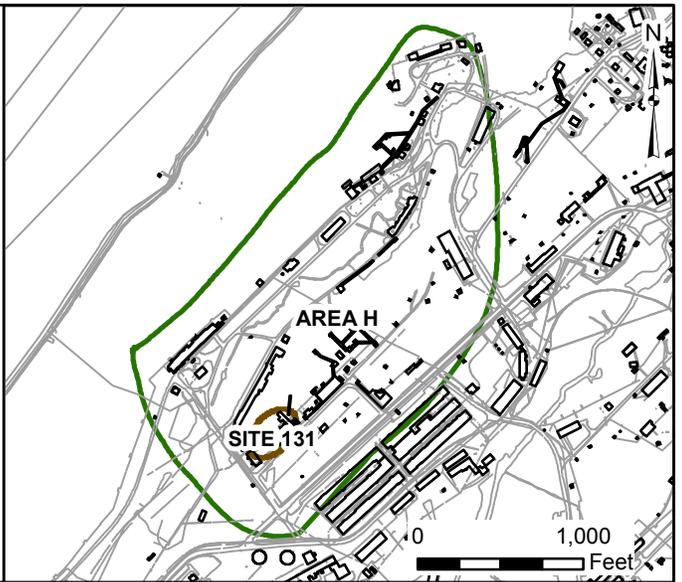
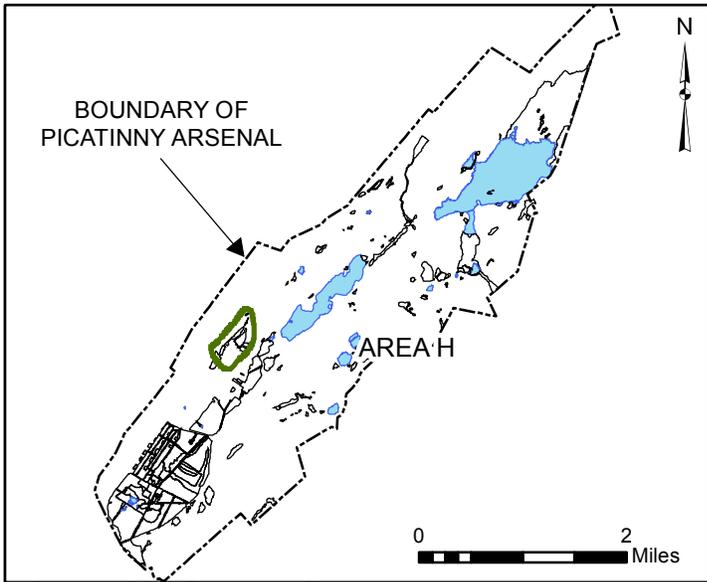
**LAYOUT OF SITE 118/PICA-097
 BUILDING 41
 PESTICIDE STORAGE FACILITY
 PICATINNY ARSENAL, NEW JERSEY**

PROJECT MANAGER
T. LLEWELLYN
 DRAWN
M. GRESS

DEPARTMENT MANAGER
M. MOHIUDDIN
 CHECKED
K. TIPTON

PROJECT NUMBER
GP06PICA.P011.NJ001

DRAWING NUMBER
3



Legend	
	Roads
	Building
	Approximate Site Location
	ANL RI Concept Plan Area

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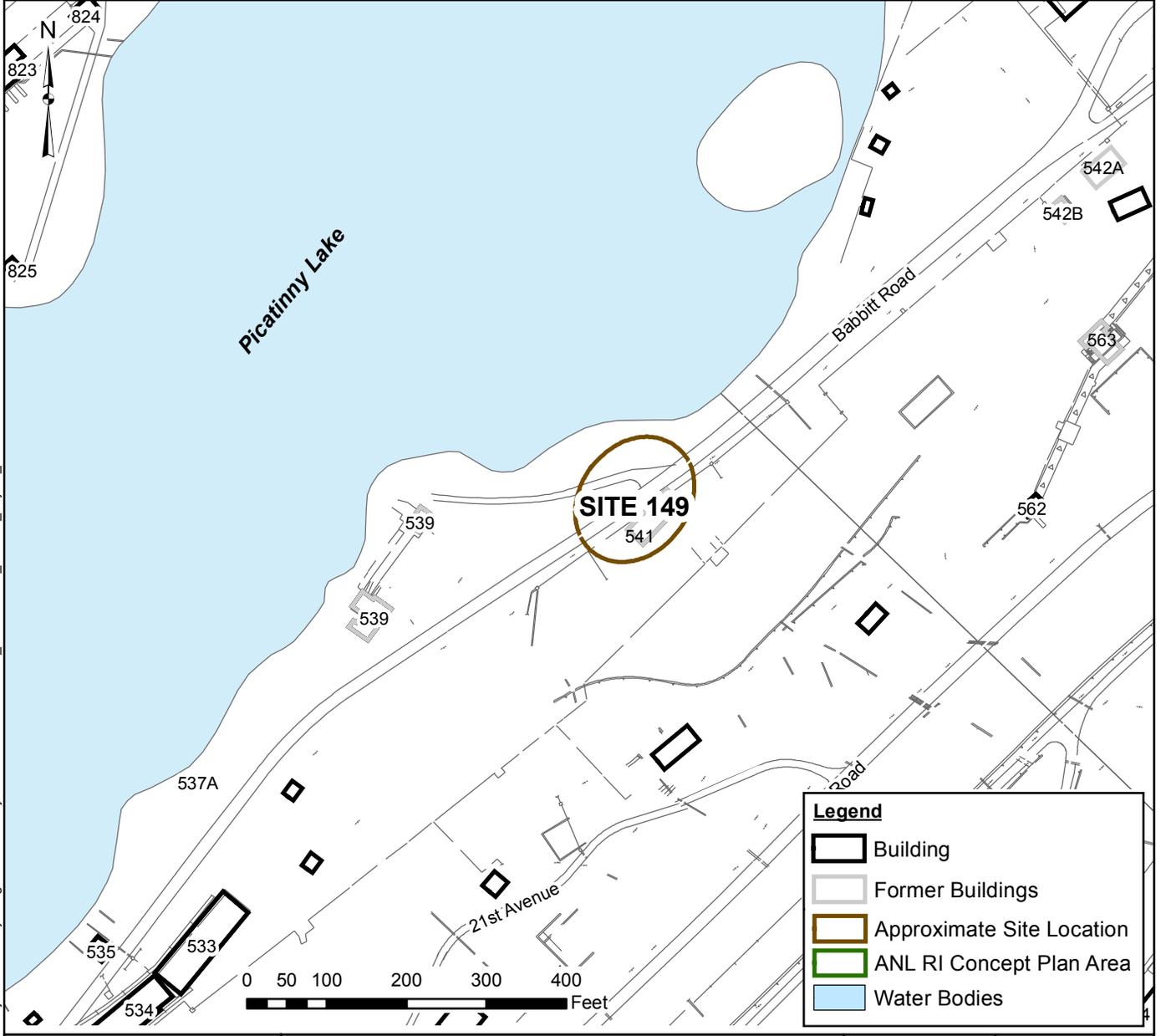
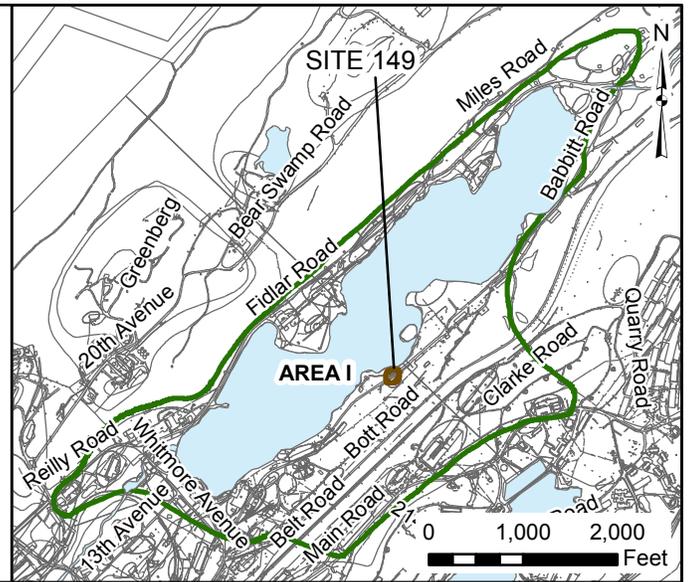
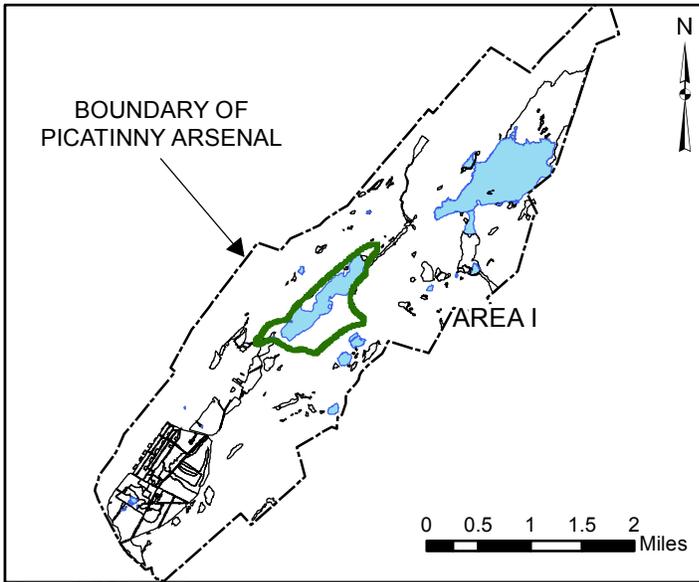
**LAYOUT OF SITE 131/PICA-131, BUILDING 266
 FORMER ORDNANCE MANUFACTURING
 PICATINNY ARSENAL, NEW JERSEY**

PROJECT MANAGER
T. LLEWELLYN
 DRAWN
M. GRESS

DEPARTMENT MANAGER
M. MOHIUDDIN
 CHECKED
K. TIPTON

PROJECT NUMBER
GP06PICA.P011.NJ001

DRAWING NUMBER
4



Legend

- Building
- Former Buildings
- Approximate Site Location
- ANL RI Concept Plan Area
- Water Bodies

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**LAYOUT OF SITE 149/PICA-149
 PROPELLANT PLANT(FORMER BUILDING 541)
 PICATINNY ARSENAL, NEW JERSEY**

PROJECT MANAGER
T. LLEWELLYN

DRAWN
M. GRESS

PROJECT NUMBER
GP06PICA.P001.NJ001

DEPARTMENT MANAGER
M. MOHIUDDIN

CHECKED
K. TIPTON

DRAWING NUMBER
5



Depth (ft)	LOC	Conc
Compound	LOC	Conc
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (mg/kg)	0.000085	0.11
4,4'-DDD (mg/kg)	0.00354	0.03 NJ
Acenaphthene (mg/kg)	0.00671	0.11 J
alpha-Chlordane (mg/kg)	0.0003	0.18 NJ
Anthracene (mg/kg)	0.03162	0.37 J
Aroclor 1248 (mg/kg)	0.0341	0.18
Aroclor 1254 (mg/kg)	0.060	0.3
Benzo(a)pyrene (mg/kg)	0.0319	0.49 J
Benzo(b)fluoranthene (mg/kg)	0.0272	0.6 J
Benzo(k)fluoranthene (mg/kg)	0.0272	0.3 J
beta-BHC (mg/kg)	0.00094	0.16 NJ
Cadmium (mg/kg)	1.70	29.8 J
Chrysene (mg/kg)	0.0571	0.6 J
Copper (mg/kg)	28	150 J
Dieldrin (mg/kg)	0.00285	0.45 NJ
Endrin aldehyde (mg/kg)	0.00267	0.01 NJ
Endrin ketone (mg/kg)	0.00267	0.49 NJ
Fluoranthene (mg/kg)	0.06423	1.6
Fluorene (mg/kg)	0.0212	0.18 J
gamma-Chlordane (mg/kg)	0.0003	0.47 NJ
Indeno(1,2,3-c,d)pyrene (mg/kg)	0.078	0.24 J
Lead (mg/kg)	38.8	58.6 J
Mercury (mg/kg)	0.249	0.49 J
Octachlorodibenzodioxin (mg/kg)	0.0085	0.24
Phenanthrene (mg/kg)	0.0419	1.17
Pyrene (mg/kg)	0.0530	1.15
Silver (mg/kg)	1.0	7.53
Zinc (mg/kg)	171	360 J

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Arsenic (mg/kg)	19	21.5 J
Dieldrin, USAEC LH17 (mg/kg)	0.2	0.25 N
Dieldrin, USAEC LM25 (mg/kg)	0.2	ND
Heptachlor epoxide, USAEC LH17 (mg/kg)	0.3	0.77
Heptachlor epoxide, USAEC LM25 (mg/kg)	0.3	ND

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Arsenic (mg/kg)	19	24 J

Date	LOC	Conc
Compound	LOC	Conc
Cadmium (ug/L)	0.28	1.1 J

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Arsenic (mg/kg)	19	20.6 J

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Arsenic (mg/kg)	19	52.1 JD

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Arsenic (mg/kg)	19	124 JD

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Arsenic (mg/kg)	19	21.5 D

Date	LOC	10/24/93	04/18/94	07/18/94
Compound	LOC	Conc	Conc	Conc
4,4'-DDT, USAEC UH20 (ug/L)	0.1	0.33	ND	ND
4,4'-DDT, USAEC UM25 (ug/L)	0.1	ND	ND	ND
Arsenic (ug/L)	3	6.88	NE	ND
Arsenic, Dissolved (ug/L)	3	ND	NA	NA
Beryllium (ug/L)	1	ND	ND	2.39
Beryllium, Dissolved (ug/L)	1	ND	NA	NA
Iron (ug/L)	300	2020	873	775
Iron, Dissolved (ug/L)	300	ND	NA	NA
Lead (ug/L)	5	6.01	27.1	ND
Lead, Dissolved (ug/L)	5	ND	NA	NA
Manganese (ug/L)	50	19000 D	3820	2550
Manganese, Dissolved (ug/L)	50	62 D	NA	NA
Sodium (ug/L)	50000	81000 D	66200	73900
Sodium, Dissolved (ug/L)	50000	84000 D	NA	NA
Trichloroethene (ug/L)	1	3.5	5.1	3.9

Date	LOC	10/24/93	04/18/94	07/18/94
Compound	LOC	Conc	Conc	Conc
Arsenic (ug/L)	3	8.19	5.33	4.91
Arsenic, Dissolved (ug/L)	3	5.68	NA	NA
Beryllium (ug/L)	1	ND	ND	2.58
Beryllium, Dissolved (ug/L)	1	ND	NA	NA
Chromium (ug/L)	70	100	NE	NE
Chromium, Dissolved (ug/L)	70	ND	NA	NA
Iron (ug/L)	300	887	NE	425
Iron, Dissolved (ug/L)	300	ND	NA	NA
Lead (ug/L)	5	23.5	17.8	ND
Lead, Dissolved (ug/L)	5	ND	NA	NA
Manganese (ug/L)	50	558	297	287
Manganese, Dissolved (ug/L)	50	308	NA	NA
Nickel (ug/L)	100	131	NE	NE
Nickel, Dissolved (ug/L)	100	NE	NA	NA

Depth (ft)	LOC	Conc
Compound	LOC	Conc
Dieldrin, USAEC LH17 (mg/kg)	0.2	0.5 N
Dieldrin, USAEC LM25 (mg/kg)	0.2	ND
Heptachlor epoxide, USAEC LH17 (mg/kg)	0.3	0.53
Heptachlor epoxide, USAEC LM25 (mg/kg)	0.3	ND
Lead (mg/kg)	800	2400 D

Date	LOC	04/18/94	04/18/94 (dup)	07/18/94	07/18/94 (dup)	12/15/97
Compound	LOC	Conc	Conc	Conc	Conc	Conc
Manganese (ug/L)	50	131	101	117	125	NA
Manganese, Dissolved (ug/L)	50	67.7	64.9	NA	NA	NA
Sodium (ug/L)	50000	76800	64900	58500	53900	NA
Sodium, Dissolved (ug/L)	50000	66600	63200	NA	NA	NA
Trichloroethene (ug/L)	1	8.6	NA	7.8	7.8	6.5

Depth (ft)	LOC	0 - 2	2 - 4	2 - 4 (dup)	4 - 6
Compound	LOC	Conc	Conc	Conc	Conc
Manganese (mg/kg)	5900	13000 D	NE	NE	NE
Thallium (mg/kg)	79	587	ND	ND	ND

LEGEND

- ⊗ SURFACE SOIL
- △ SURFACE WATER AND/OR SEDIMENT
- ⊕ SOIL BORING
- ⊕ MONITORING WELL
- ROADS
- WATER BODIES
- ▭ BUILDING
- ▭ APPROXIMATE SITE LOCATION
- D ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J ESTIMATED VALUE
- NA NOT ANALYZED
- ND NOT DETECTED
- NE NO EXCEEDANCE

Acad Version : K18.1s (LMS.rch) User Name : AFOX Date/Time : Thu, 20 Mar 2014 - 2:00pm Path Name : G:\ENVCAD\BRIGHTON\ACT\GP06PICA\1115\EA001\DWG\SITE-118.dwg - Layout Tab : LAYOUT1 copyright © 2007 PLOT SIZE: 22x34		KEYPLAN SEAL		PROJECT TITLE PICATINNY ARSENAL NEW JERSEY	PROJECT MANAGER T. LLEWELLYN DEPARTMENT MANAGER M. MOHIUDDIN SHEET TITLE HISTORICAL LOC EXCEEDENCES DATA AT SITE 118/PICA-097 PESTICIDE STORAGE FACILITY	LEAD DESIGN PROF. K. PANHORST CHECKED BY T. LLEWELLYN TASK/PHASE NUMBER EA002 PROJECT NUMBER GP06PICA.P001	DRAWN BY A. FOX DRAWING NUMBER 6
REV. ISSUED DATE DESCRIPTION		1114 Benfield Blvd. Suite A Millersville, MD 21108 Tel: 410-987-4392 Fax: 410-987-0032 www.arcadis-us.com					

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PLOT SIZE: 17x22
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SEAL



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PROJECT TITLE

PICATINNY ARSENAL
 NEW JERSEY

PROJECT MANAGER
 T. LLEWELLYN

DEPARTMENT MANAGER
 M. MOHIUDDIN

LEAD DESIGN PROF.
 K. PANHORST

CHECKED BY
 T. LLEWELLYN

SHEET TITLE
 HISTORICAL LOC EXCEEDENCES
 DATA AT
 RI SITE 131/PICA-131
 FORMER ORDNANCE MANUFACTURING

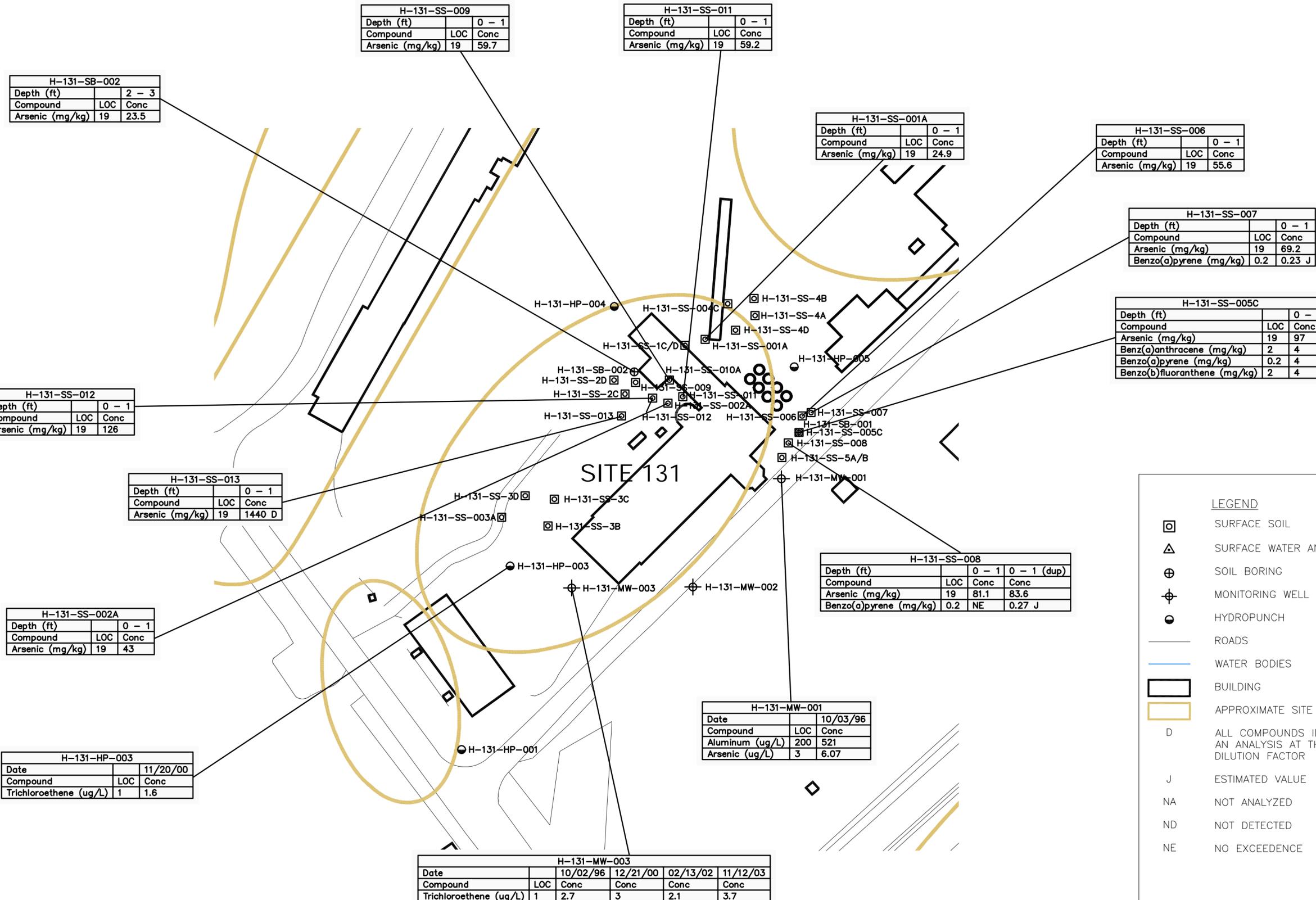
TASK/PHASE NUMBER
 EA002

DRAWN BY
 A. FOX

PROJECT NUMBER
 GP06PICA.P001

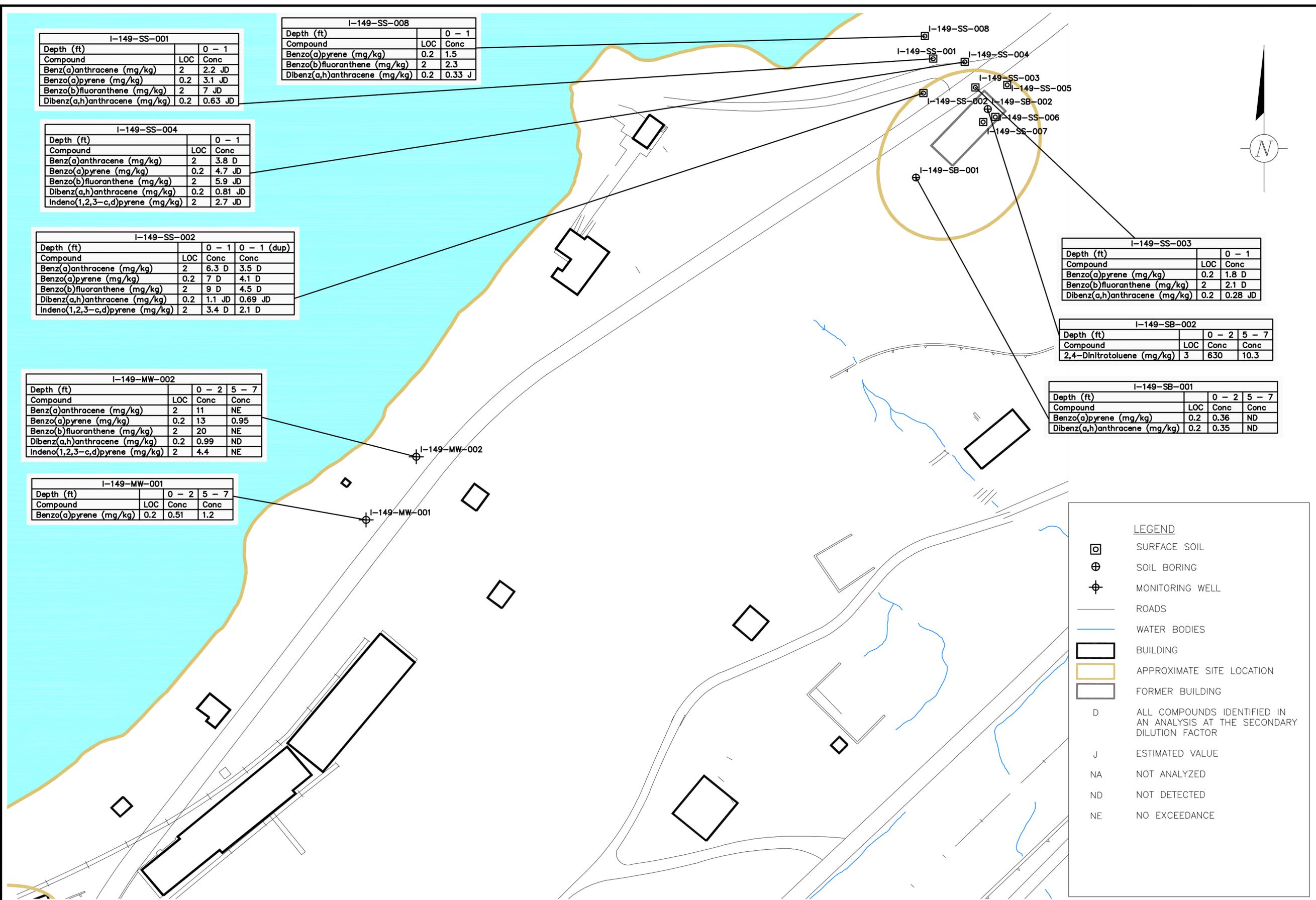
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 User Name : AFOX



I-149-SS-001			
Depth (ft)		0 - 1	
Compound	LOC	Conc	
Benzo(a)anthracene (mg/kg)	2	2.2	JD
Benzo(a)pyrene (mg/kg)	0.2	3.1	JD
Benzo(b)fluoranthene (mg/kg)	2	7	JD
Dibenz(a,h)anthracene (mg/kg)	0.2	0.63	JD

I-149-SS-008			
Depth (ft)		0 - 1	
Compound	LOC	Conc	
Benzo(a)pyrene (mg/kg)	0.2	1.5	
Benzo(b)fluoranthene (mg/kg)	2	2.3	
Dibenz(a,h)anthracene (mg/kg)	0.2	0.33	J

I-149-SS-004			
Depth (ft)		0 - 1	
Compound	LOC	Conc	
Benzo(a)anthracene (mg/kg)	2	3.8	D
Benzo(a)pyrene (mg/kg)	0.2	4.7	JD
Benzo(b)fluoranthene (mg/kg)	2	5.9	JD
Dibenz(a,h)anthracene (mg/kg)	0.2	0.81	JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	2.7	JD

I-149-SS-002				
Depth (ft)		0 - 1		0 - 1 (dup)
Compound	LOC	Conc	Conc	
Benzo(a)anthracene (mg/kg)	2	6.3	D	3.5 D
Benzo(a)pyrene (mg/kg)	0.2	7	D	4.1 D
Benzo(b)fluoranthene (mg/kg)	2	9	D	4.5 D
Dibenz(a,h)anthracene (mg/kg)	0.2	1.1	JD	0.69 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	3.4	D	2.1 D

I-149-MW-002				
Depth (ft)		0 - 2		5 - 7
Compound	LOC	Conc	Conc	
Benzo(a)anthracene (mg/kg)	2	11		NE
Benzo(a)pyrene (mg/kg)	0.2	13		0.95
Benzo(b)fluoranthene (mg/kg)	2	20		NE
Dibenz(a,h)anthracene (mg/kg)	0.2	0.99		ND
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	4.4		NE

I-149-MW-001				
Depth (ft)		0 - 2		5 - 7
Compound	LOC	Conc	Conc	
Benzo(a)pyrene (mg/kg)	0.2	0.51		1.2

I-149-SS-003			
Depth (ft)		0 - 1	
Compound	LOC	Conc	
Benzo(a)pyrene (mg/kg)	0.2	1.8	D
Benzo(b)fluoranthene (mg/kg)	2	2.1	D
Dibenz(a,h)anthracene (mg/kg)	0.2	0.28	JD

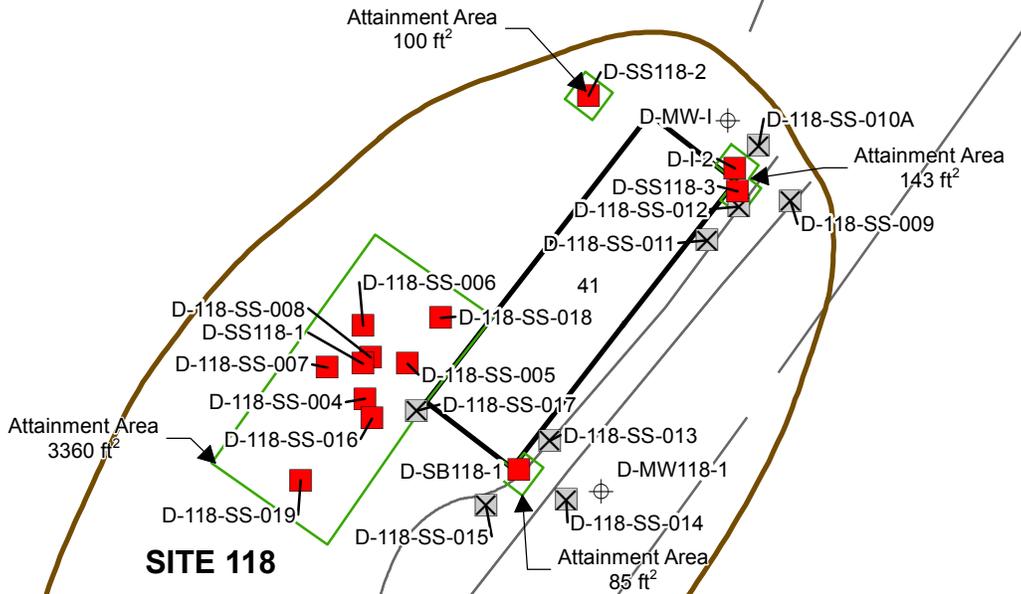
I-149-SB-002				
Depth (ft)		0 - 2		5 - 7
Compound	LOC	Conc	Conc	
2,4-Dinitrotoluene (mg/kg)	3	630		10.3

I-149-SB-001				
Depth (ft)		0 - 2		5 - 7
Compound	LOC	Conc	Conc	
Benzo(a)pyrene (mg/kg)	0.2	0.36		ND
Dibenz(a,h)anthracene (mg/kg)	0.2	0.35		ND

LEGEND

- SURFACE SOIL
- SOIL BORING
- MONITORING WELL
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- FORMER BUILDING
- D ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J ESTIMATED VALUE
- NA NOT ANALYZED
- ND NOT DETECTED
- NE NO EXCEEDANCE

copyright © 2009 SCALE IN FEET PLOT SIZE: 17x22 REV. ISSUED DATE DESCRIPTION	SEAL	 1114 Benfield Blvd. Suite A Millersville, MD 21108 Tel: 410-987-4392 Fax: 410-987-0032 www.arcadis-us.com	PROJECT TITLE PICATINNY ARSENAL NEW JERSEY	PROJECT MANAGER T. LLEWELLYN	DEPARTMENT MANAGER M. MOHIUDDIN	LEAD DESIGN PROF. K. PANHORST	CHECKED BY T. LLEWELLYN
	SHEET TITLE HISTORICAL LOC EXCEEDENCES AT SITE 149/PICA-149 PROPELLANT PLANT				TASK/PHASE NUMBER EA002	DRAWN BY A. FOX	
					PROJECT NUMBER GP06PICA.P001	DRAWING NUMBER 8	



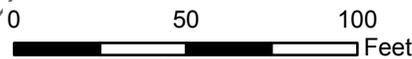
Legend

- Contaminant Concentrations Exceed NJDEP NRDCSRS*
- X Contaminant Concentrations less than NJDEP NRDCSRS*
- Well
- Area of Attainment
- Roads
- Water Bodies
- Building
- Approximate Site Location

Notes:

* - New Jersey Department of Environmental Protection Non-Residential Direct Contact Soil Remediation Standard

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**AREA OF REMEDIAL ACTION
SITE 118/PICA-097
PESTICIDE STORAGE FACILITY
PICATINNY ARSENAL, NEW JERSEY**

PROJECT MANAGER
T. LLEWELLYN

DRAWN
M. GRESS

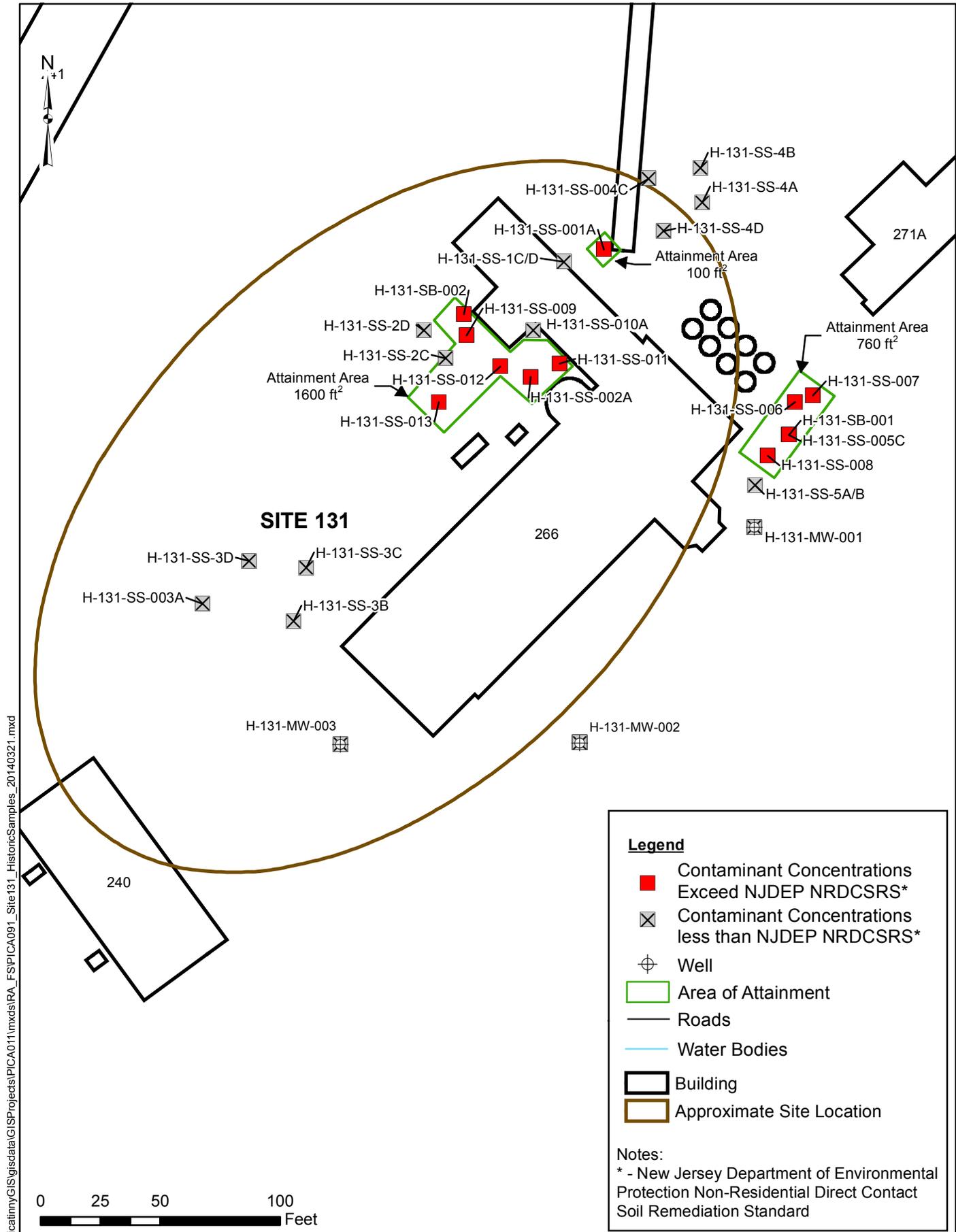
PROJECT NUMBER
GP06PICA.P011.NJ001

DEPARTMENT MANAGER
M. MOHIUDDIN

CHECKED
T. TOBIN

DRAWING NUMBER

9



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Legend

- Contaminant Concentrations Exceed NJDEP NRDCSRS*
- ⊗ Contaminant Concentrations less than NJDEP NRDCSRS*
- ⊕ Well
- ▭ Area of Attainment
- Roads
- Water Bodies
- ▭ Building
- ▭ Approximate Site Location

Notes:
 * - New Jersey Department of Environmental Protection Non-Residential Direct Contact Soil Remediation Standard

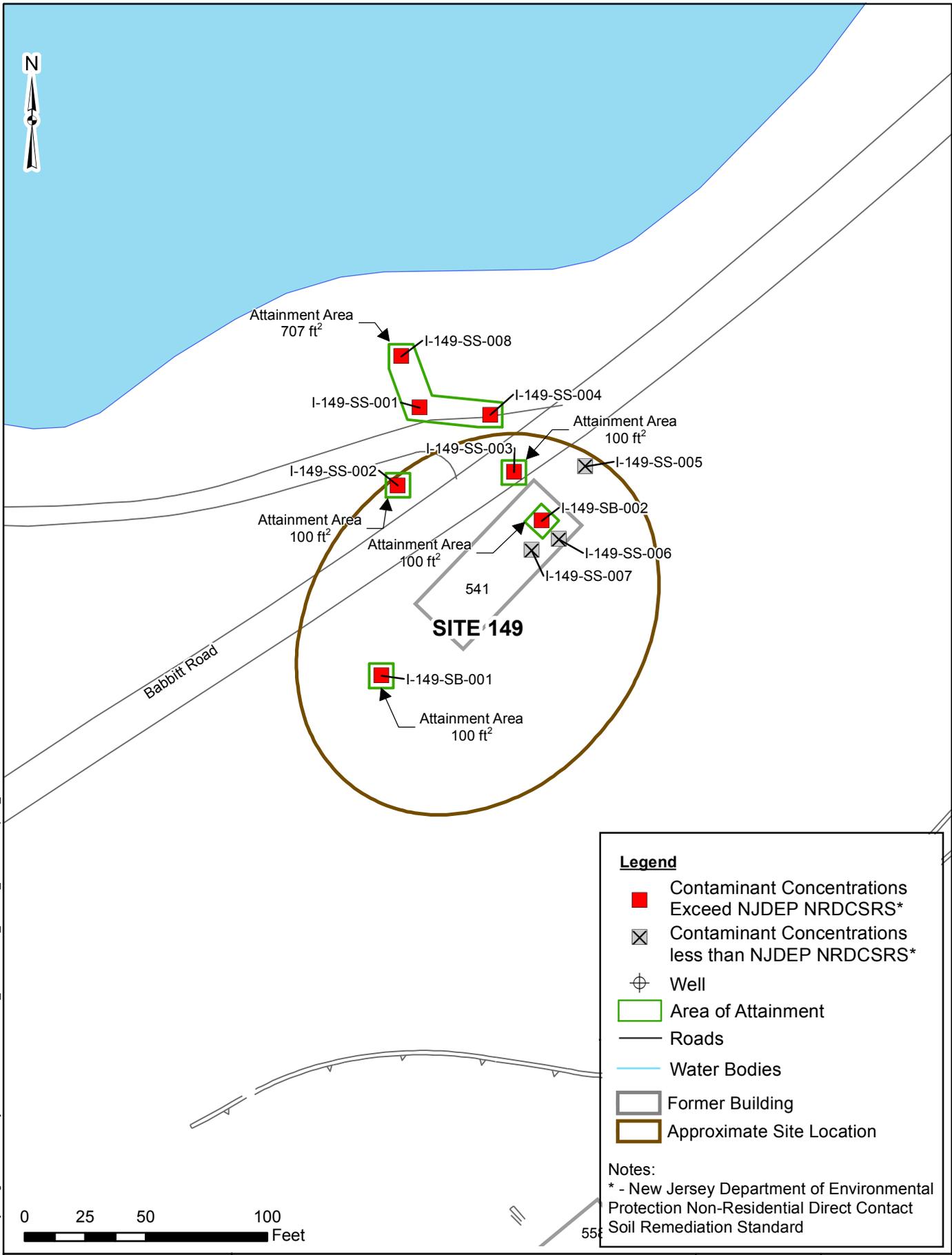


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**AREA OF REMEDIAL ACTION
 SITE 131/PICA-131
 FORMER ORDNANCE MANUFACTURING
 PICATINNY ARSENAL, NEW JERSEY**

PROJECT MANAGER
T. LLEWELLYN
 DRAWN
M. GRESS
 PROJECT NUMBER
GP06PICA.1115.EA001

DEPARTMENT MANAGER
M. MOHIUDDIN
 CHECKED
K. TIPTON
 DRAWING NUMBER
10



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**AREA OF REMEDIAL ACTION
 SITE 149/PICA-149
 PROPELLANT PLANT (FORMER BUILDING 541)
 PICATINNY ARSENAL, NEW JERSEY**

PROJECT MANAGER
 T. LLEWELLYN
 DRAWN
 M. GRESS

DEPARTMENT MANAGER
 M. MOHIUDDIN
 CHECKED
 T. TOBIN

PROJECT NUMBER
 GP06PICA.1115.EA001

DRAWING NUMBER
11