

**Proposed Remedial Action Plan**  
for  
**Site 1 - Northeast**  
**Pond Disposal Area**

**Naval Weapons**  
**Industrial Reserve Plant**  
Calverton, New York



**Engineering Field Activity Northeast**  
**Naval Facilities Engineering Command**  
Contract Number N62472-90-D-1298  
Contract Task Order 0189

February 2002

**PROPOSED REMEDIAL ACTION PLAN**  
**SITE 1 – NORTHEAST POND DISPOSAL AREA**  
**NAVAL WEAPONS INDUSTRIAL RESERVE PLANT**  
**CALVERTON, SUFFOLK COUNTY, NEW YORK**  
**FEBRUARY 2002**

**1.0 SUMMARY AND PURPOSE OF THE PROPOSED PLAN**

The Navy, in consultation with the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency (EPA), is proposing a remedy to address the significant threat to human health and/or the environment created by the presence of hazardous materials at Site 1 – Northeast Pond Disposal Area at Naval Weapons Industrial Reserve Plant (NWIRP) Calverton. As more fully described in Sections 3.0 and 4.0 of this Proposed Remedial Action Plan (PRAP), historical operations that resulted in hazardous material generation at the facility included, but were not limited to, metal finishing processes, maintenance operations, temporary storage of hazardous materials, fueling operations, painting of aircraft and components, and various training operations. Site 1 was used primarily for the disposal of construction and demolition debris (e.g., concrete, brick, wood), aircraft sections, junked aircraft assembly tooling, office materials and furniture, and paint cans. Hazardous materials that may have been disposed include petroleum, oils, lubricants, halogenated and non-halogenated solvents, and paint sludges. Contaminants associated with waste disposal operations include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs), and metals.

Waste disposal activities have resulted in the following significant threats to the public health and/or the environment:

- A significant threat to public health associated with contaminated soil and waste.
- A significant threat to the environment associated with contaminated soil and sediment.

In order to eliminate or mitigate the significant threats to public health and/or the environment that waste disposal at Site 1 may have caused, the following remedy is proposed:

- Excavation and off-site disposal of landfilled waste and contaminated soil.
- Excavation and off-site disposal of contaminated sediment.
- Short-term groundwater monitoring.

The proposed remedy, discussed in detail in Sections 7.0 and 8.0 of this PRAP, is intended to attain the remediation goals selected in Section 6.0, in conformity with applicable standards, criteria, and guidance (SCGs).

This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Navy, in consultation with NYSDEC and Suffolk County Department of Health Services (SCDHS), and New York State Department of Health (NYSDOH), will select a final remedy for the site only after careful consideration of all comments received during the public comment period. This site is not listed on the National Priorities List (NPL). However, a copy of this document will be sent to the USEPA Region II Offices for information.

The Navy has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law and 6 NYCRR Part 375. This PRAP is a summary of the information that can be found in the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), Phase 2 Remedial Investigation (RI) and Focused Feasibility Study (FFS), and other relevant reports and documents available in the document repository.

To better understand the site and investigations conducted, the public is encouraged to review the project documents at the following repository:

Riverhead Free Library  
330 Court Street  
Riverhead, New York 11901  
Hours: Mon to Fri. 9 am – 9 pm  
Sat. 9 am – 5 pm  
Sun. 1 pm – 5 pm (Oct. to May)

The Navy seeks input from the community on all PRAPs. A public comment period has been set from February 13, 2002 to March 15, 2002 to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for February 27, 2002 at the Riverhead Town Hall beginning at 7 pm.

At the meeting, the results of the RFI, Phase 2 RI, and FFS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which you can submit verbal or written comments on the PRAP.

The Navy, in consultation with NYSDEC and SCDHS, may modify the preferred alternative or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and responses provided in the Responsiveness Summary Section of the Decision Document (DD). The DD is the Navy's final selection of the remedy for this site. Written comments may be sent to Mr. James Colter at the address below through March 15, 2002:

Engineering Field Activity, Northeast  
Naval Facilities Engineering Command  
Attn: Code EV2/JLC  
10 Industrial Highway, Mail Stop 82  
Lester, Pennsylvania 19113-2090

## **2.0 SITE LOCATION AND DESCRIPTION**

NWIRP Calverton is located in Suffolk County, Long Island, approximately 80 miles east of New York City (see Figure 1). NWIRP Calverton consists of four separate parcels of land totaling approximately 358 acres. Eight inactive hazardous waste sites or areas are included within these parcels as follows (see Figure 2):

- Parcel A (32 acres): Site 2 – Fire Training Area
- Parcel B1 (40 acres): Site 6A – Fuel Calibration Area and Site 10B – Engine Test House
- Parcel B2 (131 acres): Southern Area
- Parcel C (10 acres): Site 7 – Fuel Depot and Site 10A – Jet Fuel Systems Laboratory
- Parcel D (145 acres): Site 1 – Northeast Pond Disposal Area and Site 9 – ECM Area

Site 1 is located approximately 1,000 feet south of Middle County Road (NY Route 25) and 0.95 mile east of the north gate (see Figure 2). The site consists of a relatively flat borrow and disposal area that covers approximately 2 acres (see Figure 3). The apparent disposal area measures approximately 400 feet by 200 feet and is oriented south-southwest to north-northeast. The top of the disposal area slopes gently from west-southwest to east followed by a steep 15- to 20-foot slope to the adjacent marsh/pond surface (Northeast Pond). The steep slope is unstable, contains sinkholes, and is eroding into the pond. Northeast Pond is glacially formed and approximately 2.3 acres in size. The pond has no outlet. The center of the pond is covered by a thick marsh growth that forms an island. Northeast Pond and the surrounding area have been identified as a highly sensitive archeological area. Prehistoric artifacts from 8,000 to 500 years ago have been identified in the immediate vicinity of Northeast Pond.

### 3.0 SITE HISTORY

#### 3.1 Operational/Disposal History

The former NWIRP Calverton was owned by the Navy since the early 1950s and originally consisted of approximately 6,000 acres. The Northrop Grumman Corporation (formerly Grumman Aerospace Corporation) was the sole operator of the facility, which was known as a government-owned, contractor-operated (GOCO) facility. The facility was used in the testing, refitting, and retrofitting of combat naval aircraft. Northrop Grumman ceased operations in February 1996. In September 1998, the majority of land within the fenced-in portion of the facility was transferred to the Town of Riverhead for redevelopment. Because of the need for additional environmental investigations and the potential need for remediation, the Navy retained the four parcels of land within the developed section listed above. In September 1999, an additional 2,935 acres of undeveloped land outside the fenced areas was transferred to NYSDEC who will continue to manage the property for resource development and recreational uses. An additional 140 acres of the northwest buffer zone was transferred to the Veteran's Administration (VA) for expansion of the Calverton National Cemetery.

Site 1 – Northeast Pond Disposal Area was used primarily for the disposal of demolitions debris and other construction materials (e.g., concrete, brick, wood) until 1984. Other materials reportedly disposed include junked aircraft assembly tooling, office materials and furniture, pallets, and paint cans. Hazardous materials are not known to have been purposefully disposed in the area. However, it was reported that any of the following wastes might be present at the site: petroleum, oils, lubricants, asphalt paving material, halogenated and non-halogenated solvents, and paint sludges.

The wastes were placed in a depression adjacent to Northeast Pond, and some waste may have been used to fill portions of the pond. Soil borrowed from an adjacent hillside was used as cover material, creating a level area approximately 2 acres in size with steep embankments up to 20 feet high leading into the pond from the eastern edge of the disposal area. A final soil cover was placed over the landfill in 1984.

No exposed wastes were observed on the surface or eastern embankment of the fill area during the field investigations. A small amount of debris (e.g., concrete chunks, wood scraps, metal pieces) was exposed on the embankment leading into the woods from the southern edge of the fill area. Also, sink holes have begun to appear over the last few years which now represents a significant physical hazard.

### **3.2 Remedial History**

The work at Site 1 is part of the Navy's Installation Restoration (IR) Program, which is designed to identify contamination at Navy and Marine Corps lands and facilities resulting from past operations and to institute corrective measures, as needed. There are typically four distinct stages. Stage 1 is the Preliminary Assessment (PA), which was formerly known as the Initial Assessment Study (IAS). Stage 2 is a RCRA Facility Assessment – Sampling Visit (RFA), which is also referred to as a Site Investigation (SI), which augments the information collected in the PA. Stage 3 is the RFI/Corrective Measures Study (CMS), also referred to as an RI/FS, which characterizes contamination at a facility and develops options for remediation of a site. Stage 4 is the Corrective Action, also referred to as the Remedial Action, which results in the control or cleanup of contamination at sites.

An IAS (or PA) was performed for the NWIRP Calverton facility in 1986. This study identified seven potential areas of concern, including Site 1. A follow-up SI (or RFA) was conducted for seven sites, including Site 1.

An RFI (or RI) was conducted in 1994 and 1995 to identify the nature and extent of contamination that was found in previous investigations and estimate potential risks to human health and the environment. A Phase 2 RI (or Phase 2 RFI) was conducted in 1997 to fill data gaps identified after the previous RFI.

An FFS was conducted in 2001 to develop and evaluate remedial alternatives to address the contamination and risks to human health and the environment.

### **3.3 Enforcement History**

NWIRP Calverton is listed on the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites. Remedial work at the facility is being done in accordance with a State RCRA permit.

The RFI and Phase 2 RI were conducted in accordance with the requirements of the previous New York State RCRA Hazardous Waste Permit for the facility (NYSDEC 1-4730-00013/00001-0) dated March 25, 1992. The NYSDEC was the lead oversight agency. The work was also conducted in accordance with the previous EPA facility permit (EPA ID Number NYD003995198) dated May 11, 1992. The EPA supported NYSDEC in its oversight activities. The requirements of both permits are basically the same, although the terminology and format varied.

The FFS was conducted in accordance with the requirements of the NYSDEC Division of Solid & Hazardous Materials Part 373 Permit that was re-issued to the Navy on April 18, 2000, under the NYSDEC implementing regulations (6 NYCRR Part 621). This permit supercedes and replaces the

original Part 373 Permit to Operate a Hazardous Waste Storage Facility that was issued to then Grumman Aerospace Corporation on March 25, 1992. The new permit, issued only to the Department of the Navy, deals exclusively with those Solid Waste Management Units that remain on the former NWIRP Calverton property and any corrective actions that may be required to adequately address each site. Although the Part 373 Permit is the enforceable document governing the Navy's remedial actions, the NYSDEC State Superfund group, located in the Albany office, retains primary responsibility for regulatory oversight of the Navy's actions. As such, the Navy has agreed to a request by the NYSDEC State Superfund group to utilize terminology associated with the NYSDEC State Superfund program that is closely related to the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The CERCLA terminology parallels the RCRA terminology. The implementation phases of each program have been determined to meet the substantive requirements of both programs and will also satisfy the corrective action requirements included in Module III of the Part 373 Permit.

#### **4.0 SITE CONTAMINATION**

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by hazardous materials, the Navy has conducted an RI/FS for Site 1.

#### **4.1 Summary of the Remedial Investigation**

The purpose of the RI was to define the nature and extent of soil and sediment contamination resulting from previous activities at Site 1. The RI was conducted in two phases. The first phase was conducted in 1994 and 1995, and the second phase was conducted in 1997. Two reports entitled "RCRA Facility Investigation for Naval Weapons Industrial Reserve Plant, Calverton, New York, August 1995," and "Phase 2 Remedial Investigation and Focused Feasibility Study for Site 1 – Northeast Pond Disposal Area, Naval Weapons Industrial Reserve Plant, Calverton, New York, July 2001," describe the field activities and findings of the RIs in detail.

An FFS, which is the subject of this PRAP, was prepared to address soil and sediment contamination. A report entitled "Phase 2 Remedial Investigation and Focused Feasibility Study for Site 1 – Northeast Pond Disposal Area, Naval Weapons Industrial Reserve Plant, Calverton, New York, July 2001," describes the development and analysis of alternatives in detail.

The following investigatory techniques were used to achieve the goals for the RIs:

- Test pits were excavated to delineate the nature and extent of the fill material.

- Soil samples were collected from various locations throughout the site to identify the nature and extent of soil contamination related to waste disposal activities.
- Sediment samples were collected to identify impacts to Northeast Pond.
- Samples of benthic organisms were collected from Northeast Pond and a nearby reference pond and analyzed for diversity and abundance.

To determine whether soil and sediment were contaminated at levels of concern, the RI analytical data were compared to environmental SCGs. Soil SCGs are based on the NYSDEC Technical and Administrative Guidance Memorandum on Determination of Soil Clean-up Objectives and Soil Clean-up Levels (TAGM 4046). Soil SCGs are based on protection of groundwater and protection of human health. Groundwater SCGs are based on Federal drinking water standards, Part 5 of the New York State Sanitary Code (state drinking water standards), and NYSDEC ambient groundwater quality standards and guidance values. Surface water SCGs are based on NYSDEC ambient surface water quality standards and guidance values. Sediment SCGs are based on NYSDEC Technical Guidance for Screening Contaminated Sediments.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, the soil and sediment required remediation. The RI results are summarized below. More detailed information can be found in the RFI and Phase 2 RI/FFS reports on file in the document repository.

#### **4.1.1 Site Geology and Hydrogeology**

NWIRP Calverton is underlain by the following five geologic/hydrogeologic formations (descending from ground surface):

- Upper Glacial Formation (Upper Glacial aquifer) consisting of silty, fine-grained sand with varying amounts of peat and clay near the ground surface and fine-grained sand with varying amounts of medium- to coarse-grained sand and pebbles farther below the ground surface.
- Magothy Formation (Magothy aquifer) consisting of stratified, fine to coarse sand and gravel.
- Raritan Clay Member of the Raritan Formation consisting of clay and silty clay

- Lloyd Sand Member of the Raritan Formation (Lloyd Sand aquifer) consisting of fine to coarse sand and gravel.
- Bedrock.

The Upper Glacial Formation, Magothy Formation, and Lloyd Sand are the major regional aquifers and a sole source of drinking water for residents of Long Island. The Upper Glacial and Magothy aquifers are of principal importance in Suffolk County because of their proximity to the land surface. They are used the most as a source of drinking water. The Lloyd Sand aquifer is not widely used because of its depth and the abundant water available in the overlying aquifers. The Upper Glacial and Magothy aquifers are believed to be hydraulically interconnected and to function as a single unconfined aquifer. The confining nature of the Raritan Clay is believed to minimize potential contamination to the underlying Lloyd Sand aquifer.

#### **4.1.2 Nature of Contamination**

As described in the RFI and Phase 2 RI/FFS reports, soil and sediment samples were collected at the site to characterize the nature and extent of contamination.

A summary of the surface water analytical data generated during the RI is presented in Table 2. Surface water contaminants that exceeded SCGs are one pesticide and one metal. The concentration of the pesticide 4,4'-DDD exceeded the SCG at three locations, and the concentration of the metal iron exceeded the SCG at four locations. The VOC toluene was detected at one location at a concentration below the SCG. No other organic compounds were detected in pond water.

A summary of the sediment analytical data generated during the RI is presented in Table 4. Sediment contaminants that exceeded SCGs include a VOC, a SVOC, pesticides, PCBs, and metals. The VOC is toluene, and the SVOC is bis(2-ethylhexyl)phthalate. Pesticides include 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and endrin. The PCBs include Aroclor 1248 and Aroclor 1260. The metals include cadmium, lead, nickel, and silver. Exceedances of SCGs for pesticides, PCBs, and metals were more numerous than for VOCs and SVOCs.

#### **4.1.3 Extent of Contamination**

The soil contaminants were detected throughout the fill material. The estimated areal extent of fill material is approximately 70,000 square feet (1.6 acres). At an average depth of 8.0 feet, the estimated volume of fill material is 21,000 cubic yards.

Sediment contamination was generally detected in samples collected between the landfill bank and the island in Northeast Pond. The concentrations of chemicals detected in sediment decrease by approximately a factor of 10 from the shallowest samples (0 to 6 inches deep) and the deepest sediment (18 to 24 inches). The estimated extent of sediment contamination is approximately 17,740 square feet (0.4 acre). At an average depth of 2.0 feet, the estimated volume of contaminated sediment is 1,315 cubic yards.

#### **4.2 Interim Remedial Measures**

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. The only interim remedial measure conducted at Site 1 was off-site disposal of a drum of waste. A buried drum was encountered during the RFI test pit program. Testing of the drum contents and adjacent soil detected a relatively high concentration of 1,1,1-trichloroethane. The drum was excavated, placed in an overpack container, and disposed off site in the spring of 1995. Confirmation sampling was not conducted. No other remedial actions have been conducted.

#### **4.3 Summary of Human Exposure Pathways**

This section describes the types of human exposures that may present added health risks to persons at or around the site. A baseline human health risk assessment was conducted as part of the RFI. A more detailed discussion of the potential health risks can be found in Section 4.6, Baseline Risk Assessment, of the RFI Report.

An exposure pathway is the manner by which an individual may be exposed to a contaminant. The five elements of an exposure pathway are as follows: source of contamination, environmental media and transport mechanisms, point of exposure, route of exposure, and receptor population. These elements of an exposure pathway may be based on current or future events.

The potential receptors evaluated for the current land use scenario were a maintenance worker performing tasks near Site 1 and a hypothetical adolescent recreational user. The exposure pathway for the maintenance worker includes direct contact with (dermal absorption) and ingestion of contaminated soil 250 days per year over a 25 year period. The exposure pathway for the adolescent recreational use includes direct contact with (dermal absorption) and ingestion of surface water and sediment. According to the risk assessment, no unacceptable health risks to current workers or hypothetical recreational users would be expected.

Risks to hypothetical receptors assuming a future residential land use scenario were also evaluated. The exposure pathways for this receptor are direct contact with (dermal absorption) and ingestion of contaminated soil. Noncarcinogenic health risks were identified for exposure to soil

#### **4.4 Summary of Environmental Exposure Pathways**

A variety of ecological receptors could potentially be exposed to chemicals in soil and sediment. Aquatic biota, benthic macroinvertebrates, fish, amphibians, and emergent wetland vegetation may be exposed to chemicals that have migrated into the pond.

A preliminary ecological risk characterization was conducted during the Phase 2 RI. The ecological risk evaluation eliminated most of the chemicals detected in Northeast Pond from further consideration. However, toluene, several SVOCs, several pesticides/PCBs, cadmium, lead, nickel, and silver in sediment could represent potential ecological risk. For surface soil on the landfill cover, chromium and PCBs represent a potential ecological risk.

Although the potential for ecological risks from exposure to pond water and sediment has been identified, the results of a benthic macroinvertebrate investigation did not indicate adverse impacts. The diversity of feeding groups suggests a normally functioning ecological community.

#### **5.0 ENFORCEMENT STATUS**

The RCRA permit issued to the Department of the Navy deals with those Solid Waste Management Units that remain on the former NWIRP Calverton property and any corrective actions that may be required to adequately address each site.

#### **6.0 SUMMARY OF REMEDIATION GOALS**

The overall remedial goal is to meet all SCGs and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the chemicals detected at the site through the proper application of scientific and engineering principals.

The remediation goals selected for soil at this site are as follows:

- Prevent human exposure (ingestion, dermal contact, dust inhalation) to contaminated soil in concentrations greater than soil SCGs.

- Prevent ecological receptor exposure to contaminated soil.
- Prevent leaching of contaminants at resultant groundwater concentrations in excess of groundwater SCGs.
- Comply with chemical-, location-, and action-specific applicable or relevant and appropriate requirements (ARARs) and guidance.

The remediation goals selected for sediment at this site are as follows:

- Prevent contact of contaminated sediment with surface water and aquatic life.
- Comply with chemical-, location-, and action-specific ARARs and guidance.

Contaminated surface water is believed to only be associated with contaminated sediment and does not represent a separate contaminated medium. Therefore, remediation of the contaminated sediment should also address the surface water.

## **7.0 SUMMARY OF THE EVALUATION OF ALTERNATIVES**

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions, alternative technologies, or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for Site 1 were identified, screened, and evaluated in the report entitled "Phase 2 Remedial Investigation and Focused Feasibility Study for Site 1 – Northeast Pond Disposal Area, Naval Weapons Industrial Reserve Plant, Calverton, New York, July 2001."

Remedial alternatives for waste, soil, and sediment were developed and evaluated in the FS.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to put the remedy in place. It does not include the time required to design the remedy or procure contracts for design and construction.

### **7.1 Description of Remedial Alternatives**

The potential remedies are intended to address waste, contaminated soil, and contaminated sediment at the site.

### **7.1.1 Alternative 1: No Action**

This alternative is the baseline alternative to which the other alternatives will be compared. Under this alternative, no additional remedial actions would be implemented. This alternative would leave the site in its present condition and would not provide any additional protection of human health or the environment. There are no costs associated with the no-action alternative.

### **7.1.2 Alternative 2: Bank Stabilization and Capping**

This alternative consists of bank stabilization, sediment removal, capping, and institutional controls (i.e., monitoring and site development restrictions). Alternative 2 is a containment alternative developed to minimize direct human and ecological receptor exposure to contaminated material, minimize contaminant transport through precipitation infiltration, and prevent continue erosion of contaminants into Northeast Pond. Regrading of the site would be conducted to achieve acceptable cap sub-grade slopes to ensure a final stable grade. Visible sinkholes in the slopes would be filled with flowable grout. Oversize material that may be encountered during excavation and could not be consolidated within the landfill would be disposed off site. Any hazardous waste encountered near the location of a former buried drum would be excavated and disposed at an off-site RCRA landfill.

Contaminated sediment would be removed to an average depth of 2 feet between the toe of the east slope and the island in Northeast Pond. The sediment would be dewatered (or otherwise stabilized) and placed on top of, or consolidated within, the regraded landfill.

A cap system with an impermeable geosynthetic membrane would be constructed on top of the regraded landfill. The cap would be constructed in accordance with New York State solid waste management regulations. Temporary erosion and sediment controls would be placed near the pond to minimize the potential for contaminants to migrate to the pond during construction. Permanent erosion controls would also be constructed. Drainage channels would be installed north and south of the site to provide run-on and runoff controls.

Deed restrictions on land use would be implemented to ensure that the cap is not disturbed or damaged. Site development restrictions would be included in the NWIRP Calverton facility transfer documents. Fencing would be constructed if necessary to control unauthorized access to the site. Long-term groundwater monitoring would be conducted to determine the effectiveness of the remedy and whether there have been any releases to groundwater from the capped landfill. Monitoring would be conducted quarterly for the first year and annually thereafter. A reevaluation of the site would be performed every 5 years to determine whether any changes to the controls or remedy would be required.

The estimated costs for Alternative 2 are as follows:

Capital Cost:	\$2,103,000
Annual O&M Cost:	\$74,000 (Year 1); \$25,000 (Years 2 through 30); \$20,000 (every 5 years)
Present Worth:	\$2,505,000

### **7.1.3 Alternative 3: Excavation and Off-Site Disposal**

Alternative 3 is a removal alternative developed to eliminate direct human and ecological receptor exposure to contaminated material, contaminant transport through precipitation infiltration, and erosion of contaminants into Northeast Pond. All landfill materials, contaminated soil, and contaminated sediment would be excavated and transported off site for disposal. The landfill area would not be backfilled, and the site would be returned to approximate pre-fill conditions and revegetated.

Long-term groundwater monitoring would not be required because the sources of contamination would be removed. However, short-term monitoring would be conducted to evaluate source removal on groundwater quality. If groundwater quality does not improve, groundwater use restrictions would need to be implemented.

The estimated costs for Alternative 3 are as follows:

Capital Cost:	\$6,268,000
Annual O&M Cost:	\$65,000 (Year 1 only)
Present Worth:	\$6,329,000

## **7.2 Evaluation of Remedial Alternatives**

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous substance sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Phase 2 RI/FFS.

The first two evaluation criteria are termed threshold criteria and must be satisfied for an alternative to be considered for selection. The next five primary balancing criteria are used to compare the positive and negative aspects of each of the remedial strategies. The final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the PRAP have been received.

### **7.2.1 Compliance with New York State Standards, Criteria, and Guidance**

Compliance with SCGs addresses whether or not a remedy will meet applicable laws, regulations, standards, and guidance. The most significant soil SCGs for this PRAP is the NYSDEC Technical and Administrative Guidance Memorandum on Determination of Soil Clean-up Objectives and Soil Clean-up Levels (TAGM 4046). The most significant groundwater SCGs are the New York State Drinking Water Supply Regulations (10 NYCRR Part 5) and the NYSDEC Groundwater Quality Standards. The most significant surface water SCGs are the NYSDEC Surface Water Quality Standards (6 NYCRR Parts 701 and 702). The most significant sediment SCGs is the NYSDEC Technical Guidance for Screening Contaminated Sediments. The most significant SCG for the landfill is the New York State Waste Management Facilities Rules (6 NYCRR Part 360). New York Freshwater Wetland Regulations (6 NYCRR Parts 662 to 664) provide regulations to preserve, protect, and conserve wetlands. New York State Environmental Quality Review (6 NYCRR Part 617) is required for actions that could affect any prehistoric site.

Alternative 1 would not be compliant with SCGs for soil or sediment.

Alternative 2 is expected to comply with all SCGs. The cap system would be compliant with state regulations for closure of solid waste landfills. Landfill waste, soil, and sediment with contaminant concentrations higher than SCGs would be contained beneath a cap. Work in the wetlands would comply with state wetlands regulations. Actions would be taken to identify, recover, and preserve prehistoric artifacts prior to site activities and during excavation.

Alternative 3 is expected to comply with all SCGs. Landfill waste and soil and sediment with contaminant concentrations higher than SCGs would be removed from the site. Work in the wetlands would comply with state wetlands regulations. Actions would be taken to identify, recover, and preserve prehistoric artifacts prior to site activities and during excavation.

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

This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Under current conditions, Alternative 1 would be partially protective of human health because site groundwater is not used as a source of drinking water. However, the sinkholes and unstable bank represent potential physical hazards. This alternative would not protect human health if groundwater is used for potable purposes in the future. Alternative 1 would not be protective of the environment because

there may be unacceptable risks to ecological receptors. Landfill materials could continue to erode into the pond and would remain as a potential source of groundwater contamination. In addition, the potential for off-site contamination would not be monitored.

Alternative 2 would protect human health and the environment by regrading and stabilizing the bank, removing contaminated sediment, capping the landfill, and limiting site access, land use, and groundwater use. The contaminant concentrations at the site and the potential for contaminant migration would be monitored.

Alternative 3 would protect human health and the environment by removing all landfill material, contaminated soil, and contaminated sediment. Groundwater use restrictions would be implemented if necessary. Short-term monitoring would be conducted to determine whether such restrictions are needed.

### **7.2.3 Short-term Effectiveness**

The potential short-term adverse impacts on the remedial action upon the community, the workers, and the environment during construction and implementation are evaluated. The length of time needed to achieve the remedial objectives is estimated and compared against the other alternatives.

No short-term impacts to the community, workers, or environment would be expected to occur as a result of implementing Alternative 1.

The remedial activities associated with construction of the cap (Alternative 2) are not expected to have an adverse impact on the community. Off-site transport of large quantities of waste (especially for Alternative 3) would cause additional traffic and the potential for spills. For both alternatives, the material could be hauled several hundred miles to the disposal facility.

Short-term impacts to the workers from potential exposure to contaminated media under Alternatives 2 and 3 would be controlled by the use of personal protective equipment and appropriate health and safety training.

Removal of contaminated sediment under Alternatives 2 and 3 would have a short-term impact on the wetlands in the area. It is expected that the wetlands would naturally reestablish. Erosion controls would be provided during implementation of both alternatives to prevent additional contamination of the pond.

It is expected that the remedial objectives could be achieved in 6 months for Alternative 2 and 15 months for Alternative 3.

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

This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If waste or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: the magnitude of the remaining risks, the adequacy of the controls intended to limit the risk, and the reliability of these controls.

Alternative 3 would be the most protective over the long term because landfill waste, soil, and sediment contaminants would be permanently removed from the site. Potential future leaching of contaminants from landfill soils to groundwater may lead to the implementation of groundwater use restrictions if those potential sources are not removed.

Alternative 2 would be less effective in the long term because the waste, soil, and sediment would remain on site. However, the long-term effectiveness of this alternative would be monitored, and corrective measures could be taken if necessary. Land use controls would be needed to restrict land use, and groundwater use restrictions would be needed to restrict groundwater use.

The land and groundwater use restrictions under Alternative 2 (and Alternative 3 if needed) would be protective over the long term provided they are enforced. Protection would depend on the effective administration and management of the facility transfer documents.

Alternative 1 would not be effective over the long term.

#### **7.2.5 Reduction of Toxicity, Mobility, or Volume**

Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.

None of the alternatives includes treatment to reduce the toxicity, mobility, or volume.

#### **7.2.6 Implementability**

The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

All the remedial alternatives are implementable. There are no implementability concerns for Alternative 1 because no action would be taken.

Equipment and services necessary to implement Alternatives 2 and 3 are readily available. There is sufficient off-site disposal capacity for the anticipated quantities of oversized debris and hazardous waste for Alternative 2 and the much larger quantity of waste, soil, and sediment for Alternative 3. For both alternatives, material shipped off site for disposal would require transportation over potentially long distances because no landfill facilities are available on Long Island. Transportation would need to be conducted in compliance with DOT regulations for both alternatives.

The land and groundwater use restrictions for Alternative 2 and the groundwater use restrictions potentially needed for Alternative 3 are expected to be readily implementable because the site is located within a controlled facility. These restrictions would involve legal assistance and regulatory approval. Provisions would be defined in and enforced through NWIRP Calverton transfer documents.

#### **7.2.7 Cost**

Capital and annual operation and maintenance costs are estimated for each alternative and compare on a present worth basis. Although cost is the last balancing criteria evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs of each alternative are presented in Table 3.

#### **7.2.8 Community Acceptance**

Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A Responsiveness Summary will be prepared that describes public comments received and the manner in which the Navy will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

### **8.0 SUMMARY OF THE PROPOSED REMEDY**

Based upon the results of the RI/FS, the evaluation presented in Section 7.0, and the reasons presented below, the Navy is proposing Alternative 3, as described in detail in this PRAP. The selected remedy, Alternative 3, consists of excavating all landfill waste, contaminated soil, and contaminated sediment with subsequent off-site disposal. Short-term groundwater monitoring would be conducted to determine the impacts, if any, that excavation of the landfill will have on groundwater quality and whether groundwater use restrictions will be necessary.

The Alternative 3 selection is based on the evaluation of each of the three alternatives developed for this site. It was determined that Alternative 3 would meet SCGs, prevent exposure to site-related contaminants in the soil and sediment, and prevent deterioration of downgradient groundwater conditions. The remedial goal for attainment of groundwater and surface water SCGs would be met, to the extent practicable.

The estimated present worth cost to implement the remedy proposed in this PRAP is \$6,329,000. The cost to construct the remedy is estimated to be \$6,268,000. The estimated annual cost for monitoring is \$65,000 for Year 1 only.

The elements of the proposed remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide details necessary for the construction and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved.
- Some of the excavated material may also be classified as a hazardous waste. Based on preliminary estimates, approximately 2,000 cubic yards of contaminated soil and fill materials has the potential to be classified as a hazardous waste. Material determined to be a hazardous waste would be excavated and transported to an off-site hazardous waste treatment/disposal facility.
- Excavate all landfill waste and contaminated soil and haul to an off-site landfill. Based on preliminary estimates, approximately 21,000 cubic yards of material would be excavated and disposed off site. The extent of fill material and soil contamination is shown on Figures 4 and 5. Includes requirement of an environmentally-trained archeologist to oversee the excavation to insure that no artifacts of archeological significance are disturbed.
- Excavate contaminated sediment to an estimated average depth of 2 feet between the toe of the east face of the landfill and the Northeast Pond island. Approximately 0.4 acre (1,315 cubic yards) of pond sediment would be excavated, dewatered or otherwise stabilized, and hauled off site for disposal. The extent of sediment contamination is shown on Figure 6.
- Restore the site to pre-landfill conditions. This will result in allowing the boundaries of the current wetlands to expand into areas previously occupied by the landfill.

- Limited groundwater monitoring to determine whether groundwater contaminant concentrations have decreased once the source is removed. Groundwater use controls would need to be implemented if this does not occur.
- Cutting back of the hill located on the western site of the landfill to eliminate the "cliff" that will be developed after removal of the landfill material. This will allow for both a safe and stable slope of the hillside from different points of elevation.

## GLOSSARY OF TERMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measures Study
DD	Decision Document
EPA	U.S. Environmental Protection Agency
FFS	Focused Feasibility Study
GOCO	government owned, contractor operated
IAS	Initial Assessment Study
IR	Installation Restoration
IRM	interim remedial measure
NPL	National Priorities List
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PRAP	Proposed Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SCDHS	Suffolk County Department of Health Services
SCGs	standards, criteria, and guidance
SI	Site Investigation
SVOC	semivolatile organic compound
VA	Veterans Administration
VOC	volatile organic compound

TABLE 1

NATURE AND EXTENT OF SOIL CONTAMINATION  
 SITE 1 – NORTHEAST POND DISPOSAL AREA  
 NWIRP CALVERTON, NEW YORK  
 PAGE 1 OF 2

Chemical	Frequency of Detection	Range of Positive Detections	Frequency Exceeding SCGs/PRGs	SCG/PRG
<b>Volatile Organics (µg/kg)</b>				
Benzene	1/9	2	0/9	6
1,1-Dichloroethane	1/9	340	1/9	20
1,1-Dichloroethene	1/9	8	0/9	40
1,2-Dichloroethane	1/9	40	1/9	10
1,2-Dichloroethene	1/9	2	0/9	30
Styrene	2/9	0.3 – 3	0/9	NA
1,1,2,2-Tetrachloroethane	3/9	0.7 – 10	0/9	60
Tetrachloroethene	2/9	4 - 10	0/9	140
1,1,1-Trichloroethane	1/9	120	1/9	76
1,1,2-Trichloroethane	1/9	35	0/9	NA
Trichloroethene	3/9	31 – 240	2/9	70
<b>Semivolatile Organics (µg/kg)</b>				
Benzo(a)anthracene	3/16	36 - 140	0/16	330
Benzo(a)pyrene	5/16	19 – 110	0/16	330
Benzo(b)fluoranthene	6/16	18 – 120	0/16	330
Benzo(g,h,i)perylene	2/16	28 – 41	0/16	330
Benzo(k)fluoranthene	4/16	28 – 120	0/16	330
Bis(2-ethylhexyl)phthalate	4/16	21 – 97	0/16	50,000
Butylbenzyl phthalate	5/16	32 – 270	0/16	50,000
Carbazole	1/16	380	0/16	NA
Chrysene	5/16	19 – 94	0/16	330
Di-n-butyl phthalate	6/16	20 – 270	0/16	810
Diethyl phthalate	3/16	25 – 50	0/16	710
Fluoranthene	9/16	20 – 230	0/16	50,000
Indeno(1,2,3-cd)pyrene	3/16	27 – 62	0/16	330
Phenanthrene	3/16	52 – 150	0/16	50,000
Pyrene	10/16	20 – 240	0/16	50,000
<b>Pesticides/PCBs (µg/kg)</b>				
Aldrin	10/31	0.46 – 24	0/31	41
alpha-Chlordane	4/31	0.67 – 11	0/31	200
beta-BHC	1/31	0.78	0/31	20
4,4'-DDD	7/31	0.52 – 45	0/31	770
4,4'-DDE	17/31	0.72 – 25	0/31	440

TABLE 1

**NATURE AND EXTENT OF SOIL CONTAMINATION  
SITE 1 – NORTHEAST POND DISPOSAL AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 2 OF 2**

Chemical	Frequency of Detection	Range of Positive Detections	Frequency Exceeding SCGs/PRGs	SCG/PRG
4,4'-DDT	19/31	0.56 – 180	0/31	250
Dieldrin	2/31	1.1 – 8.4	0/31	10
Endosulfan I	1/31	3.3	0/31	90
Endrin aldehyde	3/31	2.3 – 7.8	0/31	NA
Endrin ketone	7/31	0.68 – 1.3	0/31	NA
gamma-Chlordane	10/31	0.43 – 15	0/31	540
Heptachlor	1/31	0.63	0/31	10
Methoxychlor	2/31	2.5 – 9.7	0/31	10,000
Aroclor 1242	1/31	110	0/31	1,000
Aroclor 1248	14/31	15 – 2,500	1/31	1,000
Aroclor 1254	15/31	21 – 2,900	1/31	1,000
Aroclor 1260	10/31	27 - 460	0/31	1,000
<b>Metals (mg/kg)</b>				
Antimony	10/31	47.7	3/31	SB
Cadmium	26/31	2.5	2/31	1 or SB
Chromium	31/31	150	7/31	10 or SB
Lead	21/31	3,490	14/31	SB
Selenium	11/31	1.0	4/31	2 or SB
Silver	18/31	320	11/31	SB

NA not available  
SB site background

**TABLE 2**

**NATURE AND EXTENT OF SEDIMENT CONTAMINATION  
SITE 1 – NORTHEAST POND DISPOSAL AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 1 OF 2**

<b>Chemical</b>	<b>Frequency of Detection</b>	<b>Concentration Range</b>	<b>Frequency Exceeding SCG/PRG</b>	<b>SCG/PRG</b>
<b>Volatile Organics (µg/kg)</b>				
2-Butanone	1/14	83	0/14	NA
1,1-Dichloroethane	1/14	18	0/14	NA
Toluene	5/14	2 – 610	1/14	49
1,1,1-Trichloroethane	2/14	1 – 7	0/14	NA
<b>Semivolatile Organics (µg/kg)</b>				
Benzo(a)anthracene	3/23	39 – 75	0/23	330
Benzo(a)pyrene	1/23	66	0/23	NA
Benzo(b)fluoranthene	4/23	38 - 63	0/23	NA
Benzo(k)fluoranthene	3/23	48 - 83	0/23	NA
Bis(2-ethylhexyl)phthalate	11/23	81 – 1,100	1/23	330
Butylbenzyl phthalate	4/23	56 – 260	0/23	NA
Chrysene	4/23	49 – 62	0/23	NA
Fluoranthene	8/23	36 – 140	0/23	1,020
4-Methylphenol	1/23	53	0/23	330
Phenanthrene	6/23	41 - 99	0/23	330
Phenol	2/23	44 – 46	0/23	330
Pyrene	8/23	43 - 200	0/23	961
1,2,4-Trichlorobenzene	1/23	61	0/23	91
<b>Pesticides/PCBs (µg/kg)</b>				
Aldrin	4/23	1.6 – 5.3	0/23	8
alpha-Chlordane	5/23	0.48 – 1.6	0/23	80
beta-BHC	2/23	0.41 – 2.4	0/23	8
4,4'-DDD	9/23	1.2 – 2,000	4/23	16
4,4'-DDE	11/23	1.6 – 380	3/23	16
4,4'-DDT	3/23	2.3 – 900	1/23	16
Endosulfan I	1/23	0.79	0/23	16
Endrin	2/23	4.5 – 11	1/23	8
Endrin aldehyde	3/23	5.4 – 21	0/23	NA
gamma-Chlordane	5/23	0.71 - 28	0/23	80
Heptachlor epoxide	2/23	4.1 – 7.1	0/23	8
Aroclor 1248	6/23	76 – 380	3/23	160
Aroclor 1254	2/23	76 – 93	0/23	160
Aroclor-1260	3/23	130 – 730	2/23	160

TABLE 2

NATURE AND EXTENT OF SEDIMENT CONTAMINATION  
 SITE 1 – NORTHEAST POND DISPOSAL AREA  
 NWIRP CALVERTON, NEW YORK  
 PAGE 2 OF 2

Chemical	Frequency of Detection	Concentration Range	Frequency Exceeding SCG/PRG	SCG/PRG
<b>Metals (mg/kg)<sup>(1)</sup></b>				
Cadmium	5/23	0.32 – 4.1	2/23	0.6 <sup>(2)</sup> /9.0 <sup>(3)</sup>
Lead	16/23	3.0 – 136	1/23	31 <sup>(2)</sup> /110 <sup>(3)</sup>
Nickel	9/23	5.7 – 23	1/23	16 <sup>(2)</sup> /50 <sup>(3)</sup>
Selenium	6/23	0.73 – 2.3	0/23	NA
Silver	4/23	1.1 – 28.2	4/23	1.0 <sup>(2)</sup> /2.2 <sup>(3)</sup>

- NA Not available.  
 1 Only includes metals detected above background levels.  
 2 Lowest effect level.  
 3 Sever effect level.

TABLE 3

REMEDIAL ALTERNATIVE COSTS  
SITE 1 – NORTHEAST POND DISPOSAL AREA  
NWIRP CALVERTON, NEW YORK

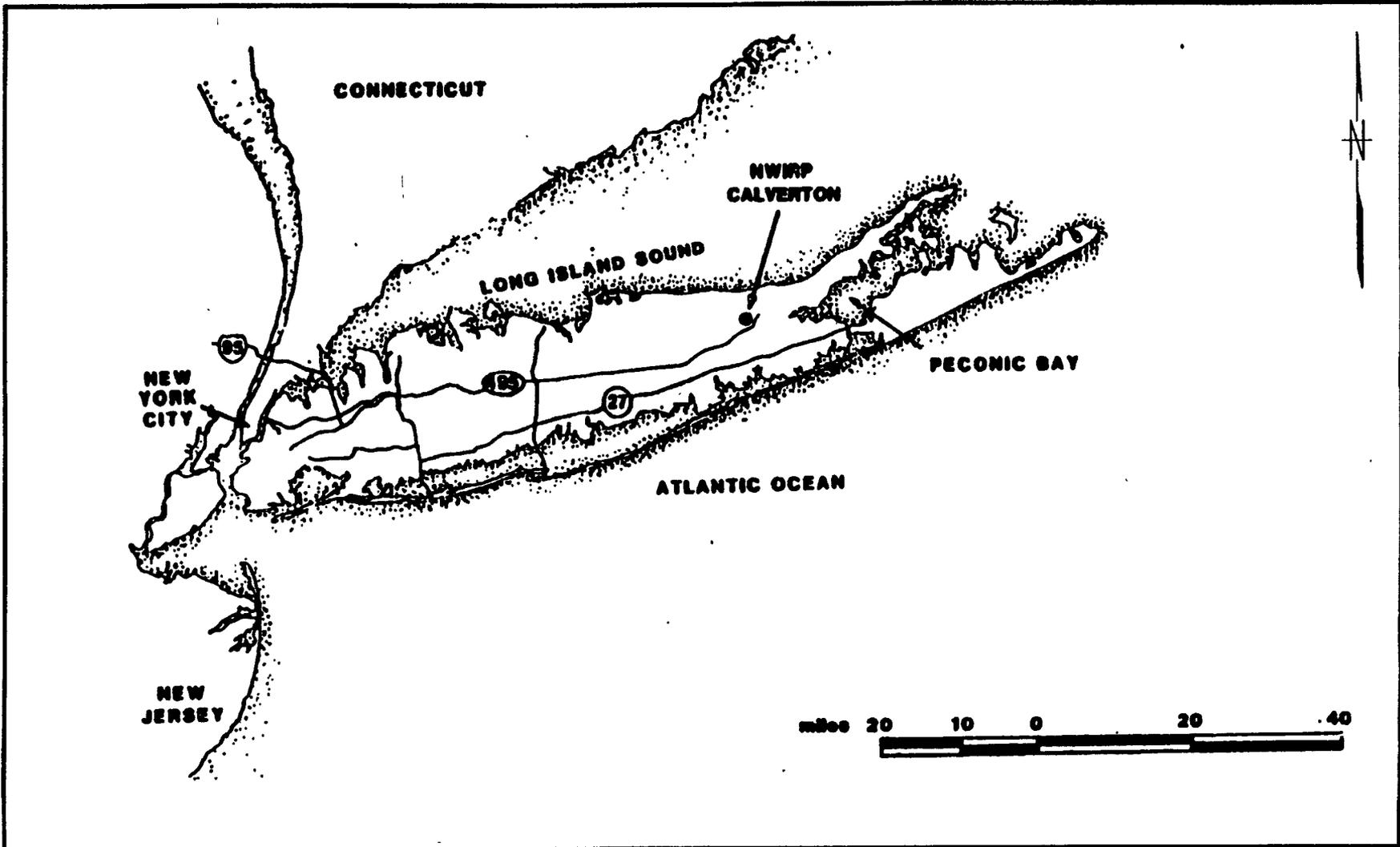
Remedial Alternative	Capital Costs	Annual O&M Costs	Total Present Worth
Alternative 1	\$0	\$0	\$0
Alternative 2	\$2,103,000	\$74,000 (Year 1) \$25,000 (Years 2 to 30) \$20,000 (every 5 years)	\$2,505,000
Alternative 3	\$6,268,000	\$65,000 (Year 1 only)	\$6,329,000

5-year review costs of approximately \$20,000 each for Alternative 2 are not shown but are included in the present worth.

This page intentionally left blank

090114/P

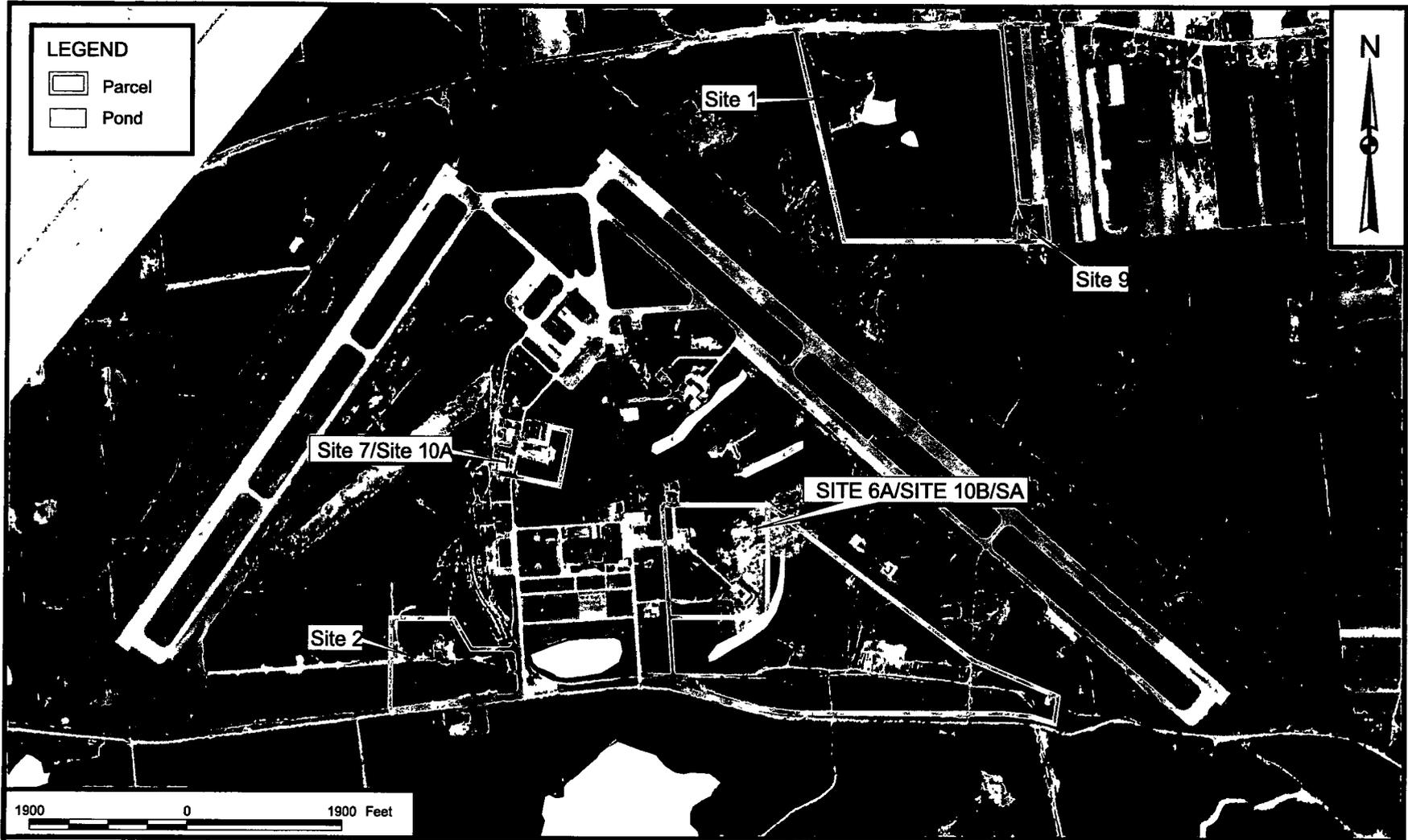
27



DRAWN BY HJP	DATE 9/12/01	 Tetra Tech NUS, Inc.  GENERAL LOCATION MAP SITE 7 - FUEL DEPOT NWIRP, CALVERTON, NEW YORK	CONTRACT NO. 4570	OWNER NO. 0189
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1	REV. 0

CTO 0189

This page intentionally left blank.



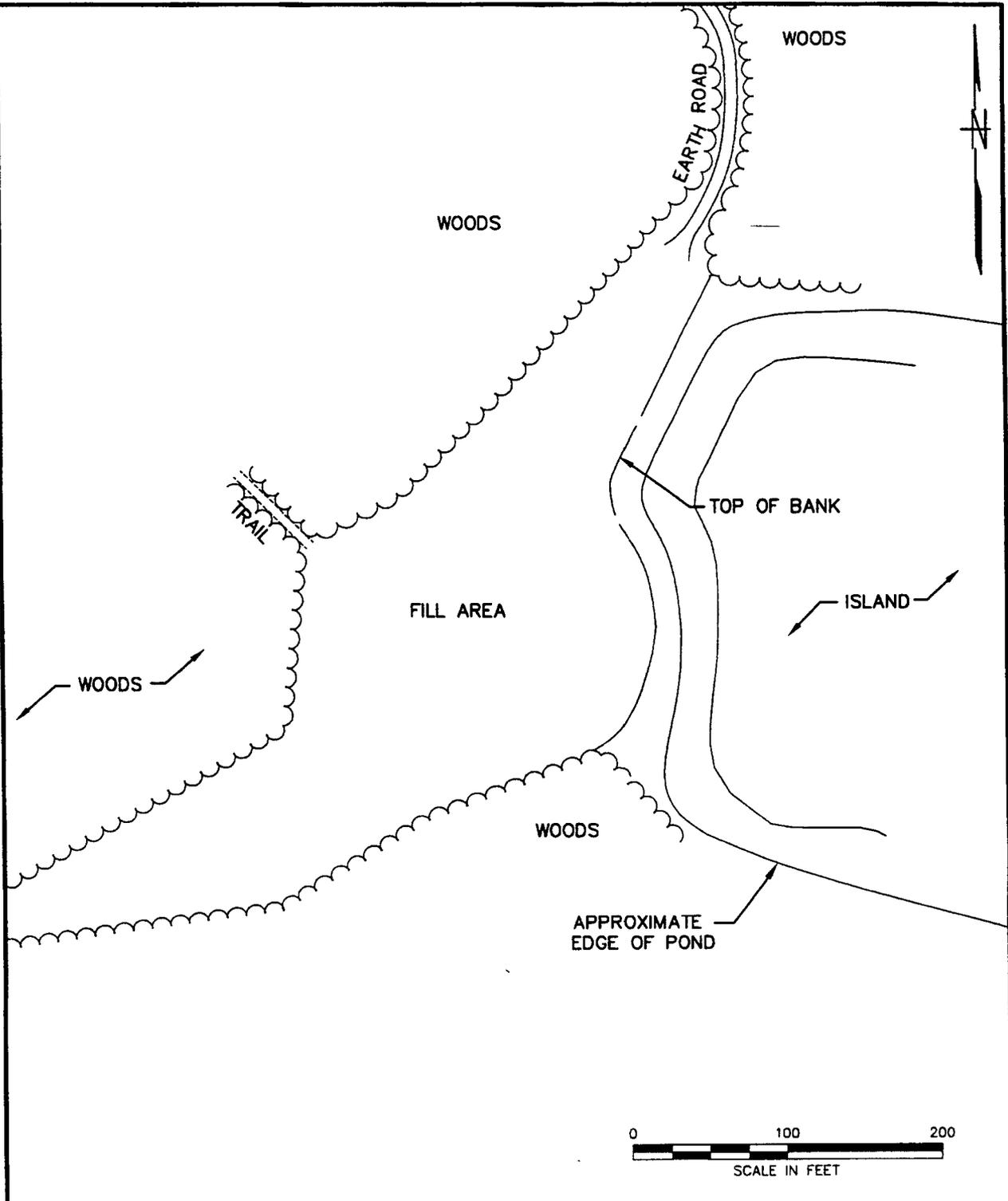
DRAWN BY	DATE
J LAMEY	11/22/89
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	

**Tetra Tech NUS, Inc.**

**SITE LOCATION MAP  
NWIRP CALVERTON, NEW YORK**

CONTRACT NUMBER 7398	OWNER NUMBER 0270
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO FIGURE 2	REV 0

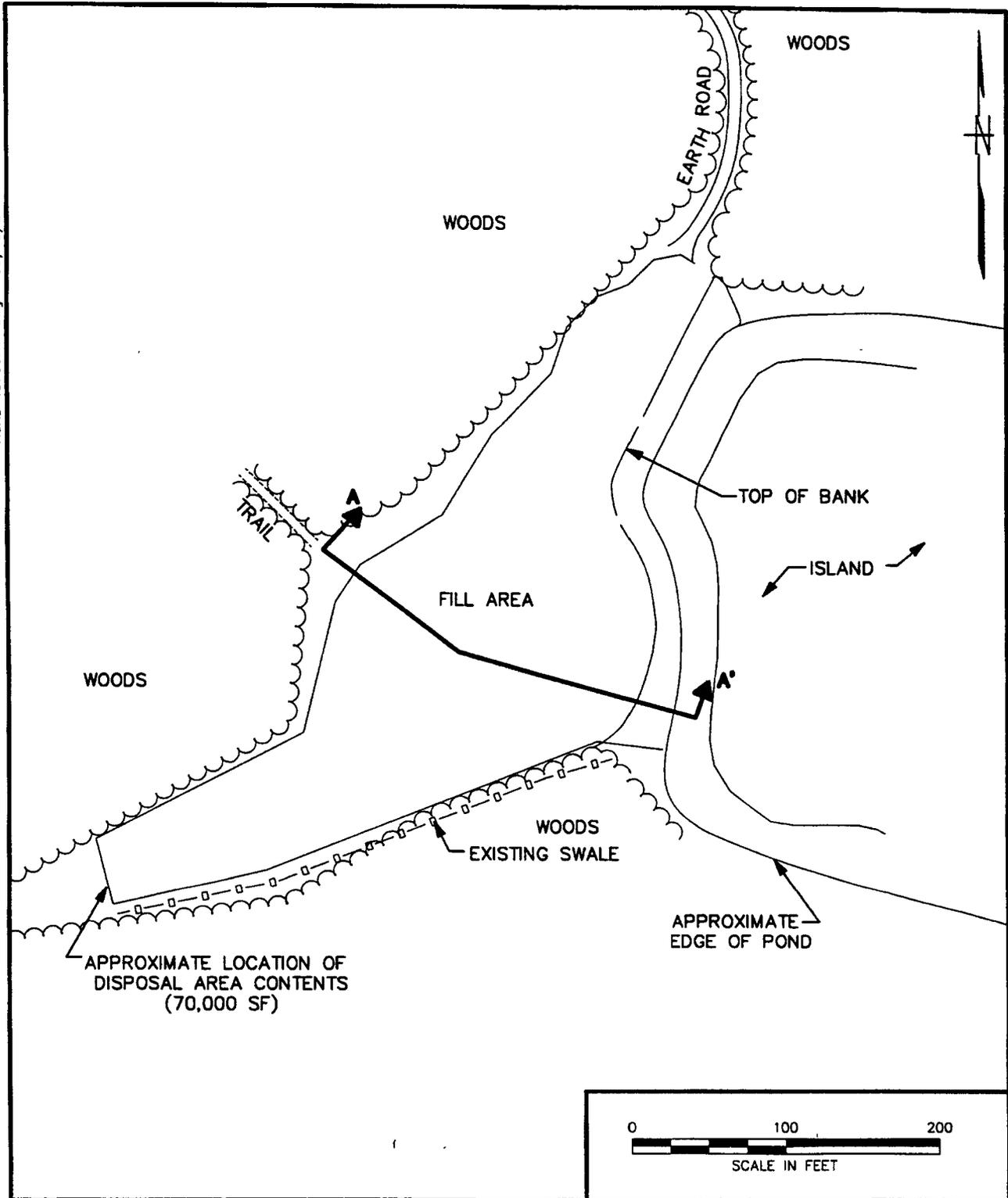
ACAD: 739BCM46.dwg 09/19/01 MF



DRAWN BY HJP	DATE 4/25/01	 <b>Tetra Tech NUS, Inc.</b>	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA		<b>SITE LAYOUT MAP</b> <b>SITE 1 - NORTHEAST POND DISPOSAL AREA</b> <b>NWRP CALVERTON, NEW YORK</b>	APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO.	REV.
			<b>FIGURE 3</b>	<b>0</b>

FORM CADD NO T4NUS\_AV.DWG - REV 0 - 1/22/98

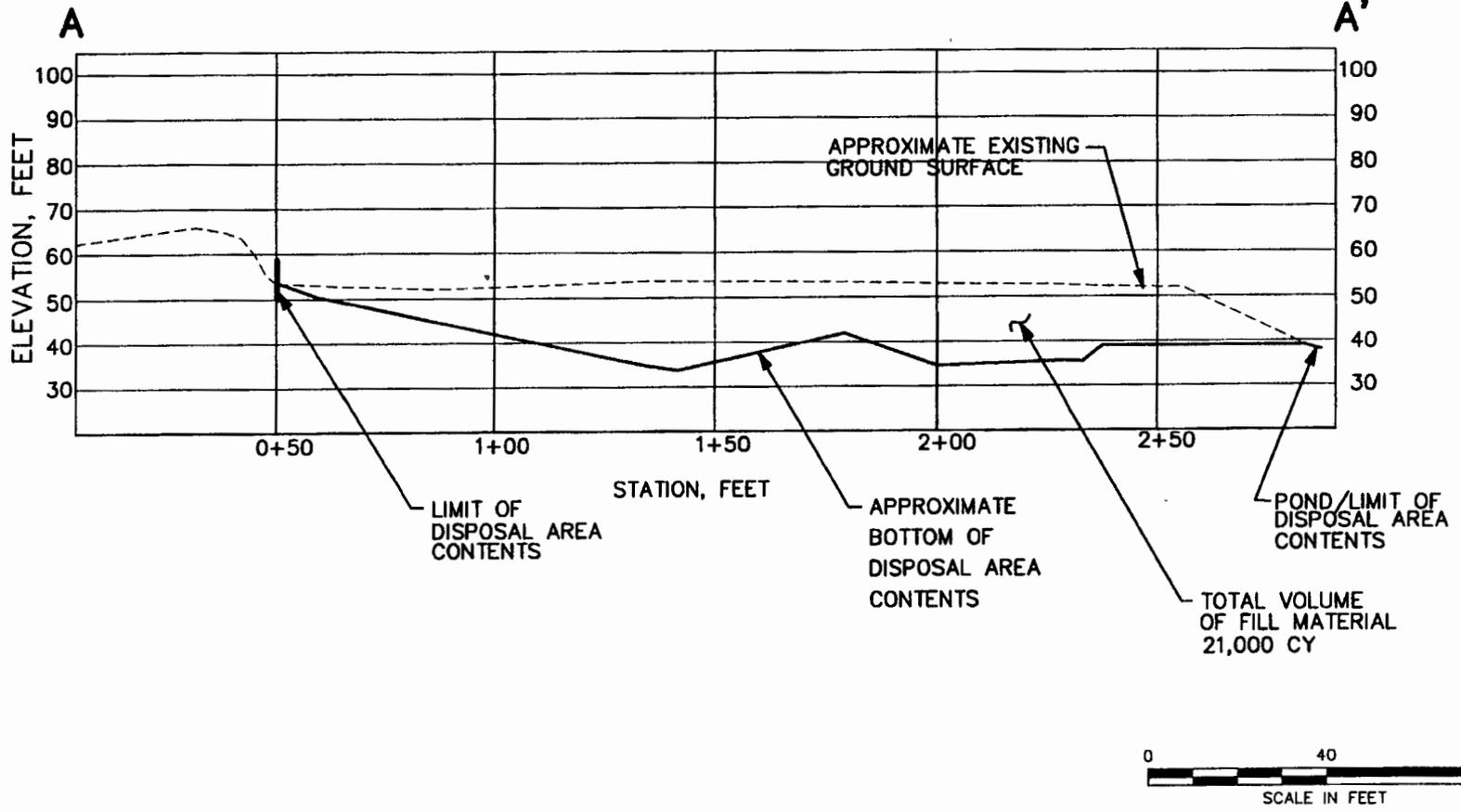
ACAD 4570CM14.dwg 09/19/01 MF



DRAWN BY HJP	DATE 6/4/01	 <b>Tetra Tech NUS, Inc.</b>	CONTRACT NO. 4570	OWNER NO. 0189
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA	<b>EXTENT OF FILL MATERIAL AND SOIL CONTAMINATION</b> <b>SITE 1 - NORTHEAST POND DISPOSAL AREA</b> <b>NWIRP CALVERTON, NEW YORK</b>		APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. <b>FIGURE 4</b>	REV. 0

FORM CADD NO T4NUS\_AV.DWG - REV 0 - 1/22/98

090114/P



33

DRAWN BY HJP	DATE 4/25/01
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE AS NOTED	

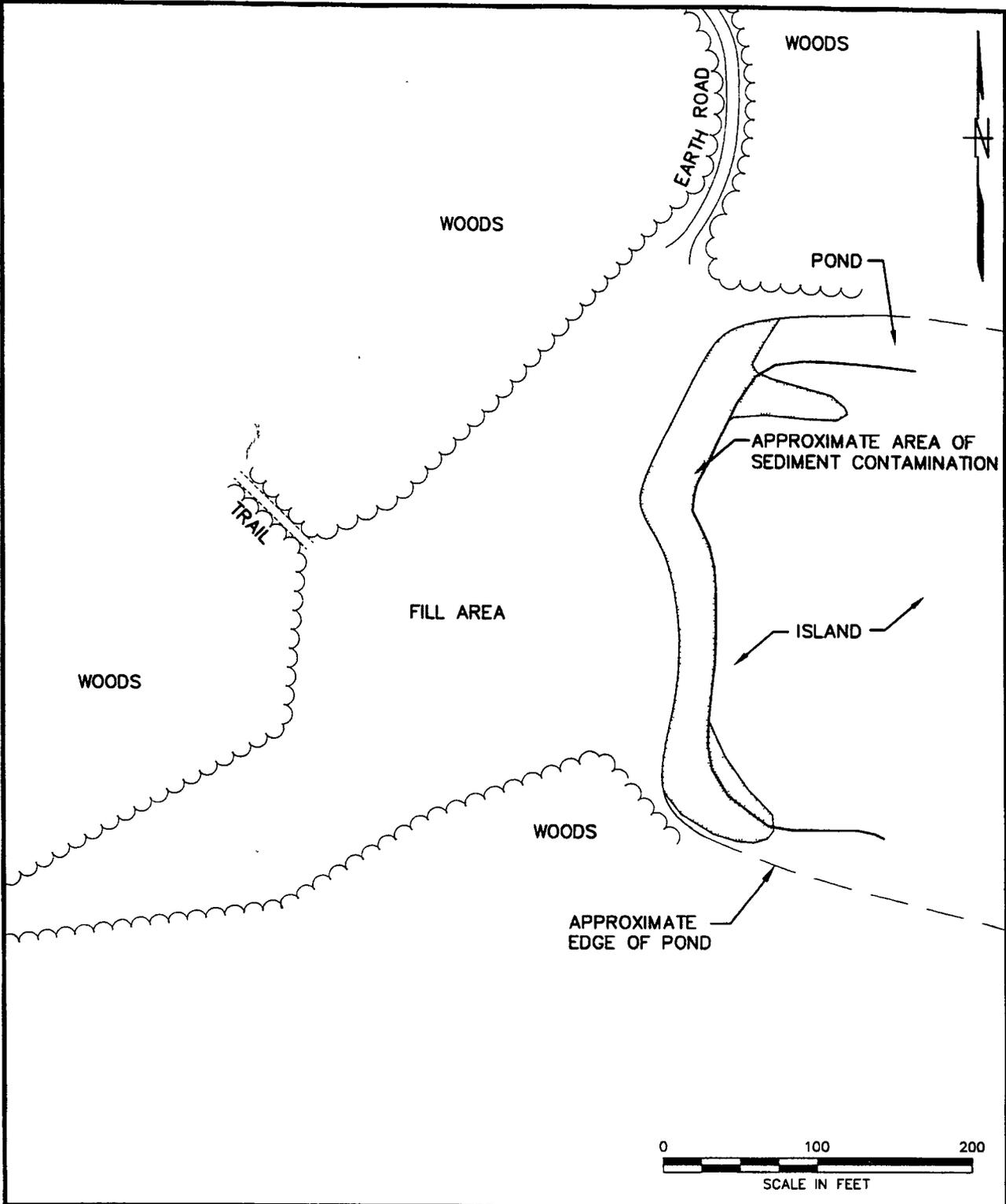
**Tetra Tech NUS, Inc.**

**CROSS SECTION A-A' AT EXISTING CONDITIONS  
SITE 1 - NORTHEAST POND DISPOSAL AREA  
NWRP CALVERTON, NEW YORK**

CONTRACT NO. 7398	OWNER NO. 0270
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5	REV. 0

CTO 0189

ACAD: 7398GM25.dwg 09/19/01 MF



DRAWN BY HJP	DATE 4/25/01	Tetra Tech NUS, Inc.	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA	<b>EXTENT OF SEDIMENT CONTAMINATION</b> <b>SITE 1 - NORTHEAST POND DISPOSAL AREA</b> <b>NWRP CALVERTON, NEW YORK</b>		APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 6	REV. 0

FORM CADD NO T+NUS\_AV.DWG - REV 0 - 1/22/98