

FINAL

**RECORD OF DECISION
SOILS AND GROUND WATER OPERABLE UNITS**

**SITE 06 - SOLVENT DISPOSAL AREA
SITE 11 - FIRE FIGHTING TRAINING AREA
SITE 13 - DISPOSAL AREA NORTHWEST OF BUILDINGS W-3, W-4 AND T-1**

**FORMER NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND**

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**FORMER NAVAL CONSTRUCTION BATTALION CENTER
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DECLARATION FOR THE RECORD OF DECISION

SOILS AND GROUND WATER OPERABLE UNITS SITES 06, 11, AND 13

Former Naval Construction Battalion Center
Davisville, Rhode Island

I. THE DECLARATION

A. SITE NAME AND LOCATION

Site 06 - Solvent Disposal Area

Site 11 - Fire Fighting Training Area

Site 13 - Disposal Area Northwest of Buildings W-3, W-4, and T-1

Former Naval Construction Battalion Center (NCBC), Davisville, Rhode Island

B. STATEMENT OF BASIS AND PURPOSE

This decision document presents the No Further Action decision for Site 06 - Solvent Disposal Area, Site 11 - Fire Fighting Training Area, and Site 13 - Disposal Area Northwest of Buildings W-3, W-4, and T-1, at the former NCBC Davisville, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and to the extent practicable the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based upon the contents of the administrative record for Sites 06, 11, and 13. The administrative record is available at the former NCBC Administrative Building (Building 404), located on Davisville Road in North Kingstown, Rhode Island.

Both the United States Environmental Protection Agency (EPA) and the State of Rhode Island Department of Environmental Management (RIDEM) concur with the No Further Action decision.

C. RATIONALE FOR NO FURTHER ACTION

For Sites 06, 11, and 13, the selected remedy is No Further Action. The Navy, as lead agency, has recommended this decision with concurrence from EPA and RIDEM.

D. DECLARATION STATEMENT

The Department of the Navy has determined that no remedial actions are necessary with respect to Sites 06, 11, and 13 to ensure protection of human health and the environment. Pursuant to Section 121 of CERCLA and Section 300.430(f)(4)(ii) of the NCP, these sites are not limited with respect to future use or access and, therefore, a five year review of the selected remedial action is not required.

RECORD OF DECISION**SOILS AND GROUND WATER OPERABLE UNITS
SITES 06, 11, AND 13****Former Naval Construction Battalion Center
Davisville, Rhode Island****TABLE OF CONTENTS**

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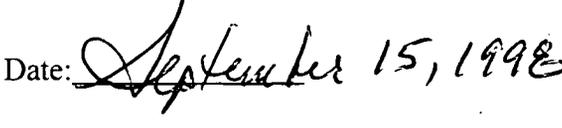
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The foregoing represents the selection of a remedial action by the Department of the Navy and the U.S. Environmental Protection Agency, Region I, with concurrence of the Rhode Island Department of Environmental Management. The lead agency concurs and recommends for immediate implementation.

By:  Date: 
Philip S. Otis

Title: BRAC Environmental Coordinator
Northern Division - Naval Facilities Engineering Command
Lester, Pennsylvania

The foregoing represents the selection of a remedial action by the Department of the Navy and the U.S. Environmental Protection Agency, Region I, with concurrence of the Rhode Island Department of Environmental Management. The EPA concurs and recommends for immediate implementation.

By: Frank Cavattin Date: 9/30/98
for Patricia L. Meaney

Title: Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region I

II. DECISION SUMMARY

A. SITE NAME, LOCATION, AND DESCRIPTION

The former U.S. Naval Construction Battalion Center (NCBC) Davisville is a National Priorities List (NPL) site. There are 12 Installation Restoration (IR) Program Sites and four study areas within NCBC Davisville that have been or are currently under investigation. This Record of Decision (ROD) addresses Site 06 - Solvent Disposal Area, Site 11 - Fire Fighting Training Area, and Site 13 - Disposal Area Northwest of Buildings W-3, W-4, and T-1.

The former NCBC Davisville facility is located in the northeast section of North Kingstown, Rhode Island, approximately 18 miles south of the state capital Providence. A portion of NCBC Davisville is adjacent to Narragansett Bay. Adjoining NCBC Davisville's southern boundary is the decommissioned Naval Air Station (NAS) Quonset Point that was transferred by the Navy to the Rhode Island Economic Development Corporation (RIEDC), formerly the Rhode Island Port Authority (RIPA), and others during the period 1974 through 1978.

NCBC Davisville is composed of three areas: the Main Center, West Davisville, and Camp Fogarty, a training facility located approximately 4 miles west of the Main Center. The areas are presented on Figure 1. Land use surrounding NCBC Davisville is predominately residential to the north. West of the Main Center, along Route 1, development consists of shopping malls, retail stores, restaurants, and gas stations.

The history of NCBC Davisville is related to the history of Quonset Point. Quonset Point was the location of the first annual encampment of the Brigade Rhode Island Militia in 1893. During World War I, it was a campground for the mobilization and training of troops and later was the home of the Rhode Island National Guard (RING). In the 1920s and 1930s it was a summer resort.

In 1939, Quonset Point was acquired by the Navy to establish a Naval Air Station (NAS). Construction began in 1940. By 1942, the operations at NAS Quonset Point had expanded into what is now called NCBC Davisville. Land at Davisville adjacent to NAS Quonset Point was designated the Advanced Base Depot. Also in 1942, the Naval Construction Training Center, known as Camp Endicott, was established to train the newly established construction battalions.

While NAS Quonset Point remained a site of naval activity, Davisville was inactive between World War II and the Korean Conflict. In 1974, operations at Davisville were greatly reduced. In 1991, closure of NCBC Davisville was announced, and all operations at Davisville were phased down to lower staffing levels. NCBC was officially closed on April 1, 1994. The portions of the facility in which Sites 06, 11, and 13 are located are set aside for economical/industrial development under the Comprehensive Base Reuse Plan.

The Main Center is an 839-acre parcel of land located in the town of North Kingstown, Rhode Island. The Main Center lies within the Potowomut River Basin. Mill Creek, Hall Creek, Davol Pond, and Frys Pond are the surface water bodies located within the Main Center.

Site 06 is a flat grassy area located between Buildings 67 and 38, covering roughly a quarter of an acre (Figure 2). It is bounded to the east by a fence, and to the west by a paved parking lot. Subsurface utilities such as a water main, storm drain, leach field and a septic tank are present at Site 06.

Site 11, the Former Fighting Training Area, consists of an open grassy field surrounded by roadways, resulting in a roughly egg-shaped area, measuring approximately 200 feet by 300 feet (Figure 3). There are no trees on the site, although a few border the northeast edge of the site. Several large unvegetated areas exist. The site is located approximately one mile west of Narragansett Bay. The ground surface slopes gradually to the southwest. The assumed destination of runoff and ground water flowing from Site 11 is Mill Creek, located approximately one-quarter mile from the site to the southwest.

Site 13 is approximately six acres in size and consists of a flat grassy field bounded on three sides by paved roads (Figure 4). Site 13 is northwest of Buildings W-3, W-4 and (the former) T-1, and is bounded on the south by "A" Street, on the east by Exeter Street and on the north by Foster Street. There are three catch basins in the area. The site also includes several devegetated areas. Surface water runoff is collected by storm drains that drain east into Hall Creek. Ground water under most of the site drains northeastward toward Davol Pond and Hall Creek. Due to a ground water divide under the site, portions of the southwestern site may drain to the west into Mill Creek. Based on elevated concentrations of PCBs in surface soil at Site 13 identified in Phase I/II sampling (TRC 1994), the Navy performed soil removal actions in a portion of the site in July 1996, March 1997, and November 1997.

All three sites are located in and surrounded by NCBC Davisville. There are no residences or use of natural resources on or adjacent to the sites. The nearest residence to any of the sites is approximately 0.25 miles northwest of Site 06.

B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

1. Land Use And Response History

An Initial Assessment Study (IAS) for NCBC Davisville was completed in September 1984, detailing historical hazardous usage and waste disposal practices at the facility. Included in the various areas identified in the study were Sites 06, 11, and 13. The IAS was followed by the Confirmation Study (CS), which included environmental sampling and analysis to verify the presence of constituents at the sites. Other investigations for Sites 06, 11, and 13 include Remedial Investigations (RI), Human Health Risk Assessments (HHRA), Ecological Risk Assessments (ERA), a Detailed Analysis of Alternatives (DAA) for each site, and Ecological Technical Memoranda for soil and ground water for each site.

A detailed description of the use and response history for each site can be found in *Volume I Remedial Investigation Report* (TRC, July 1994).

Site 06

Site 06 was reportedly used from 1970 to 1972 for the disposal of waste chlorinated hydrocarbon solvents. Personnel from the Refrigeration Mechanics Section of the Public Works Department reportedly drained over a dozen 5-gallon cans of various liquid wastes in this area, about once every three weeks, for an estimated disposal volume of 1750 gallons. Disposal reportedly took place in approximately a 30-foot square area. Site 06 was a sandy area during the time of these disposal practices. This area was subsequently covered with approximately six inches of soil and re-seeded.

Site 11

Site 11 was allegedly used between the mid-1940s and 1955 as a Fire Fighting Training Area, at the intersection of Moscrip Avenue and Middletown Street at the NCBC Davisville Main Center, where waste oils were allegedly poured on the ground, promptly ignited, and extinguished. It is likely that much of the waste oil evaporated or volatilized during this process. The area was not used for disposal, rather, constituents were quickly burned. This alleged exercise did not take place on a scheduled basis but was allegedly conducted approximately once every two or three months.

Recent review of historic aerial photographs taken from 1941 to 1975, along with confirmatory subsurface investigations including both soil and ground water sampling, have led to the conclusion that fire fighting activities may not have occurred at Site 11. Photographs reveal that the area was used for equipment storage, and the low level of constituents found at the site are consistent with this use.

Site 13

From 1945 to 1955, NCBC Davisville Construction Equipment Division (CED) was located in Buildings W-3, W-4 and T-1. Overhaul and repair activities were conducted in these buildings, vehicles were stored in the fields to the north and west, and drums of oils, thinner and solvents were stored adjacent to the buildings. Waste oils, approximately 300 gallons per month during the period 1945 to 1955, according to the DAA, were reportedly spread on the fields northwest of Buildings W-3, W-4 and T-1. The buildings adjacent to the area are not associated with the removal action. It should be noted that Buildings T-1 and T-1A were demolished in 1994 and 1995, respectively.

A removal action was completed by the Navy in the Spring of 1997 at Site 13. PCB-contaminated soil was removed and disposed off-site. The Navy has evaluated the remaining constituents in soil and ground water at Site 13 by performing risk assessments at the site. The Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) were completed in May 1998.

2. Enforcement History

In response to the environmental contamination which has occurred as a result of the use, handling, storage, or disposal of hazardous materials at numerous military installations across the United States, the Department of Defense (DOD) has initiated investigations and cleanup activities under the IR Program. The IR Program parallels the Superfund program and is conducted in several stages, including:

1. Identification of potential hazardous waste sites;
2. Confirmation of the presence of hazardous materials at the sites;
3. Determination of the type and extent of constituents;
4. Evaluation of alternatives for cleanup of the sites;
5. Proposal of a cleanup remedy;
6. Selection of a remedy; and
7. Implementation of the remedy for the cleanup of the sites.

The U.S. Navy is responsible for addressing environmental contamination at the former NCBC Davisville, pursuant to Section 120 of CERCLA and a Federal Facility Agreement (FFA) entered into by the U.S. Navy, the EPA and RIDEM in March 1992. NCBC Davisville was placed on the EPA's NPL on November 21, 1989. Investigation and cleanup of DOD sites, such as the former NCBC Davisville, are funded through the Defense Environmental Restoration Account (DERA) of the Base Realignment and Closure (BRAC) Account.

C. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Navy has kept the community and other interested parties apprized of site activities through informational meetings (Technical Review Committee meetings and Restoration Advisory Board meetings which involve community representatives), fact sheets, press releases and public notices.

In April 1989, the Navy held an informational meeting at the Administrative Building (Building 404), located at the former NCBC Davisville, Rhode Island to describe the plans for the RI and Feasibility Study (FS). In May 1989, the Navy released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial investigations.

The administrative record is available for public review at the Administrative Building (Building 404), located at the former NCBC Davisville in North Kingstown, Rhode Island. Copies of documents are also located at the Information Repository at the Reference Desk of the North Kingstown Free Library in North Kingstown, Rhode Island. The Navy published a notice and brief analysis of the Proposed Plan in the Providence Journal Bulletin and Narragansett Standard Times. The Proposed Plan was mailed to area residents, businesses, local officials and representatives, and other interested parties on July 23, 1998. It is also available to the public at the Information Repository.

On 13 August 1998, the Navy held an informational meeting to discuss the results of the RI and to present the Agency's Proposed Plan in accordance with Section 117(a) of CERCLA, and a public meeting to discuss the Proposed Plan and to accept any oral comments. Also during this meeting, the Navy answered questions from the public. From 30 July 1998 to 28 August 1998, the Navy held a 30 day public comment period to accept public comment on the Proposed Plan and on any other documents previously released. Public comments and the Navy's response to comments are presented in the Responsiveness Summary, included in Section III. A public hearing was also held on 13 August 1998. A transcript of this hearing is included in Appendix D.

D. SCOPE AND ROLE OF RESPONSE ACTION

Based upon the risk assessments and the remedial investigations for Sites 06, 11, and 13, which are discussed in further detail in the succeeding sections, no principal threats to human health or the environment have been identified as being associated with the soils or ground water at Sites 06, 11, or 13, providing the basis for the No Further Action decision.

E. SITE CHARACTERISTICS

For NCBC Davisville, an IAS was completed in September 1984, detailing the historical hazardous material usage and waste disposal practices at the facility. Included in the various areas identified in this study were Sites 06, 11, and 13. The IAS was followed by the CS, which included environmental sampling and analysis to verify the presence of constituents at the sites. Specific details of site history and the investigations conducted are provided in the following sections.

The Main Center lies within the Potowomut River Basin. Ground water at the Main Center is classified as GB by RIDEM. Ground water classified as GB may not be suitable for drinking water without treatment, due to known or presumed degradation. GB classified ground water is primarily located at highly urbanized areas or is located in the vicinity of disposal sites for solid waste, hazardous waste, or sewerage sludge.

A comprehensive evaluation of the ground water at NCBC, including Sites 06, 11, and 13 was performed. Previous ground water sampling results were compiled and used to assess the condition of the ground water at these sites. No new field activities were performed for the Ground Water Evaluation. Site history, results of previous studies, ground water monitoring results, and recommendations for future actions are presented in the Ground Water Evaluation. The inorganic analysis results of ground water samples were compared to water quality standards and the background inorganic values as presented in the *Final Basewide Ground Water Inorganics Study Report - NCBC Davisville, Rhode Island*, prepared by Stone & Webster in September 1996. The *Detailed Analysis of Alternatives Report* (TRC, 1994) contains an overview of the site investigation conducted at Sites 06, 11, and 13. The notable findings of the site investigations are summarized below.

Site 06

Site 06 is a flat grassy area located between Buildings 67 and 38, covering roughly a quarter of an acre. It is bounded to the east by a fence, and to the west by a paved parking lot. Subsurface utilities such as a water main, storm drain, leach field, and a septic tank are present at Site 06. The site is within the Hall Creek Drainage Basin, and ground water appears to flow from the southwest to the northeast. Site 13 is located approximately 1200 ft upgradient of Site 06 and Site 14 is immediately downgradient.

Site 06 was reportedly used from 1970 to 1972 for the disposal of waste chlorinated hydrocarbon solvents. Personnel from the Refrigeration Mechanics Section of the Public Works Department reportedly drained over a dozen 5-gallon cans of various liquid wastes in this area, about once every three weeks, for an estimated total disposal volume of 1,750 gallons. Disposal reportedly took place in approximately a 30-foot square area. Site 06 was a sandy area during the time of these disposal practices. This area was subsequently covered with approximately six inches of soil and re-seeded.

Site 06 was identified in the IAS as a possible receptor of hazardous wastes. In the IAS for Site 06 it was concluded that the risk posed was minimal and that no further investigation was necessary. RIDEM requested that the site be included in the Verification Step of the CS. The Verification Step of the CS contained soil sample analyses that indicated the presence of petroleum-based hydrocarbons at a concentration of 124 parts per million (ppm) and volatile organic compounds (VOC) at about 5 ppm. A second round of soil samples identified no detectable VOC and low levels of other constituents of potential concern (COPC). The CS concluded that identified COPC have a moderate to high mobility potential, although COPC were detected at generally low levels.

The Phase I RI was conducted from September 1989 to March 1990, which included collection of three surface soil samples, three subsurface soil samples, and performance of a soil gas survey. All soil samples were submitted for Target Compound List (TCL) for VOC, semi-volatile organic compounds (SVOC), and Target Analyte List (TAL) metals. See Figure 5 for Site 06 Phase I sample locations. The Phase II RI field investigation conducted from December 1992 to August 1993 was performed to further delineate the extent of COPC and included a soil gas survey, geophysical survey, surface soil sampling, soil boring sampling, and ground water sampling. During Phase II RI, five test boring were sampled for full TCL less pesticides/PCB and TAL metals. A total of 16 samples were collected: nine subsurface soil samples and seven surface samples from a depth interval of 0-2 feet. See Figure 6 for Site 06 Phase II sample locations.

VOC (chloroform, methylene chloride, acetone, 1,1,1-trichloroethane, and toluene) were reported at low levels in the surface soil, and all are common laboratory artifacts. The presence of VOC (acetone, chloroform, and 2-butanone) were reported in subsurface soil in low levels within the acceptable risk levels in the HHRA. PAH compounds were reported in inconsistent distribution patterns in the surface soil about the site, but within the acceptable risk levels in the HHRA. No non-aqueous phase liquids (NAPLs) have been detected at this site. SVOC (naphthalene, PAH, 2-methylnaphthalene, and dibenzofuran) were reported in subsurface soil at levels deemed acceptable in the risk assessments for the protection of human health and the environment. Eleven metals were

reported in the surface soil and seven metals were reported in the subsurface soil. The levels of the metals were found to be acceptable levels in the HHRA.

The soil gas survey was conducted across Site 06 and along an adjacent field on a 25 foot grid. A total of 24 soil gas sampling points were installed for sample collection at a depth of two feet below ground surface. VOC were detected at only one area near the northeast corner of Building 67, at a level found acceptable in the HHRA.

Two soil samples were collected and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) analyses at Site 06. Analytical results of the samples indicated that none of the constituents were reported above the regulatory action levels for the TCLP list (40 CFR 261.24).

A complete discussion of site characteristics and concentrations of constituents can be found in *Volume I Remedial Investigation Report - Site 06 - Solvent Disposal Area* (TRC, 1994).

Site 11

The former Fire Fighting Training Area consists of an open grassy field surrounded by roadways, resulting in a roughly egg-shaped area, measuring approximately 200 ft by 300 ft. The site consists of mowed grassy fields. There are no trees on the site, although a few border the northeast edge of the site. Site 11 is bound by Moscrip Avenue, Building 390 and Warehouses W-1 to W-3 to the south, and is located approximately one mile west of Narragansett Bay. The ground surface slopes gradually to the southwest, and small, shallow, eroded drainage swales are evident in the central portion of the study area. The swales drain to a catch basin on the western side of the study area, which is part of a storm drain system which runs under the site. The storm pipes appear to discharge into Mill Creek. The assumed destination of ground water flowing from Site 11 is Mill Creek, located approximately one-quarter mile from the site to the southwest.

Site 11 was allegedly used between the mid-1940s and 1955 as a Fire Fighting Training Area, at the intersection of Moscrip Avenue and Middletown Street at the NCBC Davisville Main Center, where waste oils were allegedly poured on the ground, promptly ignited, and extinguished. It is likely that much of the waste oil evaporated or volatilized during this process. The area was not used for disposal, rather, constituents were quickly burned. This alleged exercise did not take place on a scheduled basis but was allegedly conducted approximately once every two or three months. The total amount of wastes destroyed in this manner is not known. Recent review of historic aerial photographs taken from 1941 to 1975, along with confirmatory subsurface investigations including both soil and ground water sampling, have led to the conclusion that fire fighting activities may not have occurred at Site 11. Photographs reveal that the area was used for equipment storage, and the low level of constituents found at the site are consistent with this use.

Site 11 was identified in the IAS as a possible receptor of hazardous wastes. In the IAS report it was concluded that the risk posed by Site 11 to human health and the environment was minimal and that no further investigation was necessary. However, the Navy still included the site in the Verification Step of the CS.

The Verification Step field investigations included a geophysical survey, a site walk-through with the OVA, and surface soil sampling. A composite soil sample reported concentration of petroleum hydrocarbons (7800 ppm) and tetrachloroethylene (12 ppm). The pesticide DDT was reported in the second round of samples at concentrations up to 690 ppm. The CS concluded that the migration potential of COPC away from the site is high due to leaching into the ground water and subsequent migration towards Mill Creek. The CS recommended that the DDT be further evaluated, and three monitoring wells be installed.

The Phase I RI was conducted from September 1989 to March 1990, and included collection of eleven surface soil samples, installation of six soil borings, installation and sampling of five ground water monitoring wells, and performance of a soil gas survey. The soil samples were collected and analyzed for the TCL/TAL parameters. See Figure 7 for Site 11 Phase I sample locations.

The Phase II RI field investigation conducted from December 1992 to August 1993 was performed to further delineate the extent of COPC associated with the fire fighting training activities conducted at Site 11. The field investigation activities included a geophysical survey, surface soil sampling, test pit sampling, soil boring sampling, ground water sampling, and catch basin/storm sewer sampling. Fifteen surface soil samples were collected and analyzed for the TCL/TAL parameters. Soil samples were collected for VOC analysis from a depth of six inches to one foot below grade. A test pit was excavated to a depth of seven feet using a backhoe. The test pit sample was collected from the backhoe and was analyzed for full TCL/TAL parameters. Seven test borings were drilled and sampled for full TCL/TAL analyses. In addition, soil samples were collected from five well borings located on the site using continuous split-spoon sampling until ground water was encountered. Ground water was typically encountered five feet below ground surface. A total of twenty-one soil samples were collected and analyzed for full TCL/TAL during drilling activities. Eleven of these samples were collected from the subsurface soil and the other ten samples were collected from the 0-2 feet interval depth. See Figure 8 for Site 11 Phase II sample locations.

The only VOC reported in the surface soil was acetone which is a common laboratory artifact. Three VOC (chloroform, acetone, and 2-butanone) were reported at low concentrations in the subsurface soil and all are common laboratory artifacts. PAH compounds were reported in surface soil at acceptable levels in the HHRA. No NAPLs have been detected at this site. Five other SVOC were reported in surface soil at Site 11 at low concentrations and all are common laboratory contaminants. PAH compounds and three other SVOC were reported in subsurface soil samples at acceptable levels. Pesticides are commonly found in soil and were detected in background soil samples throughout the former NCBC Davisville facility. Pesticides were detected in surface soil throughout the site at levels found to be acceptable in the HHRA. No PCB were detected in surface soil. Pesticides and one PCB (Aroclor-1260) were reported in subsurface soil at levels deemed acceptable in the HHRA. Eleven metals were reported in both the surface and subsurface soil at acceptable levels in the HHRA.

One sample from Site 11 was collected and analyzed for TCLP analysis which reported no analytes above regulatory action levels as identified on the TCLP list (40 CFR 261.24).

A complete discussion of site characteristics and concentrations of constituents can be found in the *Volume I Remedial Investigation Report - Site 11 - Fire Fighting Training Area* (TRC, 1994).

Site 13

This area is located northwest of Buildings W-3, W-4, and the former T-1. There are eleven catch basins located in this area. Site 13 is located approximately 1,500 ft west of Site 05, and 1,100 ft south-southwest of Site 06. The site is characterized by a flat grass-covered area bounded on three sides by roads. Site 13 lies in a ground water drainage divide and ground water from this area flows to the Mill Creek and Hall Creek drainage areas.

Waste oils, approximately 300 gallons per month during the period 1945 to 1955, according to the Detailed Analysis of Alternatives (DAA) were reportedly spread on the fields northwest of Buildings W-3, W-4 and T-1. According to the DAA, Site 13 was identified in the IAS as a possible receptor of hazardous wastes. The IAS concluded that the risk posed to human health and the environment was minimal and that no further investigation was needed. At the request of RIDEM, Site 13 was included in the Verification Step of the CS.

The Verification Step field investigations included surface soil samples and one ground water sample. All samples were analyzed for petroleum hydrocarbons and scanned for purgeable organics.

The Phase I RI, conducted from September 1989 to March 1990, included a limited soil gas survey, the collection of thirteen surface soil samples, six soil borings, and the installation and sampling of three ground water monitoring wells. All surface soil were submitted for VOC analyses, ten were submitted for pesticides/PCBs, six for SVOC and metals. Subsurface soil and ground water samples were analyzed for VOC, pesticides/PCB, and TPH. Two of the subsurface samples were also analyzed for TCLP analysis. See Figure 9 for Site 13 Phase I sample locations.

The purpose of the Phase II Remedial Investigation at Site 13 was to further delineate the horizontal and vertical location of constituents associated with the disposal activities at the site. The investigations also provided a basis for the evaluation of contaminant fate and transport mechanisms and data for use in quantitatively evaluating human health risks and ecological risks.

The Phase II RI field investigation activities were conducted at Site 13 from December 1992 to September 1993. They included a geophysical survey, surface soil sampling, soil boring sampling, ground water sampling, and catch basin/stormsewer sampling. The geophysical investigation at Site 13 consisted of a seismic refraction survey.

Thirty-four surface soil samples were collected from sixteen surface soil sample locations, twelve test boring locations (0 to 2 feet), and six monitoring well boring locations (0 to 2 feet). Fifteen subsurface soil samples were taken from twelve monitoring well borings and twelve test borings. Other samples taken include a test pit below the storm drain pipe and catch basin sediments and

liquid. The surface and subsurface soil samples were analyzed for full TCL and TAL parameters. Two surface soil samples and one subsurface sample were also collected for TCLP analyses.

After the completion of the monitoring well borings, both shallow wells and deep wells were installed at Site 13. In addition, three bedrock cores were collected during the drilling activities. Ground water samples were collected from each of the monitoring wells (fourteen shallow wells and two deep wells). Ground water samples were analyzed in the field for the water quality parameters of pH, specific conductance, temperature, and turbidity, and in the laboratory for full TCL and TAL parameters. In addition, three ground water samples were analyzed for filtered metals, biochemical oxygen demand (BOD), chemical oxygen demand (COD) and total suspended solids (TSS). No NAPLs have been detected at this site. See Figure 10 for Site 13 Phase II sample locations.

Eighteen background surface soil samples were also collected across NCBC Davisville during the Phase II RI to provide a range of background soil quality for NCBC Davisville soils. All eighteen samples were analyzed for full TCL and TAL analytes.

The Navy performed removal of PCB-contaminated soil at Site 13 in the Spring of 1997. The storm drain system and catch basins were also cleaned and the contents were disposed off-site. The contaminated material was disposed off-site, and the area was backfilled with clean fill, and seeded. The final *Closeout Report for IR Program Site 13 NCBC Davisville, Rhode Island*, prepared by Stone & Webster, was released on June 16, 1997. An additional removal action was performed in December 1997, and was followed by the *Closeout Report Addendum*, dated May 1, 1998.

In general, of the environmental media investigated at Sites 06, 11, and 13, surface soil and ground water COPC have the greatest potential for off-site migration. Typically, COPC in surface soil can migrate or be carried off-site by surface runoff by being sorbed to windblown dust, and by site visitors via adherence to vehicle tires, shoes, etc. Based on current site use, dust generation and surface runoff at Sites 06, 11, and 13 are expected to be limited given the flat grass covered surface. COPC can also migrate from the surface soil through leaching and subsequent transport by ground water, by volatilization to ambient air, or by uptake by plants or animals.

F. SUMMARY OF SITE RISKS

A Final Technical Memoranda HHRA (EA Engineering, Science, and Technology (EA) November 1996), which addressed Sites 06 and 11 soils, was prepared based on results obtained from the Phase I and Phase II RI. Final HHRAs were also prepared for ground water at Sites 06 and 11, and surface soil and ground water at Site 13 in May 1998. In addition, a Draft Final Facility-Wide Freshwater/Terrestrial ERA was prepared by EA in February 1996. Subsequently, a Revised Final Technical Memorandum for soils at Sites 06 and 11 was prepared by EA in January 1998 that addresses various ecological risk issues, and includes specific evaluations of risk from surface soil. Final Technical Memoranda for ground water at Sites 06 and 11 and surface soil and ground water at Site 13 were prepared by EA in May 1998 that address various ecological risk issues, and include specific evaluations of risk from surface soil and ground water. These reports are available for

review at the Information Repository at the North Kingstown Free Library and at the Caretaker Site Office located in the former NCBC Administrative Building 404 on Davisville Road. The risk assessments were performed to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to constituents associated with soils and ground water at Sites 06, 11, and 13.

Human Health Risk Summary

Potential human health risks associated with exposure to the COPC were estimated quantitatively or qualitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on the present uses, potential future uses, and location of the sites. Both the Phase I RI and the Phase II RI data were used to characterize the human health risks. In addition, post-excavation confirmatory sampling data were used to characterize the human health risks at Site 13. Exposure dose was calculated using an upper confidence limit, the 95th percentile of the mean assuming a lognormal distribution (95th UCLM), as well as on the maximum detected chemical concentration (Reasonable Maximum Exposure or RME). Note that this method was used in accordance with the applicable guidance in place when the HHRA was performed. Potential human health exposure scenarios which were evaluated are presented below.

Future Construction Workers

It was assumed in the HHRA that construction would be accomplished in one calendar year. Excavation is expected to take 90 calendar days. Thus, for the average case in this risk assessment, the exposure period of interest was assumed to be three months (13 weeks). The maximum case, allowing for delays, was conservatively assumed to take four months (17 weeks). Since workers are likely to be onsite for 5 days/week, 8 hours/day, the following values were used for exposure frequency: average case exposure duration - 65 days/year and RME case duration - 85 days/year.

The three exposure pathways for future adult construction workers consist of workers exposed to soil via dermal contact, incidental ingestion and inhalation assuming construction of commercial buildings.

Future Commercial/Industrial Worker

It was assumed in the HHRA that workers are employed as many as 25 years and as little as 12 years (one-half the maximum exposure duration). Because that is a "light-industry" occupational scenario, clothing is likely to consist of coveralls, boots, and gloves. However, to produce a conservative estimate of exposure, workers are assumed to contact soil with their hands and feet. Workers are assumed to be onsite eight hours per day and to engage in levels of activity typical of indoor work environments. The exposure frequency for contact with site soil is assumed to be 150 days per year.

The two exposure pathways for adult employees consists of dermal contact with and incidental ingestion of surface soil under future commercial/industrial use of the site.

Future Resident (Adults and Children)

The Comprehensive Base Reuse Plan for NCBC Davisville does not include residential development. Nevertheless, potential exposure to soils by onsite residents was evaluated as a conservatively prudent measure. Potential exposure risks to future residents were also evaluated in order to determine the need for land use restrictions at the sites. Exposure parameters used for this pathway were default assumptions for residential scenarios.

The two exposure pathways for adult residents consist of incidental ingestion of and dermal contact with surface soil, assuming future residential use of the site. The two exposure pathways for child residents consist of incidental ingestion of and dermal contact with surface soil, assuming future residential use of the site.

For each pathway evaluated, an average exposure and a RME estimate was generated corresponding to exposure to the average and the maximum concentration detected in that particular medium.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical specific cancer slope factor (SF). Cancer slope factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a probability (e.g. 1×10^{-6} for 1/1,000,000) and indicate (using this example), that an average individual is not likely to have greater than a one in a million chance of developing cancer over 70 years as a result of site-related exposure as defined to the compound at the stated concentration. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

A hazard quotient (HQ) is calculated by dividing the exposure level (i.e. average daily intake) by the reference dose (RfD) or other suitable benchmark for non-carcinogenic health effects for an individual compound. Reference doses have been developed by EPA to protect sensitive individuals over the course of a lifetime and they reflect a daily exposure level that is likely to be without an appreciable risk of an adverse health effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. The HQ is often expressed as a single value (e.g. 0.3) indicating the ratio of the stated exposure as defined to the reference dose value (in this example, the exposure as characterized is approximately one third of an acceptable exposure level for the given compound). The HQ is only considered additive for compounds that have the same or similar toxic endpoint and the sum is referred to as the Hazard Index (HI). (For example: the HQ for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage).

As outlined in the NCP, acceptable risks at a Superfund site are those associated with the site which fall within the range of one in a million cancer risk and one in ten thousand cancer risk

(1×10^{-6} to 1×10^{-4}). In addition, non-cancer adverse health effects as represented by an exposure pathway HI value greater than unity (i.e. greater than 1) indicates a concern for potential non-cancer health effects.

Risk assessment results for each site are summarized below.

Site 06

Soil

Six COPC for soil at Site 06 as listed in Table A-1 found in Appendix A of this ROD were selected for evaluation in the risk assessment. The COPC were selected to represent potential site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each of the COPC can be found in the *Human Health Risk Assessment*, Section 2.0 (EA, 1996). The estimated cancer risks for future construction workers were estimated to be below 1×10^{-6} . Estimated total cancer risks for future industrial/commercial workers ranged from 4×10^{-7} to 2×10^{-6} . The estimated cancer risks for adult residents were estimated to be in the range of 3×10^{-7} to 2×10^{-6} . Estimated total cancer risks for resident children ranged from 6×10^{-7} to 3×10^{-6} . Risks between 1×10^{-4} and 1×10^{-6} are considered acceptable, in keeping with the NCP.

Cancer risk due to soil for the different exposure scenarios evaluated in the HHRA ranged from 2×10^{-8} to 1×10^{-6} under average exposure assumptions and from 2×10^{-7} to 3×10^{-6} under RME assumptions. Thus, under average exposure conditions, no receptor population at the site was estimated to have a cancer risk greater than 1×10^{-6} . For Site 06 soil, cancer risks greater than 1×10^{-6} were estimated for future commercial/industrial workers and future resident adults and children under RME conditions. However, all estimated risks were within the acceptable risk range. Arsenic, beryllium, and benzo(a)pyrene accounted for the greatest portion of the total risk. It is important to note that some inorganics occur naturally in the environment. See Table A-3 for summary of estimated cancer risks.

For health effects other than cancer due to soil exposure, total HIs for the exposed populations evaluated in the HHRA were estimated to range from 0.001 to 0.05 under average exposure assumptions and from 0.008 to 0.09 under RME assumptions. Thus, total HIs were less than 1.0 for all receptor populations at the site. HIs that are less than 1.0 are not considered to pose a potential threat to human health. Based on the exposure scenarios defined herein, no adverse health effects would be expected to be associated with subchronic exposures to COPC in soil at Site 06. Table A-3 depicts the cancer risks and non-cancer hazard indices for the COPC in soil evaluated to reflect present and potential future construction and future commercial/industrial corresponding to the average and the RME exposure scenarios.

At Site 06, lead was detected in all soil samples at concentrations ranging from 3.7 to 616 ppm. Table A-1 presents summary statistics, including the mean concentration and the 95 UCL concentration for lead. Only one sample, with a detected lead concentration of 616 ppm, exceeded

RIDOH's "lead-free" screening level of 150 ppm. The Navy received approval to treat the arithmetic average of discrete soil sample results identically to the method of treatment of a composite sample result in determining the "lead-free" status of the site. This approach is as protective of human health as if a composite sample were collected. The average concentration of lead in soil at Site 06 was 93.36 ppm, which falls within the definition of "lead-free" soils presented in the RIDOH regulations. This average is considered to be representative of the results of composite sampling, if composite sampling had been performed at the site. Therefore the presence of lead in soil at Site 06 would not likely be associated with unacceptable risks.

Ground Water

No quantitative cancer risks or risks for effects other than cancer were estimated for the sole Site 06 ground water COPC, lead. Only one well out of six wells sampled for lead in Site 06 ground water had lead concentrations detected slightly above the EPA recommended action level of 15 ug/L. Therefore, there is minimal to no risk associated with lead (the sole COPC) present in ground water at Site 06.

Site 11

Soil

Six COPC in the soil as listed in Table A-4 were selected for evaluation in the risk assessment. The estimated cancer risks for future construction workers were estimated to be below 1×10^{-6} . Estimated total cancer risks for future industrial/commercial workers ranged from 3×10^{-7} and 1×10^{-6} . The estimated cancer risks for adult residents ranged from 3×10^{-7} and 2×10^{-6} . Estimated total cancer risks for resident children ranged from 5×10^{-7} and 3×10^{-6} .

Cancer risk due to soil for the different exposure scenarios evaluated in the HHRA ranged from 2×10^{-8} to 1×10^{-6} under average exposure assumptions and from 2×10^{-7} to 7×10^{-6} under RME assumptions. Thus, under average exposure conditions, no receptor population at the site was estimated to have a cancer risk greater than 1×10^{-6} . For Site 11 soil, cancer risks greater than 1×10^{-6} were estimated for future commercial/industrial workers and future resident adults and children under RME conditions. However, all estimated risks were within the acceptable risk range. Arsenic, beryllium, and benzo(a)pyrene accounted for the greatest portion of the total risk. It is important to note that some inorganics occur naturally in the environment. See Table A-6 for a summary of the estimate cancer risks.

For health effects other than cancer due to soil exposure, total HIs for the exposed populations evaluated in the HHRA were estimated to range from 0.001 to 0.05 under average exposure assumptions and from 0.008 to 0.09 under RME assumptions. Thus, total HIs were less than 1.0 for all receptor populations at the site. HIs that are less than 1.0 are not considered to pose a potential threat to human health. Based on the exposure scenarios defined herein, no adverse health effects would be expected to be associated with subchronic exposures to COPC in soil at Site 11. Table A-6 depicts the cancer risks and non-cancer hazard indices for the COPC in soil evaluated to reflect

present and potential future construction and future commercial/industrial corresponding to the average and the RME exposure scenarios.

At Site 11, lead was detected in all soil samples at concentrations ranging from 1.8 to 39.3 ppm. Table A-4 presents summary statistics, including the mean concentration and the 95 UCL concentration for lead. All samples reported detected lead concentrations less than 150 ppm, which is considered "lead-free" in accordance with RIDOH regulations. Therefore the presence of lead in soil at Site 11 would not likely be associated with unacceptable risks.

Ground Water

One COPC in the ground water, Bis(2-ethylhexyl)phthalate which is a common laboratory contaminant, as listed in Table A-5 was selected for evaluation in the risk assessment. Cancer risk due to ground water for the different exposure scenarios evaluated in the HHRA ranged from 1×10^{-9} to 4×10^{-7} under average exposure assumptions, and from 3×10^{-9} to 2×10^{-6} under RME assumptions. Thus, under average exposure conditions, no receptor population at the site was estimated to have a cancer risk greater than 4×10^{-7} .

For health effects other than cancer, hazard quotient for ingestion of ground water exposure pathway described in this chapter are summarized in Table A-7. The HQ for the exposed populations evaluated in this HHRA were estimated to range from 3×10^{-5} to 1×10^{-2} under average exposure assumptions and from 7×10^{-5} to 2×10^{-2} under reasonable maximum exposure assumptions. All HQs are less than 1.0. An HQ that is less than 1.0 is not considered to pose a potential threat to human health. Because all of RME and AE estimates of HQ are less than one, it can be concluded that there will no adverse health effects as a result of exposure to ground water via the ingestion pathway.

Ingestion of ground water COPC was associated with cancer risks greater than 1×10^{-6} (i.e., 2×10^{-6}), but less than 1×10^{-4} , for some populations under reasonable maximum exposure conditions. On the basis of NCP standards, these risk levels fall within the acceptable range (i.e., one-in-one million to one-in-ten thousand).

Based on the exposure scenarios defined in this HHRA, no adverse health effects would be expected to be associated with subchronic exposure to chemicals of concern at Site 11 for future construction workers. There are also no adverse health effects anticipated as a result of chronic exposure to Site 11 ground water via the ingestion pathway for hypothetical future resident adults and children and future commercial/industrial workers. Table A-7 depicts the cancer risks and non-cancer hazard indices for the COPC in soil evaluated to reflect present and potential future construction and future commercial/industrial corresponding to the average and the RME exposure scenarios.

Site 13

Soil

Nine COPCs in the soil as listed in Table A-8 found in Appendix A of this ROD were selected for evaluation in the risk assessment.

Ingestion of COPCs in soil (e.g., beryllium and chromium) was associated with cancer risks slightly in the range of 2×10^{-11} to 9×10^{-6} for some populations under reasonable maximum exposure conditions, whereas risks under average exposure conditions were less than 3×10^{-6} (range: 7×10^{-12} to 3×10^{-6}) for all populations. It is important to note that some inorganics occur naturally in the environment. These levels fall within the acceptable range as defined in the NCP.

Dermal contact with COPCs in soil was associated with cancer risks greater than 1×10^{-6} , but less than 1×10^{-4} (range: 6×10^{-9} to 9×10^{-6}), for most populations under reasonable maximum exposure conditions and average exposure conditions. On the basis of NCP standards, these risk levels fall within the acceptable range as defined in the NCP. Table A-10 depicts the cancer risks and non-cancer hazard indices for the COPC in soil evaluated to reflect present and potential future construction and future commercial/industrial corresponding to the average and the RME exposure scenarios.

At Site 13, lead was detected in 61 surface and subsurface samples, with a concentration range of 1.6 to 869 mg/kg. Seven samples exceeded the 150 mg/kg screening level, with detected lead concentrations of 175, 182, 183, 274, 285, 340, and 869 mg/kg. Only one sample out of sixty-one samples is between 500 and 1,000 ppm; and mean lead concentration at the site is 41.3 mg/kg, an Environmental Lead Management Plan was not deemed necessary for Site 13.

Ground Water

Four COPCs in the ground water as listed in Table A-9 were selected for evaluation in the risk assessment. According to the *Final Human Health Risk Assessment (HHRA): Site 13 Soils And Ground Water*, ingestion of ground water COPCs was associated with cancer risks in the range of 8×10^{-8} to 1×10^{-4} for some populations under reasonable maximum exposure conditions and average exposure conditions. There is no unacceptable risk due to ground water at Site 13.

No adverse health effects would be expected to be associated with chronic and subchronic occupational or residential exposures to chemicals of concern at Site 13 for all four receptors of interest: future construction workers, future commercial/industrial workers, future resident adults and children. The cumulative HIs range between 0.001 and 0.8, under AE and RME conditions of exposure. Table A-10 depicts the cancer risks and non-cancer hazard indices for the COPC in ground water evaluated to reflect present and potential future construction and future commercial/industrial corresponding to the average and the RME exposure scenarios.

Ecological Risk Summary

The Navy also evaluated potential ecological risks due to soil and ground water associated with the Hall Creek and Mill Creek watersheds by performing an ecological risk assessment and preparing Technical Memoranda for each site to document and evaluate the findings of the ERA. The ERA was performed by identifying organisms (receptors) representative of those potentially present at the site, determining the degree to which they are potentially exposed to site-related chemicals, and quantifying the potential effects of this exposure. The ecological receptors identified for risk assessment were the robin, hawk, heron, shrew, mink, and tern. Ecological risks are quantified by comparing chemical concentrations onsite (represented by modeled chemical dose) with the concentration of each chemical not likely to be associated with harmful effects for a particular receptor (toxicity reference value or TRV). The result of this comparison is a HQ, which is calculated as the ratio of the chemical dose to the TRV:

$$\text{HQ} = \frac{\text{Chemical Dose}}{\text{TRV}}$$

HQ values greater than 1.0 reflect a dietary dose that exceeds the safe dose and carries a presumption of risk. HQ values less than 1.0 reflect minimal risk. In general, the greater the HQ the greater the concern for potential risks.

Ecological risks due to surface soil at Sites 06 and 11 are presented in the *Technical Memoranda - Ecological Risk-Based Surface Soil Remediation Evaluation at NCBC IR Sites 06, 10, and 11*, prepared by EA, dated 30 June 1997. The Technical Memoranda for soil were prepared using a stepwise protocol, which included selecting a risk threshold, identifying and validating the appropriate risk drivers, selecting preliminary remediation goals (PRGs), and determining the necessity of further action. As presented in the Final Technical Memoranda, a risk threshold of HQ=10 was chosen based on modeled results for terrestrial receptors whose food base derives ultimately from soil, or the hawk, robin, and shrew.

Ecological risks due to the ground water at Sites 06, 11, and 13, and surface soil at Site 13 are presented in the *Technical Memoranda - Ecological Risks from Ground Water at NCBC IR Sites 06, 11, and 13, Ecological Risk-Based Surface Soil Remediation Evaluation at NCBC IR Site 13* prepared by EA, dated 15 May 1998. To address ecological risk from ground water at all three sites, the Navy developed a stepwise protocol that first involved screening chemical constituents in ground water against protective criteria such as Ambient Water Quality Criteria (AWQC) or background. If any constituent exceeded screening criteria, the hydrogeology of the site was investigated to determine if ground water constituents from historical releases at a site could have reached surface water and sediment in the watershed in which the site is located, prior to surface water/sediment sampling in the mid-1990s. If migration of ground water constituents was determined to be likely, then surface water and sediment concentrations were examined to determine whether they may have resulted from ground water.

The following site-specific information has been taken from the Technical Memoranda.

Site 06

Surface soil

Because there are several sites in the Hall Creek watershed, the surface soil data for Site 06 were examined to determine if the site contained any of the potential risk drivers previously identified in the watershed. Often constituents involved in the watershed, nine were not detected at all in surface soil at Site 06. Only cadmium was detected in surface soil at Site 06 at a maximum concentration of 0.75 mg/kg. Cadmium is a potential risk driver somewhere in the Hall Creek watershed because of the cadmium/shrew maximum HQ of 28.3, and associated maximum surface soil concentration of 2.35 mg/kg. However, at Site 06, the maximum surface soil concentration of 0.75 mg/kg would only produce an HQ of 9 for the shrew. Although this is below the designated risk threshold of 10, further examination of cadmium at Site 06 was warranted to ensure that no unacceptable ecological risk existed.

The Site 06 maximum surface soil cadmium concentration of 0.75 mg/kg was compared to various benchmark values, including soil-screening values and background. The maximum cadmium concentration at Site 06 is lower than all of the commonly available soil screening values. It exceeds the NCBC background range, but lies in the lower end of the Rhode Island background range. This information supports a judgment that cadmium in surface soil at Site 06 does not pose an unacceptable ecological risk. Due to lack of a demonstrated risk from cadmium or other COPC in surface soil at Site 06, the soil-based remediation evaluation concluded that there was no ecological risk at Site 06 and that remediation of soil at Site 06 was not warranted.

Ground Water

At Site 06, the potential linkage of chemical constituents between ground water and surface water was assumed, and judgements regarding ecological risk from ground water were based on the number of common COPCs in the two environments, their concentration in both environments, their distribution in ground water, and geochemical considerations. Four constituents exceeded screening criteria in ground water: iron, manganese, lead, and bis(2-ethylhexyl)phthalate. Iron was only detected above screening values in an upgradient well, and manganese was only detected above screening levels in a background well. (Note that most screening values for metals, including manganese, were calculated as the 95 percent Upper Confidence Limit (UCL) of the mean of several wells. Therefore, as in the case of manganese, the concentration in an individual background well can exceed the background screening criterion.) The phthalate compound was implicated as a sampling artifact.

Lead was detected above screening levels in two wells, one up- and one downgradient of Site 06. However, lead did not exceed the screening criterion in samples from wells directly on Site 06, or immediately downgradient to the northeast, the prevailing direction of ground water flow. The concentration of lead in Hall Creek surface water was well below the screening criterion. Lead was moderately elevated over the screening criterion in Hall Creek sediment. The source of the lead in Hall Creek sediment was not established. There are many other possible sources, both on- and off

site. Further, based on geochemical considerations, lead would be unlikely to migrate in the ground water environment. It was determined that ecological risk from ground water at Site 06 was minimal.

Site 11

Surface Soil

Identification of watershed-specific risk drivers was based on the Draft Final ERA. Food web-based, modeled HQs based on the maximum COPC concentration in a given watershed were considered. All COPC/receptor pairs exhibiting an HQ in excess of 10 for either the hawk, robin, or shrew were identified as possible risk drivers in the watershed. The maximum watershed model results were examined to identify any HQs greater than 10 for these receptors. In the Mill Creek Watershed which contains Site 11, one COPC/receptor pair produced an HQ greater than 10: selenium/shrew (HQ=16.9).

Site 11 is the only IR site in the Mill Creek watershed, thus the identified HQ of 16.9 for selenium/shrew resulted from Site 11 surface soil data. The maximum concentration of selenium was compared to available benchmark data. Selenium was only detected in one of 32 samples collected. The highest detected concentration of selenium at Site 11 was 0.72 mg/kg. The maximum detected concentration of selenium at Site 11 is below the available toxicologically-based screening benchmarks and within both the Rhode Island and NCBC background ranges. Therefore, it was determined that no remediation of surface soil was warranted at this site.

Ground Water

At Site 11, the potential linkage of constituents between ground water and surface water was assumed, and judgements regarding ecological risk from ground water were based on the number of common COPCs in the two environments, their concentration in both environments, their distribution in ground water, and geochemical considerations. Antimony and iron were the two COPCs to be evaluated. Antimony was well below screening levels in Mill Creek surface water, and was not detected at all in sediment. In addition, antimony was not detected during the resampling of well 11-MW06D in January 1998. As expected, iron was present in ground water and exceeded the screening criterion slightly in three wells. The low level of exceedance of iron in ground water and its natural occurrence in ground water suggests little potential for ecological risk in the surface water environment. Ecological risk from ground water at Site 11 was determined to be minimal.

Site 13

Surface Soil

Elevated HQs existed for the zinc/hawk pair and the PCB/shrew pair when no other factors were considered. The hawk HQ was 51.1 and the shrew HQs ranged from 12.5 to 82.3. Area Use Factors were considered to account for the ratio of the size of an area with elevated constituents to the size

of the home range of a receptor, and were used to adjust the estimate of risk for the amount of time a receptor may be in contact with a site.

When the hawk HQ of 51.1 is adjusted to incorporate an Area Use Factor, the resulting HQ is well below 1.0. When the apparently small area of elevated zinc is viewed in the context of a small exposure zone in an area of low quality ecological habitat, it was determined that little impetus exists for remediation of zinc based on ecological issues, and that the ecological protection that would be achieved is minimal, and clearly outweighed by cost.

As a result of the soil removal actions at Site 13, the concentration of total PCB in soil was reduced to below the RIDEM clean-up criterion of 10 mg/kg. Calculated HQs for either Aroclor-1248 or Aroclor-1254 range from 12.5 to 82.3, all based on the shrew. However, when Area Use Factors were considered, only three of the Area Use Factor HQs remain above 10.0, and two are barely so.

In addition, it is important to note that the potential risk to the shrew is not death, but reduced reproductive capacity. A second important consideration is the portion of the small mammal population that is vulnerable to the risk. It was calculated that the area in question could support one shrew (at most). Therefore, the risk of reduced reproductive success is being expressed through only a minimal percent of the local population. In addition, the relatively high abundance and fecundity of small mammal populations contribute to their resilience to environmental stresses. Often, the concern in risk assessment is not so much directed at these small animal populations, but at larger animals that may prey on the shrew or other small mammal. As demonstrated for the hawk above, the risk to the hawk is reduced below threshold when the Area Use Factor is considered.

As with zinc, the area of elevated PCB represented by any one of the sample locations appears to be isolated and small. Given the isolated, small exposure zone, and the low attractive potential of the ecological habitat, continued excavation of soil in this area was not warranted.

The possibility of migration of surface soil constituents from this and other sites to nearby streams is evaluated in the *Watershed Evaluation Report*. There appears to be little potential for the isolated concentrations of zinc and (post-removal) PCB to act as sources for transport to Hall Creek surface water or sediment. Therefore, it was determined that no unacceptable risks to an ecological population exist at Site 13.

Ground Water

At Site 13, the potential linkage of chemical constituents between ground water and surface water was assumed. Ecological risk from ground water was based on the number of common COPCs in the two environments, their concentration in both environments, their distribution in ground water, and geochemical considerations. Only cobalt and aluminum exceeded screening criteria in Hall Creek sediment, but they were not greatly elevated. Iron was present in ground water and exceeded the screening criterion slightly in two wells. The low level of exceedance of iron in ground water and its natural occurrence in that medium suggests little potential for ecological risk in the surface environment. Ecological risk from ground water at Site 13 was determined to be minimal.

G. DESCRIPTION OF THE "NO FURTHER ACTION" ALTERNATIVE

The preferred alternative for Sites 06, 11, and 13 is No Further Action. The no further action alternative includes no monitoring, no deed restrictions, and no remedial actions at any of the sites. This alternative was selected based on the results of the risk assessments, along with the results of the Basewide Inorganics Ground Water Study, it has been determined that the areas are protective of human health and the environment. Sites 06, 11, and 13 are within the NCP "target level" acceptable cancer risk range of 1×10^{-6} to 1×10^{-4} .

H. DOCUMENTATION OF SIGNIFICANT CHANGES

The Navy issued a Proposed Plan on 23 July 1998 for Sites 06, 11, and 13 and presented it to the public on 13 August 1998. The plan proposed No Further Action with respect to soil and ground water at these sites. Since the No Further Action decision presented herein is identical to that presented in the Proposed Plan, no significant changes need to be addressed.

I. STATE ROLE

The RIDEM has reviewed the No Further Action Proposed Plan and has indicated its support for the selected remedy. The State has also reviewed the RI/FS, HHRA, and ERA to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. As a party to the FFA, Rhode Island concurs with the selected remedy for Sites 06, 11, and 13. A copy of the declaration of the letter of concurrence is attached as Appendix B.

III. RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is to review public response to the Proposed Plan for No Further Action with respect to Sites 06, 11, and 13 at the former Naval Construction Battalion Center (NCBC) in Davisville, Rhode Island. Site 06 is the Solvent Disposal Area, Site 11 is the Former Fire Fighting Training Area, and Site 13 is the Disposal Area Northwest of Buildings W-3, W-4, and T-1 at NCBC Davisville. This Responsiveness Summary documents the Navy's consideration of public comments during the decision-making process and provides answers to any major comments raised during the public comment period. The Responsiveness Summary is divided into the following sections:

Overview - This section briefly describes the No Further Action alternative recommended within the Proposed Plan, and any impacts on the Proposed Plan due to public comment.

Background on Community Involvement - This section provides a summary of community interest in the proposed remedy and identifies key public issues. It also describes community relations activities conducted with respect to the area of concern.

Summary of Major Questions and Comments - This section provides a summary of the major oral comments recorded at the official public hearing, and written comments received during the public comment period.

OVERVIEW

In the Proposed Plan issued for public comment in July 1998, the Navy evaluated the existing data and determined that No Further Action at Sites 06, 11, and 13 was appropriate. The preferred alternative was selected in coordination with the U.S. Environmental Protection Agency (EPA) and the Rhode Island Department of Environmental Management (RIDEM). No written comments from the public were received on the preferred no further action alternative. Only one verbal comment, addressed herein, was received during the official public hearing.

BACKGROUND ON COMMUNITY INVOLVEMENT

Throughout the remedial investigation activities, the Navy, RIDEM, and EPA have been directly involved through project review and comments. Periodic meetings have been held to maintain open lines of communication and to keep all parties abreast of current activities.

The Proposed Plan for Sites 06, 11, and 13 was mailed out to community members on the general mailing list on 23 July 1998. Notices of the availability of the Proposed Plan appeared in the Providence Journal Bulletin on 28 July 1998 and the North Kingstown Standard-Times on 30 July 1998. The notices summarized the No Further Action proposed alternative. The announcement also identified the location of the administrative record and information repository, the date and time of the public informational meeting and the public hearing, the length of the public comment period, and the address to which written comments could be sent.

SUMMARY OF MAJOR QUESTIONS AND COMMENTS

No written comments were received on the proposed no further action alternative. One verbal comment was received from Mr. Robert Johnston of Saunderstown, RI, during the official public hearing. Presented below is the comment received during the public hearing and the Navy's response to that comment.

Comment: "My name is Robert Johnston. I'm a resident of Saunderstown, Rhode Island. First of all, I'd like to commend the Navy and the EPA and the Rhode Island Department of Environmental Management for all their efforts in cleaning up the sites and making the land available for reuse.

My one comment tonight on the sites that we're discussing, 6, 11, and 13, that the work has been done and the sites are now clean, as far as contamination of risk. But as far as anybody looking at the site, you know, it looks the same as what it did before it was started. I think it would be good for the public to come and see a site that has had a large expense in terms of remediation, that when it is over with, you can see that it is cleaned and looks nicer. They may have some landscaping or some area that it doesn't just look like, yes, it is cleaned up, but there is nothing to see from all the efforts. Thank you."

Response: *The Navy's decision for no further action at Sites 6, 11, and 13 is primarily based on the confirmation that no unacceptable risks to human health or the ecological environment exist at the sites. All actions at the sites have been based on risk of constituents present to those workers, resident, or ecological habitats who/which may use the areas in the future. The Navy has confirmed through risk assessments that the property can be transferred without any land use restrictions. Although it is not expected, the areas could even be used for residential areas, based on the risk assessment results. The property will be transferred to the Rhode Island Economic Development Corporation (RIEDC) and they will be free to alter or develop the property as they choose. Areas impacted by removal actions have been backfilled and seeded to provide a grass cover. The Navy is pleased to be able to transfer the property to the RIEDC for future use without restrictions.*

CONCLUSIONS:

This comment and response are incorporated into this Final Record of Decision (ROD). No changes have been made to the reference document as a result of the comment.

LIST OF ACRONYMS AND ABBREVIATIONS

AWQC	Ambient Water Quality Criteria
BOD	Biochemical Oxygen Demand
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COD	Chemical Oxygen Demand
COPC	Constituent of Potential Concern
CS	Confirmation Study
DAA	Detailed Analysis of Alternatives
DERA	Defense Environmental Restoration Account
DOD	Department of Defense
EA	EA Engineering, Science and Technology
ERA	Ecological Risk Assessment
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
GC	Gas Chromatograph
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IAS	Initial Assessment Study
IR	Installation Restoration
MCL	Maximum Contaminant Level
NAPL	Non-aqueous Phase Liquid
NAS	Naval Air Station
NCBC	Naval Construction Battalion Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OVA	Organic Vapor Analyzer
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
ppm	Parts Per Million
PRG	Preliminary Remediation Goal
RBC	Risk-based Concentration
RfD	Reference Dose
RI	Remedial Investigation
RIDEM	Rhode Island Department of Environmental Management
RIEDC	Rhode Island Economic Development Corporation
RING	Rhode Island National Guard
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act

SF	Slope Factor
SMCL	Secondary Maximum Contaminant Level
SVOC	Semi-volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TRC	TRC Environmental Corporation
TRV	Toxicity Reference Value
TSS	Total Suspended Solids
UCL	Upper Confidence Limit of the Mean
VOC	Volatile Organic Compound

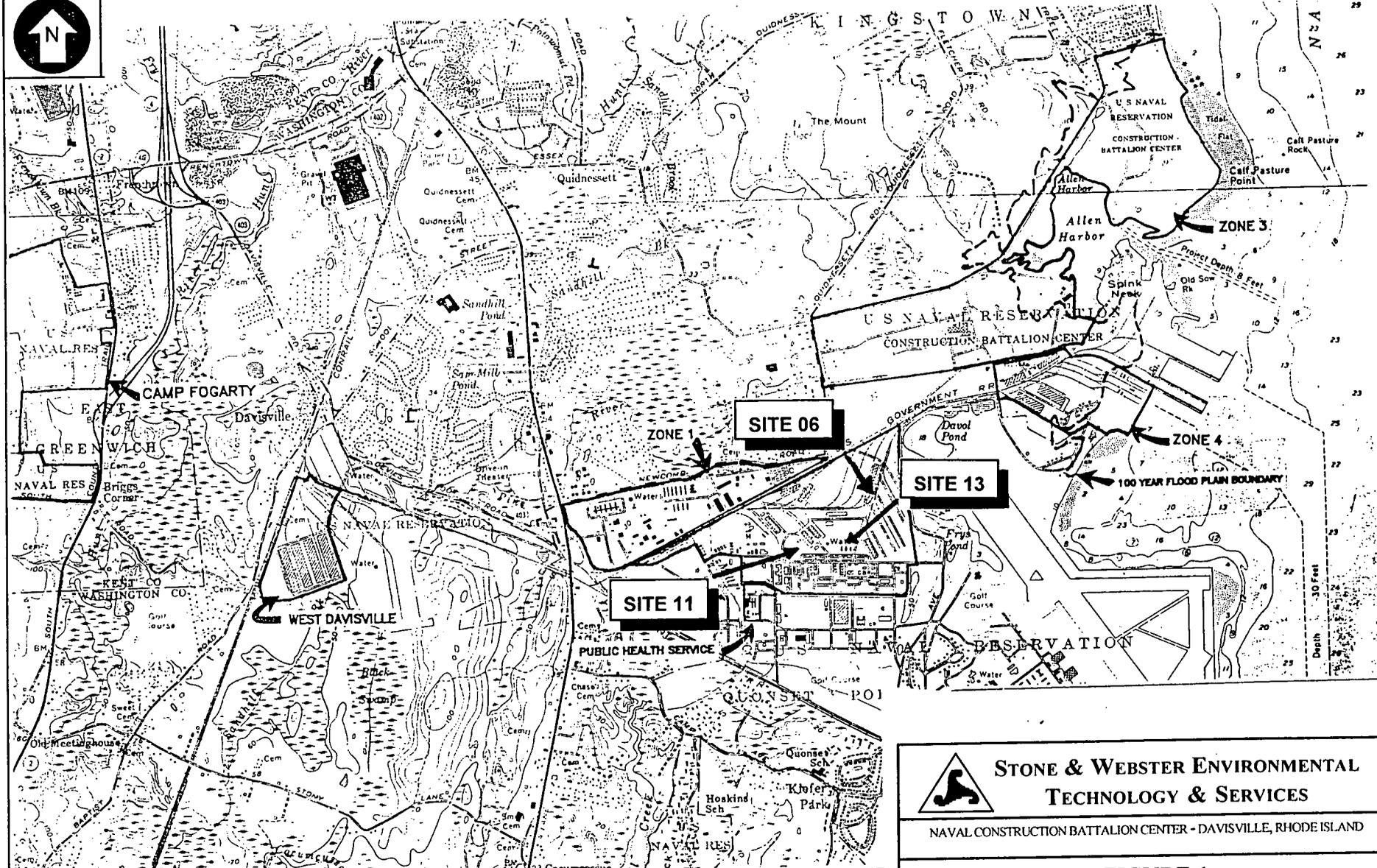
FIGURES

Site 06 - Solvent Disposal Area

Site 11 - Fire Fighting Training Area

Site 13 - Disposal Area Northwest of Buildings W-3, W-4 and T-1

NCBC - Davisville, Rhode Island



BASE MAP: U.S.G.S. EAST GREENWICH AND WICKFORD QUADRANGLE - RHODE ISLAND
7.5 MINUTE SERIES (TOPOGRAPHIC) 1942, PHOTO REVIS 1970 & 1975.



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**FIGURE 1
SITE LOCUS PLAN**



34

MIDDLETOWN ST.

GLOUCESTER LOOP

W-6

W-7

water tower

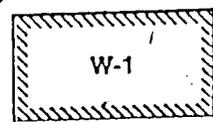


bunker

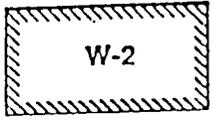
Site 11
Approximate Study Area



390

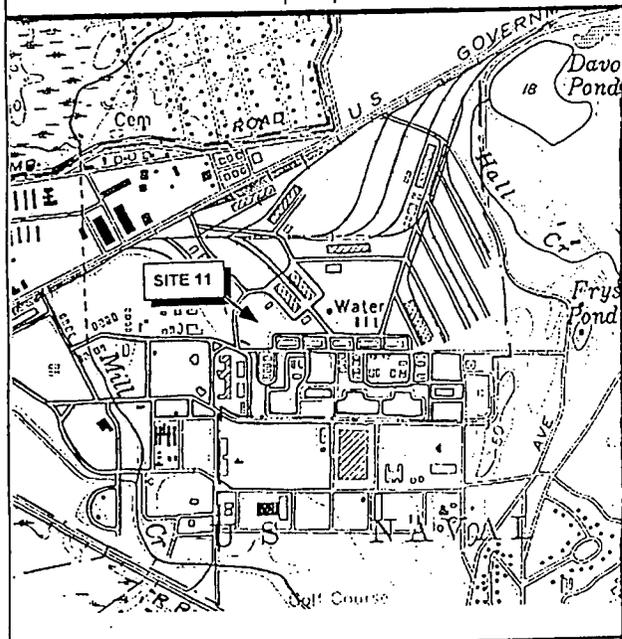
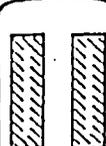


W-1



W-2

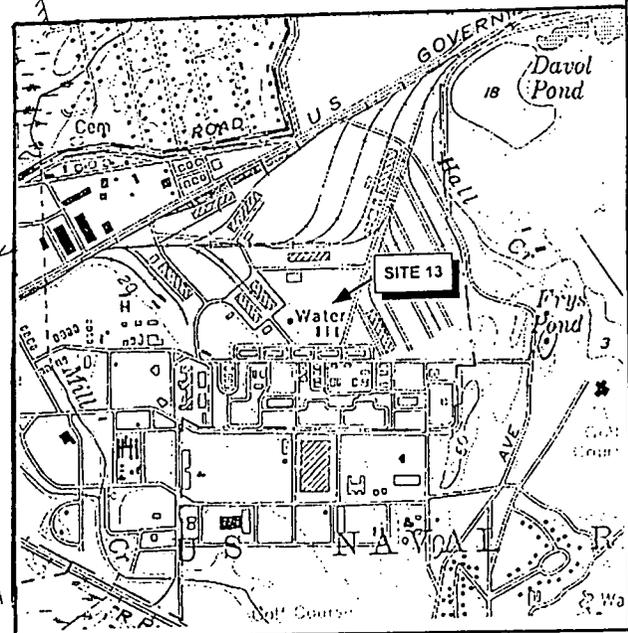
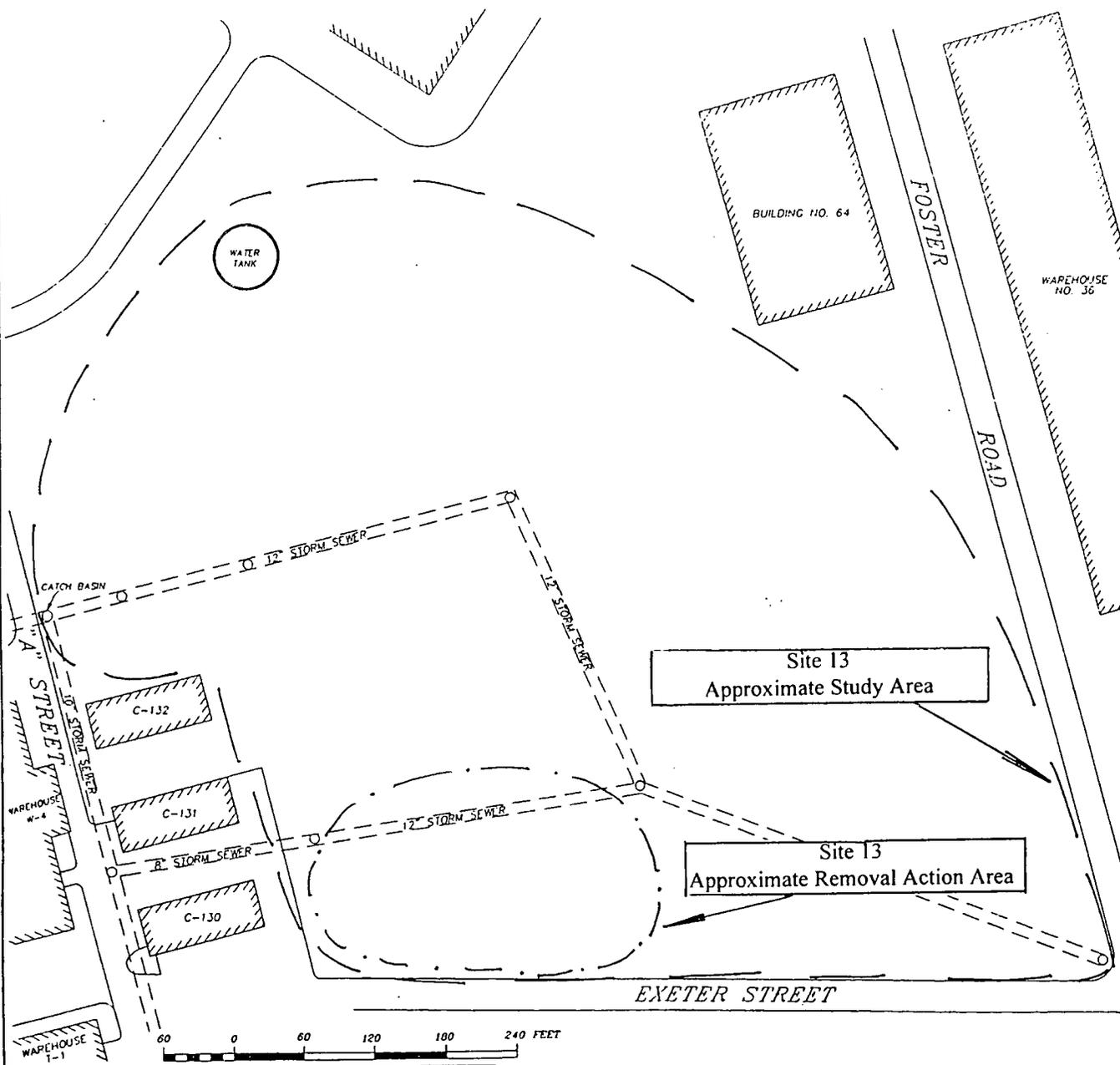
MOSCRIP AVE.



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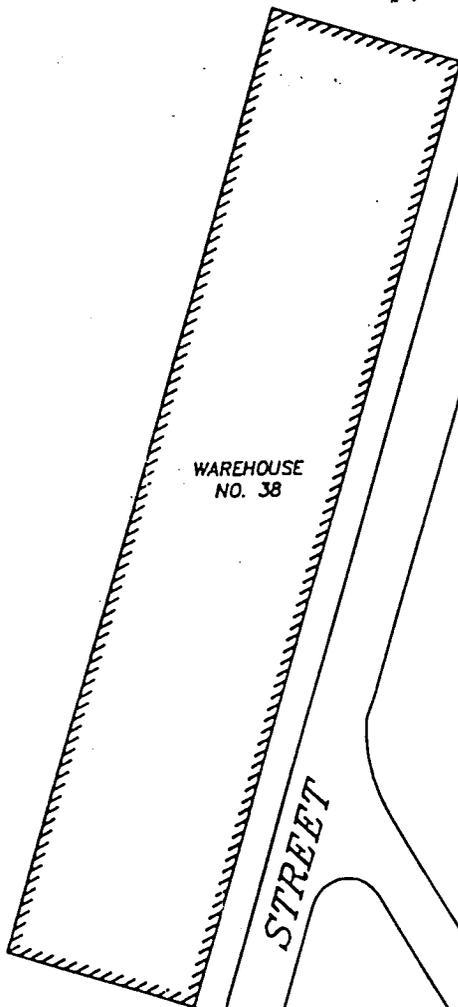
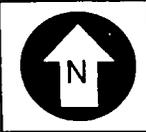
FIGURE 3 - SITE 11
ALLEGED FIRE FIGHTING TRAINING AREA



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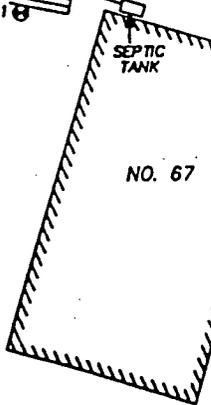
**FIGURE 4 - SITE 13
WASTE OIL DISPOSAL AREA**



WAREHOUSE NO. 38

EXETER STREET

BRISTOL STREET



LEACH FIELD

NO. 67

B6-3

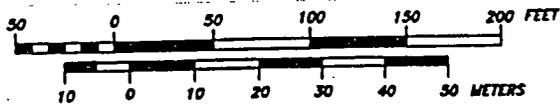
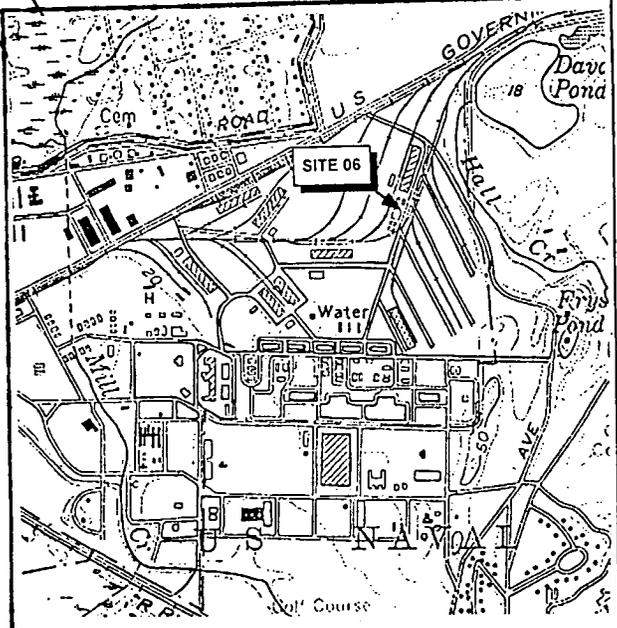
MWS-1

MWS-2
B6-2

MWS-3, B6-1

LEGEND:

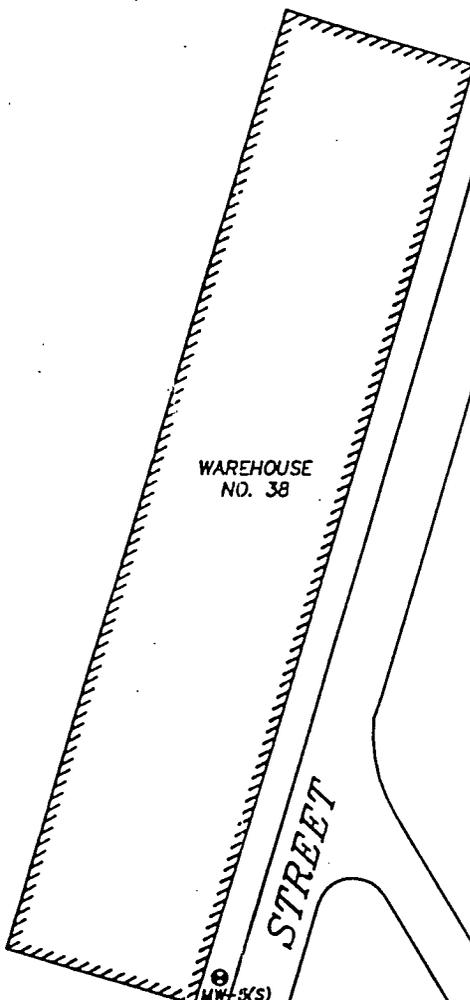
- BORING LOCATION
- ⊕ MONITORING WELL/BORING LOCATION



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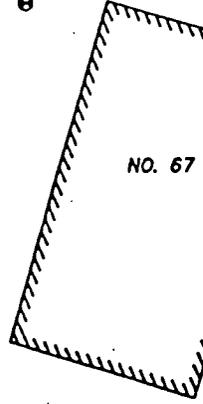
**FIGURE 5 - SITE 06
PHASE I SAMPLING LOCATIONS**



WAREHOUSE NO. 38

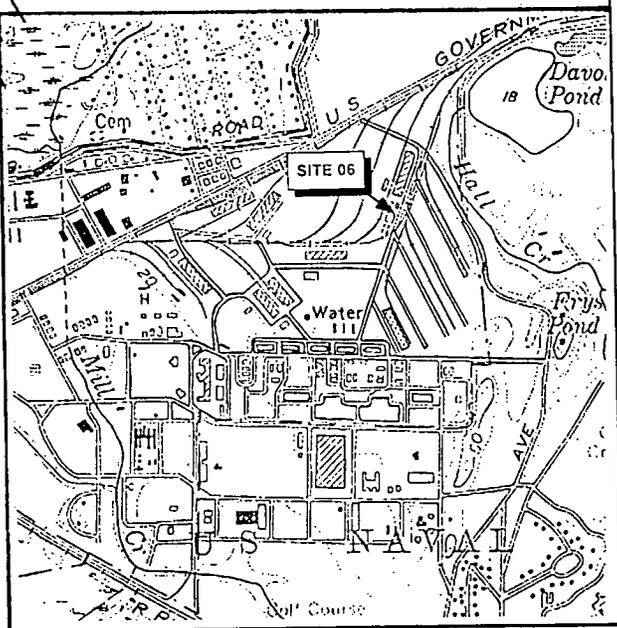
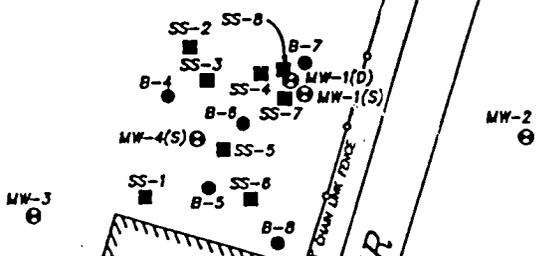
EXETER STREET

BRISTOL STREET



NO. 67

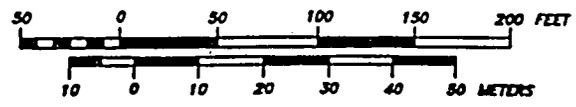
- LEGEND:**
- TEST BORING LOCATION
 - ⊕ MONITORING WELL LOCATION
 - SURFACE SOIL SAMPLE LOCATION
 - (S) SHALLOW WELL
 - (D) DEEP WELL

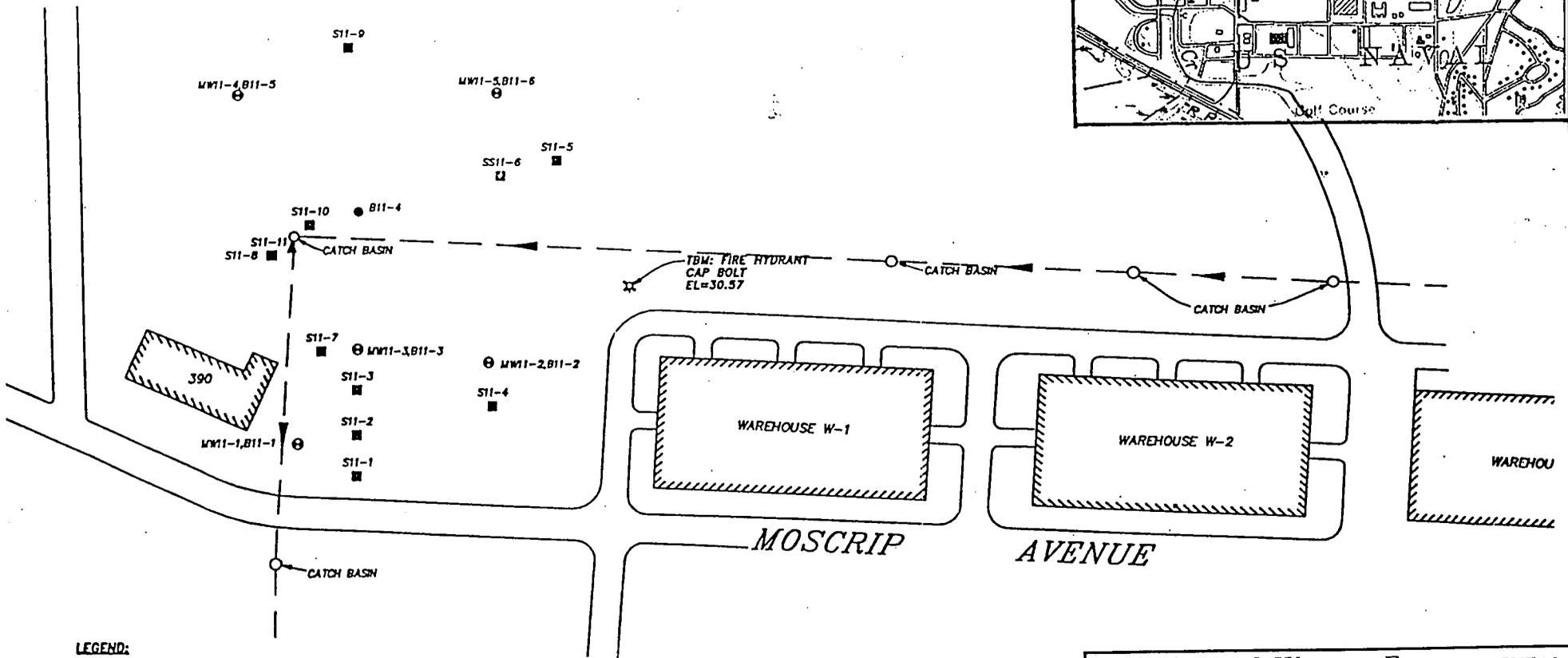
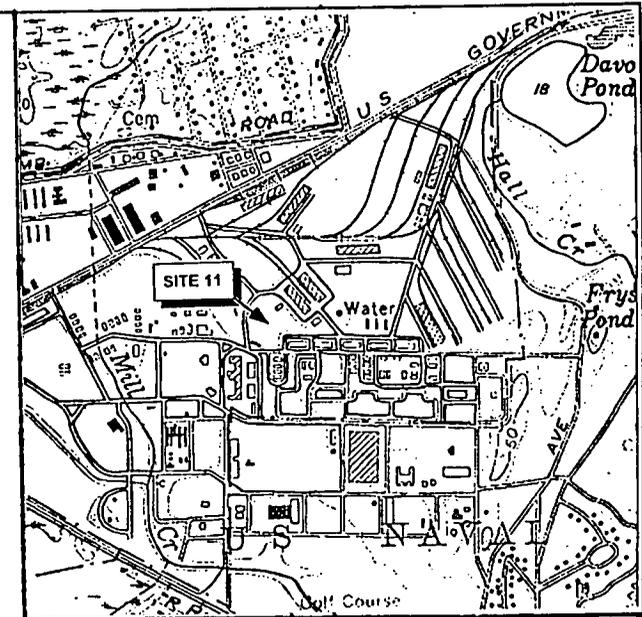


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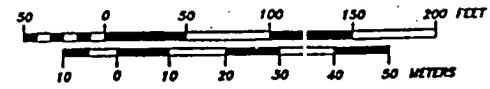
**FIGURE 6 - SITE 06
PHASE II SAMPLING LOCATIONS**





LEGEND:

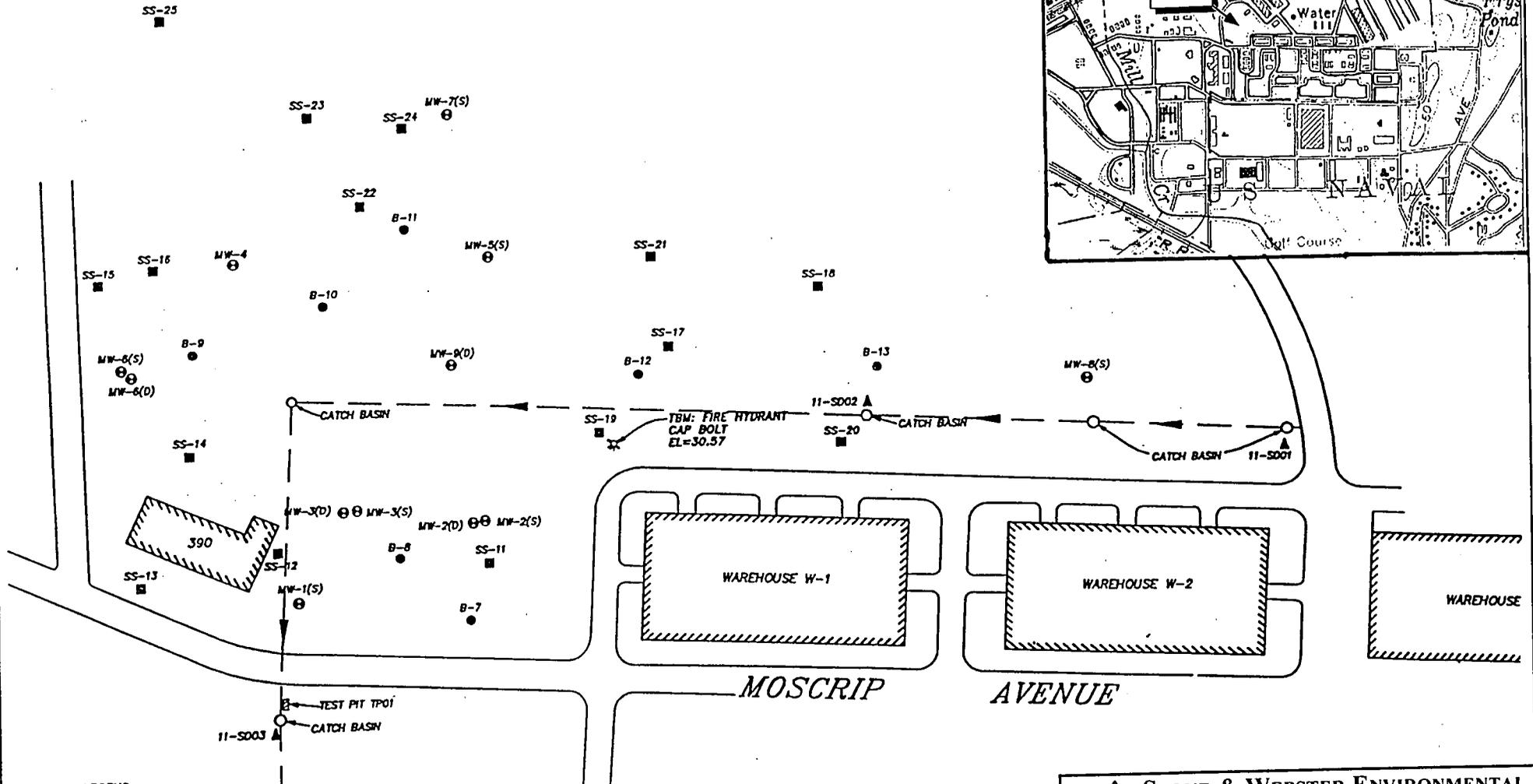
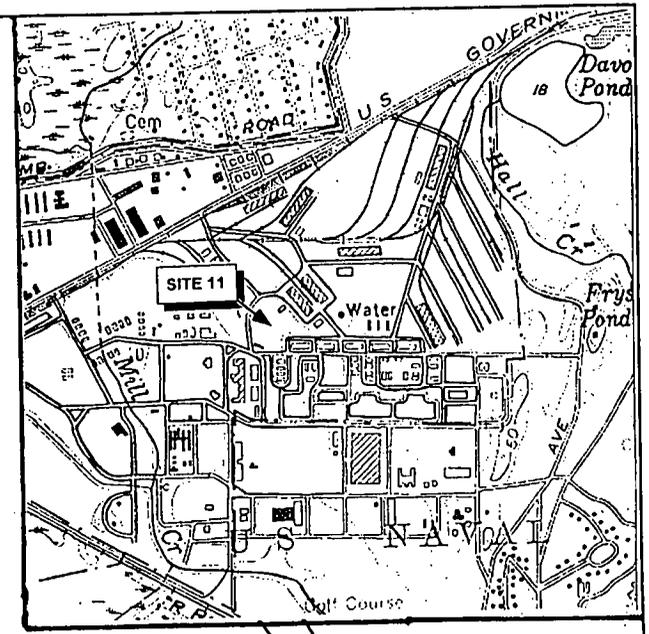
- ⊕ MONITORING WELL/BORING LOCATION
- SURFACE SOIL SAMPLE LOCATION
- STORM DRAIN LINE FLOW DIRECTION
- ▲ CATCH BASIN SAMPLE LOCATION
- BORING LOCATION



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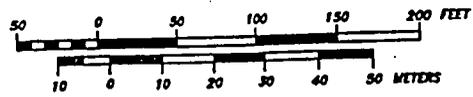
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**FIGURE 7 - SITE 11
PHASE I SAMPLING LOCATIONS**

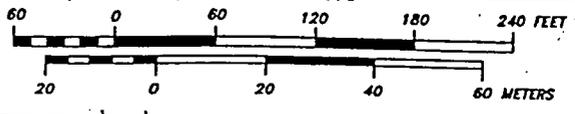
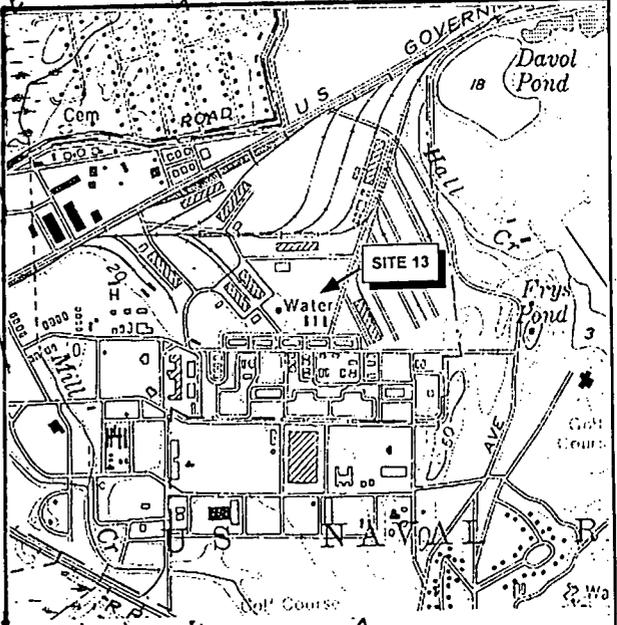


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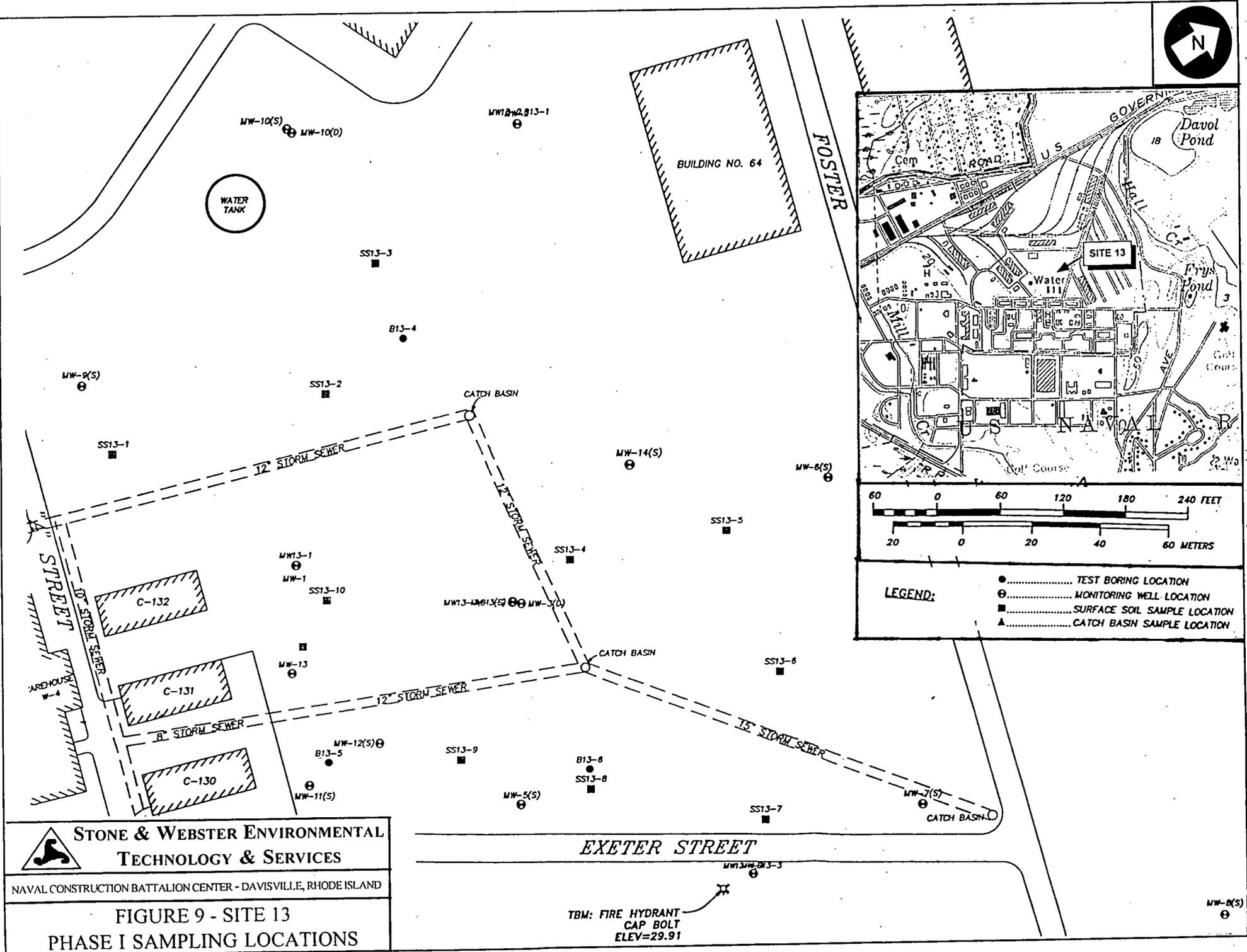
- TEST BORING LOCATION
- ⊕ MONITORING WELL LOCATION
- SURFACE SOIL SAMPLE LOCATION
- (S) SHALLOW WELL
- (D) DEEP WELL
- ▨ TEST PIT
- ▲ CATCH BASIN SAMPLE LOCATION
- STORM DRAIN LINE FLOW DIRECTION



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FIGURE 8 - SITE 11 PHASE II SAMPLING LOCATIONS	



- LEGEND:**
- TEST BORING LOCATION
 - ⊕ MONITORING WELL LOCATION
 - SURFACE SOIL SAMPLE LOCATION
 - ▲ CATCH BASIN SAMPLE LOCATION



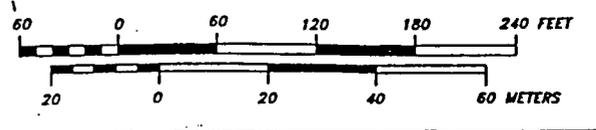
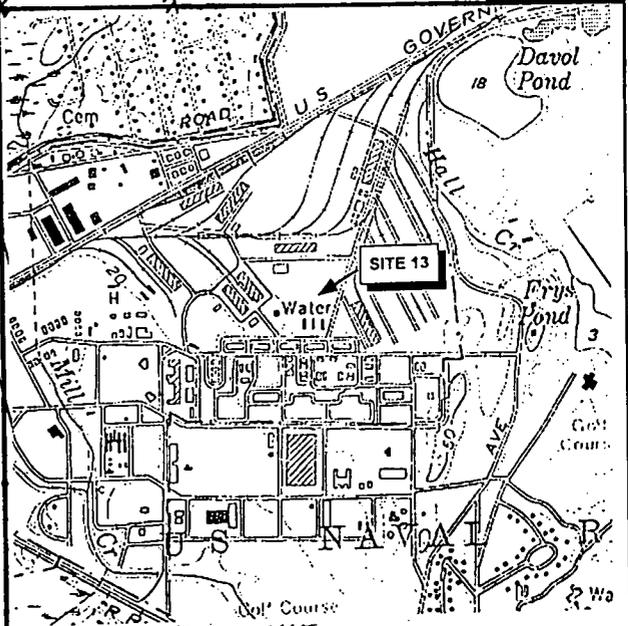
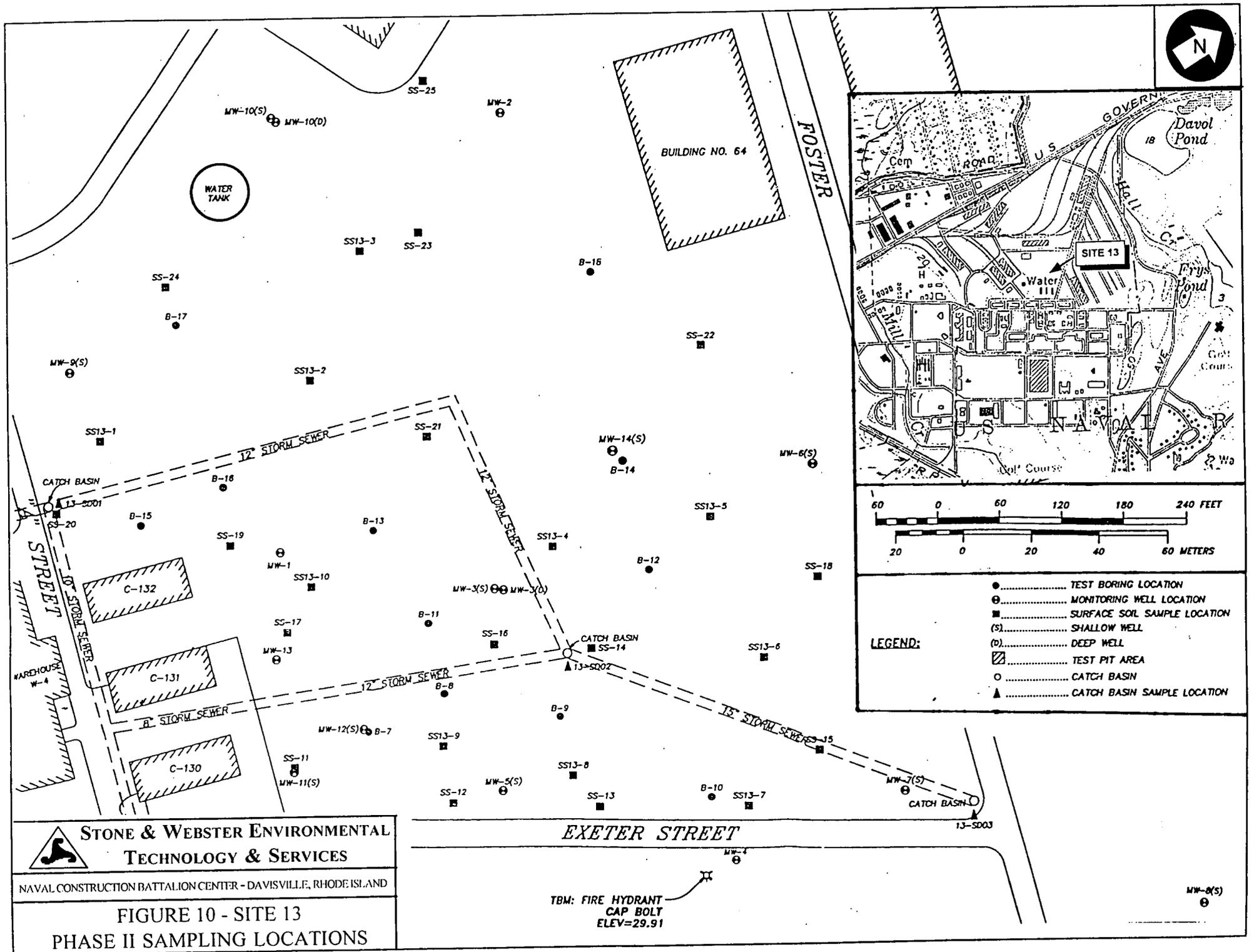
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NAVAL CONSTRUCTION BATTALION CENTER - DAVISVILLE, RHODE ISLAND

**FIGURE 9 - SITE 13
PHASE I SAMPLING LOCATIONS**

TBM: FIRE HYDRANT
CAP BOLT
ELEV=29.91

MW-8(S)



- LEGEND:**
- TEST BORING LOCATION
 - ⊕ MONITORING WELL LOCATION
 - SURFACE SOIL SAMPLE LOCATION
 - (S) SHALLOW WELL
 - (D) DEEP WELL
 - ▨ TEST PIT AREA
 - CATCH BASIN
 - ▲ CATCH BASIN SAMPLE LOCATION

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NAVAL CONSTRUCTION BATTALION CENTER - DAVISVILLE, RHODE ISLAND

**FIGURE 10 - SITE 13
PHASE II SAMPLING LOCATIONS**

TBM: FIRE HYDRANT
CAP BOLT
ELEV=29.91

APPENDIX A
RISK ASSESSMENT SUMMARY
Site 06 - Solvent Disposal Area
Site 11 - Fire Fighting Training Area
Site 13 - Disposal Area Northwest of Buildings W-3, W-4 and T-1
NCBC - Davisville, Rhode Island

TABLE A-1
SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN SURFACE SOILS
NCBC DAVISVILLE SITE 06

Chemical of Concern	Frequency Detected	Range of Nondetects (mg/kg)	Range of Detects (mg/kg)	Mean (mg/kg)	95 UCLM (mg/kg)
INORGANICS					
Arsenic	19 / 19	--	0.52 - 3.1	1.3	1.7
Beryllium	17 / 19	0.21-0.21	0.32 - 0.69	0.38	0.49
Lead	19 / 19	--	6.9 - 616	84	180
SEMIVOLATILES					
Benzo(a)anthracene	3 / 19	0.33 - 5.5	0.056 - 0.5	0.19	0.22
Benzo(a)pyrene	3 / 19	0.33 - 5.5	0.043 -0.44	0.18	0.23
Benzo(b)fluoranthene	4 / 19	0.33 - 5.5	0.048 - 0.64	0.19	0.25

Source: *Final Technical Memorandum Human Health Risk Assessment (HHRA) For IR Program Sites 06, 10, and 11, Naval Construction Battalion Center, Davisville, Rhode Island, EA Engineering, Science, and Technology, November 1996.*

TABLE A-2
SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN GROUND WATER
NCBC DAVISVILLE SITE 06

Chemical of Concern	Frequency Detected	Range of Nondetects (ug/L)	Range of Detects (ug/L)	Mean (ug/L)	95 UCLM (ug/L)
INORGANICS					
Lead	3 / 6	1 - 1	2.7 - 17.8	4.98	81.3

Source: *Final Human Health Risk Assessment (HHRA): Sites 06 and 11 Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island*, EA Engineering, Science, and Technology, May 1998.

**TABLE A-3
SUMMARY OF ESTIMATED CANCER RISKS AND HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN
CANCER FOR ALL RECEPTOR POPULATIONS, NCBC DAVISVILLE SITE 06**

Exposure Pathway	Future Construction Workers		Future Commercial Workers		Future Adult Residents		Future Children Residents	
	AE	RME	AE	RME	AE	RME	AE	RME
CANCER RISKS								
Dermal contact with soil	--	--	--	--	--	--	--	--
Inhalation of fugitive dusts	1 x 10 ⁻¹¹	3 x 10 ⁻¹¹	NA	NA	NA	NA	NA	NA
TOTAL RISK	2 x 10 ⁻⁸	2 x 10 ⁻⁷	4 x 10 ⁻⁷	2 x 10 ⁻⁶	3 x 10 ⁻⁷	2 x 10 ⁻⁶	6 x 10 ⁻⁷	3 x 10 ⁻⁶
HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN CANCER								
Incidental ingestion of soil	0.001	0.008	0.002	0.003	0.002	0.002	0.02	0.03
Dermal contact with soil	--	--	--	--	--	--	--	--
Inhalation of fugitive dusts	0.0000001	0.0000004	NA	NA	NA	NA	NA	NA
TOTAL HI	0.001	0.008	0.002	0.003	0.002	0.003	0.02	0.03

Source: Final Technical Memorandum Human Health Risk Assessment (HHRA) For IR Program Sites 06, 10, and 11, Naval Construction Battalion Center, Davisville, Rhode Island, EA Engineering, Science, and Technology, November 1996.

TABLE A-4
SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN SURFACE SOILS
NCBC DAVISVILLE SITE 11

Chemical of Concern	Frequency Detected	Range of Nondetects (mg/kg)	Range of Detects (mg/kg)	Mean (mg/kg)	95 UCLM (mg/kg)
INORGANICS					
Arsenic	21 / 31	0.4-0.66	0.42 - 2.4	0.98	1.4
Beryllium	28 / 31	0.22-0.43	0.23 - 0.87	0.39	0.46
Lead	31 / 31	--	1.8 - 39.3	13	18
SEMIVOLATILES					
Benzo(a)anthracene	11 / 31	0.33 - 0.38	0.047 - 3.2	0.26	0.28
Benzo(a)pyrene	9 / 31	0.33 - 0.38	0.037 - 1.5	0.20	0.24
Benzo(b)fluoranthene	14 / 31	0.33 - 0.38	0.041 - 3.5	0.28	0.30

Source: *Final Technical Memorandum Human Health Risk Assessment (HHRA) For IR Program Sites 06, 10, and 11, Naval Construction Battalion Center, Davisville, Rhode Island*, EA Engineering, Science, and Technology, November 1996.

TABLE A-5
SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN GROUND WATER
NCBC DAVISVILLE SITE 11

Chemical of Concern	Frequency Detected	Range of Nondetects (ug/L)	Range of Detects (ug/L)	Mean (ug/L)	95 UCLM (ug/L)
SEMIVOLATILES					
Bis(2-ethylhexyl)phthalate	1 / 12	10	14	10.3	10.9

Source: *Final Human Health Risk Assessment (HHRA): Sites 06 and 11 Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island*, EA Engineering, Science, and Technology, May 1998.

**TABLE A-6
SUMMARY OF ESTIMATED CANCER RISKS DUE TO SOIL AND HAZARD INDICES FOR HEALTH EFFECTS
OTHER THAN CANCER FOR ALL RECEPTOR POPULATIONS, NCBC DAVISVILLE SITE 11**

Exposure Pathway	Future Construction Workers		Future Commercial Workers		Future Adult Residents		Future Children Residents	
	AE	RME	AE	RME	AE	RME	AE	RME
CANCER RISKS								
Incidental ingestion of soil	3×10^{-8}	2×10^{-7}	3×10^{-7}	1×10^{-6}	3×10^{-7}	2×10^{-6}	5×10^{-7}	3×10^{-6}
Dermal contact with soil	--	--	--	--	--	--	--	--
Inhalation of fugitive dusts	2×10^{-11}	7×10^{-11}	NA	NA	NA	NA	NA	NA
TOTAL RISK	3×10^{-8}	2×10^{-7}	3×10^{-7}	1×10^{-6}	3×10^{-7}	2×10^{-6}	5×10^{-7}	3×10^{-6}
HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN CANCER								
Incidental ingestion of soil	0.001	0.008	0.001	0.003	0.001	0.003	0.01	0.03
Dermal contact with soil	--	--	--	--	--	--	--	--
Inhalation of fugitive dusts	0.0000003	0.000001	NA	NA	NA	NA	NA	NA
TOTAL HI	0.001	0.008	0.001	0.003	0.001	0.003	0.01	0.03

Source: Final Technical Memorandum Human Health Risk Assessment (HHRA) For IR Program Sites 06, 10, and 11, Naval Construction Battalion Center, Davisville, Rhode Island, EA Engineering, Science, and Technology, November 1996.

TABLE A-7
SUMMARY OF ESTIMATED CANCER RISKS DUE TO GROUND WATER AND HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN CANCER FOR ALL RECEPTOR POPULATIONS, NCBC DAVISVILLE SITE 11

Exposure Pathway	Future Construction Workers		Future Commercial Workers		Future Adult Residents		Future Child Residents	
	AE	RME	AE	RME	AE	RME	AE	RME
CANCER RISKS								
Ingestion of ground water	1 x 10 ⁻⁹	3 x 10 ⁻⁹	6 x 10 ⁻⁹	3 x 10 ⁻⁸	4 x 10 ⁻⁷	2 x 10 ⁻⁶	2 x 10 ⁻⁷	1 x 10 ⁻⁶
TOTAL RISK	1 x 10 ⁻⁹	3 x 10 ⁻⁹	6 x 10 ⁻⁹	3 x 10 ⁻⁸	4 x 10 ⁻⁷	2 x 10 ⁻⁶	2 x 10 ⁻⁷	1 x 10 ⁻⁶
HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN CANCER								
Ingestion of ground water	3 x 10 ⁻⁵	7 x 10 ⁻⁵	2 x 10 ⁻⁴	3 x 10 ⁻⁴	1 x 10 ⁻²	2 x 10 ⁻²	2 x 10 ⁻³	6 x 10 ⁻³
TOTAL HI	3 x 10 ⁻⁵	7 x 10 ⁻⁵	2 x 10 ⁻⁴	3 x 10 ⁻⁴	1 x 10 ⁻²	2 x 10 ⁻²	2 x 10 ⁻³	6 x 10 ⁻³

All values after rounding.

NA Not Applicable.

Because there are no volatile COPC identified in ground water inhalation and dermal exposure during showering with ground water were not evaluated.

Source: *Final Human Health Risk Assessment (HHRA): Sites 06 and 11 Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island*, EA Engineering, Science, and Technology, May 1998.

TABLE A-8
SUMMARY STATISTICS FOR CONSTITUENTS OF CONCERN IN SURFACE SOILS
NCBC DAVISVILLE SITE 13

Chemical of Concern	Frequency Detected	Range of Nondetects (mg/kg)	Range of Detects (mg/kg)	Mean (mg/kg)	95 UCLM (mg/kg)
INORGANICS					
Arsenic	31 / 37	0.64 - 1.6	0.45 - 2.1	1.25	1.36
Beryllium	31 / 40	0.21 - 0.43	0.31 - 8.1	0.68	1.00
Chromium	40 / 40	NA	1.8 - 63	7.94	10.57
Lead	40 / 40	NA	1.6 - 869	57.09	99.56
SEMIVOLATILES/PAHs					
Benzo(a)pyrene	6 / 40	0.165 - 0.85	0.037 - 0.13	0.182	0.212
2-Methylnaphthalene	3 / 40	0.18 - 1.7	0.082 - 0.35	0.356	0.418
PESTICIDES/PCBs					
Aroclor 1248	5 / 43	0.0185 - 0.180	0.091 - 1.0	0.120	0.176
Aroclor 1254	14 / 43	0.033 - 0.2	0.018 - 3.3	0.290	0.449
Aroclor 1260	23 / 43	0.033 - 0.2	0.0053 - 2.65	0.233	0.397

Source: *Final Human Health Risk Assessment (HHRA): Site 13 Soil and Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island*, EA Engineering, Science, and Technology, May 1998.

TABLE A-9
SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN GROUND WATER
NCBC DAVISVILLE SITE 13

Chemical of Concern	Frequency Detected	Range of Nondetects (ug/L)	Range of Detects (ug/L)	Mean (ug/L)	95 UCLM (ug/L)
INORGANICS					
Beryllium	4 / 19	0.055 - 1	0.25-2.6	0.99	2.32
PESTICIDES					
Heptachlor epoxide	4 / 16	0.025	0.0017 - 0.028	0.022	0.039*
SEMIVOLATILES					
Pentachlorophenol	1 / 16	12.5	2	11.8	15.7*
VOLATILES					
1,2-Dichloroethane	1 / 16	5	1	4.75	6.01*

* 95th UCLM exceeds the maximum concentration and maximum concentration will be used as the exposure point concentration.

Source: *Final Human Health Risk Assessment (HHRA): Site 13 Soil and Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island*, EA Engineering, Science, and Technology, May 1998.

TABLE A-10
SUMMARY OF ESTIMATED CANCER RISKS AND HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN CANCER FOR ALL RECEPTOR POPULATIONS, NCBC DAVISVILLE SITE 13

Exposure Pathway	Future Construction Workers		Future Commercial Workers		Future Adult Residents		Future Child Residents	
	AE	RME	AE	RME	AE	RME	AE	RME
CANCER RISKS								
Incidental ingestion of soil	1×10^{-8}	8×10^{-8}	5×10^{-7}	2×10^{-6}	4×10^{-7}	3×10^{-6}	8×10^{-7}	5×10^{-6}
Dermal contact with soil	6×10^{-9}	8×10^{-9}	3×10^{-6}	6×10^{-6}	2×10^{-6}	7×10^{-6}	3×10^{-6}	9×10^{-6}
Inhalation of fugitive dusts	7×10^{-12}	2×10^{-11}	NA	NA	NA	NA	NA	NA
Ingestion of ground water	8×10^{-8}	2×10^{-7}	3×10^{-6}	2×10^{-5}	1×10^{-5}	1×10^{-4}	6×10^{-6}	8×10^{-5}
Inhalation and dermal exposure to ground water during showering	NA	NA	NA	NA	2×10^{-7}	1×10^{-6}	1×10^{-7}	6×10^{-7}
TOTAL RISK	1×10^{-7}	3×10^{-7}	7×10^{-6}	3×10^{-5}	1×10^{-5}	1×10^{-4}	1×10^{-5}	1×10^{-4}
HAZARD INDICES FOR HEALTH EFFECTS OTHER THAN CANCER								
Incidental ingestion of soil	4×10^{-5}	3×10^{-4}	2×10^{-2}	3×10^{-2}	2×10^{-2}	3×10^{-2}	2×10^{-1}	3×10^{-1}
Dermal contact with soil	2×10^{-5}	3×10^{-5}	4×10^{-2}	4×10^{-2}	4×10^{-2}	4×10^{-2}	3×10^{-1}	3×10^{-1}
Inhalation of fugitive dusts	1×10^{-8}	3×10^{-8}	NA	NA	NA	NA	NA	NA
Ingestion of ground water	1×10^{-3}	4×10^{-3}	5×10^{-3}	1×10^{-2}	4×10^{-2}	8×10^{-2}	9×10^{-2}	2×10^{-1}
Inhalation and dermal exposure to ground water during showering	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HI	1×10^{-3}	4×10^{-3}	7×10^{-2}	7×10^{-2}	1×10^{-1}	2×10^{-1}	6×10^{-1}	8×10^{-1}

All values after rounding.

Source: *Final Human Health Risk Assessment (HHRA): Site 13 Soil and Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island, EA Engineering, Science, and Technology, May 1998.*

APPENDIX B
RIDEM LETTER OF CONCURRENCE

Site 06 - Solvent Disposal Area

Site 11 - Fire Fighting Training Area

Site 13 - Disposal Area Northwest of Buildings W-3, W-4 and T-1

NCBC - Davisville, Rhode Island



RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767

TDD 401-831-5508

29 September 1998

Ms. Patricia Meaney
Director, Office of Site Remediation and Restoration
USEPA - Region 1
JFK Federal Building - HIO
Boston, MA 02203

RE: Record of Decision for:
Site 06 - Solvent Disposal Area
Site 11 - Fire Fighting Training Area
Site 13 - Disposal Area Northwest of Buildings W-3, W-4, and T-1
Former Naval Construction Battalion Center (NCBC), Davisville, RI

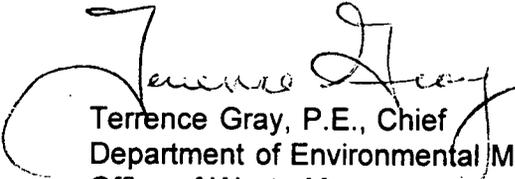
Dear Ms. Meaney;

On 23 March 1992 the State of Rhode Island entered into a Federal Facilities Agreement (FFA) with the Department of the Navy and the Environmental Protection Agency. One of the primary goals of the FFA is to insure that the environmental impacts associated with past activities at the former Naval Construction Battalion Center (NCBC) located in Davisville, Rhode Island are thoroughly investigated and that appropriate actions are taken to protect human health and the environment.

In accordance with the FFA, The Department has reviewed the Record of Decision for the above three referenced sites, dated September 1998. Our review of this document, combined with our knowledge of the sites gathered through our historical involvement in the investigatory phases, has determined that the selected remedy of no further action is appropriate.

RIDEM would like to commend the Navy for their diligence in investigating these sites, undertaking various removal actions, and working with the local community and affected stakeholders by considering their concerns. RIDEM concurs with this Record Of Decision and looks forward to continuing working with the Navy and EPA on the remaining concerns at this base.

Sincerely,


Terrence Gray, P.E., Chief
Department of Environmental Management
Office of Waste Management

APPENDIX C
ADMINISTRATIVE RECORD INDEX AND GUIDANCE DOCUMENTS

Site 06 - Solvent Disposal Area

Site 11 - Fire Fighting Training Area

Site 13 - Disposal Area Northwest of Buildings W-3, W-4 and T-1

NCBC - Davisville, Rhode Island

(UNDER SEPARATE COVER)

APPENDIX D
TRANSCRIPT OF PUBLIC HEARING

Site 06 - Solvent Disposal Area

Site 11 - Fire Fighting Training Area

Site 13 - Disposal Area Northwest of Buildings W-3, W-4 and T-1

NCBC - Davisville, Rhode Island

1 STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

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PROCEEDINGS AT HEARING :
IN RE: PROPOSED REMEDIAL :
ACTION PLAN FOR SITES 6, 11 & 13 :
.....

DATE: August 13, 1998
TIME: 7:00 p.m.
PLACE: NCBC Davisville
1330 Davisville Road
North Kingstown, RI

ORIGINAL

- PRESENT:
- PHILIP S. OTIS, NAVAL REMEDIAL PROJECT MANAGER
 - WALTER DAVIS, NAVAL ENVIRONMENTAL MANAGER
 - CHRISTINE WILLIAMS, EPA REMEDIAL PROJECT MANAGER
 - LINDA GARDINER, SENIOR ENGINEER, STONE & WEBSTER
 - MONICA BERUBE, ENGINEER, STONE & WEBSTER
 - RICHARD GOTTLIEB, RIDEM
 - JOHN MAYHEW, NAVAL GEOLOGIST
 - JIM ROPP, EA ENGINEERING

ALLIED COURT REPORTERS, INC.
115 PHENIX AVENUE
CRANSTON, RI 02920
(401) 946-5500

1 (COMMENCED AT 8:15 P.M.)

2 MR. OTIS: This will convene the
3 public hearing portion of this evening's meeting
4 which is intended to receive comments from the
5 public on the proposed remedial action plan for
6 site 6, site 11, and site 13 at the Naval
7 Construction Battalion Center, Davisville, Rhode
8 Island. Are there any members in the audience
9 this evening that would like to make a comment
10 that will be included in the Record of Decision,
11 the portion of the Record of Decision that is
12 called the Responsiveness Summary? Bob, please
13 identify yourself.

14 MR. JOHNSTON: My name is Robert
15 Johnston. I'm a resident of Saunderstown, Rhode
16 Island.

17 First of all, I'd like to commend the Navy
18 and the EPA and the Rhode Island Department of
19 Environmental Management for all their efforts in
20 cleaning up the sites and making the land
21 available for reuse.

22 My one comment tonight on the sites that
23 we're discussing, 6, 11, and 13, that the work
24 has been done' and the sites are now clean, as far

1 as contamination of risk. But as far as anybody
2 looking at the site, you know, it looks the same
3 as what it did before it was started. I think it
4 would be good for the public to come and see a
5 site that has had a large expanse in terms of
6 remediation, that when it is over with, you can
7 see that it is cleaned and looks nicer. They may
8 have some landscaping or some area that it
9 doesn't just look like, yes, it is cleaned up,
10 but there is nothing to see from all the efforts.
11 Thank you.

12 MR. OTIS: Thank you, Mr.

13 Johnston. Anybody else?

14 All right. There being no other indication
15 that anybody wishes to make a comment at this
16 time, let me remind you that you are afforded the
17 opportunity to submit a written comment, either
18 by a separate letter or by filling out the form
19 that was included as an insert with the proposed
20 plan that was put out in the mail, copies of
21 which are available here this evening. The date
22 is the 28th of August for the submission.
23 Anything must be postmarked by that time in order
24 to be responsive to the official public comment

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period. With that, the formal part of this public hearing is over and I thank you all for your participation.

(SIGN-IN SHEET ATTACHED)

(CONCLUDED AT 8:25 P.M.)

* * * * *

C E R T I F I C A T E

I, Claudia J. Read, Notary Public, do hereby certify that I reported in shorthand the foregoing proceedings, and that the foregoing transcript contains a true, accurate, and complete record of the proceedings at the above-entitled hearing.

IN WITNESS WHEREOF, I have hereunto set my hand this 14th day of August, 1998.

Claudia J. Read Notary Public

CLAUDIA J. READ, NOTARY PUBLIC/CERTIFIED COURT
REPORTER

29th RAB MEETING 13 AUG 98

SIGN UP SHEET

<u>NAME</u>	<u>AFFILIATION</u>	<u>PHONE</u>
Jim Rapp	EA ENGINEERING	781-275-8846
JOHN MAYHEW	NAVY (NORTH DIV)	610 595-0567 x125
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Mark House	Resource Controls (TAG)	401 728 6860
Christine Williams	EPA	617 573 5736
David Peterson	EPA	617 565-3269
Bob Johnston	Saunderstown, RI	401 245-5462
Dan Orish	URI	401 874 2267
Al Grampio	QDN YC	401 884-8306
RICHARD GOTTLIB	RIDEM	401-222-2797 x7138
MONICA BERUBE	STONE & WEBSTER	617 589 1538
Susan Licardi	Town of NK	401 294-3331
Betsy Morrison	Envir. Design	401-461-8242
Deborah Branson	US Naval War College	401 841 3318
Lawrence McBride	Resident	401-295-7832
John Patterson	SENATOR - DISTRICT 23	885-7776
Sue Hawser	REP - DISTRICT 44	222-6595
JAY O'BRIEN	Resident	- 884-8144
WALTER DAVIS	CSO/DARTMOUTH	(401) 294-6108
HOWARD COHEN	RIEDC	401-222-3134