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Final

VOLUME I
DPDO FILM PROCESSING DISPOSAL AREA REMEDIAL INVESTIGATION REPORT

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND

Contract No. N62472-86-C-1282
May, 1994

Prepared For:
Northern Division
Naval Facilities Engineering Command
Lester, Pennsylvania

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May 20, 1994

Ms. Marilyn Powers
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Naval Facilities Engineering Command
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Lester, PA 19113-2090

Re: Final Remedial Investigation Report
Site 08 - DPDO Film Processing Disposal Area
Naval Construction Battalion Center
Davisville, Rhode Island
Contract No. N62472-85-C-1026
TRC Project No. 01042-0050-00450

Dear Ms. Powers:

Enclosed please find five (5) copies of the Final Remedial Investigation Report, Volume I, which has been prepared for Site 08 - DPDO Film Processing Disposal Area, located at the Naval Construction Battalion Center in Davisville, Rhode Island.

Volume I of this report has been incorporated into one document including the technical report text, table, figures, and appendices A - I. Since there were no revisions to Volume II - the Human Health Risk Assessment, the Draft Final copy will serve as the Final report and a new document will not be prepared. Please note that an evaluation of human health risks associated with ground water ingestion under a future commercial/industrial site use has been included as Appenddis I of Volume I.

If you have any questions or comments concerning the Final Remedial Investigation Report for the DPDO Film Processing Disposal Area, please feel free to contact myself or Mr. Thomas McMorrow at (203) 289-8631.

Sincerely,
TRC ENVIRONMENTAL CORPORATION

Robert C. Smith /JMK

Robert C. Smith, P.E.
Program Manager

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EXECUTIVE SUMMARY

A Phase II Remedial Investigation was conducted at the Naval Construction Battalion Center (NCBC) Davisville, Site 08 - DPDO Film Processing Disposal Area in North Kingstown, Rhode Island by TRC Environmental Corporation (TRC) under contract to the U.S. Department of the Navy, Northern Division.

Purpose

The purposes of the remedial investigation were to evaluate the site geology and hydrogeology; to characterize the nature and extent of contamination at the site; to identify potential sources of site contamination; to obtain sufficient information so that a human health assessment could be conducted to determine potential risk to the public; and to develop the goals and objectives for a remedial response.

Volume I of the report describes the physical characteristics of the site, the Phase II field activities, the nature and extent of contamination at the site based on both Phase I and Phase II field investigations, and conclusions regarding the on-site contamination. The Appendices contain laboratory data packages, data validation summaries, boring logs, and other relevant information.

Volume II of the report presents the findings of the Human Health Risk Assessment.

Site Description and History

Site 08 - Defense Property Disposal Office (DPDO) Film Processing Disposal Area is a flat, grass-covered area to the east of Building 314 at West Davisville. The study area is defined as an 80 x 40 foot grid which likely received runoff from the area where wastes were disposed. A 10-foot wide asphalt road passes through the center of the site. A fence delineating the NCBC Davisville property line forms the eastern border of the study area and to the west is Building 314. Access to the site is controlled by a chain-link fence with a locked entrance gate.

For a six-month period during 1973, the Defense Property Disposal Office (DPDO) recovered silver from photographic wastes. Waste liquids from this recovery process were discharged on the

pavement outside of Building 314. This silver recovery operation was operated as a batch system with a 15- to 20-gallon capacity. Waste liquids generated consisted of photographic compounds, such as sodium thiosulfate and hydroquinone, and liquids containing small concentrations of formaldehyde, acetic acid, potassium hydroxide and sulfuric acid. No information on the frequency or total quantity of discharge was available from interviews or record searches; however, the amounts were reportedly small. Liquids were poured on a paved area and allowed to run off during rainfall events, according to the Initial Assessment Study (Hart, 1984a).

Field Investigation Scope

The Phase II remedial investigation scope of work was developed based on the results of the Phase I investigation. The goals of the Phase II field activities were to fully characterize the nature and extent of the suspected contamination and to establish potential contaminant migration pathways based on the hydrogeologic regime of the site and the surrounding area. The field activities of the Phase II investigation were conducted between January and April of 1993 and consisted of the following:

- A soil gas survey was conducted across the site. A total of 27 soil gas sample locations were sampled. The soil gas survey was conducted to fine-tune Phase II sampling locations.
- Six surface soil samples were collected from four on-site and two off-site locations.
- Five soil test borings and four monitoring well borings were drilled and sampled during Phase II.
- Two monitoring wells and one well cluster consisting of a shallow and deep monitoring well were installed. All of the monitoring wells were sampled and slug tests were conducted.

Site Geology and Hydrogeology

The unconsolidated deposits at the DPDO Film Processing Disposal Area consist of a wide range of grain sizes, from clay to gravel. The material is predominantly glacial in origin with the exception of a possible two foot thick artificial surficial fill layer and was deposited during Pleistocene

time. The soil composition of the suspected fill varies across the site but generally consists of dark brown to brown, fine to medium and fine to coarse sand, with some silt and varying amounts of gravel.

Beneath the surficial fill layer is an approximately 8 to 12 foot thick layer of brown sand, with some silt and gravel. In general, this layer grades to finer grained material with depth; a brown to gray brown color gradation was noted in the bottom two feet.

The brown sand strata appears to have been deposited in a glacial outwash environment. This is supported by the wide variety of grain sizes detected in this layer which indicates a high energy depositional system (e.g. fast flowing water or rapidly melting ice front).

Below a depth of approximately 10 to 12 feet, lithologies were more consistent in all borings across the site. This layer of soils consists of a dark gray, fine to medium sand with varying amounts of silt and gravel. The lowest part of the layer, described as a very fine sand and silt, appears to be derived from material similar to the underlying bedrock.

From a depth of approximately 19 to 26 feet, the material encountered was a dark gray silt with some quartz biotite schist fragments. This material appeared to be composed primarily of weathered bedrock.

At a depth of 26 feet, bedrock was encountered. The rock core was a very competent quartz biotite schist with minor amounts of pyrite. The bedrock encountered belongs to the Rhode Island formation.

Four monitoring wells were installed in the unconsolidated layers above the bedrock. A ground water contour map was developed for the shallow ground water. The shallow ground water flow at the site is to the north-northeast and generally follows the Sandhill Brook drainage basin. The ground water at Site 08 has been classified as GAA-NA by the Rhode Island Department of Environmental Management (RIDEM). GAA ground waters include those ground water resources which RIDEM has designated to be suitable for public drinking water without treatment. Areas classified as non-attainment are those areas which are known or presumed to be out of compliance with the standards of the assigned classification. Based on the results of the Phase II RI conducted at Site 08, the Navy has sought concurrence with the RIDEM Division of Ground Water that the non-

attainment classification is not applicable to the Site 08 area and that ground water classification should be upgraded to a Class GAA.

The town of North Kingstown has also proposed the installation of an additional production well located approximately 5,000 feet to the north-west of Site 08. Site 08 is located just outside of the capture zone for this well, as presented in the Phase I Report, Hunt River Aquifer Wellhead Recharge Area Study (GZA, 1992).

Field Investigation Summary

The Phase I and Phase II analytical results for soil and ground water were compared to the Rhode Island cleanup criteria guidelines and proposed regulations for soils and the Rhode Island Groundwater Quality Standards (existing and proposed) and federal MCLs for ground water.

For each environmental media a discussion of the contaminant types detected, the environmental distribution of the contaminants, and a comparison to established regulatory criteria is presented below.

Soil

Volatile Organic Compounds:

The Phase II soil gas survey collected 27 soil gas samples from across the site. No VOCs were detected in any soil gas sample.

VOCs were detected in the surface and subsurface soil samples at the site at low part per billion concentrations. The compounds detected consisted primarily of acetone and methylene chloride, which are common laboratory contaminants.

One Phase I subsurface soil sample (SS-09-03), collected at a depth of 3 feet, had a total xylene concentration of 0.210 ppm.

Semi-Volatile Organic Compounds:

Various low concentrations of SVOCs, consisting mainly of polynuclear aromatic hydrocarbons (PAHs) and phthalates, were detected in the surface and subsurface soil across the site. The highest concentrations of total PAHs (>1 ppm) were noted in the central portion of the site (at Phase I surface soil samples S-08-03 and S-08-07). Many of the soil samples collected in both Phase I and Phase II contained detectable concentrations of carcinogenic

PAH compounds. The highest subsurface soil concentrations of SVOCs generally occurred across the northern portion of the site (Phase I subsurface soil samples S-08-05-03 and S-08-09-03). The primary source of PAHs in the Phase II soil samples (boring sample 08-B04-01 and surface soil sample 08-SS13) appears to be associated with the asphaltic materials of the paved road which runs across the site.

Pesticides and PCBs:

The pesticide 4,4'-DDT was detected, at low or estimated concentrations, in two surface soil samples (Phase I S-08-05 and Phase II 08-B05-01) collected from along the northern edge of the site. The 4,4'-DDT concentrations detected in the two samples were 0.029 ppm in S-08-05 and 0.0029 ppm in 08-B05-01.

The PCB Aroclor-1260 was the only PCB Aroclor detected in the surface and subsurface soil samples. The highest PCB concentration of 1.4 ppm was detected in the Phase I surface soil sample S-08-06. However, none of the detected PCB soil concentrations exceeded the proposed RIDEM definition for solid waste which includes waste containing a concentration of 10 ppm or greater PCBs. RIDEM has also proposed that waste containing 50 ppm or greater PCBs is defined as a hazardous waste. No subsurface soil samples contained detectable concentrations of PCBs.

Inorganic Compounds:

No elevated levels of metals were detected in soil samples from either the surface or subsurface. Silver was detected at two locations (one in each phase) at a maximum concentration of 28 ppm. No Phase I and II soil samples had lead concentrations that exceeded the state of Rhode Island lead soil standard of 300 ppm.

Ground Water

Volatile Organic Compounds:

The results of the ground water sample analysis indicate the presence of common laboratory contaminants and acetone at low concentrations in several of the ground water samples. In addition, carbon disulfide was detected at an estimated concentration of 0.009 ppm in the duplicate ground water sample collected in monitoring well 08-MW03D. No other VOCs were detected in the site ground water samples. The detected VOC concentrations did not exceed State of Rhode Island ground water quality standards or federal Maximum Contaminant Levels (MCLs).

Semi-Volatile Organic Compounds:

The common laboratory contaminant bis(2-ethylhexyl)phthalate was detected at low concentrations in two of the Phase II site ground water samples. No other SVOCs were detected in the ground water samples. The detected SVOC concentrations did not exceed established State of Rhode Island ground water quality standards or federal MCLs.

Pesticides and PCBs:

No pesticides or PCBs were detected in the site ground water samples.

Inorganic Compounds:

Low concentrations of inorganic analytes were detected in each of the four site ground water samples. A noticeable reduction in detected analyte concentrations was noted in the filtered versus the unfiltered samples. Significant analyte concentration reductions were especially evident for aluminum, iron, magnesium, and potassium. These reductions indicate that these analytes were primarily present in the ground water samples as suspended solids. However, none of the detected concentrations of filtered or unfiltered inorganics exceeded established State of Rhode Island ground water quality standards or federal MCLs.

Human Health Risk Assessment

A Human Health Risk Assessment (RA) has been conducted for Site 08, as presented in Volume II of this document. The RA evaluated the analytical data for the site to identify chemicals of potential concern. An exposure assessment was conducted in which potential migration pathways were evaluated and potential human exposure scenarios were developed. The following exposure scenarios were identified:

- Scenario 1 (Current Trespasser) - Exposure of youths aged 9 to 18 years to surface soils (via dermal contact and ingestion) through direct access to the site.

- Scenario 2 (Current or Future Commercial/Industrial Worker) - Exposure of adult employees to surface soils (via dermal contact and ingestion) through future use of the site. A supplemental evaluation of ground water ingestion under commercial/industrial site use was also conducted.

- Scenario 3 (Future Construction Worker) - Exposure of adult workers to subsurface soils (via dermal contact, ingestion, and inhalation) for a one-year period, assuming construction of commercial or residential buildings.

- Scenario 4 (Future Resident) - Exposure of children (0 to 6 years of age) and youths/adults (7 to 30 years of age) to surface and subsurface soils (via ingestion and dermal contact) and ground water (via ingestion) through future residential use of the site.

Conclusions and Recommendations

Based on the results of the Remedial Investigation the following conclusions regarding the nature of the site contamination can be made.

- Site soils were not significantly impacted by the reported film processing waste disposal activities. Low concentrations of VOCs, PAHs, phthalates, pesticides, and PCBs were detected in the soils across the site. The detected VOCs appear to be laboratory-related contaminants. The low detected concentrations of organic compounds in the soil do not appear to have impacted ground water at the site.

- Low concentrations of acetone, carbon disulfide, and bis(2-ethylhexyl)phthalate were detected in ground water samples. However, these compounds are likely laboratory-related contaminants. Several inorganic analytes were detected in ground water. The detected concentrations of these compounds and inorganic analytes did not exceed established State of Rhode Island ground water quality standards or federal MCLs.

- Ground water quality at Site 08 presents potential non-cancer risks to human health under a future commercial/industrial and residential site use scenarios. Cancer risks associated with ground water ingestion under these scenarios exceed the point of departure risk of 1E-06 but are within the acceptable risk range of 1E-04 to 1E-06 for Superfund remedial actions. Soil quality at Site 08 presents potential cancer risks under future commercial/industrial or future residential site use which exceed the point of departure but fall within the acceptable range for remedial actions at Superfund sites. Uncertainties associated with the calculated risk levels must be considered in their evaluation.

The DPDO site was extensively investigated through the sampling and analysis of environmental media. The investigation defined environmental conditions at the site in detail and no additional information is required.

Prior to initiating the Phase II RI, the first phase of the Feasibility Study effort was initiated, as presented in the Draft Final Initial Screening of Alternatives Report (TRC, 1993). This report, which is based on information presented within the Phase I Report only, included the development of initial

remedial response objectives for the site. These objectives included the minimization of potential exposures to surface soil contaminants at levels which exceed ARARs/TBCs or which pose unacceptable risks to human health. However, based on the Phase II RI and RA, ARARs/TBCs are not exceeded for soils, estimated human health cancer risks are within the acceptable risk range for remedial responses at Superfund sites and the site poses no significant ecological risks.

Ground water ingestion under future commercial/industrial or residential site use indicates a potential for non-cancer human health effects. However, considering the uncertainties associated with those risk estimates which exceeded the point of departure risk level, no remedial response objectives have been developed for the site based on protection of human health. In addition, the concentrations of inorganics in ground water that drive the risk assessment (arsenic, beryllium, and manganese) were detected at similar concentrations at other RI sites.

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1.0 INTRODUCTION

This Remedial Investigation Report is submitted in partial fulfillment of the Remedial Investigation and Feasibility Study (RI/FS) for the Defense Property Disposal Office (DPDO) Film Processing Disposal Area (Site 08), located at the West Davisville section of the Naval Construction Battalion Center (NCBC). NCBC Davisville is situated in the northeast section of the Town of North Kingstown, Rhode Island (NCBC Davisville), . The Phase II RI/FS is being conducted under contract N62472-85-C-1026 for the U.S. Department of the Navy, Northern Division. TRC Environmental Corporation (TRC) was authorized to begin Phase II Remedial Investigation (RI) field activities at the DPDO Film Processing Area on February 14, 1993.

This document details the procedures and results of the Phase II portion of the field investigation which was completed in March 1993. For completeness, the Phase I RI results have been included in discussions of the nature and extent of the contamination present at the site to provide a comprehensive contamination assessment in this report. In addition, brief summaries of the site background investigation and the site setting have been included in this report. The complete findings of the Phase I site investigation are presented in the Phase I Remedial Investigation Report completed by TRC in May, 1991 (TRC, 1991).

1.1 Objectives and Scope of the Investigation

The objectives of the Phase I/Phase II RI were the following:

- Define the nature and extent of contamination (waste types, concentrations, distributions).
- Provide a basis for the evaluation of contaminant fate and transport mechanisms.
- Provide a basis for conducting human health assessments:
  - Identify constituents of potential concern.
  - Characterize potential land uses (current and future) and exposure pathways.
  - Estimate the potential for adverse human health effects.
- Update Phase I identification of federal/state contaminant- and location-specific ARARs.

- Provide a database sufficient to support the detailed evaluation of remedial alternatives within a Feasibility Study or Focused Feasibility Study.

The Phase I and Phase II field investigations included a soil gas survey, air monitoring, surface soil sampling, subsurface soil sampling, ground water sampling, and ground water level measurements.

1.2 Summary of Site Background Information

1.2.1 NCBC Description

NCBC Davisville is located in the northeast section of the Town of North Kingstown, Rhode Island, approximately 18 miles south of the state capital, Providence as shown on Figure 1. A significant portion of NCBC Davisville is contiguous with Narragansett Bay. NCBC Davisville is composed of three areas including the Main Center, the West Davisville storage area, and Camp Fogarty, a training facility located approximately 4 miles west of NCBC Davisville as shown on Figure 2. The DPDO Film Processing Disposal Area is located in the West Davisville Storage area. Adjoining NCBC Davisville southern boundary is the decommissioned Naval Air Station (NAS) Quonset Point which was excessed by the Navy to the Rhode Island Port Authority (RIPA) in April, 1973.

1.2.2 NCBC Davisville History

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. In the 1920s and 1930s, it was a summer resort.

In 1939, Quonset Point was acquired by the Navy, and construction began in 1940. During construction of an air station and pier, millions of cubic yards of sediment were dredged to create a ship basin and channel. Wartime activities at Naval Air Station (NAS) Quonset Point included training aircraft carrier pilots and crews, overhauling aircraft, supplying military equipment and planes, and providing coastal defense.

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, and a pier was constructed. Later that year the Naval Construction Training Center (NCTC), known as Camp Endicott, was established to train the newly established construction battalions. By November 1942, the camp was at capacity, housing 15,000 men and 350 officers. Over 100,000 men were trained at Camp Endicott by the end of World War II.

After the war, activities at NAS Quonset Point remained the same, providing an operating base for aircraft and ships. After 1947, NAS Quonset Point was the home port of carrier-based jet squadrons. The Antarctic Development Squadron Six was moved to NAS Quonset Point in 1956. A Naval Air Rework Facility (NARF) was created there in 1967. The NARF performed overhaul and repair work previously handled by NAS Quonset Point.

The NCBC Davisville area was inactive between World War II and the Korean Conflict. In 1951, it became the Headquarters Construction Battalion Center (CBC). The CBC loaded ships and trained men for both the Korean and Vietnam Conflicts. In 1974, the NAS and NARF at Quonset Point were decommissioned, and operations at Davisville were greatly reduced. In 1989, the closure of Davisville was announced, and all operations at Davisville were phased down to the present staffing levels for Public Works, Maintenance, Security and Navy Personnel.

1.2.2.1 Site 08 - Defense Property Disposal Office (DPDO) Film Processing Disposal Area Background

For a six-month period during 1973, the Defense Property Disposal Office (DPDO) recovered silver from photographic wastes (see Table 1). Waste liquids from this recovery process were reportedly discharged on the pavement outside of Building 314 (Hart, 1984). This silver recovery operation was operated as a batch system with a 15- to 20-gallon capacity. Waste liquids generated consisted of photographic compounds, such as sodium thiosulfate and hydroquinone, and liquids containing small concentrations of formaldehyde, acetic acid, potassium hydroxide and sulfuric acid. No information on frequency or total quantity of discharge was available from interviews or record searches; however, the amounts were reportedly small. Only a small quantity of waste liquids were

reportedly discharged at this site. The waste liquids were reportedly poured on a paved area and allowed to run off during rainfall events, according to the IAS report.

The DPDO Film Processing Disposal Area is located adjacent to a DPDO warehouse (Building 314) in West Davisville. The size of the site was extended (to 40 feet by 80 feet) for the Phase II investigation to include the grass area between the paved road and Building 314. The site is a flat grass covered area with a 10-foot wide paved road passing through the center of it. The eastern boundary of the site is a 10-foot high fence which delineates the present West Davisville property line (Figure 3). Site 08 surface water runoff is toward the east. The Rhode Island Port Authority obtained the property located east of the site from the U.S. Navy in 1973. This property was formerly used as a disposal area and is currently being investigated by the U.S. Army Corps of Engineers. Historical aerial photographs of the site indicate this general area was used as a storage area for trailers and drums. Access to the site is controlled by a chain-link fence with a locked entrance gate.

1.2.3 History of Facility Response Actions at NCBC Davisville

1.2.3.1 Previous Investigations - U.S. Navy

In 1983, the Navy Assessment and Control of Installation Pollutants (NACIP) Office awarded Navy Contract No. N62474-83-C-6974 to Fred C. Hart Associates, Inc. (Hart) to conduct an Initial Assessment Study (IAS) of potentially contaminated sites at NCBC Davisville. The IAS identified a total of fourteen potentially contaminated sites at NCBC Davisville (Hart, 1984a). The IAS concluded that three of the fourteen sites identified at NCBC Davisville posed a sufficient threat to human health or to the environment to warrant additional investigation. The IAS report recommended that the Navy conduct a Confirmation Study (CS), as defined under the NACIP program, on the following three sites: Site 05 - Transformer Oil Disposal Area, Site 07 - Calf Pasture Point, and Site 09 - Allen Harbor Landfill.

A copy of the IAS was sent by the Navy to the Rhode Island Department of Environmental Management (RIDEM) for review and comment. In a letter dated October 19, 1984, RIDEM presented its review findings and requested that the Navy add seven of the fourteen sites originally

identified in the IAS to the list of sites to be examined further in the upcoming Confirmation Study. The Navy agreed to the RIDEM request.

In 1985, the Navy awarded a Confirmation Study (Contract No. N62472-85-C-1026) to TRC Environmental Consultants, Inc. (TRC). Thirteen sites were investigated as part of the Verification Step of the Confirmation Study. The scope of work for the Verification Step included investigation of the three sites identified in the IAS as needing additional study, the seven sites requested by RIDEM, and three sites identified by the Navy that warranted further investigation. The sites investigated during the Verification Step program are: Site 02 - CED Battery Acid Disposal Area; Site 03 - CED Solvent Disposal Area; Site 04 - CED Asphalt Disposal Area; Site 05 - Transformer Oil Disposal Area; Site 06 - Solvent Disposal Area; Site 07 - Calf Pasture Point; Site 08 - DPDO Film Processing Disposal Area; Site 09 - Allen Harbor Landfill; Site 10 - Camp Forgarty Disposal Area; Site 11 - Fire Fighting Training Area; Site 12 - DPDO Transformer Oil Spill Area; Site 13 - Disposal Area Northwest of Buildings W-3, W-4 and T-1; and Site 14 - Building 38 Transformer Oil Leaks.

A draft report of the Verification Step of the NCBC Davisville Confirmation Study was completed by TRC in May 1985. This report was sent by the Navy to RIDEM for review and comment. The Navy received review comments from RIDEM in June 1985. The comments suggested that additional sampling should be conducted, which TRC subsequently performed.

The final report on the Verification Step of the Confirmation Study was completed by TRC in February 1987. This report was sent by the Navy to RIDEM for review and comment. In September 1987, the Navy received a comment letter from RIDEM on the report.

1.2.3.2 Previous Investigations - U.S. EPA

NCBC Davisville was proposed by the U.S. Environmental Protection Agency (EPA) for inclusion on the National Priority List (NPL) in July, 1989. NCBC Davisville was added to the NPL on November 21, 1989. EPA developed a Hazard Ranking System (HRS) scoring package to support the proposed and final listings (EPA, 1989). The HRS package was based on existing information; a Preliminary Assessment/Site Investigation was not performed.

The HRS package was based on the 24 potential sites which were identified in the IAS (Hart, 1984a,b). The IAS identified potential sites in NCBC Davisville, West Davisville, Camp Fogarty, and the decommissioned NAS Quonset Point. The HRS package used an aggregate of the two most seriously impacted sites to form the basis of the ranking package. The two sites used in the HRS package are: Site 09 - Allen Harbor Landfill and Site 07 - Calf Pasture Point.

Of the 24 potential sites listed in the HRS package, the areas designated 1 through 14 coincide with the 14 areas identified in the Navy's IAS, described in Section 1.2.3.1. The remaining potential areas, 15 through 24, were identified by the EPA from an "Off-Site Activity Investigation" report (Hart, 1984b). The HRS package notes that areas 15 through 24 are on property not currently owned or operated by the U.S. Navy. Several of these areas are being investigated by the Army Corps of Engineers' program aimed at former defense facilities.

1.2.3.3 Recent Remedial Investigation

In 1988, the Navy's three-phase NACIP Program was restructured to conform with EPA's four-phase program. This change was predicated by the Superfund Amendments and Reauthorization Act (SARA) of 1986. Thus, the U.S. Navy changed its NACIP Program to closely parallel the EPA requirements for remedial actions at Superfund sites. The Navy's program is now referred to as the Installation Restoration (IR) Program. Under the IR Program, current investigations at NCBC Davisville are in the Remedial Investigation/Feasibility Study (RI/FS) phase.

In March 1988, TRC was initially tasked by the Navy to implement the recommendations of the Confirmation Study - Verification Step by developing a Plan of Action to conduct more extensive sampling under a NACIP Confirmation Study - Characterization Step. However, shortly after initiating this task, the Navy requested TRC to develop a Remedial Investigation (RI) Work Plan conforming to the newly established Navy IR Program, and to the extent possible, conforming to current EPA requirements under the NCP and the EPA draft RI guidance (dated March 1988). The resulting Phase I RI/FS Work Plan included a Field Sampling Plan, a Health and Safety Plan, a Quality Assurance Project Plan and a Data Management Plan (TRC, 1988). The Phase I RI field investigations were

conducted by TRC from September 1989 to March 1990 and the Phase I Draft Final RI Report was submitted to the Navy in May 1991.

1.2.3.4 History of Response Actions

Although Site 08 was identified in the IAS report as "a possible site of hazardous waste disposal", the IAS concluded that the risk posed by Site 08 to human health and the environment was minimal and that no further investigation was necessary. However, at the request of the RIDEM, the site was included in the Confirmation Study.

The Confirmation Study report concluded that "the migration potential of the silver is moderate to low and that adsorption onto soil particles would prevent the element from entering the ground water". The study also concluded that "the site poses a negligible health risk based on accidental ingestion of the site soils and that no further action was necessary". However, at the request of the RIDEM, Site 08 was included in the Phase I RI.

The Phase I RI investigation report recommended that no further action was necessary at the site. However, Site 08 has been included in the Phase II RI to define the ground water quality underlying the site.

1.3 Regional Site Hydrology

1.3.1 Regional Geology/Hydrogeology

The Narragansett Bay area, including all of NCBC Davisville, overlies the Narragansett Basin. This geologic structure is a complex syncline of Pennsylvanian Age metasedimentary rocks approximately 12 miles wide and up to 12,000 feet deep. The Narragansett Basin's western limit is approximately 3 miles west of NCBC Davisville, and its eastern edge is close to Fall River, MA (see Figure 4). The bedrock is overlain by various glacial deposits up to 200 feet thick that have left the basin area relatively flat compared to the surrounding areas (Schafer, 1961).

The bedrock forming the basin consists of five formations which consist chiefly of non-marine conglomerates, sandstones, and shales. The principal geologic unit in this area is the Rhode Island Formation, which consists of fine to coarse conglomerate, sandstone, lithic graywacke, graywacke,

arkose, shale, and a minor amount of meta-anthracite and anthracite. The color of the unit is gray, dark gray and greenish, with black shale and anthracite beds; cross-bedding or irregular, discontinuous bedding is often found in this unit. In the northern part of the Narragansett Basin, the unit is very strong and well indurated, but not metamorphosed. In the southern portion of the basin, which NCBC Davisville overlies, the unit is metamorphosed and contains quartz-mica-sillimanite schist. As shown in Figure 5, the DPDO Film Processing Disposal Area overlies the Narragansett Basin (Schafer, 1961).

The topography of the bedrock surface beneath the Davisville area exhibits over 150 feet of relief in a series of north-south trending valleys and ridges. For approximately 300 million years, between the formation of the Pennsylvania bedrock and the Wisconsin glacial advances, the bedrock surface had been exposed to river and stream erosion. During this period, the erosion developed the north-south trending relief. The advance of the glaciers deepened the valleys with their erosive forces. In the vicinity of NCBC Davisville, the depth to bedrock ranges from ground surface to 90 feet (Johnson and Marks, 1959).

Historically, the unconsolidated soils overlying the bedrock were eroded and transported by the advancing glaciers and then deposited as a nearly continuous mantle. There are three general types of the glacial deposits: till, water-laid deposits, and wind-deposited material. Glacial till is a dense, non-stratified heterogeneous mixture of sand, silt, clay, and gravel deposited directly on top of the bedrock as a thin mantle when the advancing glaciers scraped, ground, crushed, and then overrode the bedrock. Associated with glacial till are end moraines, which are ridges of glacial material, till, and water-laid sediments deposited at the margin of a glacier when it was stationary. In the Davisville area, till is exposed along highlands such as Lippitt Hill, the hillside due west of the rifle and pistol range at Camp Fogarty and along the hillside of the ridge between West Davisville and NCBC Davisville. Just northeast of Building 224 (Site 02 CED Battery Acid Disposal Area) there is an end moraine deposit which controlled the pro-glacial melt water drainage system (see Figure 6).

Water-laid deposits are either coarse-grained soils deposited in running waters or fine-grained soils deposited in calm lake waters. As streams of melt water flowed from the shrinking glaciers, rock debris from the melting ice was picked up, transported downstream, and deposited as well-sorted sand or gravel (glaciofluvial). Fine-grained silt and clay was transported by the streams into glacial lakes,

where they settled out onto the lake bottom (glaciolacustrine). Most of the surficial geologic soils in the Davisville area are water-laid deposits. Melt water streams flowing along the west side of the end moraine near Building 224 deposited a sequence of sands and silts over most of NCBC Davisville including Sites 02, 03, 05, 06, 11, and 13. The thickness of the glacial soils is quite variable; it is generally thin, often less than 10 feet at the higher elevations (eroded off where bedrock is exposed), and over 150 feet thick in some portions of the bedrock valleys (Schafer, 1961).

At the end of the glacial period, the climate was characterized by strong wind movement of sand and silt. This type of deposit is loose and heterogeneous, and not very thick in the Davisville area.

All the bedrock units underlying the Davisville area have primary porosities (pore openings between the grains of mineral crystals forming the rock) of less than 1 percent and very low secondary porosities (joints, fractures, and openings along bedding planes). The only openings capable of yielding significant amounts of ground water are the secondary openings. In general, well yields from the bedrock formations are generally low, about 22 gallons/minute (gpm) from an average depth of approximately 225 feet. Flow from the secondary openings is greatest in the top 250 to 300 feet of bedrock (Rhode Island Development Council, 1953). Below this depth the openings start to close up due to greater overburden pressures. In the Davisville area, the bedrock is not the principal aquifer and, therefore, is penetrated by only a small number of wells.

The glacial soils in the Davisville area generally consist of the following:

- Stratified sand or gravel interbedded with very fine sand and silt;
- Till, a heterogeneous mixture of silt, sand, clay, and gravel; and
- Stratified sand or gravel interbedded with varying amounts of till.

All of the above materials will yield ground water, but only the stratified sands or gravels are permeable enough to yield large quantities of water for development. These very permeable materials form the Hunt Ground Water Reservoir (formerly referred to as the Potowomut-Wickford aquifer), which has been designated a sole source aquifer and is the principal source of potable water in the area. The specific capacities (gallons/minute/foot of drawdown, gpm/ft) of several large wells drilled into the stratified deposits range between 5 and 300 gpm/ft of drawdown. Some wells yield as much as 2,700 gpm. A hydrologic review of the aquifer recharge and discharge shows the long-term sustained

safe yield of the entire Hunt Ground Water Reservoir is about 8 million gallons/day (mgd) (GZA, 1992).

Ground water in the Davisville area is unconfined. Therefore, movement of the ground water is in direct response to gravity. The water table is likely a subdued reflection of the surface topography; thus, ground water generally flows from higher areas (zones of recharge) to lower areas (zones of discharge) such as local lakes, streams, swamps, or Narragansett Bay. For the Davisville area, the direction of the regional ground water flow is west to east, from the highlands towards Narragansett Bay. For small localized areas, the direction of ground water flow will be to the nearest downhill discharge area. Water table elevation contours obtained from the Hunt River Aquifer Wellhead Recharge Area Study Report (GZA, 1992) are shown on Figure 7.

The ground water quality of the Hunt Ground Water Reservoir is suitable for most purposes. It generally contains less than 70 ppm of dissolved solids and the pH is slightly acidic to neutral with a range of 5.5 to 7.0. The principal anions in the ground water are bicarbonate, sulfate, chloride and nitrate, all usually present at concentrations less than 25 ppm. In the vicinity of Narragansett Bay, the chloride concentration may exceed 250 ppm, due to the occurrence of salt water intrusion. The principal cations in the ground water are calcium, sodium, magnesium and potassium, each at concentrations generally less than 10 ppm, resulting in "soft" water. Iron and manganese usually do not exceed drinking water standards (Rosenshein, Gonthiel and Allen, 1968).

1.3.2 Regional Hydrology

All of the investigated sites lie within the Hunt River drainage basin. The basin is about 60 square miles and is divided into four smaller sub-basins (see Figure 8). Camp Fogarty and West Davisville lie within the Potowomut River basin, and NCBC Davisville lies within the Coastal River basin. All stream flow and river flow eventually discharges into Narragansett Bay (see Figure 9). During most of the year, a part of the stream flow consists of water discharged from detention storage in natural, as well as man-made impoundments. The remaining flow is from direct runoff of precipitation and from base runoff consisting largely of ground water discharge. The ground water

contributes close to 50 percent of the average annual stream flow. The water bodies in the area of the ten sites are shown on Figure 9 (Rosenshein, Gonthiel, and Allen, 1968).

Annual precipitation in the area has ranged from 24.8 inches to 66.2 inches with an average of 42.3 inches. The frequency of measurable precipitation events (0.01 inch or greater) averages once every 3 days and is evenly distributed throughout the year. The average annual snowfall is almost 40 inches and has varied from 11.3 to 75.6 inches. Roughly 36 percent of the precipitation actually recharges the ground water system; the other 64 percent runs off into streams or is lost through evapotranspiration (GZA, 1992). The surface water and ground water quality are similar since ground water contributes a major portion to stream flow. The principal surface water anions are bicarbonate, sulfate, chloride, and nitrate. The principal surface water cations are calcium, sodium, magnesium, and potassium. The pH ranges between 5.5 and 7.0. The iron concentrations in stream water vary from 0.03 to 3.7 ppm with the higher concentrations reported in Sandhill Brook, the lower reach of the Hunt River, and the Potowomut River. Manganese concentrations range between less than 0.01 and 0.54 ppm (Rosenshein, Gonthiel, and Allen, 1968).

The topography at Site 08 dips gently to the east. This easterly dip directs surface water runoff across Site 08 onto the former Devils Foot Road Landfill.

1.3.3 Area Water Use

Available information (Personal Communication, Cohen, Smith, 1992) indicates that potable water in the Davisville area is supplied by either the North Kingstown Water Department or the Rhode Island Port Authority.

The North Kingstown Water Department supplies the non-military portion of Davisville and North Kingstown with water. North Kingstown operates three wells located in the Hunt Ground Water Reservoir and has proposed an additional well location (GZA, 1992). The locations of these wells are indicated in Figure 10.

The Rhode Island Port Authority (RIPA) supplies water on a wholesale basis to the Navy and some private users on Quonset Point (Personal Communication, Cohen, 1992). RIPA obtains its water from a series of three ground water supply wells located in the Hunt Ground Water Reservoir, as

indicated in Figure 10. The Kent County Water Authority, which supplies water to towns north of North Kingstown, also maintains a ground water production well in the Hunt Ground Water Reservoir, also shown on Figure 10.

No active ground water supply wells exist at NCBC Davisville on Navy property (Personal Communication, Cohen, 1992).

Wellhead protection areas have been defined for the production wells which are part of community water systems in the vicinity of NCBC Davisville. Community water systems are defined as public water systems which serve at least 15 service connections used by year-round residents or which regularly serve at least 25 year-round residents. The refined wellhead protection areas for the community wells in the immediate vicinity of NCBC Davisville are indicated in Figure 11. Also indicated are the capture zones of the wells, as presented in the Phase I Report, Hunt River Aquifer Wellhead Recharge Area Study (GZA, 1992). As indicated, none of the NCBC Davisville sites fall within the wellhead protection areas. The southern portion of Site 10 is located within the capture zone of the proposed North Kingstown production well. Site 08 is also located in the general vicinity of the proposed well's capture zone.

Two production wells which are not part of community water systems (referred to as non-community water systems) are also located in the vicinity of NCBC Davisville. One of these well locations is indicated in Figure 10. The other non-community well is not indicated in the figure but is located in the vicinity of the Rhode Island Port Authority well in the northern portion of the figure. Refined wellhead protection areas have not been defined for the non-community wells. Therefore, the default value of 2,000 feet, as defined in the Rhode Island Rules and Regulations for Ground Water Quality, is used as the wellhead protection area for these wells. None of the NCBC Davisville sites fall within 2,000 feet of a non-community well.

As part of the Phase II RI, a well search was conducted in the vicinity of the NCBC Davisville DPDO Film Processing Disposal Area to identify potential users of ground water in the area. A comparison of property tax records and water company bills of residences within a one mile radius of the DPDO Film Processing Disposal Area were used to identify locations of potential domestic supply wells. Table 2 presents the available information regarding the possible location of domestic wells

within the one mile radius. Figure 12 shows the locations of each of the wells. The domestic wells in the area are screened within the stratified sand or gravel interbedded with very fine sand and silt.

The results of the well survey indicate that all the known domestic supply wells within a one mile radius of the site are all located hydraulically upgradient of the DPDO Film Processing Disposal Area.

1.3.4 Environmental Setting

NCBC Davisville is situated in the northeastern portion of North Kingstown, Rhode Island with a significant portion of the base located adjacent to Narragansett Bay. A summary of the environmental setting of NCBC Davisville is provided below.

The Rhode Island Department of Environmental Management (RIDEM) has classified ground water in Rhode Island to protect and restore the quality of the state's ground water resources for use as drinking water and other beneficial uses, and to assure protection of the public health and welfare, and the environment. In general, the majority of ground water under NCBC Davisville has been classified as GB. Ground water classified 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. However, the ground water at the subject site, Site 08, DPDO Film Processing Disposal Area, is classified as Class GAA-NA. Ground water classified GAA includes those ground water resources which RIDEM has designated to be suitable for public drinking water without treatment and which are located in one of the three following areas:

1. Ground water reservoirs and portions of their recharge areas as delineated by RIDEM;

2. A 2,000 foot radius circle around each community water system well or within the delineation of a well head protection area to each well delineated by RIDEM;

3. Ground water dependant areas, such as Block Island, that are physically isolated from reasonable alternative water supplies and where the existing ground water supply warrants the highest level of protection.

In addition, other areas classified as non-attainment (NA) areas are those areas which are known or presumed to be out of compliance with the standards of the assigned classification. The goal for non-attainment areas is restoration to a quality consistent with the classification.

Based on the results of the Phase II RI conducted at Site 08, the Navy has sought concurrence of the RIDEM Division of Ground Water that the Non-Attainment classification is not applicable to the Site 08 area, and that the ground water classification should be upgraded to a Class GAA. A descision from the RIDEM Division of Ground Water is pending.

1.4 Report Organization

This RI report is divided into four sections and includes a series of tables, figures, and appendices. This section of the report, Section 1.0, summarizes information from previous reports, including the site description, site history, and regional setting. Section 2.0 presents overviews of the Phase I and Phase II field investigation activities. Described are the scope and methodology of each field investigation activity, including the sample types, number, location, and the field observations and measurements. Section 3.0 presents the results of the Phase I and Phase II sampling activities and includes data summary tables, data/standard comparison tables, and contaminant concentration maps. Section 4.0 presents the results of the Phase II background surface soil sampling activities and includes data summary tables and soil description tables. Section 5.0 presents a discussion of contaminant fate and transport of site soils and ground water. Section 6.0 presents a summary of the results of the Phase II human health risk assessment. Section 7.0 provides a summary of the nature and extent of the site contamination and presents conclusions regarding remedial action goals and recommendations for further work.

2.0 SITE INVESTIGATION

This section of the report provides information on the Phase I and Phase II field investigation activities conducted at the DPDO Film Processing Disposal Area (Site 08). The field investigation activities adhered to the site specific Health and Safety Plan (TRC, 1989(a) and TRC, 1992(a)), Field Sampling Plans (TRC, 1989(b) and TRC, 1992(b)), and Quality Assurance Project Management Plans (TRC, 1989(c) and TRC, 1992(c)) developed for each RI phase.

The scope of work for the Phase I activities was established by the Navy after evaluation of the Confirmation Study (TRC, 1987) by RIDEM. The Phase I investigation activities included surface and subsurface soil sampling. The findings presented in the Phase I RI report were evaluated by EPA Region I and RIDEM. EPA Region I and RIDEM comments and concerns on the Phase I RI report were incorporated into the Phase II sampling program. The Site 08 Phase II field investigation activities included a soil gas survey, surface soil sampling, soil boring sampling, and ground water sampling. A survey map showing all of the Phase I and Phase II sampling locations is provided in Figures 13 and 14.

In this section of the report, a separate discussion is provided for each of the field investigation activities. An overview of the investigation activities for each media is presented in each discussion, including an identification of sample numbers, locations, and analyses. Also provided in each section is a discussion of any field observations and measurements. All of the samples were collected and analyzed according to quality assurance/quality control criteria defined in the Quality Assurance Project Management Plans prepared for each phase (TRC, 1989(c) and TRC, 1992(c)).

The Phase I samples were analyzed by Compuchem Laboratories, Inc. located in Research Triangle Park, North Carolina. Phase I samples were analyzed for compounds included under the U.S. EPA Contract Laboratory Programs target compound list/target analyte list (TCL/TAL) and RCRA hazardous waste characteristic parameters. The Phase II samples were analyzed by Pace, Inc. (Pace) located in Hampton, New Hampshire. Phase II samples were analyzed for compounds included under the U.S. EPA Contract Laboratory Programs target compound list/target analyte list (TCL/TAL) and RCRA hazardous waste characteristic parameters. A list of the TCL and TAL compounds/analytes is

presented in Tables 3 and 4, while a list of the TCLP parameters are presented in Table 5. Appendix A contains the sample indices for the Phase I and Phase II samples.

All of the sample analytical results for the Phase II investigation (with selected Phase I results) are discussed in Section 3.0. Phase I summary tables are located in Appendix B and the Phase II CLP Form I data sheets are located in Appendix C. All of the required field quality control samples (e.g., field blanks, trip blanks, and duplicates) were collected during the field investigations. The analytical results of the field quality control samples for Phase II are presented in Appendix D.

2.1 Soil Gas Investigations

The objective of the soil gas survey was to identify the presence of volatile organic compounds (VOCs) in subsurface soil vapors and, thereby, to aid in defining the presence, nature, and extent of subsurface volatile organic contamination. The technology is based on the observation of increased concentrations of gaseous VOCs within pore spaces of VOC contaminated unsaturated soils, above contaminated buried wastes, and above contaminant plumes in ground water. Results of the soil gas survey were used to focus later RI sampling efforts.

The soil gas survey was performed by Target Environmental Services, Inc. (Target) of Columbia, Maryland. The soil gas methodology performed by Target, differing slightly from the generic soil gas outline provided in the Phase II Work Plan, met with the RI objectives. The Site 08 soil gas survey was performed on January 12, 1993. A detailed reported of the soil gas investigation was documented in a report entitled, Geophysical Investigations and Soil Gas Survey Summary Report, (TRC, 1993).

2.1.1 Soil Gas Methodology

The field portion of the soil gas surveys consisted of advancement of the sampling probe, collection of the soil gas sample, and analyses of the soil gas sample. The soil gas samples were collected manually using a drive rod which produced a 1/2 inch hole. A stainless steel probe was then inserted to the bottom of the hole and sealed off from the atmosphere using bentonite clay. At all

locations at which pavement was present, a rotary hammer was employed for pavement penetration prior to using the drive rod.

Following isolation of the sampling zone, approximately three apparatus volumes of gas were purged from the sampling system to ensure that atmospheric air was purged from the sampling system. A second sample of soil gas was then withdrawn and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self sealing vial was detached from the sampling system, packaged, labeled, and stored for laboratory analysis.

All of the samples collected during the field portion of the survey were subjected to two types of analyses. One analysis was conducted according to EPA Method 601 (modified) on a gas chromatograph equipped with an electron capture detector (ECD), using a direct injection technique. Specific analytes standardized for this analysis were:

- 1,1-dichloroethene (11DCE)
- methylene chloride (CH_2Cl_2)
- trans-1,2-dichloroethene (t12DCE)
- 1,1-dichloroethane (11DCA)
- cis-1,2-dichloroethene (c12DEC)
- chloroform ($CHCl_3$)
- 1,1,1-trichloroethane (111TCA)
- carbon tetrachloride (CCl_4)
- trichloroethene (TCE)
- 1,1,2-trichloroethane (112TCA)
- tetrachloroethene (PCE)
- 1,1,2,2-tetrachloroethane (TECA)

The chlorinated hydrocarbons were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used industrial solvents.

The second analysis was conducted according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (FID), using a direct injection technique. The analytes selected for the standardization in this analysis were:

- benzene
- toluene
- ethylbenzene
- meta- and para-xylene
- ortho-xylene

These compounds were chosen to evaluate the presence of fuel products, or petroleum-based solvents.

The analytical equipment was calibrated using a 3-point instrument-response curve and injection of known concentrations of the target analytes. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples, and their response factors were used to calculate the analyte concentrations.

Total FID Volatile values were generated by summing the areas of all integrated chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of Total FID Volatile values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concentrations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors are compound specific. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

Prior to the day's field activities and between each sample point the sampling equipment, slide hammer rods, and probes were decontaminated by washing with soapy water and rinsed thoroughly. Internal surfaces were flushed dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end of each day's field activities, after every twentieth soil gas sample, and prior to sampling at a new site. These quality assurance/quality control (QA/QC) samples were obtained by inserting the probe tip into a tube flushed by a 20 psi flow of pre-purified nitrogen. Concentrations of all analytes were below the reporting limit in all field control samples, indicating that the QA/QC measures employed were sufficient to prevent cross-contamination of the samples during collection.

A duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas were also analyzed after every tenth field sample. Concentrations of all analytes were below the reporting limit in all laboratory blanks and all duplicate analyses were within acceptable limits. Results of all of the soil gas analyses conducted during the Phase II RI are available in the Geophysical Investigations and Soil Gas Survey Summary Report (TRC, 1993).

2.1.2 Soil Gas Sampling Strategy and Location

The soil gas survey was conducted across the site on a 10-foot spaced grid (see Figure 15). The survey was performed on January 12, 1993. A total of twenty-seven (27) soil gas points were installed for the measurement of soil gas, and twenty seven (27) soil gas samples were collected. Soil gas samples were collected at a depth of 3 feet below grade.

2.1.3 Soil Gas Survey Results

All soil gas samples collected in the field phase of the survey were subjected to dual analysis. No VOCs were detected at any of the twenty-seven soil gas points.

2.2 Surface Soil Investigation

Surface soil sampling was conducted under the Phase I and Phase II field investigations to determine the presence, nature, and extent of surface soil contamination at the DPDO Film Processing Area.

2.2.1 Overview of Investigation

Surface soil samples were collected during both the Phase I and Phase II field investigations. Surface soil samples were collected with dedicated, decontaminated, stainless-steel spoons. During the Phase I site investigation, ten surface soil samples (S-08-1, S-08-2, S-08-3, S-08-4, S-08-5, S-08-6, S-08-7, S-08-8, S-08-9, and S-08-10) were collected and analyzed for the Target Compound List (TCL) and Target Analyte List (TAL) parameters. One surface soil sample, S-08-09, was also analyzed for those parameters listed under the Toxicity Characteristic Leaching Procedure (TCLP).

The Phase I surface soil samples were collected from a depth of 0- to 6-inches below grade following the removal of any surface debris. Randomly generated sampling locations were collected from a 40 by 40 feet sampling grid. The sampling rationale for each Phase I location is provided in the Phase I Field Sampling Plan (TRC, 1989(b)).

During the Phase II investigation, six additional surface soil samples (SS-08-11 through SS-08-16) and eight test boring/monitoring well surface soil samples (0-2' interval samples) were collected. The locations of the on- and off-site Phase II surface soil sample locations, as well as the Phase I sampling locations are shown on Figures 13 and 14.

2.2.2 Field Measurements and Observations

A description of each of the Phase II surface soil and first interval test boring/monitoring well samples was recorded in a field notebook. Descriptions of the surface soil samples are presented in the surface soil sample logs provided in Table 6.

The surface soil samples typically contained fine to medium sand with some silt and gravel. Sample S-08-09 which was collected during the Phase I investigation appeared visibly oily. No staining or odors were noted in the surface soil samples collected during the Phase II investigation.

2.3 Subsurface Investigation

A subsurface investigation was conducted at the site by drilling and sampling test borings to characterize the soil quality and to define the geologic conditions at the site. This section of the report includes an overview of the test boring investigation, a summary of the site geological findings, and a summary of field measurements and observations made during the drilling activities.

2.3.1 Overview of Investigation

Phase I borings were advanced using a hand auger at the locations shown on Figure 13. The Phase I augering activities resulted in the collection of five subsurface soil samples from depths of 2 to 3 feet.

During Phase II, five test borings were drilled and sampled across the site. In addition, four monitoring well borings were completed and soil samples were collected from three of the well borings. Samples were not collected from the fourth well boring because monitoring wells 08-MW03S and 08-MW03D are a well cluster.

The Phase II well and test boring locations are shown on Figure 14. Soil samples were collected for analysis from well borings completed for the following three wells: 08-MW01S, 08-MW02S, and 08-MW03S. Split-spoon sampling for geological and/or laboratory analysis was conducted at all four well borings.

Each boring was split-spoon sampled for the purpose of geological logging and laboratory analysis. At each boring continuous split-spoon sampling was conducted to the water table; at depths below the water table sampling continued at five foot intervals. The test borings were advanced ten feet beyond the observed depth of the water table to an average depth of approximately sixteen feet. At monitoring well 08-MW03D, a ten foot Nx core of the bedrock was also collected.

In Phase I, the soil samples were analyzed for TCL, TAL, and TCLP parameters. The Phase II soil boring samples were analyzed for TCL and TAL parameters.

2.3.2 Field Measurements and Observations

During the boring investigation activities, all the field measurements and observations were recorded in a field notebook. The soil boring logs provided in Appendix E include all the field measurements and observations for the Phase II well borings and test borings.

No discolored soils, waste products, or odors indicating potential contamination were noted during the Phase II boring program.

HNu readings were measured at the surface of each boring and off of each split-spoon soil sample during all drilling and sampling activities. No elevated HNu readings (i.e., above background) were detected at the site during the boring activities (see Table 7).

2.3.3 Site Geology

The geology at the DPDO Film Processing Disposal Area was evaluated using the information from the Phase II test borings and monitoring well borings. Copies of all the site borings and well logs are provided in Appendix E. Split spoon sampling and rock coring was conducted during drilling activities. All of the split spoon soil samples were geologically logged using the Bermeister soil

description system. Available well logs from the surrounding area (Devils Foot Landfill Confirmation Study (SEC, 1988)) were also reviewed to confirm the geology of the site.

A geologic cross section has been drawn to present the subsurface geology of the site. The cross section location line is shown on Figure 16 and the corresponding cross section is shown on Figure 17.

The unconsolidated deposits at the site consist of a wide range of grain sizes, from clay to gravel. The material is predominantly glacial in origin (with the exception of what appears to be a two foot thick artificial surface fill layer) and was deposited during Pleistocene time. The top two feet of soil appears to be fill material or reworked natural material from the site. Although no indications of unnatural fill materials (i.e. brick fragments, concrete, etc) were observed in the samples, the inconsistent nature of the top two feet of soil, and the proximity to buildings support the belief that this material is likely reworked native soil. The composition of the suspected fill varies across the site, but generally consist of a dark brown to brown, fine to medium and fine to coarse sand, with some silt and varying amounts of gravel.

Beneath the fill is an approximate 8- to 12-foot thick layer of brown sand, with some silt and gravel. This layer consists of two units which vary across the site. Generally, the upper unit consists of a 4 foot thick layer of brown, medium to coarse sand with some silt and gravel. The lower unit is a 4 foot thick brown, fine grained sand with some silt and little gravel. In general, this layer grades to finer grained material with depth, a brown to gray brown color gradation was noted in the bottom two feet. Boring 08-B04 is the exception to this general trend, because the upper unit at this boring was found to consists of alternating beds of fine and medium sands overlying a thin (6") peat layer. Borings 08-B05 and 08-MW01S encountered a thin layer (3" to 11" thick) of dark brown peat with little silt at a depth of approximately 10 feet.

The depositional environment of the brown sand strata appears to be consistent with a glacial outwash environment. The wide variety of grain sizes indicates a probable higher energy depositional system where significant grain-size sorting did not occur (e.g., fast flowing water or rapidly melting ice front). Because peat is deposited in stagnant or low energy environments, the site also appears to have been exposed to fluxuating depositional environments.

Below a depth of approximately 10 to 12 feet, lithologies were more consistent in all borings completed across the site. This lower group of soils consists of three distinct dark gray and gray strata. The upper unit in this group is a dark gray fine sand with some silt and gravel about 3 to 4 feet thick. Underlying the dark gray unit is a 2- to 3-foot thick gray medium to coarse grained sand with some gravel and a 4-foot thick gray very fine sand and silt with some gravel. The depositional origin of the gray sand and silt units are similar to the overlying brown sands without the periods of quiescence (low energy environment) marked by the peat deposits in the brown sand units. The bottom unit in this group, a brown, very fine sand and silt, appears to be derived from material similar to the underlying bedrock.

A soil sample was collected from the screened interval of three monitoring well borings and analyzed for cation exchange capacity and grain size analysis. The results of these analyses are presented in Appendix F. According ASTM D-422 methodology, the soil samples were categorized as a silty sand. The cation exchange capacity of the soil samples ranged from 1.1 meq/100 g to 2.12 meq/100 g.

All borings were advanced to depths ranging from 16 to 19 feet, with the exception of boring 08-MW03D which was drilled to a total depth of 35 feet. Boring 08-MW03D was the only boring to penetrate below the gray sand and silt unit described previously. Boring 08-MW03D encountered a dark gray silt with some quartz biotite schist fragments which appears to be weathered bedrock material. This material was encountered at a depth of 19 feet and was approximately 6 feet thick. At a depth of 25 feet, the auger reached refusal, split spoon sampling was discontinued, and rock coring was initiated.

Rock Coring Results

Bedrock coring was conducted at the DPDO site to characterized the bedrock at the site. Coring was accomplished using a double-tube Nx (wireline) core barrels equipped with a diamond-tipped bit. Rock coring was initiated on 08-MW03D at a depth of 25 feet. A total of 10 feet of rock core was collected from two 5-foot coring runs. Complete (100%) recovery of the 10 foot section confirmed the presence of competent rock at the 25-foot depth.

The DPDO Film Processing Disposal Area overlies rocks of the Narragansett Basin which consists of five formations described as non-marine conglomerates, irregularly interbedded sandstones and shales of Pennsylvanian age. The principal unit of the Narragansett basin is the Rhode Island formation, consisting of fine to coarse conglomerate, sandstone, lithic graywacke, graywacke, arkose, and shale. The southern portion of the Narragansett basin, which includes the area around the site. The Rhode Island formation is described as a quartz mica schist, feldspathic quartzite, garnet-staurolite schist, with some quartz mica silliminite schist. Rock cores recovered from coring operations for 08-MW03D are very competent quartz mica schist with minor amounts of pyrite. This core appears to be representative of the Rhode Island Formation. Some high angle and vertical fractures were observed in the recovered rock cores at depths of 26.5 feet, 30.0 feet, and 33.0 feet below ground surface.

2.4 Ground Water Investigation

A ground water investigation was conducted to assess the shallow ground water quality (presence, nature, and extent of site ground water contamination), as well as to provide information on the DPDO Film Processing Disposal Area hydrogeology. Placement of the monitoring wells was based on the Phase I interpretation of ground water flow direction. Since the ground water beneath Site 08 is classified as GAA-NA, and local citizens and the state expressed concern of ground water quality, a limited ground water investigation was conducted to assess Site 08 ground water quality.

The following sections provide an overview of the ground water investigation, a summary of the monitoring well installation methods and well construction details, a summary of the monitoring well types and locations, and a summary of the field measurements and observations associated with the ground water investigation conducted at the site. A description of the site hydrogeology based on the data collected during the Phase II investigation is also provided.

2.4.1 Overview of the Ground Water Investigation

Ground water samples were collected from the four monitoring wells installed at the site. Three shallow monitoring wells 08-MW01S, 08-MW02S, and 08-MW03S and one deep well,

08-MW03D, were installed during the Phase II investigation. The three shallow wells were installed to intercept the ground water table in the shallow zone. The shallow well completion depths were fourteen feet at well 08-MW03S, and nineteen feet at wells 08-MW01S and 08-MW02S. Monitoring well 08-MW03D was installed at a depth of twenty-five feet to intercept the ground water directly above bedrock.

Each well was constructed in accordance with the approved Phase II Field Sampling Plan (TRC, 1993(c)). All wells were constructed of 2-inch inside-diameter (I.D.), flush-threaded, Schedule 40 PVC riser and 20-slot (0.020 inch) PVC screen. The well construction details are presented in Table 8.

All monitoring wells were developed by the surging and pumping technique. The goals of the well development program was to remove fine-grained sediments from the vicinity of the well screen until the water attained visual clarity and to create a good hydraulic connection between the well and the surrounding formation so that a representative ground water sample could be collected (see Tables 9 and 10). The development program was modified at monitoring wells 08-MW02S and 08-MW03S as these wells produced so little water that using the Wattera pump for development was impossible. Therefore, an attempt was made to develop these wells using bailers. Even developing with bailers drew down the water level of these wells to less than a foot after only 1-2 gallons had been extracted. No water quality measurements were collected during the bailer development process.

Ground water samples were collected from all four site monitoring wells. The monitoring wells were sampled approximately two weeks after the well development. The following procedures were followed at each well during the site ground water sampling event which was conducted on March 10, 1993.

- The depth to water was measured at each monitoring well with a decontaminated electric water sensing device.

- New tygon tubing was inserted into the well to a depth equivalent to the center of the well screen interval, and connected to a peristaltic pump fitted with silicone pump-head tubing.

- The well was purged using the peristaltic pump at a rate of approximately 300 ml/min.

- The following parameters were monitored and recorded every three minutes using a YSI 3560 multiparameter monitoring device: temperature, pH, conductivity, and Eh.

- Well purging was stopped and ground water samples were collected from the wells after all readings were stabilized to ± 5% for three successive monitoring intervals.

- Ground water samples were collected directly from the tygon tubing into pre-preserved (when appropriate) sample containers.

- Sample collection as follows: TCL VOC, TCL BNA, TCL pesticides/PCBs, TAL metals, and cyanide.

- In addition, filtered metals (dissolved) and cyanide samples were collected from each well. The filter sample was collected by attaching a Ready-Flow™ high capacity 0.45 mm in-line disposable filter. The filtered ground water was then collected directly into the appropriate sample bottles.

- All samples were labeled according to the procedures described in the NCBC Field Sampling Plan and placed in an iced cooler prior to shipment to PACE, Inc., for analysis.

- The tygon and silicon tubing, used with the peristaltic pump, was changed after use at each well.

2.4.2 Field Measurements and Observations

Several field measurements were collected as part of the site ground water investigation. These measurements included water level measurements and the pH, specific conductance, Eh, temperature, and turbidity of each ground water sample. All field measurements and notable observations made during the ground water sampling were recorded in a field notebook and are discussed below.

The ground water field parameters pH, specific conductance, Eh, turbidity, and temperature were measured prior to ground water sample collection and are provided in Table 11. The values of the field parameters of the ground water in each of the four monitoring wells were similar with one exception; positive Eh values were measured in the ground water in monitoring well MW-1. The ground water from all of the other site monitoring wells had negative Eh values. No other parameters measured at monitoring well MW-1 were different from those measured at the other monitoring wells.

The ground water levels were measured in each on site monitoring well at two different times and the Rhode Island Port Authority monitoring wells one time in Phase II. The ground water measurements from the two events are provided in Table 12.

All of the monitoring wells were surveyed for location in reference to the Rhode Island Grid System and for elevation by a licensed surveyor. The elevations of the top of the protective casing, the top of the inner well casing, and the ground adjacent to the well were surveyed to the nearest one hundredth of a foot (0.01). All of the well coordinates and elevations are provided in Table 13.

2.4.3 Hydraulic Testing

On March 12, 1993, single well hydraulic conductivity tests (slug tests) were performed at all of the four monitoring wells. With the slug test the hydraulic conductivity or transmissivity of an aquifer is determined from the rate of rise of the water level in a well after a certain volume or "slug" is suddenly removed from the well. At each well, a pressure transducer connected to a digital LCD readout was lowered several feet into the water and secured to the top of the well. A closed five-foot, sand-filled PVC cylinder was submerged in the well to displace a portion of the water column. After the water level had reached equilibrium, the cylinder was rapidly pulled out to produce an instantaneous drop in hydraulic head. The piezometric response was recorded at specified intervals until the water level had re-equilibrated or up to a total elapsed time of one half hour, whichever came first. If the water level re-equilibrated in less than fifteen minutes, a second slug test was performed at the well.

After the slug tests were completed, the data were analyzed with SLUGIX™ (Interpex Limited, 1988), an interactive computer slug test analysis program, using the option for the Bouwer and Rice (1976) method for completely or partially penetrating wells in unconfined aquifers. Using this method, the hydraulic conductivity and transmissivity of the aquifer near the well were calculated.

The slug test data are provided in Appendix G, and the test results are summarized in Table 14. For the four wells, the calculated hydraulic conductivity values ranged from 0.13 ft/d (08-MW03S) to 7.35 ft/d (08-MW03D), with a median value of 2.3 ft/d. Due to the shallow depth to bedrock the hydraulic conductivity from the deeper well was included in the median. With slug tests the portion of

the aquifer "sampled" for hydraulic conductivity is smaller than that for pump tests; the resulting transmissivity primarily reflects the aquifer conditions immediately surrounding the tested well's screened interval, and so by definition will be less than that for an aquifer's entire saturated thickness (Bouwer and Rice, 1976). The calculated shallow transmissivity values ranged from 3.57 ft^2/d (08-MW03S) to 7.4 ft^2/d (08-MW03D), with a median value of 58 ft^2/d.

2.4.4 Site Hydrogeology

Shallow and deep monitoring wells were installed in the subsurface at the DPDO Film Processing Disposal Area to investigate the site hydrogeology. A summary of the monitoring well depths and the depths which the monitoring wells are screened is presented in Table 10.

Water levels were measured in the wells two times during the Phase II investigation. Water level measurements were made in March and April of 1993. In addition to collecting water level measurements from the site monitoring wells in April, permission was granted by the U.S. Army Corps of Engineers to obtain water level measurements from four nearby monitoring wells located in the Devils Foot Road Disposal Area. The April water level data, using the site and Devils Foot Road Disposal Area monitoring wells, were used to evaluate ground water flow directions and estimate the flow rates at the site. Ground water contour maps have been developed for the shallow monitoring well water levels and are presented in Figures 18 and 19.

Ground water flow direction in the vicinity of Site 08 is controlled by topography and the drainage pathway of Sandhill Brook. The March 1993 ground water elevation data was collected from the four on-site monitoring wells. The distance between the on-site monitoring wells, given the small areal area of Site 08, is less than 80 feet. The close spacing of Site 08 monitoring wells along with the flat topography of the site controlled the ground water flow direction. Close well spacings will reflect local ground water irregularities that may not be seen on larger scale ground water contour maps. This explains the differences between the March and April ground water contour maps. The April 1993 water level contour map included elevations from monitoring wells on the adjacent Devils Foot Road Landfill. These additional wide spread monitoring wells allowed the fine-tuning of the Site 08 ground

water flow direction to the northwest (along Sandhill Brook) versus the eastern direction obtained from the Site 08 monitoring wells.

Horizontal Hydraulic Gradients and Linear Velocities

The ground water levels measured in the shallow monitoring wells in April 1993 were used to develop a piezometric surface elevation contour map. The piezometric surface level elevation contours indicate that the shallow ground water flow is to the north-northeast, which generally correlates with the expression of the surface topography, and appears to be influenced by Sandhill Brook drainage.

The equation $V = Ki/n$ can be used to estimate the average linear ground water velocity where: V = horizontal flow velocity (ft/day), K = hydraulic conductivity (ft/day), i = hydraulic gradient (ft/ft), and n = porosity (unitless). Using the piezometric surface contour map for the April 1993 data a horizontal gradient of approximately 0.0079 ft/ft (between wells DMW-3 and DMW-2) was calculated. Well hydraulic (slug) tests were conducted on all of the site monitoring wells to determine the hydraulic conductivity. Table 14 presents the results of the slug tests, while the test data and graphical representations of the slug test results are located in Appendix G. Using an average hydraulic conductivity (K) of 2.3 ft/day determined from the slug tests (see Table 14), an estimated porosity of 20% (Freeze and Cherry, 1979), and the horizontal gradient calculated from the measured water levels (0.0079 ft/ft), the average horizontal ground water velocity was estimated to be approximately 0.09 ft/day.

The low average horizontal ground water velocity was not unexpected given the low hydraulic conductivity rates calculated from the slug tests. The actual ground water velocity may be even slower given the fact that the hydraulic conductivity at two of the sites wells were less than 1 ft/day (see Table 14).

3.0 NATURE AND EXTENT OF CONTAMINATION

This section of the report presents the results for the sampling activities described in Section 2.0, with emphasis on the Phase II sample results. The Phase I results are included during the general evaluation of the site regarding the overall nature and extent of contamination where appropriate. For a detailed discussion of the Phase I results, see Section 4.0 of the Phase I Remedial Investigation (RI) report (TRC, 1991).

The discussion on the nature and extent of contamination at the DPDO Film Processing Disposal Area is presented in separate sections for the soil (surface soil and subsurface soil) and ground water. Each section provides a summary of each investigation activity and is followed by a separate discussion for each of the following chemical compound classes: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/PCBs, and inorganic analytes.

A brief comparison to NCBC Davisville Phase II surface soil background data has been included in the surface soil discussions. Detailed discussion on surface soil background data is presented in Section 4.0.

The chemical class discussions contain summaries of analytical results along with comparisons of detected contaminant levels to action levels, guidelines and/or standards. Ground water contaminant levels were compared to the Rhode Island Rules and Regulations for Groundwater Quality (located in Appendix I) and to the federal maximum contaminant levels (MCLs) established under the Safe Drinking Water Act.

In the case of surface and subsurface soils, there are no proposed or final cleanup standards with the exception of PCBs and lead. Soil cleanup standards for PCBs of 10 ppm and lead of 300 ppm have typically been used by RIDEM.

All samples were analyzed according to U.S. EPA Contract Laboratory Program (CLP) protocols. Summary tables or "hits" tables of the Phase I sample data and Phase II CLP Form I data sheets are presented in Appendix B and C, respectively. All sample data (Tier I CLP deliverables) was validated according to established US EPA Region I data validation guidelines for quality assurance data validation. Table 15 lists the data reporting qualifiers associated with the sampling results, as well

as those that were applied during the data validation. A description of the data validation process and a complete discussion of the Phase II data validation results is included in Appendix H.

3.1 Soil Assessment

Soil samples were collected during the Phase II investigation as part of the surface soil sampling and drilling activities. The surface soil sampling, monitor well, and test boring locations were established based on the findings of the Phase I investigation. The Phase II soil samples were collected from the following locations: the same area of the Phase I investigation, the area west of the adjacent paved road, and from the Rhode Island Port Authority property adjacent to and directly east of the site. The Phase I soil sample locations are shown on Figure 13. The locations of Phase II surface soil samples, test borings, and monitor wells are shown on Figure 14.

A total of twenty-four (24) soil samples were collected during the Phase II site investigation. Fifteen (15) surface soil samples, seven (7) subsurface samples, and two (2) duplicate samples were collected at the site. During Phase II, surface soil samples were collected from thirteen (13) on-site and two (2) off-site locations. Samples collected from the first sampling interval (0-2 feet) of the test borings and monitoring well borings were also included as surface soil samples. Subsurface soil samples were collected from seven (7) boring locations for laboratory analysis: five (5) samples were collected from five (5) of the test borings and two (2) were collected from four (4) monitoring well borings. The soil samples were analyzed for the TCL/TAL parameters. The analytical results of these samples were assessed to evaluate the nature and extent of soil contamination at the site. A summary of the surface and subsurface soil sample results is provided as detection summary or 'hits" tables in Tables 16 and 17, respectively.

A brief comparison of the Phase I and Phase II surface soil data to NCBC Davisville surface soil background data has been included. A total of eighteen (18) background surface soil samples were collected across NCBC Davisville. Based on the results of the background sample analyses, only seven samples were used for a comparison to site-specific contaminants. A detailed discussion on the background samples is provided in Section 4.0.

Presented in this section of the report is a discussion on the nature and extent of the soil contamination at the DPDO Film Processing Disposal Area. The discussion proceeds from surface soil to subsurface soil and is presented in the order of the following chemical compound classes: VOCs, SVOCs, pesticides/PCBs, and inorganic compounds. The contaminant discussion for each section presents general observations regarding soil contamination along with comparisons to soil cleanup standards where applicable. Soil cleanup levels typically used by the RIDEM for lead and PCBs were evaluated in this comparison. A comparison of the PCB and lead concentrations detected in the site surface and subsurface soils with the RIDEM action levels is provided in Tables 18 and 19, respectively.

3.1.1 Volatile Organic Compounds (VOCs)

Surface Soil

All surface soil samples collected during the Phase I investigation were analyzed for TCL VOCs. Chloroform and acetone were the only two VOCs reported in Phase II surface soil samples (S-08-03, S-08-07, S-08-08, and S-08-10) (see Appendix B).

The surface soil samples collected during the Phase II investigation were also analyzed for TCL VOC. Methylene chloride and acetone were detected at low concentrations in eight surface soil samples (08-SS11, 08-SS12, 08-SS15, 08-SS18, 08-B02-01, 08-MW01-01, 08-MW02-01, and 08-MW04-01). Acetone, the only compound detected in both sampling phases, was also detected in one field blank (FB-217) and a duplicate (08-B06-01), indicating that acetone was possibly introduced into the soil samples during laboratory analysis (EPA, 1989).

The reported presence of chloroform (Phase I) was not confirmed in the Phase II samples; likewise, the presence of methylene chloride (Phase II) conflicts with the Phase I results. In addition, all three compounds have high vapor pressures, further suggesting that their presence in surface soils is unlikely. Although methylene chloride, chloroform, and acetone were reported in some surface soil samples during both phases, all are common laboratory contaminants (EPA, 1989) and all were present at low concentrations, suggesting that their presence is due to laboratory contamination. No other

VOCs were detected in any of the surface soil samples during either investigation phase (see Table 16).

Two volatile organic compounds (methylene chloride and toluene) were detected in the seven (7) background surface soil samples used of comparison. Therefore, since the only VOCs detected in Phase I surface soil samples were acetone and chloroform, surface soil samples S-08-03-00-S, S-08-07-00-S, S-08-08-00-S, and S-08-10-00-S all exceeded background VOC concentrations. In Phase II, two VOCs, methylene chloride and acetone, were detected in surface soil samples. Methylene chloride was detected at concentrations exceeding background (0.005 ppm) in samples 08-SS11, 08-MW02-01, and 08-MW03-01. Acetone was detected at concentrations exceeding background (ND) in samples 08-SS15, 08-SS18, 08-B02-01, 08-B06-01, and 08-MW01-01.

The highest level of total VOCs, 0.190 ppm, was detected in Phase II surface soil sample 08-SS18. Cleanup standards for total VOCs, as well as individual VOCs, in soil have not been established by the RIDEM or EPA Region I.

Subsurface Soil

During Phase I, chloroform and xylene were detected in two of the subsurface soil samples (S-08-07-03 and S-08-09-03). TCLP analytical results of S-08-09-03 indicated the presence of low leachable levels of xylene. However, neither chloroform nor xylene were detected in any of the Phase II soil or ground water samples (see Appendix B).

Results of the Phase II subsurface soil analysis indicate the presence of low levels of VOCs in some of the subsurface soil samples. As in the case of the Phase II surface soils, the only VOCs detected were methylene chloride (sample 08-B03-02) and acetone (samples (08-B01-02 and 08-B03-03), both occurring at low ppb concentrations. No other VOCs were detected in the subsurface soil samples. The highest total VOC concentration of 0.065 ppm was detected in subsurface soil sample 08-B03-03 at a depth of four to six feet (see Table 17).

3.1.2 Semi-Volatile Organic Compounds (SVOCs)

Surface Soil

A subset of SVOCs, polynuclear aromatic hydrocarbons (PAHs) were detected in the Phase I surface soil samples. However, the PAH compounds were detected in most of the surface samples were at low estimated ("J" qualifier) concentrations. The highest Phase I total PAH concentration was detected in surface soil sample S-08-03 at 3,554 ppm (see Appendix B).

During the Phase II investigation, only two surface soil samples (08-B04-01 and 08-SS13) exhibited low levels of SVOCs. Polynuclear aromatic hydrocarbons (PAHs) and phthalates were the only classes of SVOCs detected in these surface soil samples. No other SVOCs were detected in the Phase II surface soil samples (see Table 16).

Five (5) PAHs and two (2) phthalates were detected in the seven (7) background surface soil samples. In Phase I surface soil samples, PAHs and phthalates were also the primary detected semi-volatile organic compounds. Surface soil samples S-08-03-00-S, S-08-06-00-S, S-08-07-00-S, and S-08-08-00-S were the surface soil samples that most frequently exceeded background concentrations. In Phase II, only PAHs were detected in surface soil samples. Concentrations of PAHs exceeded background surface soil PAH concentrations at 08-SS13 and 08-B04-01.

Low concentrations of PAHs detected in Phase II surface soil samples were detected in the surface soil samples collected from near the asphalt road that crosses the site. The highest total PAH surface soil concentration of 1.73 ppm was detected in sample 08-B04-01. A total PAH concentration of 0.540 ppm was also detected in sample 08-SS13 collected from the edge of the asphalt road. Although no asphalt was observed in the collected samples, it is possible that small pieces of asphalt pavement from the road may have contaminated these samples and account for the detected PAHs.

Of the PAHs detected in both the Phase I and Phase II surface soil samples, carcinogenic PAHs (caPAH) make up approximately one-half of the PAHs detected in the surface soil samples. The detected Phase II PAHs appear to be associated with the paved road asphalt. Samples were not collected from near the asphalt road during the Phase I investigation.

Subsurface Soil

Direct comparison of the Phase I and Phase II subsurface soil samples indicated a significant decrease in SVOC concentrations. The one exception was Phase I subsurface soil sample S-08-09-03, collected at a depth of 3 feet, which had a total SVOC concentration of 3.790 ppm and its companion, surface soil sample S-08-09, which had a total SVOC concentration of 0.250 ppm (see Appendix B).

None of the Phase II subsurface soil samples contained detectable levels of SVOCs, except sample 08-B05-02. This soil sample contained low levels of benzo(b)fluoranthene (0.200 ppm) (see Table 17).

3.1.3 Pesticides/PCBs

Surface Soil

Ten (10) surface soil samples were analyzed for pesticides and PCBs during the Phase I investigation. The pesticide, 4,4'-DDT, was detected in only one surface soil sample (S-08-05) at a concentration of 0.029 ppm. The PCB Aroclor-1260 was detected in four of the surface soil samples (S-08-03, S-08-04, S-08-06, and S-08-08). None of the detected Phase I surface soil sample PCB concentrations exceeds the current RIDEM PCB cleanup level of 10 ppm (see Appendix B).

Fifteen (15) surface soil samples were analyzed for pesticides and PCBs during the Phase II investigation. Of these samples, one contained detectable concentrations of a pesticide and six contained detectable concentrations of PCBs. The pesticide, 4,4'-DDT, was detected in surface soil sample 08-B05-01 at a concentration of 2.9 ppm (see Table 16).

Twelve (12) pesticides and no PCBs were detected in the seven (7) background surface soil samples. In Phase I surface soil samples, 4,4'-DDT and Aroclor-1260 were the only detected pesticides/PCBs. Surface soil samples S-08-03-00-S, S-08-04-00-S, S-08-06-00-S, and S-08-07-00-S all had Aroclor-1260 concentrations that ranged from 0.19 ppm to 1.4 ppm. In Phase II, 4,4'-DDT and Aroclor-1260 were also the only detected pesticides/PCBs. However, no surface soil concentrations of pesticides exceeded background surface soil concentrations.

In Phase II, PCBs were detected at low concentrations in surface soil samples 08-MW01-01, 08-MW03-01, 08-SS14, 08-SS15, 08-SS16, and 08-SS18. The highest Phase II surface soil PCB

concentration of 0.051 ppm was detected in sample 08-SS18, a duplicate of sample 08-SS15. None of the Phase II surface soil sample PCB concentrations exceeded the RIDEM soil cleanup level of 10 ppm (see Table 18).

Evaluation of the Phase I and Phase II PCB surface soil samples data indicates that low parts per billion (ppb) concentrations of PCBs exist in these surface soils across the site. The concentrations of PCBs detected in Phase I and Phase II surface soil samples could be attributed to the DPDO practice of storing containers, drums, and trailers in the vicinity of Site 08.

Subsurface Soils

No pesticides or PCBs were detected in any of the Phase I subsurface soil samples (see Appendix B). During Phase II, seven (7) subsurface soil samples were collected and analyzed for pesticides and PCBs. None of the seven subsurface soil samples contained detectable levels of pesticides or PCBs.

3.1.4 Inorganic Compounds

Surface Soil

Ten (10) surface soil samples were collected during Phase I and analyzed for TAL metals. Arsenic, beryllium, chromium, copper, lead, and zinc were detected in all surface soil samples. Silver was detected in sample S-08-04 at a concentration of 28 ppm (see Appendix B).

Fifteen (15) surface soil samples collected during the Phase II investigation were analyzed for TAL metals and cyanide. The metals detected in the Phase II surface soil samples were similar to those detected in the Phase I samples (see Table 16).

Inorganic analyte concentrations were compared with the NCBC background soil ranges compiled from seven samples collected across the base (see Section 4). Table 20 presents the comparison of analyte ranges detected in on-site soils with the NCBC background ranges.

In the Phase I surface soil samples, those analytes which most frequently exceeded the NCBC background soil ranges were beryllium (5 times), lead (4 times), copper (4 times), iron (3 times), potassium (3 times), nickel (2 times), and chromium (2 times). Analytes that exceeded background

concentrations once included antimony, barium, cobalt, mercury, magnesium, vanadium, silver, and zinc. The most heavily impacted surface soil samples were S-08-07-00-S (exceeds 11 times), S-08-05-00-S (exceeds 5 times), S-08-10-00-S (exceeds 4 times), and S-08-09-00-S (exceeds 4 times). In the Phase II surface soil samples, those analytes which most frequently exceeded the NCBC background soil ranges were magnesium (3 times), barium (2 times), nickel (2 times), potassium (2 times), cyanide (2 times), and calcium (2 times). Analytes that exceeded background concentrations once included cadmium, cobalt, iron, manganese, and silver. The most heavily impacted surface soil samples were 08-B04-01 (8 times), 08-B06-01 (6 times), and 08-B05-01 (2 times).

Silver, commonly used in photographic processes, was identified at low levels (0.47 ppm) in surface soil sample 08-B04-01. This sample also contained the highest detected lead concentration of 39.7 ppm which is below the cleanup level of 300 ppm typically used by RIDEM. A comparison of the detected lead concentrations in the site surface soil samples to the State of Rhode Island soil lead cleanup criteria of 300 ppm is presented in Table 18.

Subsurface Soil

Concentrations of inorganic analytes detected in the five (5) Phase I subsurface soil samples were comparable to those detected in the Phase I surface soil samples (see Appendix B). TCLP extraction results for subsurface soil sample S-08-09-03 indicated the presence of chromium, copper, lead, nickel, and zinc in the TCLP leachate.

Seven (7) subsurface soil samples collected during the Phase II investigation were analyzed for TAL metals and cyanide. Results of the subsurface soil samples analysis indicate metal concentrations similar to those detected in the surface soil samples (see Table 17). However, silver was not detected in any of the Phase II subsurface soil samples. Detected lead concentrations were similar to those detected in the overlying surface soils. The highest lead concentration detected in the subsurface soil samples was 13.4 ppm in subsurface soil sample 08-B05-02. Inorganic analyte concentrations detected in the site subsurface soils were compared with the NCBC background soil ranges compiled from seven samples collected across the base. Table 20 presents a comparison of the analyte ranges detected in on-site subsurface soils to the NCBC background ranges.

3.3 Ground Water Assessment

Ground water samples were collected from four monitoring wells installed at the site during the Phase II investigation. During Phase II, four monitoring wells of varying depths, 08-MW01S, 08-MW02S, 08-MW03S, and 08-MW03D, were installed and sampled for TCL VOCs, SVOCs, pesticides/PCBs, total (unfiltered) and dissolved (filtered) TAL metals, and cyanide. Ground water sampling was conducted in February 1993 at the four on-site ground water monitoring well locations. The analytical results of the Phase II ground water samples are provided in Table 21 and the corresponding CLP Form I data sheets are provided in Appendix C of this report.

The following sections discuss the presence and nature of any ground water contamination detected in the monitoring well ground water samples. The ground water assessment discussion is presented in the order of the following chemical compound classes: VOCs, SVOCs, pesticides/PCBs, and inorganic compounds. Ground water contaminant levels were compared to federal maximum contaminant levels (MCLs) and secondary maximum contaminant levels (SMCLs) established under the Safe Drinking Water Act, and to the Rhode Island DEM Rules and Regulations for Ground Water Quality (RIDEM MCLs mirror the listed ground water quality standards). Contaminant-specific comparisons of detected levels to RIDEM and federal ground water standards are presented in Table 22.

3.3.1 Volatile Organic Compounds (VOCs)

Ground water samples were collected from three shallow wells and one deep well installed just above the bedrock and analyzed for volatile organic compounds. This sampling event included the collection of a duplicate ground water sample from deep monitoring well 08-MW03D. In addition to the ground water samples, a field blank was collected during the ground water sampling for analysis. The VOC, acetone, was detected at low concentrations in the two ground water samples collected from monitoring wells 08-MW02S and 08-MW03S (0.040 and 0.092 ppm, respectively). It is likely that the presence of acetone, a common laboratory solvent, can be attributed to laboratory

contamination. The VOC carbon disulfide was detected in duplicate ground water sample 08-MW03D (08-MW04S) at an estimated concentration of 0.009 ppm.

The results of the ground water sampling indicate that the ground water at Site 08 may be impacted by volatile organic compounds. The presence of acetone in the site ground water samples can possibly be attributed to laboratory-induced contamination.

3.3.2 Semi-Volatile Organic Compounds (SVOCs)

Ground water samples were collected and analyzed for semi-volatile organic compounds from all four of the Phase II monitoring wells. A duplicate sample collected at monitoring well 08-MW03D was also analyzed for SVOCs. In addition, the ground water sampling event field blank was analyzed for SVOCs. One SVOCs was detected in the ground water samples collected at Site 08 (see Table 21). Bis(2-ethylhexyl)phthalate was detected in monitoring wells 08-MW03S and 08-MW03D at concentrations of 0.006 ppm and 0.120 ppm, respectively. In addition, bis(2-ethylhexyl)phthalate was detected in a duplicate sample of 08-MW03D (08-MW04S) at a concentration of 0.010 ppm. The presence of bis(2-ethylhexyl)phthalate in site ground water samples can possibly be attributed to laboratory-induced contamination.

3.3.3 Pesticides/PCBs

Ground water samples were collected and analyzed for pesticides and polychlorinated biphenyls (PCBs) from all four of the Phase II monitoring wells. The duplicate ground water sample collected at monitoring well 08-MW03D and ground water sampling event field blank were also analyzed for pesticides/PCBs. No pesticides or PCBs were detected in the ground water samples collected at Site 08 (Table 21).

3.3.4 Inorganic Compounds

Ground water sampling results indicate that the ground water at Site 08 has been slightly impacted by inorganic analytes. Ground water samples were collected and analyzed for inorganics from all four of the Phase II monitoring wells. Filtered and unfiltered samples were collected from all

of the wells for dissolved metals analysis. Duplicate filtered and unfiltered samples were also collected at monitoring well 08-MW03D and analyzed for metals.

Inorganics were detected in each of the ground water samples collected from the site. The detected inorganic compounds included aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, potassium, selenium, sodium, vanadium, zinc, and cyanide. The detected concentrations of the dissolved analytes were similar in all of the ground water samples. The only differences noted between the shallow and deep ground water samples were the concentrations of calcium (6 times higher in deep ground water) and sodium (4 times higher in the shallow ground water). The detected concentrations of the inorganic compounds were well below the established federal MCLs and Rhode Island ground water quality standards (see Table 22). The results of the Phase II ground water sample analysis indicate that the ground water at the site may be slightly impacted by inorganics.

Inorganic analyses were conducted on three filtered ground water samples collected from monitoring wells 08-MW01S, 08-MW02S, and 08-MW03D. Comparison of the filtered vs. non-filtered sample results indicate that inorganic concentrations of the filtered samples are equivalent to or slightly less than the concentrations of the non-filtered samples (except for noted reductions in aluminum, iron, magnesium, potassium, and sodium). A comparison between filtered vs. unfiltered data is presented in Table 23. The similarity of the filtered vs. unfiltered analytical data indicates that the low flow sampling technique used at Site 08 accurately assessed the ground water analyte concentrations. The low flow sampling technique greatly decreased the turbidity of the ground water samples. Comparison of the turbidity units (NTUs) in Table 11 to analyte concentrations in Table 23 indicates a direct correlation between low concentrations of inorganics and low NTU measurements. Therefore, the greatest decrease in analyte concentrations were between filtered and unfiltered samples in a high NTU monitoring well (i.e., 08-MW02S).

4.0 BACKGROUND SURFACE SOIL INVESTIGATION

Eighteen (18) background surface soil samples were collected across NCBC Davisville during the Phase II RI. The locations selected were based on proximity to RI sites and the absence of potential contaminant source areas (i.e., buildings, roads, or other man-made improvements). The actual sampling stations were selected after inspection of historical aerial photographs and an extensive ground reconnaissance (see Figure 19 for locations). Areas which indicated past influence from NCBC Davisville operations were eliminated as background sample locations.

The background surface soil sampling locations were chosen so that soil quality data collected near RI sites could be compared with Phase I and II RI site-specific soil quality data. The background surface soil quality data has been used in the Human Health Risk Assessment to determine site-specific inorganic analyte contaminants of concerns (COCs). The background surface soil quality data has been used in this Remedial Investigation report to provide a range of background concentrations for NCBC Davisville soils. These ranges allowed the identification of impacted soils at individual RI sites. The presence of hazardous substances in background samples can also impact cleanup decisions. It may not be appropriate to clean up contaminants detected at a given site to risk-based levels when background concentrations exceed those levels.

The EPA has classified background contamination as being associated with **naturally occurring** (minerals or substances present in the environment in forms that have not been influenced by human activity) or **anthropogenic** (natural and man-made substances present in the environment as a result of human activities not specifically related to the CERCLA site) sources. The presence of certain anthropogenic contaminants could be expected on a facility-wide basis (e.g., pesticides) while others (e.g., chlorinated solvents or PCBs) would not be expected to be present on a large-scale basis.

4.1 Surface Soil Sampling Method

Surface soil samples were collected with a dedicated, decontaminated, stainless-steel spoon. Soils collected for volatile organic analysis were collected from a depth of six to twelve inches below ground surface. Volatile soil samples were transferred directly into the sample container to minimize loss of volatile organic compounds from the sample. The remaining samples were collected from a

dedicated, decontaminated, stainless-steel bowl. Soil from the entire 0-12 inch interval was thoroughly mixed prior to being transferred into the sample container.

4.2 Field Measurements and Observations

A description of each of the Phase II background surface soil samples was recorded in a field notebook. Descriptions of the background surface soil sample logs are presented in Table 24.

The physical description of background soils varied across the site. However, soils were primarily composed of brown fine sand and silt, with some organic matter, no odor, and moist.

4.3 Analytical Results

All eighteen background surface soil samples were analyzed for the complete target compound list (TCL) and target analyte list (TAL). The analytical results of the background samples have been summarized and are presented in the following sections. These analytical results have also been incorporated in compound-specific comparison Tables 25a, 25b, 25c, and 25d.

4.3.1 Volatile Organic Compounds (VOCs)

The following volatile organic compounds (VOCs) were detected in NCBC Davisville background soil samples:

- methylene chloride (3/18) ranged from ND - 0.005 ppm
- 1,1,1-trichloroethane (6/18) ranged from ND - 0.010 ppm, and
- toluene (4/18) ranged from ND - 0.004 ppm (Table 23a).

The VOCs methylene chloride, and toluene are common laboratory contaminants and were detected infrequently in the background samples (EPA, 1989). While methylene chloride and toluene were not eliminated during the data validation process, their presence in the surface soil samples may be attributable to laboratory-induced contamination rather than environmental contamination. The most frequently detected VOC was 1,1,1-trichloroethane. It was detected in six samples at estimated (J) concentrations ranging from 0.002 to 0.010 ppm. 1,1,1-Trichloroethane was commonly used at numerous locations across the NCBC Davisville facility. These past activities may have resulted in the widespread detection of low concentrations of this chlorinated VOC in background sampling locations.

4.3.2 Semi-Volatile Organic Compounds (SVOCs)

Two types of semi-volatile organic compounds (SVOCs) were detected in the background soil samples: phthalates and polynuclear aromatic hydrocarbons (PAHs) (Table 25b). Three phthalate compounds were detected:

- di-n-butyl phthalate (5/18) which ranged from ND - 0.067 ppm,
- butyl benzyl phthalate (3/18) which ranged from ND - 0.380 ppm, and
- bis(2-ethylhexyl)phthalate (4/18) which ranged from ND - 0.580 ppm.

Phthalates are common laboratory contaminants and their presence in the background samples may be attributed to this source (EPA, 1989).

Nine PAHs were detected in the background soil samples (Table 25b). The most frequently detected PAHs were fluoranthene and pyrene both detected in eight of the eighteen background samples. The presence of these PAHs in such a large portion of NCBC Davisville background soils probably reflects the wide spread paving of the base as well as the use of petroleum products to spread herbicides to control weeds. Concentrations of PAH compounds ranged from ND - 0.580 ppm.

4.3.3 Pesticides/PCBs

Results of the NCBC Davisville background soil sampling indicate that low concentrations of both pesticides and PCBs are present over much of the base. Fifteen different pesticides were detected in at least one of the background surface soil samples (Table 25c). The most commonly detected pesticides were 4,4'-DDT and 4,4'-DDE which were found in ten of the eighteen background samples. The frequent detection of pesticides in background samples reflects the widespread use of these compounds at NCBC Davisville. The highest detected concentration of a pesticide (4,4'-DDT) was 0.610 ppm. The concentrations of pesticides detected in the background samples indicate that the pesticide concentrations measured at the RI sites may not have resulted from site-specific activities.

The PCB Aroclor-1260 was detected in five of the eighteen background soil samples. The highest concentration of Aroclor-1260 detected was 0.096 ppm. This concentration is well under the state of Rhode Island cleanup guidance of 10 ppm.

4.3.4 Inorganic Analytes

Results of the background soil sample inorganic analysis indicate no unusually high concentrations of inorganic analytes. Table 25d provides the concentration ranges for each of the analytes detected in the background soil samples.

4.4 Verification of Background Analytical Data

A number of background soil samples contained detectable concentrations of VOCs, PAHs, phthalates, pesticides, and PCBs. The following sections provide an analysis of all of the background analytical data to determine if some of the background samples should be excluded from the data base due to the presence of contaminants which would not be anticipated on a facility-wide basis, potentially indicating that the samples are not representative of true background conditions at the facility. The primary purpose of collecting background surface soil samples was to provide a range of inorganic concentrations that is compared to site specific data in the Human Health and Ecological Risk Assessments. An evaluation of the effect on inorganic concentration ranges of excluding some organic-impacted background samples is presented below.

4.4.1 Volatile Organic Compound Analysis

Four VOCs (methylene chloride (5/18), acetone (2/18), toluene (4/18), and 1,1,1-trichloroethane (6/18)) were detected in background soil samples. No discernible pattern of VOC contamination was identified. The background samples were analyzed primarily in four sample delivery groups. VOCs were detected in all sample delivery groups. Inspection of other surface soil samples collected in the same sample delivery groups found no identifiable pattern of VOC contamination. The only background samples with multiple contaminants were BK-SS21 and BK-SS22 (toluene and 1,1,1-trichloroethane).

The only VOC contaminant detected in background samples which has not been identified by the EPA as a common laboratory contaminant is 1,1,1-trichloroethane. If the six background samples in which 1,1,1-trichloroethane was detected are deleted from the background data base, the background inorganic analyte ranges are not appreciably impacted. A total of 10 inorganic analytes

ranges decreased. Only three changed by more than 3 ppb: aluminum (4,000 ppb), iron (2,500 ppb), and sodium (20 ppb). While the concentrations of aluminum and iron decreased substantially when these samples were excluded, the initial inorganic concentrations did not adversely impact soil quality.

Based on the presence of 1,1,1-trichloroethane in six of the background surface soil samples, these samples have been eliminated from the background database.

4.4.2 Semi-volatile Organic Compound Analysis

Phthalates and PAHs were the only SVOCs detected in the eighteen background soil samples. Phthalates are common laboratory contaminants and their presence is probably the result of laboratory contamination. The majority of SVOC impacted samples were detected in the vicinity of Hall Creek (BK-SS09, 11, 12, 15, 16, 17, and 18). The most impacted background soil sample was BK-SS12 in which 9 SVOCs were detected. Most of these background locations were collected from wooded areas in which historical aerial photographs indicated no previous naval activities. The presence of these low concentrations of PAHs is potentially due to runoff from the facility roads.

If the background samples in which 1,1,1-trichloroethane were detected are excluded from the background soil data base, the number of samples in which phthalates and PAHs are detected is significantly reduced. However as stated in Section 4.4.4, the inorganic analyte concentration ranges remain relatively stable. None of the background samples have been eliminated due to the presence of SVOCs.

4.4.3 Pesticide/PCB Analysis

Numerous pesticides and Aroclor-1260 were detected in background soil samples. The most commonly detected pesticides were 4,4'-DDE (10/18), 4,4'-DDT (10/18), 4,4'-DDD (5/18), and alpha chlordane (5/18). These pesticides were also detected at concentrations that exceeded 10 ppb. The highest concentrations detected were for 4,4'-DDT (610 ppb) and 4,4'-DDE (550 ppb). No other pesticide detected in a background soil sample exceeded 65 ppb. The presence of pesticides in NCBC Davisville soils is likely due to the wide spread use of pesticides to control vegetation across the facility. Due to the frequency of pesticide compounds detected in the background as well as site specific samples, it appears that the presence of low concentrations of pesticides in NCBC Davisville

soils represents background conditions at the facility. Therefore, pesticide-impacted background soil samples were not removed from the background sample data base.

The PCB Aroclor-1260 was detected in five of the eighteen background soil samples collected across the site. The concentrations detected at all five locations were all below 100 ppb. As stated in Section 4.3.3, the Rhode Island Cleanup Guidance for PCBs is 10 ppm. The source of the Aroclor-1260 in the five background soil samples is unknown. The locations where Aroclor-1260 was detected can be divided into three general areas: wetlands across from the Allen Harbor Landfill (BK-SS03 and BK-SS04), in the vicinity of Sites 02 and 03 (BK-SS05 and BK-SS08), and in the Hall Creek woodlands east of Site 06 (BK-SS10). If the five background samples in which Aroclor-1260 was detected are deleted from the background soil data base, the resulting background inorganic analyte ranges generated from that data are not significantly altered from the original data set. However, these five samples will be eliminated from the background surface soil data base since the presence of PCBs is not considered to be representative of facility background conditions.

4.4.4 Inorganic Analyte Analysis

As has been stated in Section 4.3.4, the concentrations of inorganic analytes detected in the eighteen background samples collected near the eight RI sites do not appear to be elevated. Table 25d presents a summary of inorganic analyte concentration ranges based upon the following criteria: excluding all background soil samples impacted by 1,1,1-trichloroethane, excluding all background soil samples impacted by Aroclor-1260, excluding all background soil samples impacted by both Aroclor-1260 and 1,1,1-trichloroethane, and not excluding any background soil samples.

The detailed analysis of the background soil samples indicates that while some samples have been impacted by organic contaminants, the inorganic contaminant concentration ranges have not been severely impacted. However, those eleven background surface soil samples which contained 1,1,1-trichloroethane and PCBs have been eliminated from the background data base. The last column of Table 25d has been used for the comparison of site-specific analyte results to NCBC background ranges.

5.0 CONTAMINANT FATE AND TRANSPORT

This section of the RA evaluates the fate and transport of contaminants associated with the site and provides an indication of future contaminant movement. Section 5.1 outlines the occurrence of contamination across the site in surface soil, subsurface soil, and ground water. Observed contamination in soil consists mainly of PAHs and inorganics. Selected VOCs, DDT, and Aroclor-1260 were also detected in soil. In ground water, inorganics were the most frequently detected contaminants.

5.1 Potential Routes of Migration

To determine the fate of contaminants of potential concern at the site, information on the physical/chemical and environmental fate properties was collected for site contaminants. This information is presented in Table 26 for the contaminants of potential concern in soil and ground water as identified in the Human Health Risk Assessment. Several of the environmental media studied have the potential for off-site migration, primarily surface soils and ground water. Subsurface soils are less likely to be transported off-site unless exposed by excavation. The primary mode of transport of chemicals in subsurface soil would be leaching and ground water transport.

Contaminants in surface soils can migrate or be carried off site by surface runoff (resulting from precipitation), sorbed to windblown dust, and by users of the site via vehicle tires, shoes, etc. With the exception of future excavation, dust generation and surface runoff at Site 08 are expected to be minimal since the site is covered by grass and a paved road. Contaminants can also move from the surface soils (leaving the soils in place) through leaching by infiltration of precipitation and transport by ground water, and volatilization to ambient air. Finally, contaminants may be transported to plants or animals and subsequently consumed by humans.

The presence of acetone and inorganics in the ground water indicates that the ground water may have been impacted by the site through the downward leaching of these chemicals through soils. The location of the closest domestic supply well is approximately 1,500 feet southwest of Site 08. The direction of ground water flow is toward the north-northeast. Although it is unlikely that the existing well has been affected by the site, future wells in other locations could potentially be impacted.

5.2 Contaminant Distribution and Observed Migration

The following section examines contaminant presence across the site (also discussed in Sections 2.4 to 2.6 of the Human Health Risk Assessment) in combination with the migration pathways to provide an understanding of contaminant persistence and migration at the site. The discussions below are presented with respect to individual contaminants or contaminant groups. Contaminants observed in the environmental samples collected from the site include VOCs, SVOCs, pesticides/PCBs, and inorganics.

Volatile Organic Compounds

In general, VOCs were detected infrequently and at low concentrations in soils on site.

The principal mechanism for the natural removal of VOCs is through volatilization (EPA, 1979). Vapor pressures (@ approximately 25°C) of acetone, chloroform, and methylene chloride, the three VOCs of potential concern in soil, are 231, 246 and 435 mm Hg, respectively (see Table 26). The Henry's Law Constants for acetone, chloroform, and methylene chloride are 3.67E-05 atm-m^3/mol, 4.35 x 10^{-3} atm-m^3/mol, and 2.68 x 10^{-3} atm-m^3/mol, respectively. The role of biodegradation in the natural attenuation of these compounds is compound-specific. Similarly the role of adsorption is compound-specific (e.g., acetone and methylene chloride have less tendency to be retained by soils than chloroform, as evidenced by their smaller organic carbon/water partition coefficients (K_{oc}s)). Chloroform and methylene chloride are fairly soluble in water with solubilities of 8,000 and 13,000 mg/l, respectively. Acetone is more soluble in water than chloroform and methylene chloride with a solubility of 1,000,000 mg/L. Chloroform and methylene chloride also tend to partition from organic media into water based on their octanol/water partition coefficients (K_{ow}s) (93 and 20, respectively). Acetone is even more likely to partition from organic media into water based on its lower log K_{ow} (-0.24). This is in contrast to PAHs, which have a much greater relative affinity for organic-based media (e.g., octanol) than water. Overall, acetone, chloroform, and methylene chloride in surface and subsurface soil are not expected to persist in the environment. The primary migration pathways from soil are expected to be volatilization and leaching through soil into water. Acetone, the only VOC

found in ground water, was detected in 2/4 ground water samples with both concentrations (40 and 90 mg/l) above the trace concentration level (>10 mg/l). The chemical/physical and environmental fate data indicate that VOCs like acetone are likely to migrate downward in soils to ground water.

Semi-Volatile Organic Compounds

SVOCs were identified in surface and subsurface soil sampled on site. SVOCs, particularly PAHs, are persistent in the environment due to their complex chemical nature. While some of the lighter PAHs (with fewer aromatic rings) would be subject to biodegradation or volatilization, chemical persistence generally increases with increasing number of aromatic rings. SVOCs are generally characterized by high boiling point, low vapor pressure, and low solubility (except phenols).

PAHs were the primary SVOCs of potential concern in surface and subsurface soils on site. Additionally, benzoic acid and bis(2-ethylhexyl)phthalate were detected in both surface and subsurface soil samples. PAHs generally have a very low solubility (<0.01 mg/l), whereas the solubility of benzoic acid is much greater (2,700 mg/l). Although benzoic acid may be more likely to migrate into ground water based on its higher solubility, SVOCs (including benzoic acid) were not detected in ground water. The K_{oc}'s of PAHs are generally greater than 2,500 ml/g, with many greater than 100,000 ml/g indicating that PAHs readily adsorb to organic carbon in soils. This may account for their lack of detection in ground water samples. Overall, migration of PAHs and benzoic acid from soil to ground water is likely to be low. Off-site transport of particulate-sorbed PAHs may be possible through dust generation at the soil surface and through soil transport in surface water runoff. PAHs in soil are more likely to persist than VOCs, but are less likely to persist than DDT or inorganics. In addition to the lack of SVOCs in ground water, the concentrations of benzoic acid and most of the PAHs were less in subsurface soil than in surface soil.

Bis(2-ethylhexyl)phthalate was the only phthalate of potential concern in surface and subsurface soil. It should be noted that phthalates are common laboratory contaminants and are widespread in the environment (ATSDR, 1987; ATSDR, 1989b). Phthalate esters generally occur in association with other semi-volatile organic compounds. They generally exhibit low solubility and high K_{oc}, and so would not be particularly amenable to water transport. This is consistent with the site data

which show the phthalates were detected only in soil samples and not in ground water. As with PAHs, bis(2-ethylhexyl)phthalate may be transported off-site in airborne dust or sorbed to particulates in surface water runoff.

Pesticides and PCBs

DDT and Aroclor-1260 were detected in 2 of 24 and 9 of 24 surface soil samples, respectively. Aroclor-1260 was also detected once in subsurface soil. DDT was not detected in subsurface soil. In general, pesticides and PCBs have a strong affinity for organics in soils (e.g., K_{oc} of DDT is 243,000 ml/g), which tends to lower their mobility. In addition, many pesticides and PCBs are very persistent.

The DDT and Aroclor-1260 at the site appear confined to soils, as neither of these compounds were detected in ground water, and thus do not appear to be migrating from the site into this medium.

PCBs are generally regarded to be a significant environmental problem because of their persistence and adverse health effects. However, PCBs do not tend to migrate unless solvents or oils are present or unless transported in airborne dust or sorbed to particulates in surface water runoff (EPA, 1979).

Inorganic Analytes

Many metals have a strong affinity for soils (particularly clay particles and organic matter in soils) which reduces their mobility. High pH can increase the mobility of certain metals. The presence of the inorganic analytes, particularly the naturally occurring elements, were examined in the context of site background concentrations. Site background samples were collected as composite samples from unimpacted areas at Sites 02, 07, 09, and 10 and wooded areas near Sites 06, 11, and 13 during the Phase II RI. The analytes of potential concern in surface soils are beryllium, chromium, cyanide, lead, and nickel. The analytes of potential concern in subsurface soil samples are beryllium, chromium, and cyanide.

The inorganics of potential concern in ground water include aluminum (4/4), arsenic (3/4), barium (4/4), beryllium (1/4), chromium (3/4), cobalt (2/4), copper (3/4), cyanide (1/4), lead (3/4), manganese (4/4), and vanadium (1/4). The presence of a number of these inorganics in surface and subsurface soils indicates migration from soil to ground water may have occurred.

6.0 HUMAN HEALTH RISK ASSESSMENT

A Human Health Risk Assessment (RA) has been conducted for Site 08, as presented in Volume II of this document. The RA evaluated the analytical data for the site to identify chemicals of potential concern. An exposure assessment was conducted in which potential migration pathways were evaluated and potential human exposure scenarios were developed. The following exposure scenarios were identified:

- Scenario 1 (Current Trespasser) - Exposure of youths aged 9 to 18 years to surface soils (via dermal contact and ingestion) through direct access to the site.

- Scenario 2 (Current or Future Commercial/Industrial Worker) - Exposure of adult employees to surface soils (via dermal contact and ingestion) through future use of the site.

- Scenario 3 (Future Construction Worker) - Exposure of adult workers to subsurface soils (via dermal contact, ingestion, and inhalation) for a one-year period, assuming construction of commercial or residential buildings.

- Scenario 4 (Future Resident) - Exposure of children (0 to 6 years of age) and youths/adults (7 to 30 years of age) to surface and subsurface soils (via ingestion and dermal contact) and ground water (via ingestion) through future residential use of the site.

As an addendum to the RA, the potential exposure of current or future industrial workers to ground water via ingestion (Scenario 2A) was also evaluated, as presented in Appendix I of this report. While ground water ingestion was previously evaluated for future site residents, consideration of exposures to future commercial/industrial site workers is appropriate since the Base Reuse Plan designates the area in which Site 08 is located as an economic/industrial development area.

Exposure doses were developed based on the geometric mean of chemical concentrations as well as on the basis of the maximum detected chemical concentration (reasonable maximum exposure). The exposure assessment was followed by a toxicity assessment in which the toxic effects of the chemicals of concern were evaluated.

Based on this information, risks were quantitatively characterized or, where insufficient toxicological data are available to allow a quantitative assessment, were qualitatively characterized.

Cancer risks are represented in scientific notation where a lifetime cancer risk of 1E-04 represents a lifetime cancer risk of one in ten thousand. The National Contingency Plan (NCP), as presented in 40 CFR Part 300, defines 1E-04 to 1E-06 as an acceptable risk range for Superfund remedial actions, with 1E-06 the point of departure for determining risk-based remediation goals. For non-cancer risks, risk is quantitated by a Hazard Index (HI), for which values exceeding unity (1) indicate the potential for non-cancer health effects. Therefore, the cancer risk and HI ratios that constitute a potential concern are greater than 1E-06 and greater than 1E+00, respectively.

Cancer and non-cancer risk estimates were less than these potential levels of concern for soil exposures under Scenarios 1 and 3 (trespassing and construction scenarios). Non-cancer risk estimates were also less than the potential levels of concern for exposures to soils under Scenarios 2 and 4 (commercial/industrial use and residential use scenarios). Cancer risks for soil exposures (both ingestion and dermal contact) under Scenarios 2 and 4 exceeded the point of departure risk level of 1E-06 but were within the 1E-04 to 1E-06 risk range. Exposure to carcinogenic PAHs, the PCB Aroclor-1260, arsenic and beryllium accounts for the majority of these estimated risks. It should be noted, however, that the detected concentrations of PAHs fall within those reported for urban background situations, while those for arsenic are within background concentrations at NCBC Davisville (as defined by Phase II background samples).

Cancer and non-cancer risks for ingestion of ground water, under Scenarios 2A and 4, were greater than the potential levels of concern. Cancer risks for both scenarios exceeded the point of departure risk level of 1E-06 but were within the 1E-04 to 1E-06 risk range. Exposure to arsenic and beryllium accounts for the majority of the cancer risks. The non-cancer HI ratios for ingestion of ground water under both scenarios exceeded 1E+00. Exposure to manganese accounted for the majority of the non-cancer risk.

Uncertainties are associated with the estimation of cancer and non-cancer risks. The main sources of uncertainty associated with the calculation of the cancer risk estimates which exceed the point of departure value include the application of a cancer slope factor for one PAH (benzo(a)pyrene) to the estimation of risk for other carcinogenic PAHs, the presence of PAHs, arsenic and beryllium at levels which are typical of urban situations and background levels, respectively, and the use of animal

data to derive human toxicological values. The main uncertainty associated with the potential for non-cancer health effects due to the presence of manganese in ground water is the presence of manganese in upgradient wells at sites located throughout NCBC Davisville at levels which exceed those detected at Site 08.

6.1 Ecological Assessment Status

An Ecological Risk Assessment was conducted for Site 08 and the Sandhill Brook Watershed as part of the main Phase II RI field work at NCBC Davisville. The results of the Ecological Risk Assessment is provided as Appendix R of the draft Naval Construction Battalion Center, Davisville Rhode Island Human Health Risk Assessment (TRC, 1993).

The objective of the ecological risk assessment is to provide a qualitative and quantitative assessment of the ecological risks and/or impacts associated with terrestrial and freshwater conditions for Site 08 and the Sandhill Brook Watershed.

The Ecological Risk Assessment concluded that Site 08 does not pose an ecological risk to aquatic or terrestrial communities in the Sandhill Brook Watershed because:

- Sediment metals are generally within naturally occurring ranges;
- SEM and AVS data generally indicate that metals in the sediment of the brook have low bioavailability;
- Toxicity quotients based on comparison to derived sediment quality criteria are less than 1;
- The sediment contaminant concentrations are generally below the NOAA ERL;
- The wildlife and benthic observations in this system indicate a taxonomically and functionally diverse ecosystem;
- RIDEM does not recommend any specific precautions in regard to state endangered species; and
- Estimated dietary exposures of PCBs to mink foraging in the watershed are less than toxicity-based benchmark.

7.0 SUMMARY AND CONCLUSIONS

This section of the report briefly summarizes site background information and the findings of the RI investigations. Conclusions regarding the site and recommendations for future work and remedial response action objectives are also provided.

7.1 Summary Nature and Extent of Contamination

The results of the Phase I and Phase II site investigations indicate that both soil and ground water at the site have been slightly impacted by contamination. Below is a summary of the limited impacts to each environmental media with a discussion of the chemical compound classes analyzed for in the site media.

Soil

Volatile Organic Compounds:

The Phase II soil gas survey collected 27 soil gas samples from across the site. No VOCs were detected in any of the soil gas samples.

VOCs were detected in the surface and subsurface soil samples at the site at low part per billion concentrations. The compounds detected consisted primarily of acetone and methylene chloride, common laboratory contaminants.

One Phase I subsurface soil sample (SS-09-03), collected at a depth of 3 feet, had a total xylene concentration of 0.210 ppm.

Semi-Volatile Organic Compounds:

Various low concentrations of SVOCs, consisting mainly of PAHs and phthalates, were detected in the surface and subsurface soil across the site. The highest concentrations of total PAHs (>1 ppm) were noted in the central portion of the site (at Phase I surface soil samples S-08-06 and S-08-07). Many of the soil samples collected in both Phase I and Phase II contained detectable concentrations of caPAHs compounds. The highest subsurface soil concentrations of SVOCs generally occurred across the northern portion of the site (Phase I subsurface soil samples S-08-05-03 and S-08-09-03). The primary source of PAHs in the Phase II soil samples (boring sample B-B04-01 and surface soil sample 08-SS13), appears to be associated with the asphaltic materials of the paved road which runs across the site.

Pesticides and PCBs:

The pesticide, 4,4'-DDT, was detected, at low or estimated concentrations, in two surface soil samples (Phase I S-08-05 and Phase II 08-B05-01) collected from along the northern edge of the site. The 4,4'-DDT concentrations detected in the two samples were 0.29 ppm in S-08-05 and 0.0029 ppm in 08-B05-01.

The PCB Aroclor-1260 was the only PCB Aroclor detected in the surface and subsurface soil samples. The highest PCB concentration of 1.4 ppm was detected in the Phase I surface soil sample S-08-06. However, none of the detected PCB soil concentrations exceeded the RIDEM definition for solid waste which includes wastes containing a concentration of 10 to 50 ppm PCBs. RIDEM has also proposed that wastes containing 50 ppm or greater PCBs is defined as a hazardous waste. No subsurface soil samples contained detectable concentrations of PCBs.

Inorganic Compounds:

No elevated levels of metals were detected in either the surface or subsurface soil samples. None of the Phase I or Phase II soil samples had lead concentrations that exceeded the RIDEM lead soil cleanup level of 300 ppm.

Ground Water

Volatile Organic Compounds:

The results of the ground water sample analysis indicate the presence of the common laboratory contaminant acetone at low concentrations in several of the ground water samples. In addition, carbon disulfide was detected at an estimated concentration of 0.009 ppm in the duplicate ground water sample collected in monitoring well 08-MW03D. No other VOCs were detected in the site ground water samples. The detected VOC concentrations did not exceed State of Rhode Island ground water quality standards or federal Maximum Contaminant Levels (MCLs).

Semi-Volatile Organic Compounds:

The common laboratory contaminant, bis(2-ethylhexyl)phthalate, was detected at low concentrations in two of the Phase II site ground water samples. No other SVOCs were detected in the ground water samples. The detected SVOC concentrations did not exceed established State of Rhode Island ground water quality standards or federal MCLs.

Pesticides and PCBs:

No pesticides or PCBs were detected the site ground water samples.

Inorganic Compounds:

Low concentrations of inorganic analytes were detected in each of the four site ground water samples. A noticeable reduction in detected analyte concentrations was noted between the filtered and unfiltered samples. Significant analyte concentration reductions were especially evident for aluminum, iron, magnesium, and potassium. These reductions indicate that these analytes were primarily present in the ground water samples as suspended solids. However, none of the detected concentrations of filtered or unfiltered inorganics exceeded established State of Rhode Island ground water quality standards or federal MCLs.

7.2 Human Health Risk Assessment Summary

Four exposure scenarios were assessed in the Human Health Risk Assessment (HHRA). These scenarios are Current Trespasser (Scenario 1), Current or Future Commercial/Industrial Worker (Scenario 2), Future Construction Worker (Scenario 3), and Future Resident (Scenario 4). Two types of human health risks were evaluated, cancer and non-cancer. The National Contingency Plan (NCP) defines 1E-04 to 1E-06 as an acceptable cancer risk range for Superfund remedial actions. For non-cancer risks, risk is quantified by a Hazard Index (HI), with HI's greater than 1 indicating potential non-cancer health effects.

Cancer and non-cancer risk estimates were less than levels of concern for soil exposures under Scenarios 1 and 3 (trespassing and construction). Cancer risks for soil exposure (both ingestion and dermal contact) under Scenarios 2 and 4 (commercial/industrial and residential) exceeded 1E-06 but were within the 1E-04 to 1E-06 range. Non-cancer HI values were less than the potential level of concern for soil exposure under Scenarios 2 and 4.

Cancer and non-cancer risks for ingestion of ground water under Scenarios 2 and 4, were greater than the potential levels of concern. Cancer risks exceeded the point of departure risk level of 1E-06 but were within the 1E-04 to 1E-06 risk range. The non-cancer risk for ingestion of ground water exceeded 1E+00, due to the presence of manganese. However, manganese is detected in upgradient wells at other RI sites at levels exceeding Site 08 levels, indicating its presence may not be site-related.

7.2.1 Ecological Risk Assessment Summary

The Ecological Risk Assessment (ERA) was conducted as part of the main Naval Construction Battalion Center Remedial Investigation and is presented as Appendix R of the Human Health Risk Assessment Report. The ERA concluded that Site 08 does not pose an ecological risk to aquatic or terrestrial communities in the Sandhill Brook Watershed.

7.3 Conclusions

As stated in Section 7.1, no soil or ground water contamination has been identified at the site at levels which exceed any regulatory standards or criteria.

The following conclusions can be drawn regarding the site as a whole:

- Site soils were not significantly impacted by the reported film processing waste disposal activities. Low concentrations of VOCs, PAHs, phthalates, pesticides, and PCBs were detected in the soils across the site. The detected VOCs and phthalates appear to be laboratory-related contaminants. The low detected concentrations of organic compounds in the soil do not appear to have impacted the site ground water.

- Low concentrations of acetone, carbon disulfide, and bis(2-ethylhexyl)phthalate were detected in ground water samples. However, these compounds are likely laboratory related contaminants. Several inorganic analytes were detected in ground water. The detected concentrations of these compounds and inorganic analytes did not exceed established State of Rhode Island ground water quality standards or federal MCLs.

- Ground water quality at Site 08 presents potential non-cancer risks to human health under a future commercial/industrial and residential site use scenarios. Cancer risks associated with ground water ingestion under these scenarios exceed the point of departure risk of 1E-06 but are within the acceptable risk range of 1E-04 to 1E-06 for Superfund remedial actions. Soil quality at Site 08 presents potential cancer risks under future commercial/industrial or future residential site use which exceed the point of departure but fall within the acceptable range for remedial actions at Superfund sites. Uncertainties associated with the calculated risk levels must be considered in their evaluation. In addition, the concentrations of inorganics in ground water that drive the risk assessment (arsenic, beryllium, and manganese) were detected at similar concentrations at other RI sites.

7.3.1 Data Limitations and Recommendations for Future Work

The DPDO site was extensively investigated through sampling and analysis of the environmental media. The investigation has defined environmental conditions at the site in detail and no additional information is required.

7.3.2 Recommended Remedial Action Objectives

Prior to initiating the Phase II RI, the first phase of the Feasibility Study effort was initiated, as presented in the Draft Final Initial Screening of Alternatives Report (TRC, 1993). This report, which is based on information presented within the Phase I Report only, included the development of initial remedial response objectives for the site. These objectives included the minimization of potential exposures to surface soil contaminants at levels which exceed ARARs/TBCs or which pose unacceptable risks to human health. However, based on the Phase II RI and RA, ARARs/TBCs are not exceeded for soils, estimated human health cancer risks are within the acceptable risk range for remedial responses at Superfund sites, and the site poses no significant ecological risks.

Ground water ingestion under future commercial/industrial or residential site use indicates a potential for non-cancer human health effects. However, considering the uncertainties associated with those risk estimates which exceeded the point of departure risk level, no remedial response objectives have been developed for the site based on protection of human health.

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TABLE 1

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI

SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SUMMARY OF SITE CONTAMINATION DATA

PERIOD OF OPERATION	TYPE OF MATERIAL DISPOSED OF	ESTIMATE QUANTITY OF WASTE
1973	Sodium thiosulfate, hydroquinone, formaldehyde, acetic acid, potassium hydroxide, sulfuric acid	Unknown - reportedly small

Table 2

Naval Construction Battalion Center
Davisville, RI

Site 08 DPDO Film Processing Disposal Area
Domestic Wells in the Vicinity of Site 08

Owners Name	Address	Upgradient of Ground Water Flow
Balmforth, Maxon G	3726 Quaker Lane N. Kingstown RI	YES
Boettger, Adolf F	3808 Quaker Lane N. Kingstown RI	YES
Briggs, Frederick	3700 Quaker Lane N. Kingstown RI	YES
Dinofrio, Donald J	3650 Quaker Lane N. Kingstown RI	YES
Diraimo, John M	440 Old Baptist Rd N. Kingstown RI	YES
Dubois, Francis G	1011 Quaker Lane N. Kingstown RI	YES
Ford, Judy A	Quaker Lane N. Kingstown RI	YES
Lombardi, Santo	3574 Quaker Lane N. Kingstown RI	YES
Pastuch, Justyn	3560 Quaker Lane N. Kingstown RI	YES
Starr, Jeffrey T	3510 Quaker Lane N. Kingstown RI	YES
Tatro, Russel	3662 Quaker Lane N. Kingstown RI	YES

TABLE 3
LIST OF TCL COMPOUNDS
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND

TCL Volatiles	TCL Semivolatiles		TCL Pesticides/PCBs
Chloromethane	Phenol	2,6-Dinitrotoluene	alpha-BHC
Bromomethane	bis(2-Chloroethyl)ether	3-Nitroanaline	beta-BHC
Vinyl Chloride	2-Chlorophenol	Acenapthene	delta-BHC
Methylene Chloride	1,3-Dichlorobenzene	2,4-Dinitrophenol	gamma-BHC(Lindane)
Acetone	1,4-Dichlorobenzene	4-Nitrophenol	Heptachlor
Carbon Disulfide	1,2-Dichlorobenzene	Dibenzofuran	Aldrin
1,1-Dichloroethene	2-Methyl Phenol	2,4-Dinitrotoluene	Heptachlor Epoxide
1,1-Dichloroethane	2,2'-oxybis(1-chloropropane)	Diethyl Phthalate	Endosulfan I
1,2-Dichloroethene (Total)	4-Methyl Phenol	4-Chlorophenyl-phenylether	Dieldrin
Chloroform	n-Nitro-di-n-Propylamine	Fluorene	4-4-DDE
1,2-Dichloroethane	Hexachloroethane	4-Nitroanaline	Endrin
2-Butanone	Nitrobenzene	4,6-Dinitro-2-methylphenol	Endosulfan II
1,1,1-Trichloroethane	Isophorone	n-Nitrosodiphenylamine	4,4-DDD
Carbon Tetrachloride	2-Nitrophenol	4-Bromophenyl-phenylether	Endosulfan Sulfate
Bromodichloromethane	2,4-Dimethylphenol	Hexachlorobenzene	4,4-DDT
1,2-Dichloropropane	Benzoic Acid	Pentachlorophenol	Methoxychlor
cis-1,3-Dichloropropene	2,4-Dichlorophenol	Phenanthrene	Endrin Ketone
Trichloroethene	1,2,4-Trichlorobenzene	Anthracene	Endrin Aldehyde
Dibromochloromethane	Naphthalene	Carbazole	alpha-Chlordane
1,1,2-Trichloroethane	4-Chloroaniline	di-n-Butyl Phthalate	gamma-Chlordane
Benzene	Hexachlorobutadiene	Fluoranthene	Toxaphene
Trans-1,3-Dichloropropene	4-Chloro-3-methylphenol	Pyrene	Aroclor - 1016
Bromoform	2-Methyl Naphthalene	Butyl Benzyl Phthalate	Aroclor - 1221
4-Methyl-2-Pentanone	Hexachlorobutadiene	3,3'-Dichlorobenzidine	Aroclor - 1232
2-Hexanone	4-Chloro-3-methylphenol	Benzo(a)anthracene	Aroclor - 1242
Tetrachloroethene	2-Methylnaphthalene	Chrysene	Aroclor - 1248
1,1,2,2-Tetrachloroethane	Hexachlorocyclopentadiene	bis(2-Ethylhexyl) Phthalate	Aroclor - 1254
Toluene	2,4,6-Trichlorophenol	di-n-Octyl Phthalate	Aroclor - 1260
Chlorobenzene	2,4,5-Trichlorophenol	Benzo(b)fluoranthene	
Ethylbenzene	2-Chloronaphthalene	Benzo(k)fluoranthene	
Styrene	2-Nitroaniline	Benzo(a)pyrene	
Xylene(Total)	Dimethyl Phthalate	Indeno(1,2,3-cd)pyrene	
	Acenapthylene	Dibenzo(a,h)anthracene	
		Benzo(g,h,i)perylene	

TABLE 4
LIST OF TAL ANALYTES
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND

TAL Metals	
Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Vanadium
Iron	Zinc
Lead	Cyanide

TABLE 5
LIST OF TCLP PARAMETERS
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND

TCLP Metals	TCLP Pesticides	TCLP Semivolatiles	TCLP Volatiles
Arsenic	Chlordane	Hexachlorobenzene	Benzene
Barium	2,4-D	Hexachloro-1,3-butadiene	Carbon Tetrachloride
Cadmium	Endrin	Hexachloroethane	Chlorobenzene
Chromium	Heptachlor	Nitrobenzene	Chloroform
Lead	Heptachlor Epoxide	Pyridine	1,2-Dichloroethane
Mercury	Lindane	2,4-Dinitrotoluene	1,1-Dichloroethylene
Selenium	Methoxychlor	1,4-Dichlorobenzene	Methyl Ethyl Ketone
Silver	Toxaphene	o-Cresol	Tetrachlororthylene
	2,4,5-TP Silvex	m-Cresol	Trichloroethylene
		p-Cresol	Vinyl Chloride
		Pentachlorophenol	
		2,4,5-Trichlorophenol	
		2,4,6-Trichlorophenol	

TABLE 6
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SURFACE SOIL SAMPLE DESCRIPTION
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA

SAMPLE #	DATE	TIME	DESCRIPTION
08-SS11	2/18/93	1120	Frozen solid, w/organic roots - top 2". Dark brown medium-fine grained SAND, some silt, little gravel, no odor - 2" to 12".
08-SS12	2/18/93	1100	Frozen solid, w/organic roots - top 2". Dark brown medium-fine grained SAND, some silt, little gravel, no odor -2" to 8" Light brown, fine SAND, little silt, trace of gravel, moist, no odor - 8" to 12".
08-SS13	2/18/93	1030	Asphalt - top 6" used pick to obtain sample below, removed all visible ashalt from sample. Dark brown medium-fine grained SAND, some silt, little gravel, no odor - 6" to 12".
08-SS14	2/18/93	0940	Frozen solid, w/organic roots - top 2". Dark brown medium-fine grained SAND, some silt, little gravel, no odor - 2" to 12".
08-SS15	2/18/93	1140	Dark organic fine SAND, w/ little silt. Dark black fine to medium SAND - 2" to 8". Dark black fine to medium SAND, w/ some gravel - 8" to 12".
08-SS16	2/18/93	1145	Same as above
08-MW11	2/17/93	1150	Dark brown fine-medium SAND, moist - top 4". Brown fine SAND, w/ silt and some gravel, no odor - 4" to 24"
08-MW21	2/17/93	1348	Dark brown medium to coarse SAND, w/ some gravel, dry - top 3". Brown medium to coarse SAND, w/ some gravel, dry, no odor - 3" to 24".
08-MW31	2/18/93	0948	Dark brown medium SAND, w/ some silt, gravel, dry - top 4". Brown medium SAND, w/ some silt, gravel, dry, no odor - 4" to 24".
08-B11	2/22/93	1450	Dark brown fine SAND, w/ silt and gravel, dry, no odor - top 4". Brown fine SAND, w/ silt and gravel, dry, no odor - 4" to 24".
08-B21	2/22/93	1535	Dark brown fine to coarse SAND, w/ gravel, dry - top 10". Brown fine SAND, w/ silt and gravel, no odor, moist - 4" to 24".
08-B31	2/19/93	1300	Brown medium SAND, w/ gravel, moist - top 14". Brown fine SAND, w/ silt, moist, no odor - 14" to 24".
08-B41	2/19/93	1135	Brown fine to medium SAND, little silt and gravel, moist, no odor - top 18" Brown medium SAND, moist, no odor - 18" to 24"
08-B51	2/23/93	0920	Dark brown organic SILT top 4". Brown medium SAND, w/ siltand gravel, moist - 4" to 24".

TABLE 7

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI.
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SPLIT-SPOON HEADSPACE READINGS

BORING #	INTERVAL (FT)	HEADSPACE (ppm) HNu	LOWER EXPLOSIVE LIMIT LEL (ppm)	OXYGEN (%)
Site 08 - DPDO Film Processing Disposal Area:				
*08B01-01	0-2	0.0	0.0	21.0
*08B01-02	2-4	0.0	0.0	21.0
08B01-03	4-6	0.0	0.0	21.0
08B01-04	9-11	0.0	0.0	21.0
08B01-04	14-16	0.0	0.0	21.0
*08B02-01	1-2	0.0	0.0	21.0
*08B02-02	2-4	0.0	0.0	21.0
08B02-03	4-6	0.0	0.0	21.0
08B02-05	9-11	--	--	--
08B02-08	14-16	0.0	0.0	21.0
*08B03-01	0-2	0.0	0.0	20.9
08B03-02	2-4	0.0	0.0	20.9
*08B03-03	4-6	0.0	0.0	20.9
08B03-05	9-11	--	--	--
08B03-08	14-16	0.0	0.0	20.9
*08B04-01	0-2	0.0	0.0	20.9
*08B04-02	2-4	0.0	0.0	20.9
08B04-03	4-6	0.0	0.0	20.9
08B04-04	6-8	0.0	0.0	20.9
08B04-05	8-10	0.0	0.0	20.9
08B04-06	10-12	0.0	0.0	20.9
08B04-07	12-14	0.0	0.0	20.9
08B04-08	14-16	0.0	0.0	20.9
*08B05-01	0-2	0.0	0.0	21.0
*08B05-02	2-4	0.0	0.0	21.0
08B05-03	4-6	0.0	0.0	21.0
08B05-04	6-8	0.0	0.0	21.0
08B05-05	8-10	0.0	0.0	20.9
08B05-06	10-12	0.0	0.0	20.9
08B05-07	12-14	0.0	0.0	20.9
08B05-08	14-16	0.0	0.0	20.9
08B05-09	16-18	0.0	0.0	20.9

NOTES:

* = SOIL SAMPLE COLLECTED
--- = NO SOIL RECOVERED

TABLE 8

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
MONITORING WELL DATA SHEETS

WELL LOCATION	DATE INSTALLED	TPVC (ft, msl)	HOLE DIAMETER	CASING TYPE/ DIAMETER	TOTAL DEPTH	SCREENED INTERVAL
MW-1	2/17/93	51.99	8"	PVC/2"	19	4-19
MW-2	2/17/93	51.03	8"	PVC/2"	19	4-19
MW-3S	2/18/93	50.94	8"	PVC/2"	14	4-14
MW-3D	2/18/93	50.73	8"	PVC/2"	25	15.5-25.5

NOTES:
msl = FEET ABOVE MEAN SEA LEVEL
TPVC = TOP OF PVC CASING

TABLE 9

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI.
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
WELL DEVELOPMENT LOG

MONITORING WELL IDENTIFICATION	DATE	PUMPING DURATION	TYPE PUMP	PUMPING RATE	VOLUME REMOVED	OBSERVATIONS
08MW-1	2/22/93	2 HOURS	WATTERA	.33 GPM	55 GAL	NO ODOR, DARK BLACK, VERY SILTY ENTIRE DEVELOPMENT
08MW-2	2/22/93	100 MIN	WATTERA	.13 GPM	13 GAL	NO ODOR, DARK BLACK, VERY SILTY ENTIRE DEVELOPMENT
08MW-3D	2/22/93	2 HOURS	WATTERA	.75 GPM	90 GAL	NO ODOR, DARK BLACK, VERY SILTY ENTIRE DEVELOPMENT
08MW-3S	2/24/93	6 HOURS	BAILER	—	—	NO ODOR, DARK BLACK, VERY SILTY ENTIRE DEVELOPMENT
08MW-2	2/24/93	6 HOURS	BAILER	—	—	NO ODOR, DARK BLACK, VERY SILTY ENTIRE DEVELOPMENT

TABLE 10

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI.
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
WELL DEVELOPMENT PARAMETERS

WELL NUMBER	DATE	SAMPLE TIME	pH	TEMP (°c)	CONDUCTIVITY (umhos/cm)	PURGE RATE gal/min	PUMP TYPE	OBSERVATIONS
08-MW1	2/22/93	1224	6.34	7.5	350	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW1	2/22/93	1244	6.47	8.0	320	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW1	2/22/93	1304	6.45	8.5	300	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW1	2/22/93	1328	6.45	9.0	290	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW1	2/22/93	1348	6.43	9.0	290	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW1	2/22/93	1408	6.57	9.5	290	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/22/93	1442	6.66	9.0	210	.33	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/22/93	1502	6.68	9.0	182	.25	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/22/93	1532	6.66	9.0	190	.125	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/22/93	1552	6.66	9.0	195	.125	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/22/93	1615	6.67	9.0	290	.125	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3D	2/22/93	0935	6.65	5.0	420	.66	WATTERA	CLEAR, NO ODOR
08-MW3D	2/22/93	0952	6.60	9.5	250	.66	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3D	2/22/93	1014	6.62	9.5	220	1	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3D	2/22/93	1034	6.60	10.0	220	1	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3D	2/22/93	1054	6.60	10.0	220	1	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3D	2/22/93	1114	6.60	10.5	220	.75	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3D	2/22/93	1134	6.61	10.5	220	.75	WATTERA	DARK BLACK, NO ODOR, VERY SILTY
08-MW3S	2/24/93	0900	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW3S	2/24/93	1130	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW3S	2/24/93	1330	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW3S	2/24/93	1500	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/24/93	0900	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/24/93	1130	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/24/93	1330	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY
08-MW2	2/24/93	1500	—	—	—	—	BAILER	DARK BLACK, NO ODOR, VERY SILTY

TABLE 11
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
GROUND WATER SAMPLING PARAMETERS
MW1

TIME	TEMP (degrees C)	CONDUCTIVITY (milliohms/cm)	pH	Eh (mV)	FLOW RATE (ml/min.)	TURBIDITY (NTU)	DEPTH TO WATER (from top of PVC)	WATER LEVEL (EL. AMSL)
1455	5.6	0.030	7.34	34	250	20	5.60	46.39
	5.5	0.030	7.24	32	250	20	5.90	46.09
1501	5.3	0.030	7.21	27	250	22	5.90	46.09
	5.0	0.030	7.18	20	250	31	5.92	46.07
	4.9	0.030	7.17	17	250	34	5.92	46.07
	4.8	0.030	7.14	14	250	42	5.93	46.06
	4.7	0.040	7.13	10	250	44	5.93	46.06
	4.6	0.040	7.12	11	250	47	5.93	46.06
	4.5	0.040	7.11	16	300	47	6.10	45.89
	4.4	0.040	7.03	17	300	43	6.12	45.87
	4.4	0.040	7.01	18	300	37	6.22	45.77
	4.3	0.040	6.99	19	300	29	6.20	45.79
	4.1	0.040	6.97	20	300	23	6.20	45.79
	4.1	0.040	6.94	20	300	18	6.20	45.79
	4.0	0.040	6.92	20	300	16	6.20	45.79
	3.9	0.040	6.90	21	300	14	6.20	45.79
	3.9	0.040	6.88	22	300	15	6.22	45.77
1547	3.9	0.040	6.88	25	300	15	6.22	45.77

51.99 ELEVATION OF TOP OF PVC
ABOVE MEAN SEA LEVEL (AMSL)

TABLE 11 (CONT.)
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
GROUND WATER SAMPLING PARAMETERS
MW2

TIME	TEMP (degrees C)	CONDUCTIVITY (milliohms/cm)	pH	Eh (mV)	FLOW RATE (ml/min.)	TURBIDITY (NTU)	DEPTH TO WATER (from top of PVC)	WATER LEVEL (EL. AMSL)
1325	6.8	0.040	8.89	-100	125	20	5.36	45.67
	6.5	0.040	9.28	-87	500	18	7.63	43.40
	6.5	0.040	9.32	-77	125	18	7.63	43.40
	6.7	0.040	9.29	-69	300	17	7.90	43.13
	6.9	0.040	9.03	-72	250	17	8.15	42.88
	6.8	0.040	8.75	-152	250	16	8.30	42.73
	7.1	0.050	8.40	-149	250	16	8.52	42.51
	7.4	0.050	8.35	-149	250	18	8.73	42.30
	7.5	0.050	8.37	-152	250	20	8.92	42.11
	7.4	0.050	8.22	-143	250	21	8.95	42.08
	7.4	0.050	7.97	-129	250	24	9.00	42.03
	7.6	0.050	7.89	-134	250	29	9.18	41.85
1401	7.7	0.050	7.86	-144	250	32	9.28	41.75
	7.8	0.050	7.92	-143	250	33	9.32	41.71
	7.9	0.050	7.94	-139	250	33	9.36	41.67
	7.9	0.050	7.91	-142	250	33	9.38	41.65

51.03 ELEVATION OF TOP OF PVC
ABOVE MEAN SEA LEVEL (AMSL)

TABLE 11 (CONT.)
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
GROUND WATER SAMPLING PARAMETERS
MW3(S)

TIME	TEMP (degrees C)	CONDUCTIVITY (milliohms/cm)	Ph	Eh (mV)	FLOW RATE (ml/min.)	TURBIDITY (NTU)	DEPTH TO WATER (from top of PVC)	WATER LEVEL (EL. AMSL)
1200	5.5	0.030	6.92	-21	150	63	5.28	45.66
	5.4	0.035	6.79	-30	150	70	7.00	43.94
	5.3	0.035	6.78	-38	150	76	7.48	43.46
	5.2	0.035	6.78	-46	150	79	7.64	43.30
	5.3	0.035	6.80	-53	150	81	7.85	43.09
	5.4	0.035	6.78	-58	150	84	8.00	42.94
	5.5	0.035	6.78	-61	150	85	8.15	42.79
	5.8	0.035	6.79	-63	150	83	8.25	42.69
	6.0	0.035	6.80	-67	125	82	8.41	42.53
	6.0	0.035	6.80	-68	125	72	8.47	42.47
	6.0	0.035	6.80	-69	125	72	8.55	42.39
	6.0	0.035	6.82	-70	125	67	8.69	42.25
	6.1	0.035	6.80	-71	120	62	8.72	42.22
	6.3	0.035	6.82	-70	120	59	8.78	42.16
	6.4	0.035	6.82	-71	120	60	8.85	42.09
	6.6	0.035	6.82	-70	120	58	8.92	42.02
	6.6	0.035	6.84	-71	120	58	9.00	41.94

50.94 ELEVATION OF TOP OF PVC
ABOVE MEAN SEA LEVEL (AMSL)

TABLE 11 (CONT.)
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
GROUND WATER SAMPLING PARAMETERS

MW3(D)

TIME	TEMP (degrees C)	CONDUCTIVITY (milliohms/cm)	pH	Eh (mV)	FLOW RATE (ml/min.)	TURBIDITY (NTU)	DEPTH TO WATER (from top of PVC)	WATER LEVEL (EL. AMSL)
1020	9.5	0.045	6.78	-26	350	4.2	5.41	45.32
	9.9	0.045	6.88	-37	300	4.2	5.55	45.18
	10.0	0.045	6.95	-45	300	4.0	5.55	45.18
	10.0	0.040	6.97	-47	300	4.0	5.55	45.18
	10.0	0.040	7.02	-56	300	3.8	5.55	45.18
	10.0	0.040	7.04	-58	300	3.8	5.55	45.18
	9.9	0.040	7.05	-61	300	3.7	5.55	45.18
	10.0	0.040	7.07	-61	300	3.6	5.53	45.20
	9.9	0.040	7.08	-63	300	3.6	5.55	45.18
	9.9	0.040	7.08	-65	300	3.5	5.56	45.17
	9.9	0.040	7.09	-66	300	3.5	5.56	45.17

50.73 ELEVATION OF TOP OF PVC
ABOVE MEAN SEA LEVEL (AMSL)

TABLE 12
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI.
SITE 08 - FILM PROCESSING DISPOSAL AREA
GROUND WATER ELEVATIONS

Date	Well Number	Ground Water Elevation
03/12/93	MW-1	46.35
03/12/93	MW-2	45.71
03/12/93	MW-3(S)	45.80
03/12/93	MW-3(D)	45.40

Date	Well Number	Ground Water Elevation
04/06/93	MW-1	46.35
04/06/93	MW-2	46.05
04/06/93	MW-3(S)	45.91
04/06/93	MW-3(D)	45.74

GROUND WATER ELEVATIONS
U.S. ARMY CORPS OF ENGINEERS (RHODE ISLAND PORT AUTHORITY TRACT)
DEVILS FOOT ROAD DISPOSAL AREA

Date	Well Number	Ground Water Elevation
04/06/93	DMW-1	50.70
04/06/93	DMW-2	45.58
04/06/93	DMW-3	51.06
04/06/93	DMW-4	44.44

TABLE 13

NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
MONITORING WELL SURVEY DATA

MONITORING WELL NUMBER	NORTH	EAST	GROUND ELEVATION (MSL)	TOP OF PVC ELEVATION (MSL)
MW-1	189755.56	506950.33	51.99	51.99
MW-2	189795.12	506997.28	51.03	51.03
MW-3S	189746.87	507013.04	50.73	50.94
MW-3D	189742.18	507012.99	50.94	50.73

NOTE:
Elevations were taken to the top of the PVC
North and East locations are in Rhode Island grid coordinates
MSL - Indicates elevation is referenced to mean sea level

TABLE 14
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
SUMMARY OF SLUG TEST RESULTS

WELL LOCATION	TEST DATE	SCREENED INTERVAL (FT BELOW GRADE)	TEST 1 T (ft^2/d)	TEST 2 T (ft^2/d)	TEST 1 K (ft/d)	TEST 2 K (ft/d)
MW–1	3/12/93	4.0–19.0	39.65	46.73	1.586	1.869
MW–2	3/12/93	4.0–19.0	3.594	---	.1437	---
MW–3S	3/12/93	4.0–14.0	3.356	---	.1342	---
MW–3D	3/12/93	15.5–25.5	178.4	183.6	7.138	7.347

NOTES:
T = Transmissivity
K = Hydraulic Conductivity
--- = Not Tested

TABLE 15
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
DATA REPORTING QUALIFIERS

Organic Compound Qualifiers

Value — If the result is a value greater than or equal to the detection limit, then the value is reported

'-' — Indicates compound was analyzed for but not detected.

J — Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. If the limit of detection is 10µg and a concentration of 3µg is calculated, then value is reported as 3J.

B — Indicates the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

NJ — Indicates the compound was detected. The associated numerical value is qualified as presumtively present at an estimated level.

Inorganic Compound Qualifiers

Value — If the result is a value greater than or equal to the instrument detection limit, then the value is reported.

'-' — Indicates element was analyzed for but not detected.

J — Indicates an estimated value.

B — Indicates the result is a value greater than the instrument detection limit but less than the contract required detection limit (CRQL).

TABLE 16

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SURFACE SOIL SUMMARY TABLE

CLIENT ID: LABORATORY ID:	08-SS11 35078-16	08-SS12 35078-17	08-SS13 35078-18	08-SS14 35078-19	08-SS15 35078-20
VOLATILE ORGANIC COMPOUNDS (µg/kg)					
METHYLENE CHLORIDE	6 J	4 J	--	--	--
ACETONE	--	--	--	--	56 J
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)					
FLUORANTHENE *	--	--	--	--	--
PYRENE *	--	--	340 J	--	--
BENZO(A)ANTHRACENE **	--	--	--	--	--
CHRYSENE **	--	--	200 J	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	--	--	--	--	--
BENZO(B)FLUORANTHENE **	--	--	--	--	--
BENZO(A)PYRENE **	--	--	--	--	--
TOTAL SVOCs	0	0	540	0	0
TOTAL PAHs	0	0	540	0	0
TOTAL CaPAHs	0	0	200	0	0
PESTICIDES / PCBs (µg/kg)					
4,4' - DDT	--	--	--	--	--
AROCLOR - 1260	--	--	--	52	39
INORGANIC ANALYTES (mg/kg)					
ALUMINUM	6330	4360	3990	2780	3570
ANTIMONY	--	--	--	--	--
ARSENIC	0.87 J	0.93 J	0.71 J	0.57 J	0.76 J
BARIUM	15.4 J	12.4 J	10.1 J	9.6 J	9.5 J
BERYLLIUM	0.46 J	0.4 J	0.41 J	0.34 J	0.35 J
CADMIUM	--	--	--	--	--
CALCIUM	280 J	203 J	255 J	183 J	167 J
CHROMIUM	6.4	4.2	5.5	2.6	3.5
COBALT	3.9 J	3.1 J	2.3 J	2 J	1.9 J
COPPER	8.5	6.6	6.1	4.1 J	5.3
IRON	9110 J	5880 J	6430 J	3550 J	5170 J
LEAD	10.7 J	8.2 J	13 J	5.5 J	9.6 J
MAGNESIUM	1330	865 J	655 J	390 J	536 J
MANGANESE	70.9 J	71.5	75.1	60.1 J	62.9
MERCURY	--	--	--	--	--
NICKEL	6 J	3.5 J	3.2 J	2.2 J	2.5 J
POTASSIUM	519 J	441 J	451 J	253 J	338 J
SELENIUM	--	0.21 J	--	0.21 J	0.21 J
SILVER	--	--	--	--	--
SODIUM	--	--	--	--	--
THALLIUM	--	--	--	--	--
VANADIUM	10.2	6.2 J	5.4 J	3.4 J	4.8 J
ZINC	30.4	29.8	30	20.6	27.5
CYANIDE	--	--	--	--	--

-- = Non-detect
J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)
** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 16

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SURFACE SOIL SUMMARY TABLE

CLIENT ID:	08-SS16	08-SS18	08-B01-01	08-B02-01	08-B03-01
LABORATORY ID:	35078-21	35078-48	35114-1	35114-3	35098-1
VOLATILE ORGANIC COMPOUNDS (µg/kg)					
METHYLENE CHLORIDE	--	--	--	--	--
ACETONE	--	190	--	82	--
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)					
FLUORANTHENE *	--	--	--	--	--
PYRENE *	--	--	--	--	--
BENZO(A)ANTHRACENE **	--	--	--	--	--
CHRYSENE **	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	--	--	--	--	--
BENZO(B)FLUORANTHENE **	--	--	--	--	--
BENZO(A)PYRENE **	--	--	--	--	--
TOTAL SVOCs	0	0	0	0	0
TOTAL PAHs	0	0	0	0	0
TOTAL CaPAHs	0	0	0	0	0
PESTICIDES / PCBs (µg/kg)					
4,4' - DDT	--	--	--	--	--
AROCLOR - 1260	23 J	51	--	--	--
INORGANIC ANALYTES (mg/kg)					
ALUMINUM	2380	3860	5970	4360	5970
ANTIMONY	--	--	--	--	--
ARSENIC	0.51 J	0.64 J	0.74 J	1 J	0.79 J
BARIUM	10.2 J	8.8 J	11.5 J	10.6 J	8.9 J
BERYLLIUM	0.38 J	0.36 J	0.41 J	0.37 J	0.42 J
CADMIUM	--	--	--	--	--
CALCIUM	156 J	207 J	206 J	200 J	123 J
CHROMIUM	2.5	3.7 J	4.8 J	4 J	4.8 J
COBALT	1.2 J	2.5 J	3 J	2.6 J	2.9 J
COPPER	4.7 J	5.3	5.4	4 J	4.4
IRON	3650 J	6310 J	7510 J	4360 J	6480 J
LEAD	8.4 J	10.4 J	4.9 J	4.9 J	4.6 J
MAGNESIUM	311 J	705 J	929 J	662 J	564 J
MANGANESE	78.9	65 J	42.2 J	42.9 J	57.3 J
MERCURY	--	--	--	--	--
NICKEL	2.4 J	2.7 J	5.3 J	4 J	4.6 J
POTASSIUM	336 J	361 J	449 J	360 J	441 J
SELENIUM	0.21 J	--	--	--	--
SILVER	--	--	--	--	--
SODIUM	--	--	--	--	--
THALLIUM	--	--	--	--	--
VANADIUM	2.9 J	5.9 J	8 J	5.9 J	8.2 J
ZINC	28.9	27.9	21.4	27	37.5
CYANIDE	--	--	0.39 J	--	--

-- = Non-detect

J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)

** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 16

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SURFACE SOIL SUMMARY TABLE

CLIENT ID:	08-B04-01	08-B05-01	08-B06-01	08-MW01-01	08-MW02-01
LABORATORY ID:	35098-3	35132-1	35132-3	35064-1	35064-3
VOLATILE ORGANIC COMPOUNDS (µg/kg)			(Duplicate of B05-01)		
METHYLENE CHLORIDE	--	--	--	5 J	7 J
ACETONE	--	--	19	43 J	--
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)					
FLUORANTHENE *	310 J	--	--	--	--
PYRENE *	470	--	--	--	--
BENZO(A)ANTHRACENE **	230 J	--	--	--	--
CHRYSENE **	260 J	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	--	--	--	--	--
BENZO(B)FLUORANTHENE **	210 J	--	--	--	--
BENZO(A)PYRENE **	250 J	--	--	--	--
TOTAL SVOCs	1730	0	0	0	0
TOTAL PAHs	1730	0	0	0	0
TOTAL CaPAHs	950	0	0	0	0
PESTICIDES / PCBs (µg/kg)					
4,4' - DDT	--	2.9 J	--	--	--
AROCLOR - 1260	--	--	--	34 J	--
INORGANIC ANALYTES (mg/kg)					
ALUMINUM	5600	4550	3820	5450	5850
ANTIMONY	--	--	--	--	--
ARSENIC	0.76 J	0.78 J	1.1 J	0.71 J	0.72 J
BARIUM	19.6 J	14.4 J	24.5 J	12 J	11.1 J
BERYLLIUM	0.29 J	0.37 J	0.58 J	0.48 J	0.45 J
CADMIUM	0.36 J	--	--	--	--
CALCIUM	477 J	1470	8360	232 J	156 J
CHROMIUM	9 J	7.2 J	9.3 J	4.8	4.8
COBALT	5.1 J	2.8 J	3.6 J	2.8 J	1.9 J
COPPER	6.3	7.6	7.8	6.4	2.6 J
IRON	10900 J	8710 J	8140 J	7230 J	6140 J
LEAD	39.7 J	12.4 J	8.2 J	5.6 J	3.9 J
MAGNESIUM	2050 J	1260 J	1710 J	960 J	507 J
MANGANESE	120 J	104 J	175 J	61	40.1
MERCURY	--	--	--	--	--
NICKEL	7.4	5.1 J	7.5 J	4.6 J	2.3 J
POTASSIUM	1030 J	490 J	818 J	545 J	369 J
SELENIUM	--	--	--	--	0.31 J
SILVER	0.47 J	--	--	--	--
SODIUM	--	--	50.4 J	--	--
THALLIUM	--	--	--	--	--
VANADIUM	12.3 J	8.8 J	9.3 J	7.3 J	7.1 J
ZINC	22.8	39.8	42.9	31.5	20.6
CYANIDE	0.23 J	--	--	--	--

-- = Non-detect

J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)

** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 16

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SURFACE SOIL SUMMARY TABLE

CLIENT ID:	08-MW03-01	08-MW04-01
LABORATORY ID:	35078-1	35078-3
VOLATILE ORGANIC COMPOUNDS (µg/kg)		(Duplicate of MW03-01)
METHYLENE CHLORIDE	7 J	--
ACETONE	--	--
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)		
FLUORANTHENE *	--	--
PYRENE *	--	--
BENZO(A)ANTHRACENE **	--	--
CHRYSENE **	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	--	--
BENZO(B)FLUORANTHENE **	--	--
BENZO(A)PYRENE **	--	--
TOTAL SVOCs	0	0
TOTAL PAHs	0	0
TOTAL CaPAHs	0	0
PESTICIDES / PCBs (µg/kg)		
4,4' - DDT	--	2.9 J
AROCLOR - 1260	20 J	32 J
INORGANIC ANALYTES (mg/kg)		
ALUMINUM	3300	2970
ANTIMONY	--	--
ARSENIC	0.67 J	0.55 J
BARIUM	9.8 J	9.9 J
BERYLLIUM	0.44 J	0.41 J
CADMIUM	--	0.72 J
CALCIUM	353 J	217 J
CHROMIUM	3.1	2.9
COBALT	2.2 J	1 J
COPPER	4 J	4.1 J
IRON	5240 J	4900 J
LEAD	6.8 J	10.6 J
MAGNESIUM	681 J	375 J
MANGANESE	92.4	87.5
MERCURY	--	--
NICKEL	3.1 J	2.4 J
POTASSIUM	444 J	416 J
SELENIUM	--	0.25 J
SILVER	--	--
SODIUM	--	--
THALLIUM	--	--
VANADIUM	4.3 J	3.6 J
ZINC	44.7	44.8
CYANIDE	--	--

-- = Non-detect
J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)
** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 17

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SUBSURFACE SOIL SUMMARY TABLE

CLIENT ID:	08-B01-02	08-B02-02	08-B03-03	08-B04-02	08-B05-02
LABORATORY ID:	35114-2	35114-4	35098-2	35098-4	35132-2
VOLATILE ORGANIC COMPOUNDS (µg/kg)					
METHYLENE CHLORIDE	--	--	--	--	--
ACETONE	43	--	65	--	--
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)					
BENZO(B)FLUORANTHENE **	--	--	--	--	200 J
TOTAL SVOCs	0	0	0	0	200
TOTAL PAHs	0	0	0	0	200
TOTAL CaPAHs	0	0	0	0	200
PESTICIDES / PCBs (µg/kg)					
INORGANIC ANALYTES (mg/kg)					
ALUMINUM	4240	2880	5390	1940	3210
ANTIMONY	--	--	2.8 J	--	--
ARSENIC	0.42 J	0.36 J	0.82 J	0.41 J	0.51 J
BARIUM	10.2 J	8.9 J	10 J	6.5 J	10.5 J
BERYLLIUM	0.51 J	0.48 J	0.38 J	0.38 J	0.49 J
CADMIUM	--	--	--	--	--
CALCIUM	217 J	262 J	196 J	98.7 J	439 J
CHROMIUM	5 J	3.2 J	4.7 J	1.4 J	3.5 J
COBALT	2.7 J	2.7 J	3.4 J	0.99 J	1.9 J
COPPER	5.9	3 J	6.3	1.8 J	5.8
IRON	6770 J	5130 J	6200 J	3510 J	5010 J
LEAD	8 J	5.8 J	5.1 J	4 J	13.4 J
MAGNESIUM	722 J	398 J	803 J	189 J	469 J
MANGANESE	46.6 J	45.1 J	49.1 J	32.4 J	42 J
MERCURY	--	--	--	--	--
NICKEL	4 J	2.4 J	4.6 J	--	--
POTASSIUM	478 J	492 J	545 J	339 J	447 J
SELENIUM	--	--	--	--	--
SILVER	--	--	--	--	--
SODIUM	--	--	--	--	--
THALLIUM	--	--	--	--	--
VANADIUM	6.1 J	4.1 J	8.3 J	2 J	4.4 J
ZINC	34.4	34.6	26.1	29	35.2
CYANIDE	--	0.4 J	--	--	--

-- = Non-detect

J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)

** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 17

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
SUBSURFACE SOIL SUMMARY TABLE

CLIENT ID:	08-MW01-02	08-MW03-02
LABORATORY ID:	35062-2	35078-2
VOLATILE ORGANIC COMPOUNDS (µg/kg)		
METHYLENE CHLORIDE	--	6 J
ACETONE	--	--
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)		
BENZO(B)FLUORANTHENE **	--	--
TOTAL SVOCs	0	0
TOTAL PAHs	0	0
TOTAL CaPAHs	0	0
PESTICIDES / PCBs (µg/kg)		
INORGANIC ANALYTES (mg/kg)		
ALUMINUM	4230	1940
ANTIMONY	--	--
ARSENIC	0.61 J	0.39 J
BARIUM	13.5 J	7 J
BERYLLIUM	0.66 J	0.34 J
CADMIUM	--	--
CALCIUM	333 J	143 J
CHROMIUM	3.4	2.1
COBALT	2.6 J	0.92 J
COPPER	8.1	1.8
IRON	7530 J	2860 J
LEAD	7.3 J	3.4 J
MAGNESIUM	914	197 J
MANGANESE	65.2	54.3
MERCURY	--	--
NICKEL	5.8 J	--
POTASSIUM	777 J	333 J
SELENIUM	--	0.24 J
SILVER	--	--
SODIUM	--	--
THALLIUM	--	--
VANADIUM	5.2 J	1.8 J
ZINC	44.5	57.7
CYANIDE	--	--

-- = Non-detect

J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)

** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 18
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
Site 08 DPDO Film Processing Disposal Area
Comparison of Maximum Soil Contaminant Levels to Action Levels
Surface Soil Samples

Parameter	Surface Soils Concentration (ppb)	Federal Action Level (ppm)	State Action Level (ppm)
PCBs – Aroclor–1260			
TRC Sample ID			
08–MW11	34J	10(1)	10/50(3)
08–MW31	20J	10(1)	10/50(3)
08–MW41	32J	10(1)	10/50(3)
08–SS14	52	10(1)	10/50(3)
08–SS15	39	10(1)	10/50(3)
08–SS16	23J	10(1)	10/50(3)
08–SS18	51	10(1)	10/50(3)
08–B12	23NJ	10(1)	10/50(3)
LEAD			
TRC Sample ID			
08–MW11	5.6J	500–1,000(2)	300(4)
08–MW21	3.9J	500–1,000(2)	300(4)
08–MW31	6.8J	500–1,000(2)	300(4)
08–MW41	10.6J	500–1,000(2)	300(4)
08–SS11	10.7J	500–1,000(2)	300(4)
08–SS12	8.2J	500–1,000(2)	300(4)
08–SS13	13J	500–1,000(2)	300(4)
08–SS14	5.5J	500–1,000(2)	300(4)
08–SS15	9.6J	500–1,000(2)	300(4)
08–SS16	8.4J	500–1,000(2)	300(4)
08–SS18	10.4J	500–1,000(2)	300(4)
08–B11	4.9J	500–1,000(2)	300(4)
08–B21	4.9J	500–1,000(2)	300(4)
08–B31	4.6J	500–1,000(2)	300(4)
08–B41	39.7J	500–1,000(2)	300(4)
08–B51	12.4J	500–1,000(2)	300(4)
08–B61	8.2J	500–1,000(2)	300(4)

(1) TSCA (40 CFR 761); Requirements for decontaminating spills in nonrestricted areas.

(2) USEPA, OSWER Directive 9355.4–02, Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites.

(3) RIDEM Rules and Regulations for Solid Waste Management Facilities defines solid waste as including any soil debris or other material with a concentration of 10 ppm or greater PCBs. RIDEM Rules and Regulations for Hazardous Waste Management defines Type 6 – extremely hazardous as including waste which contains 50 ppm or greater PCBs.

(4) RIDEM and RI Dept. of Health–Risk Assessment Guidance Level.

J – The associated numerical value is an estimated quantity

NJ – The compound was detected. The numerical value is qualified as presumtively present at an estimated level.

TABLE 19
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RI
Site 08 DPDO Film Processing Disposal Area
Comparison of Soil Contaminant Levels to Action Levels
Subsurface Soil Samples

Parameter	Subsurface Soil Concentration (ppb)	Federal Action Level (ppm)	State Action Level (ppm)
LEAD			
TRC Sample ID			
08–MW12	7.3J	500–1,000(2)	300(4)
08–MW32	3.4J	500–1,000(2)	300(4)
08–B12	8J	500–1,000(2)	300(4)
08–B22	5.8J	500–1,000(2)	300(4)
08–B33	5.1J	500–1,000(2)	300(4)
08–B42	4J	500–1,000(2)	300(4)
08–B52	13.4J	500–1,000(2)	300(4)

(1) TSCA (40 CFR 761); Requirements for decontaminating spills in nonrestricted areas.

(2) USEPA, OSWER Directive 9355.4–02, Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites.

(3) RIDEM Rules and Regulations for Solid Waste Management Facilities defines solid waste as including any soil debris or other material with a concentration of 10 ppm or greater PCBs. RIDEM Rules and Regulations for Hazardous Waste Management defines Type 6 – extremely hazardous as including waste which contains 50 ppm or greater PCBs.

(4) RIDEM and RI Dept. of Health–Risk Assessment Guidance Level.

J – The associated numerical value is an estimated quantity

NJ – The compound was detected. The numerical value is qualified as presumtively present at an estimated level.

TABLE 20
NAVAL CONSRUCTION BATTALION CENTER
DAVISVILLE, RI
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
BACKGROUND, SURFACE, and SUBSURFACE SOIL SAMPLES
COMPARISON OF OBSERVED CONCENTRATIONS

	OBSERVED CONCENTRATION RANGES IN ON-SITE SOILS (mg/kg)		OBSERVED BACKGROUND SURFACE SOIL CONCENTRATION RANGES
ELEMENT	SURFACE SOILS	SUBSURFACE SOILS	(mg/kg)
Aluminum	2,380-6,330	1,940-5,390	1,710 - 8,560
Antimony	ND-11.7	ND-2.8	ND
Arsenic	0.51-2.6	0.36-1.3	0.59-8.1
Barium	6.4-32.6	6.5-19.3	5.6 - 15.5
Beryllium	0.29-1.4	ND-1.4	ND - 0.66
Cadmium	ND-0.72	ND	ND - 0.46
Calcium	123-8,360	143-930	62.7 - 628
Chromium	2.5-15.5	1.4-11.6	ND - 9.6
Cobalt	ND-7.9	ND-3.4	ND - 4.6
Copper	2.6-87.3	ND-8.1	ND - 15
Iron	3,550-16,800	2,860-11,000	3,810 - 10,700
Lead	3.9-171	2.6-13.4	3.4 - 53.8
Magnesium	311-2,050	189-966	325 - 1,220
Manganese	40.1-175	32.4-169	21.8 - 150
Mercury	ND-0.14	ND	ND
Nickel	ND-30.8	ND-5.8	ND - 6.2
Potassium	ND-1,320	ND-1,360	ND - 728
Selenium	ND-0.31	ND-0.24	ND - 0.77
Silver	ND-28	ND	ND - 0.16
Sodium	ND-50.4	ND-482	ND - 119
Thallium	ND	ND	ND - 0.19
Vanadium	2.9-25.4	ND-8.3	3.3 - 24.6
Zinc	20.6-197	26.1-68.5	10.3 - 172
Cyanide	ND-0.39	ND-0.4	ND

NOTES:

ND Indicates that the element was not detected in the soil sample.

TABLE 21

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
GROUND WATER SUMMARY TABLE

CLIENT ID:	08-MW01S	08-MW02S	08-MW03S	08-MW03D	08-MW04S
LABORATORY ID:	35352-43	35352-42	35352-44	35352-39	35352-40
VOLATILE ORGANIC COMPOUNDS (µg/l)					(Dupe of MW03D)
ACETONE	--	40	92	--	--
CARBON DISULFIDE	--	--	--	--	9
SEMIVOLATILE ORGANIC COMPOUNDS (µg/l)					
BIS(2-ETHYLHEXYL)PHTHALATE	--	--	6 J	120	10 J
TOTAL SVOCs	0	0	6	120	10
TOTAL PAHs	0	0	0	0	0
TOTAL CaPAHs	0	0	0	0	10
PESTICIDES / PCBs (µg/l)					
INORGANIC ANALYTES (µg/l)					
ALUMINUM	707	2850	3380	289	348
ANTIMONY	--	--	--	--	--
ARSENIC	1 J	1.8 J	1.1 J	--	--
BARIUM	41.9 J	19.7 J	23 J	11.3 J	12 J
BERYLLIUM	--	--	0.38 J	--	--
CADMIUM	--	--	--	--	--
CALCIUM	11200	18300	4450 J	26200 J	28000
CHROMIUM	4.1 J	5.9 J	7.1 J	--	--
COBALT	--	2.4 J	4.7 J	--	--
COPPER	--	7.9 J	6.8 J	--	2 J
IRON	1970 J	4090 J	12900 J	2030 J	2250 J
LEAD	2.5 J	2.4 J	3.3 J	--	2.2 J
MAGNESIUM	1360 J	1530 J	1840 J	3880 J	4190 J
MANGANESE	361	741	1300	812	868
MERCURY	--	--	--	--	--
NICKEL	--	--	--	--	--
POTASSIUM	3640 J	13000	4540 J	2940 J	3100 J
SELENIUM	2.7 J	2.3 J	1.3 J	--	1.2 J
SILVER	--	--	--	--	--
SODIUM	23000	28600	28800	7870	8350
THALLIUM	--	--	--	--	--
VANADIUM	--	--	4.6 J	--	--
ZINC	--	--	21.5	--	--
CYANIDE	--	--	3.1 J	--	2.8 J

-- = Non-detect

J = Estimated Concentration

* - Polynuclear Aromatic Hydrocarbons (PAHs)

** - Carcinogenic Polynuclear Aromatic Hydrocarbons (CaPAHs)

TABLE 22
NAVAL CONSTRUCTIONBATTALION CENTER
DAVISVILLE, RI
Site 08 – DPDO Film Process Disposal Area
Comparison of Detected Ground Water Contaminantsto
Applicable or Relevant and Appropriate Requirements (ARARs) or To–be Considered Requirements (TBCs)

Parameter	Maximum Concentration Detected in Ground Water (ppb)	--- FEDERAL ARARs/TBCs --- MCL[1] (ppb)	MCLG[2] (ppb)	SMCL[3] (ppb)	RHODE ISLAND –ARARs/TBCs– Ground Water[4] Quality Standards (ppb)
Inorganics					
Aluminum	3,380			50 – 200	
Arsenic	1.8 J	50			50
Barium	41.9 J	2,000	2,000		2,000
Beryllium	0.38 J	1	0.0		
Chromium	7.1 J	100	100		100
Copper	7.9 J	1,300	1,300	1,000	
Iron	12,900 J			300	
Lead	3.3 J	15	0.0		15
Manganese	1,300			50	
Selenium	2.7 J	50	50		50
Zinc	21.5			5,000	
Cyanide	3.1 J	200	200		

NOTES:

1. MCL – Maximum Contaminant Level. National Primary Drinking Water Regulations, Final Rule Amendments to SDWA, U.S. EPA, Effective July 1992; for beryllium and nickel, effective January 17, 1994.
2. MCLG– Maximum Contaminant Level Goal, based on health considerations only, Final Rule Amendments to SDWA, U.S. EPA, Effective July 1992; for bis(2–ethylhexyl)phthalate (also known as di(2–ethylhexyl) phthalate), beryllium and nickel, effective January 17, 1994.
3. SMCL – Secondary Maximum Contaminant Level, National Secondary Drinking Water Regulations, Final Rule Amendments to SWDA, U.S. EPA, Effective July 1992.
4. Water Quality Standards, Class GAA and Class GA ground waters, Rhode Island Regulation DEM–GW–01–92, May 1992.

*–Action levels representative of drinking water quality at the tap, U.S. EPA, May 7, 1991.
--- Nothing was detected
B – The associated numerical value is greater than the instrument detection limit but less than the CRQL

TABLE 23

NCBC DAVISVILLE, RI - SITE 08
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA
COMPARISION OF FILTERED vs UNFILTERED INORGANIC ANALYTES

CLIENT ID:	08-MW01S	08-MW01SF	08-MW02S	08-MW02SF	08-MW03S	08-MW03SF	08-MW03D	08-MW03DF	08-MW04S	08-MW04SF
LABORATORY ID:	35352-43	35352-016	35352-42	35352-018	35352-44	35352-020	35352-39	35352-033	35352-40	35352-035
INORGANIC ANALYTES (µg/l)		(FILTERED)		(FILTERED)		(FILTERED)		(FILTERED)	(Dupe of MW03D)	(FILTERED)
ALUMINUM	707	–	2850	571	3380	329	289	–	348	–
ANTIMONY	–	17.1 J	–	23.5 J	–	–	–	–	–	–
ARSENIC	1 J	–	1.8 J	1.1 J	1.1 J	1.1 J	–	–	–	–
BARIUM	41.9 J	24.5 J	19.7 J	7.4 J	23 J	13.7 J	11.3 J	10.2 J	12 J	10.7 J
BERYLLIUM	–	–	–	–	0.38 J	–	–	–	–	–
CADMIUM	–	–	–	–	–	–	–	–	–	–
CALCIUM	11200	10600	18300	15400	4450 J	5140 J	26200 J	26600 J	28000	27000
CHROMIUM	4.1 J	5.5 J	5.9 J	–	7.1 J	–	–	3.1 J	–	3.6 J
COBALT	–	–	2.4 J	–	4.7 J	–	–	–	–	–
COPPER	–	6 J	7.9 J	8.5 J	6.8 J	4.8 J	–	2.4 J	2 J	–
IRON	1970 J	2360 J	4090 J	303 J	12900 J	9570 J	2030 J	1590 J	2250 J	1710 J
LEAD	2.5 J	–	2.4 J	–	3.3 J	1.2 J	–	2.6 J	2.2 J	1.3 J
MAGNESIUM	1360 J	1260 J	1530 J	880 J	1840 J	1320 J	3880 J	3850 J	4190 J	3930 J
MANGANESE	361	443	741	314	1300	1300	812	839	868	862
MERCURY	–	–	–	–	–	–	–	–	–	–
NICKEL	–	–	–	–	–	–	–	–	–	–
POTASSIUM	3640 J	3750 J	13000	11900	4540 J	4030 J	2940 J	3010 J	3100 J	3230 J
SELENIUM	2.7 J	3.1 J	2.3 J	1.2 J	1.3 J	3.5 J	–	3.8 J	1.2 J	–
SILVER	–	–	–	–	–	–	–	–	–	–
SODIUM	23000	22500	28600	26200	28800	27600	7870	8030	8350	8240
THALLIUM	–	–	–	–	–	–	–	–	–	–
VANADIUM	–	–	–	–	4.6 J	–	–	–	–	–
ZINC	–	–	–	–	21.5	–	–	–	–	–
CYANIDE	–	–	–	–	3.1 J	4.4 J	–	–	2.8 J	–

– = Non-detect
J = Estimated Concentration

TABLE 24

NCBC DAVISVILLE - PHASE II RI
SURFACE SOIL SAMPLE DESCRIPTION
BACKGROUND SURFACE SOIL SAMPLES

SAMPLE #	DATE	TIME	DESCRIPTION
BK-SS01	5/10/93	1350	Dark gray fine SAND, some silt, trace organics, wet, organic odor, 0" to 12".
BK-SS02	5/10/93	1415	Gray medium to coarse SAND, little silt and little-trace gravel and organics, moist, no odor, 0"-12".
BK-SS03	5/12/93	1010	Brown fine -medium SAND, trace of organics, moist, no odor.
BK-SS04	5/12/93	1030	Black to dark brown fine-medium SAND, mottled, trace organics, moist, no odor.
BK-SS05	5/12/93	1115	Brown fine SAND and SILT, some gravel and cobbles, moist, no odor.
BK-SS06	5/12/93	1100	Dark brown SILT, some organic material, moist, no odor, 0"-4".
			Brown fine SAND, some silt, cobbles and boulders, moist, no odor.
BK-SS07	5/12/93	1045	Dark brown fine SAND, some silt, little gravel, small piece of glass, moist, no odor.
BK-SS08	5/11/93	1430	Brown fine SAND, some silt, trace gravel, moist, no odor.
BK-SS09	5/12/93	1345	Dark grayish brown fine SAND and SILT, some medium gravel, moist, roots, no odor.
BK-SS10	5/12/93	1400	Brown ORGANIC SILT, moist, no odor, 0"-2".
			Brown SILT, moist, no odor, 2"-6".
			Dark brown fine SAND and SILT, moist, no odor.
BK-SS11	5/11/93	1500	Dark brown fine SAND, some silt, trace gravel and coarse sand, moist, no odor.
BK-SS12	5/11/93	1515	Dark to light brown fine SAND, some silt, trace gravel, moist, no odor.
BK-SS15	5/11/93	1530	Dark brown fine SAND and SILT, moist, no odor.
BK-SS16	5/11/93	1545	Dark brown fine SAND and SILT, little organic material, roots, moist, no odor.
BK-SS17	5/11/93	1600	Dark gray fine SAND and SILT, roots, wet, no odor.
BK-SS18	5/11/93	1615	Dark brown fine SAND and SILT, moist, roots, no odor.
BK-SS21	5/06/93	1230	Brown ORGANIC MATTER and SILT, no odor, moist, 0"-4".
			Light brown silt, trace organic matter and fine sand, no odor, moist, 4"-12".
BK-SS22	5/06/93	1230	Brown SILT, trace fine sand and organic matter, no odor, moist.

TABLE 25a
NCBC DAVISVILLE - PHASE II RI
BACKGROUND SURFACE SOIL SAMPLES
FREQUENCY OF VOLATILE ORGANIC COMPOUNDS DETECTED AS THE DATA BASE CHANGES

COMPOUND	FREQUENCY DETECTED				BACKGROUND RANGE (µg/kg)
	FULL DATA BASE	1,1,1-TCA EXCLUDED	PCBs EXCLUDED	BOTH EXCLUDED	
Chloromethane	0/18	0/12	0/13	0/7	ND
Bromomethane	0/18	0/12	0/13	0/7	ND
Vinyl chloride	0/18	0/12	0/13	0/7	ND
Chloroethane	0/18	0/12	0/13	0/7	ND
Methylene chloride	3/18	3/12	1/13	1/7	ND - 3
Acetone	0/18	0/12	0/13	0/7	ND
Carbon disulfide	0/18	0/12	0/13	0/7	ND
1,1-Dichloroethene	0/18	0/12	0/13	0/7	ND
1,1-Dichloroethane	0/18	0/12	0/13	0/7	ND
1,2-Dichloroethene(Total)	0/18	0/12	0/13	0/7	ND
Chloroform	0/18	0/12	0/13	0/7	ND
1,2-Dichloroethane	0/18	0/12	0/13	0/7	ND
2-Butanone	0/18	0/12	0/13	0/7	ND
1,1,1-Trichloroethane	6/18	0/12	0/13	0/7	ND
Carbon tetrachloride	0/18	0/12	0/13	0/7	ND
Bromodichloromethane	0/18	0/12	0/13	0/7	ND
1,2-Dichloropropane	0/18	0/12	0/13	0/7	ND
Cis-1,3-Dichloropropene	0/18	0/12	0/13	0/7	ND
Trichloroethene	0/18	0/12	0/13	0/7	ND
Dibromochloromethane	0/18	0/12	0/13	0/7	ND
1,1,2-Trichloroethane	0/18	0/12	0/13	0/7	ND
Benzene	0/18	0/12	0/13	0/7	ND
Trans-1,3-Dichloropropene	0/18	0/12	0/13	0/7	ND
Bromoform	0/18	0/12	0/13	0/7	ND
4-Methyl-2-pentanone	0/18	0/12	0/13	0/7	ND
2-Hexanone	0/18	0/12	0/13	0/7	ND
Tetrachloroethene	0/18	0/12	0/13	0/7	ND
1,1,2,2-Tetrachloroethane	0/18	0/12	0/13	0/7	ND
Toluene	4/18	2/12	4/13	2/7	ND - 3
Chlorobenzene	0/18	0/12	0/13	0/7	ND
Ethylbenzene	0/18	0/12	0/13	0/7	ND
Styrene	0/18	0/12	0/13	0/7	ND
Xylenes (Total)	0/18	0/12	0/13	0/7	ND

TABLE 25b
NCBC DAVISVILLE - PHASE II RI
BACKGROUND SURFACE SOIL SAMPLES
FREQUENCY OF SEMIVOLATILE ORGANIC COMPOUNDS DETECTED AS THE DATA BASE CHANGES

COMPOUND	FREQUENCY DETECTED				BACKGROUND RANGE (µg/kg)
	FULL DATA BASE	1,1,1-TCA EXCLUDED	PCBs EXCLUDED	BOTH EXCLUDED	
Phenol	0/18	0/12	0/13	0/7	ND
bis(2-Chloroethyl)ether	0/18	0/12	0/13	0/7	ND
2-Chlorophenol	0/18	0/12	0/13	0/7	ND
1,3-Dichlorobenzene	0/18	0/12	0/13	0/7	ND
1,4-Dichlorobenzene	0/18	0/12	0/13	0/7	ND
1,2-Dichlorobenzene	0/18	0/12	0/13	0/7	ND
2-Methylphenol	0/18	0/12	0/13	0/7	ND
2,2'-Oxybis(1-chloropropane)	0/18	0/12	0/13	0/7	ND
4-Methylphenol	0/18	0/12	0/13	0/7	ND
N-Nitroso-di-n-propylamine	0/18	0/12	0/13	0/7	ND
Hexachloroethane	0/18	0/12	0/13	0/7	ND
Nitrobenzene	0/18	0/12	0/13	0/7	ND
Isophorone	0/18	0/12	0/13	0/7	ND
2-Nitrophenol	0/18	0/12	0/13	0/7	ND
2,4-Dimethylphenol	0/18	0/12	0/13	0/7	ND
bis(2-Chloroethoxy)methane	0/18	0/12	0/13	0/7	ND
2,4-Dichlorophenol	0/18	0/12	0/13	0/7	ND
1,2,4-Trichlorobenzene	0/18	0/12	0/13	0/7	ND
Naphthalene	0/18	0/12	0/13	0/7	ND
4-Chloroaniline	0/18	0/12	0/13	0/7	ND
Hexachlorobutadiene	0/18	0/12	0/13	0/7	ND
4-Chloro-3-methylphenol	0/18	0/12	0/13	0/7	ND
2-Methylnaphthalene	0/18	0/12	0/13	0/7	ND
Hexachlorocyclopentadiene	0/18	0/12	0/13	0/7	ND
2,4,6-Trichlorophenol	0/18	0/12	0/13	0/7	ND
2,4,5-Trichlorophenol	0/18	0/12	0/13	0/7	ND
2-Chloronaphthalene	0/18	0/12	0/13	0/7	ND
2-Nitroaniline	0/18	0/12	0/13	0/7	ND
Dimethyl phthalate	0/18	0/12	0/13	0/7	ND
Acenaphthylene	0/18	0/12	0/13	0/7	ND
2,6-Dinitrotoluene	0/18	0/12	0/13	0/7	ND
3-Nitroaniline	0/18	0/12	0/13	0/7	ND
Acenaphthene	0/18	0/12	0/13	0/7	ND
2,4-Dinitrophenol	0/18	0/12	0/13	0/7	ND
4-Nitrophenol	0/18	0/12	0/13	0/7	ND
Dibenzofuran	0/18	0/12	0/13	0/7	ND
2,4-Dinitrotoluene	0/18	0/12	0/13	0/7	ND
Diethyl phthalate	0/18	0/12	0/13	0/7	ND
4-Chlorophenyl phenyl ether	0/18	0/12	0/13	0/7	ND
Fluorene	0/18	0/12	0/13	0/7	ND
4-Nitroaniline	0/18	0/12	0/13	0/7	ND
4,6-Dinitro-2-methylphenol	0/18	0/12	0/13	0/7	ND
N-Nitrosodiphenylamine(1)	0/18	0/12	0/13	0/7	ND
4-Bromophenyl phenyl ether	0/18	0/12	0/13	0/7	ND
Hexachlorobenzene	0/18	0/12	0/13	0/7	ND
Pentachlorophenol	0/18	0/12	0/13	0/7	ND
Phenanthrene	3/18	0/12	3/13	0/7	ND
Anthracene	0/18	0/12	0/13	0/7	ND
Carbazole	0/18	0/12	0/13	0/7	ND
Di-n-butyl phthalate	5/18	3/12	3/13	1/7	ND - 41
Fluoranthene	8/18	4/12	7/13	3/7	ND - 250
Pyrene	8/18	4/12	7/13	3/7	ND - 260
Butyl benzyl phthalate	3/18	2/12	1/13	1/7	ND - 51
3,3'-Dichlorobenzidine	0/18	0/12	0/13	0/7	ND
Benzo(a)anthracene	1/18	0/12	1/13	0/7	ND
Chrysene	4/18	2/12	2/13	2/7	ND - 190
bis(2-Ethylhexyl)phthalate	4/18	2/12	2/13	0/7	ND
Di-n-octyl phthalate	0/18	0/12	0/13	0/7	ND
Benzo(b)fluoranthene	6/18	2/12	4/13	1/7	ND - 270
Benzo(k)fluoranthene	5/18	2/12	4/13	1/7	ND - 73
Benzo(a)pyrene	1/18	0/12	1/13	0/7	ND
Indeno(1,2,3-cd)pyrene	1/18	0/12	1/13	0/7	ND
Dibenzo(a,h)anthracene	0/18	0/12	0/13	0/7	ND
Benzo(g,h,i)perylene	0/18	0/12	0/13	0/7	ND

TABLE 25c
NCBC DAVISVILLE - PHASE II RI
BACKGROUND SURFACE SOIL SAMPLES
FREQUENCY OF PESTICIDES/PCBs DETECTED AS THE DATA BASE CHANGES

COMPOUND	FREQUENCY DETECTED				BACKGROUND RANGE (µg/kg)
	FULL DATA BASE	1,1,1-TCA EXCLUDED	PCBs EXCLUDED	BOTH EXCLUDED	
Alpha-BHC	0/18	0/12	0/13	0/7	ND
Beta-BHC	0/18	0/12	0/13	0/7	ND
Delta-BHC	4/18	2/12	2/13	0/7	ND
Gamma-BHC (Lindane)	0/18	0/12	0/13	0/7	ND
Heptachlor	1/18	0/12	0/13	1/7	ND - 1.7
Aldrin	1/18	0/12	0/13	1/7	ND - 0.16
Heptachlor epoxide	2/18	0/12	0/13	1/7	ND - 3
Endosulfan I	0/18	0/12	0/13	0/7	ND
Dieldrin	3/18	0/12	3/13	0/7	ND
4,4'-DDE	10/18	6/12	7/13	3/7	ND - 590
Endrin	3/18	2/12	2/13	1/7	ND - 0.31
Endosulfan II	1/18	1/12	0/13	0/7	ND
4,4'-DDD	5/18	1/12	3/13	1/7	ND - 62
Endosulfan sulfate	4/18	2/12	3/13	1/7	ND - 1.2
4,4'-DDT	10/18	6/12	7/13	3/7	ND - 610
p,p'-Methoxychlor	1/18	1/12	1/13	1/7	ND - 1.4
Endrin ketone	0/18	0/12	0/13	0/7	ND
Endrin aldehyde	6/18	4/12	4/13	2/7	ND - 4.2
Alpha chlordane	5/18	2/12	5/13	2/7	ND - 54
Gamma chlordane	3/18	1/12	2/13	1/7	ND - 44
Toxaphene	0/18	0/12	0/13	0/7	ND
PCB-1016	0/18	0/12	0/13	0/7	ND
PCB-1221	0/18	0/12	0/13	0/7	ND
PCB-1232	0/18	0/12	0/13	0/7	ND
PCB-1242	0/18	0/12	0/13	0/7	ND
PCB-1248	0/18	0/12	0/13	0/7	ND
PCB-1254	0/18	0/12	0/13	0/7	ND
PCB-1260	5/18	5/12	0/13	0/7	ND

TABLE 25d

NCBC DAVISVILLE - PHASE II RI
BACKGROUND
SURFACE SOIL SAMPLES
COMPARISON OF OBSERVED CONCENTRATIONS

ELEMENT	OBSERVED BACKGROUND SURFACE SOIL CONCENTRATION RANGES (mg/kg)	OBSERVED BACKGROUND SURFACE SOIL TCA SAMPLES EXCLUDED (mg/kg)	OBSERVED BACKGROUND SURFACE SOIL PCB SAMPLES EXCLUDED (mg/kg)	OBSERVED BACKGROUND SURFACE SOIL BOTH EXCLUDED (mg/kg)
Aluminum	1,170 - 12,600	1,170 - 8,560	1,170 - 12,600	1,170 - 8,560
Antimony	ND - 3	ND	ND - 3	ND
Arsenic	0.59 - 8.1	0.59 - 8.1	0.59 - 8.1	0.59 - 8.1
Barium	5.6 - 19.8	5.6 - 15.5	5.6 - 19.8	5.6 - 15.5
Beryllium	ND - 0.77	0.12 - 0.66	ND - 0.77	0.12 - 0.66
Cadmium	ND - 0.46	ND - 0.46	ND - 0.46	ND - 0.46
Calcium	62.7 - 628	62.7 - 628	62.7 - 628	62.7 - 628
Chromium	ND - 11	ND - 11	ND - 9.6	ND - 9.6
Cobalt	ND - 4.6	ND - 4.6	ND - 4.6	ND - 4.6
Copper	ND - 15	ND - 15	1.6 - 15	ND - 15
Iron	3,810 - 13,200	3,810 - 10,700	3,810 - 13,200	3,810 - 10,700
Lead	3.4 - 55.9	3.4 - 53.8	3.4 - 55.9	3.4 - 53.8
Magnesium	325 - 1,220	325 - 1,220	325 - 1,220	325 - 1,220
Manganese	21.8 - 150	21.8 - 150	21.8 - 150	21.8 - 150
Mercury	ND - 0.06	ND - 0.06	ND	ND
Nickel	ND - 7.5	ND - 6.2	ND - 7.5	ND - 6.2
Potassium	ND - 728	ND - 728	ND - 728	ND - 728
Selenium	ND - 0.77	ND - 0.77	ND - 0.77	ND - 0.77
Silver	ND - 0.22	ND - 0.16	ND - 0.22	ND - 0.16
Sodium	ND - 139	ND - 119	ND - 139	ND - 119
Thallium	ND - 0.24	ND - 0.19	ND - 0.24	ND - 0.19
Vanadium	3.3 - 24.6	3.3 - 24.6	3.3 - 24.6	3.3 - 24.6
Zinc	10.3 - 172	10.3 - 172	10.3 - 172	10.3 - 172
Cyanide	ND - 0.17	ND - 0.17	ND	ND

NOTES:
- Indicates that the data for that element was not presented in that reference.
ND Indicates that the element was not detected in the soil sample.

TABLE 26
PHYSICAL, CHEMICAL AND ENVIRONMENTAL PROPERTIES
FOR CONSTITUENTS OF POTENTIAL CONCERN
NCBC DAVISVILLE - SITE 08

COMPOUND NAME	WATER SOLUBILITY (mg/L)	VAPOR PRESSURE (mm Hg)	HENRY'S LAW CONSTANT (atm-m3/mol)	Koc (mL/g)	LOG Kow	HALF-LIFE SOIL (days)
VOLATILE ORGANICS						
Acetone	1.00E+06	2.31E+02	3.67E-05	2.2	-0.24	NA
Chloroform	7.95E+03	2.46E+02	4.35E-03	31	1.97	NA
Methylene chloride	1.30E+04	4.35E+02	2.68E-03	8.8	1.30	NA
SEMIVOLATILE ORGANICS						
Benzoic acid	2.70E+03	4.50E-03	7.00E-08	NA	1.87	NA
Benzo(a)anthracene	5.70E-03	2.20E-08	1.16E-06	1380000	5.60	NA
Benzo(a)pyrene	1.20E-03	5.60E-09	1.55E-06	5500000	6.06	420-480
Benzo(b)fluoranthene	1.40E-02	5.00E-07	1.19E-05	550000	6.06	NA
Benzo(g,h,i)perylene	7.00E-04	1.03E-10	5.34E-08	1600000	6.51	NA
Benzo(k)fluoranthene	4.30E-03	5.10E-07	3.94E-05	550000	6.06	NA
Bis(2-ethylhexyl)phthalate	3.00E-01	6.45E-06	1.10E-05	100000	5.11	NA
Chrysene	1.80E-03	6.30E-09	1.05E-06	200000	5.61	NA
Dibenz(a,h)anthracene	5.00E-04	1.00E-10	7.33E-08	3300000	6.80	NA
Fluoranthene	2.06E-01	5.00E-06	6.46E-06	38000	4.90	NA
Indeno(1,2,3-cd)pyrene	5.30E-04	1.00E-10	6.86E-08	1600000	6.50	NA
Phenanthrene	1.00E+00	6.80E-04	1.59E-04	14000	4.46	NA
Pyrene	1.32E-01	2.50E-06	5.04E-06	38000	4.88	NA
PESTICIDES / PCB'S						
DDT, 4,4-	5.00E-03	5.50E-06	5.13E-04	243000	6.19	1000-5500
Polychlorinated Biphenyls	3.10E-02	7.70E-05	1.07E-03	530000	6.04	NA
INORGANICS						
Aluminum	NA	NA	NA	NA	NA	NA
Arsenic	NA	0.00E+00	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA
Beryllium	NA	0.00E+00	NA	NA	NA	NA
Chromium III	NA	0.00E+00	NA	NA	NA	NA
Chromium VI	NA	0.00E+00	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA
Copper	NA	0.00E+00	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA
Lead	NA	0.00E+00	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Nickel	NA	0.00E+00	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA

REFERENCES

EPA. 1986. Superfund Public Health Evaluation Manual
Howard. 1990. Handbook of Environmental Fate and Exposure Data for Organic Chemicals.
Montgomery & Welkom. 1990. Groundwater Chemcials Desk Reference.
Oak Ridge National Laboratory. 1984. Multiple-Pathway Screening-Level Assessment of a Hazardous Waste Incineration Facility.

FIGURES

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5 Regional Geology

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13 Phase I RI Sampling Locations

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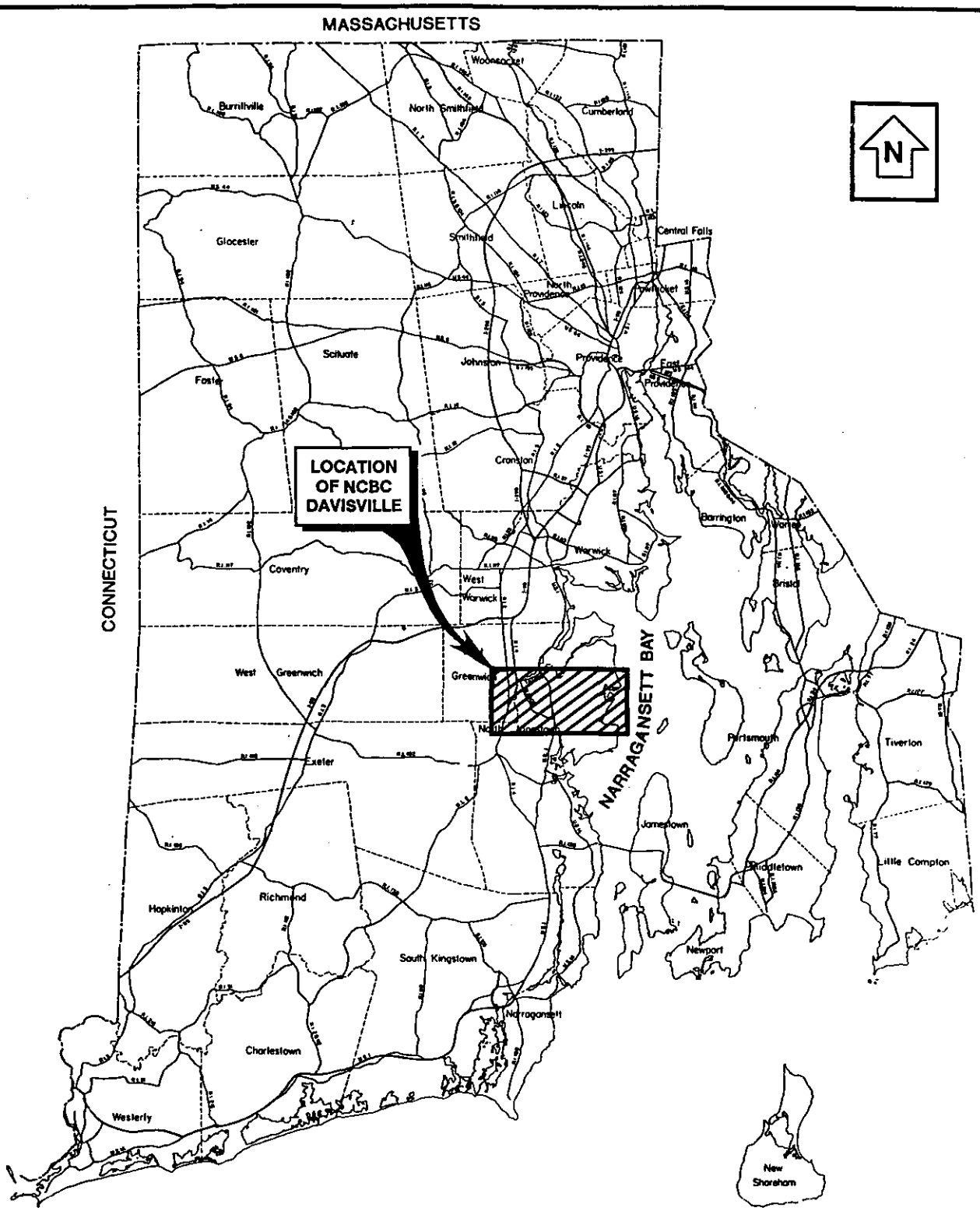
19 Ground Water Contour Plan

20 Background Surface Soil Sample Location



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NAVAL CONSTRUCTION BATTALION CENTER

DAVISVILLE RHODE ISLAND

FIGURE 1.

NCBC SITE LOCATION PLAN

Date: 5/94

Drawing No. 01042-0050

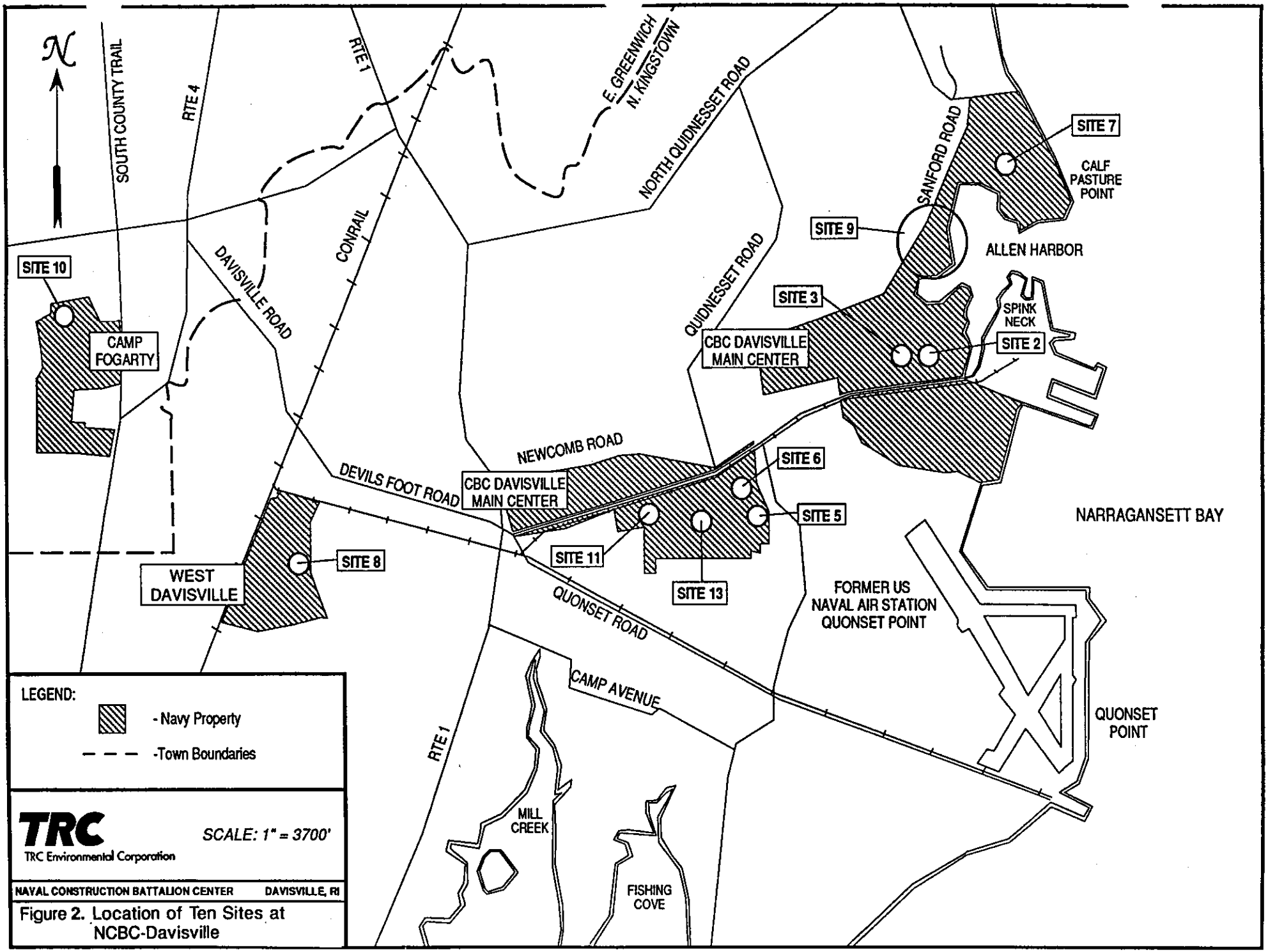


Figure 2. Location of Ten Sites at NCBC-Davisville

MS22/3/P

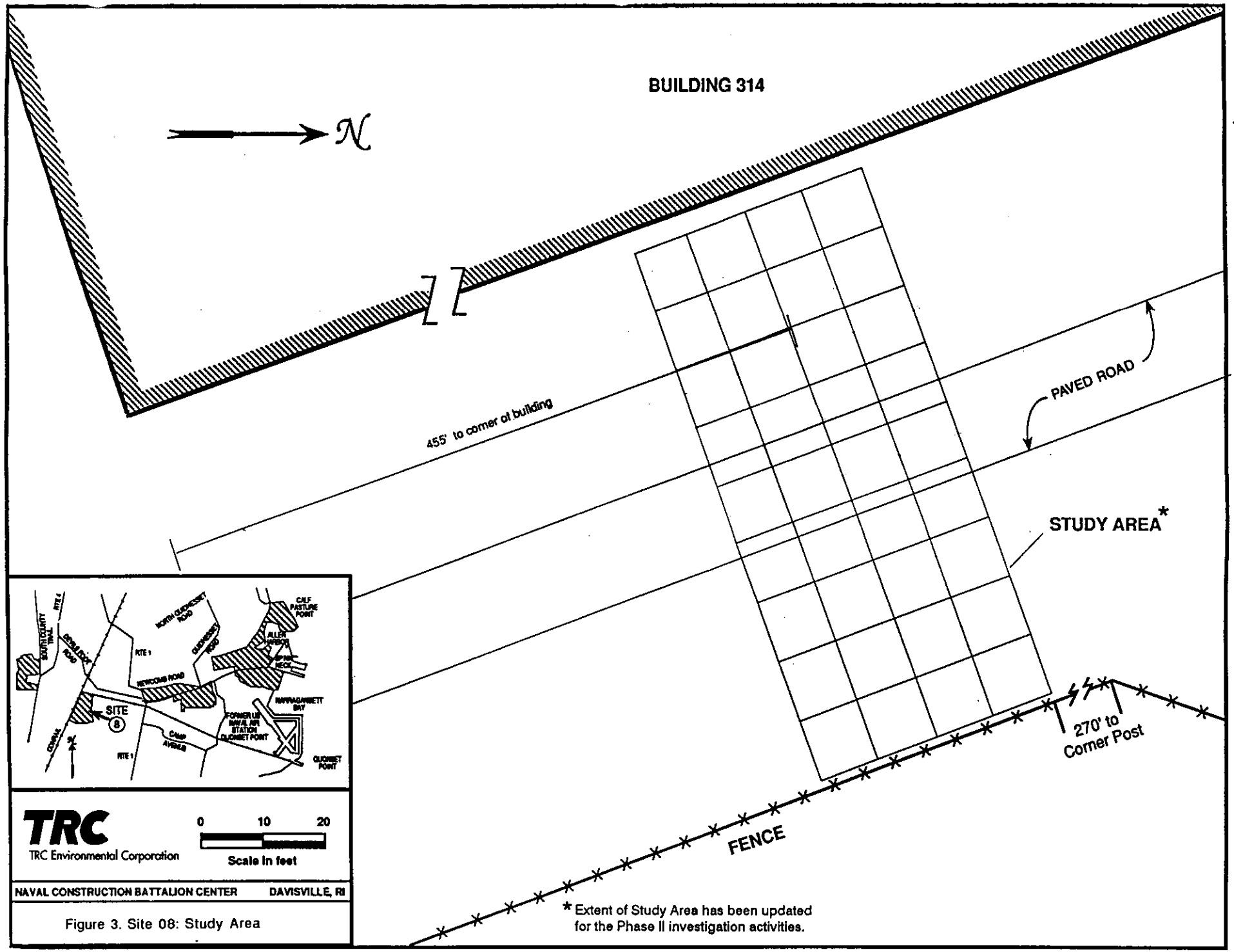
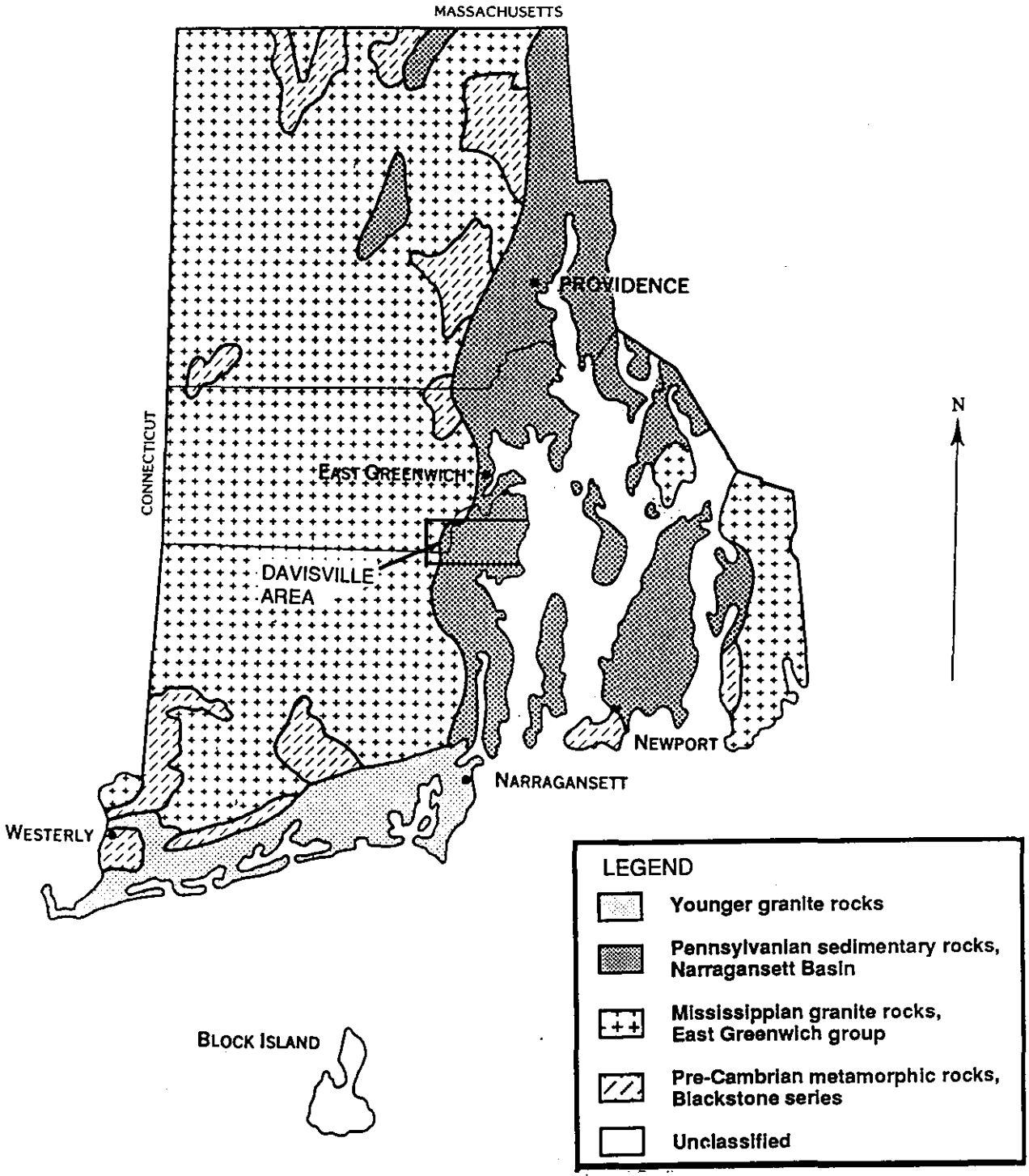


Figure 3. Site 08: Study Area



0 5 10
Scale in miles

FIGURE DERIVED FROM: SOIL SURVEY OF RHODE ISLAND, UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE IN COOPERATION WITH RHODE ISLAND AGRICULTURAL EXPERIMENT STATION.

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FIGURE 4.
GENERAL GEOLOGIC MAP OF RHODE ISLAND

Date: 5/94 | Project No. 01042-0050

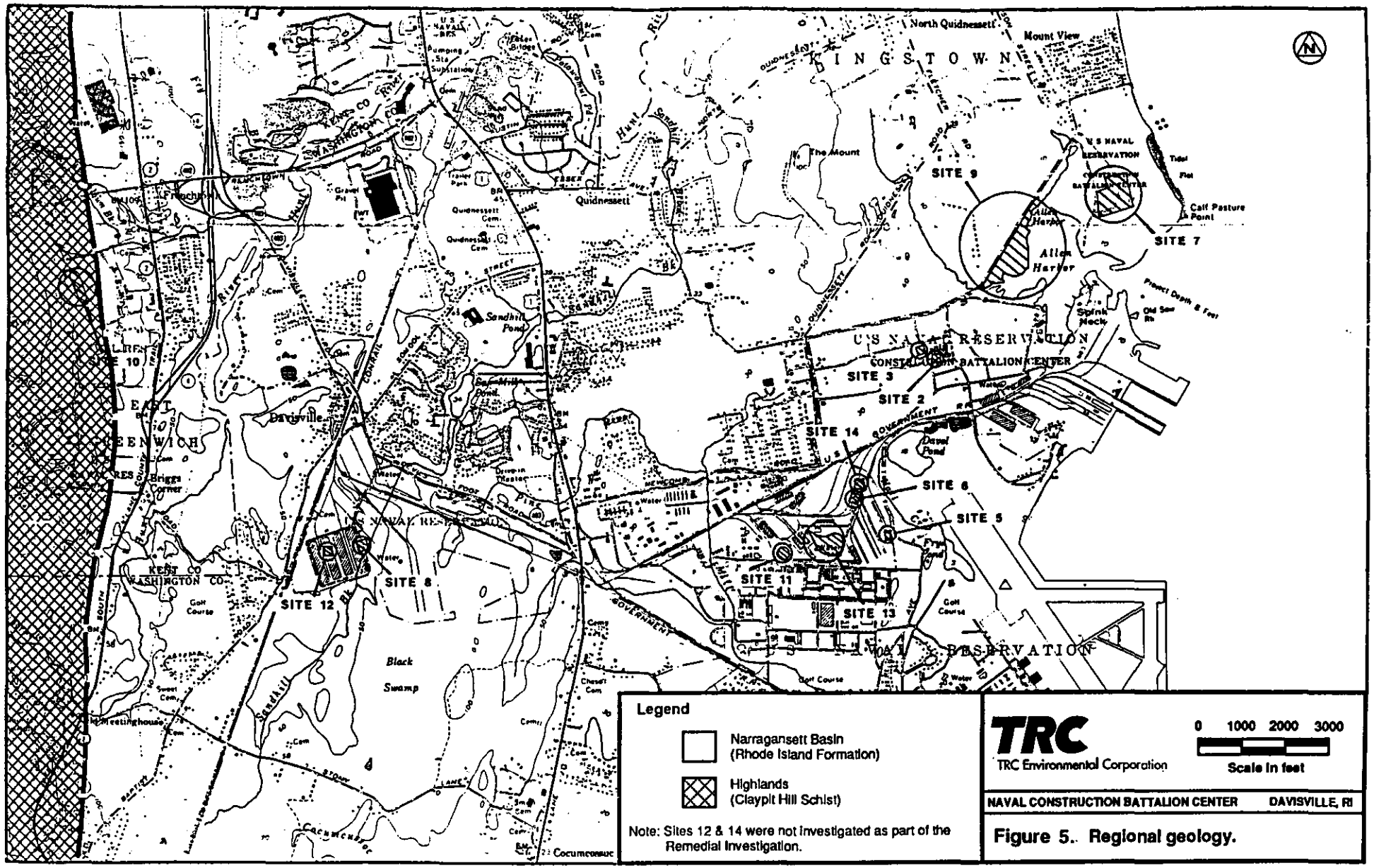


Figure 5. Regional geology.

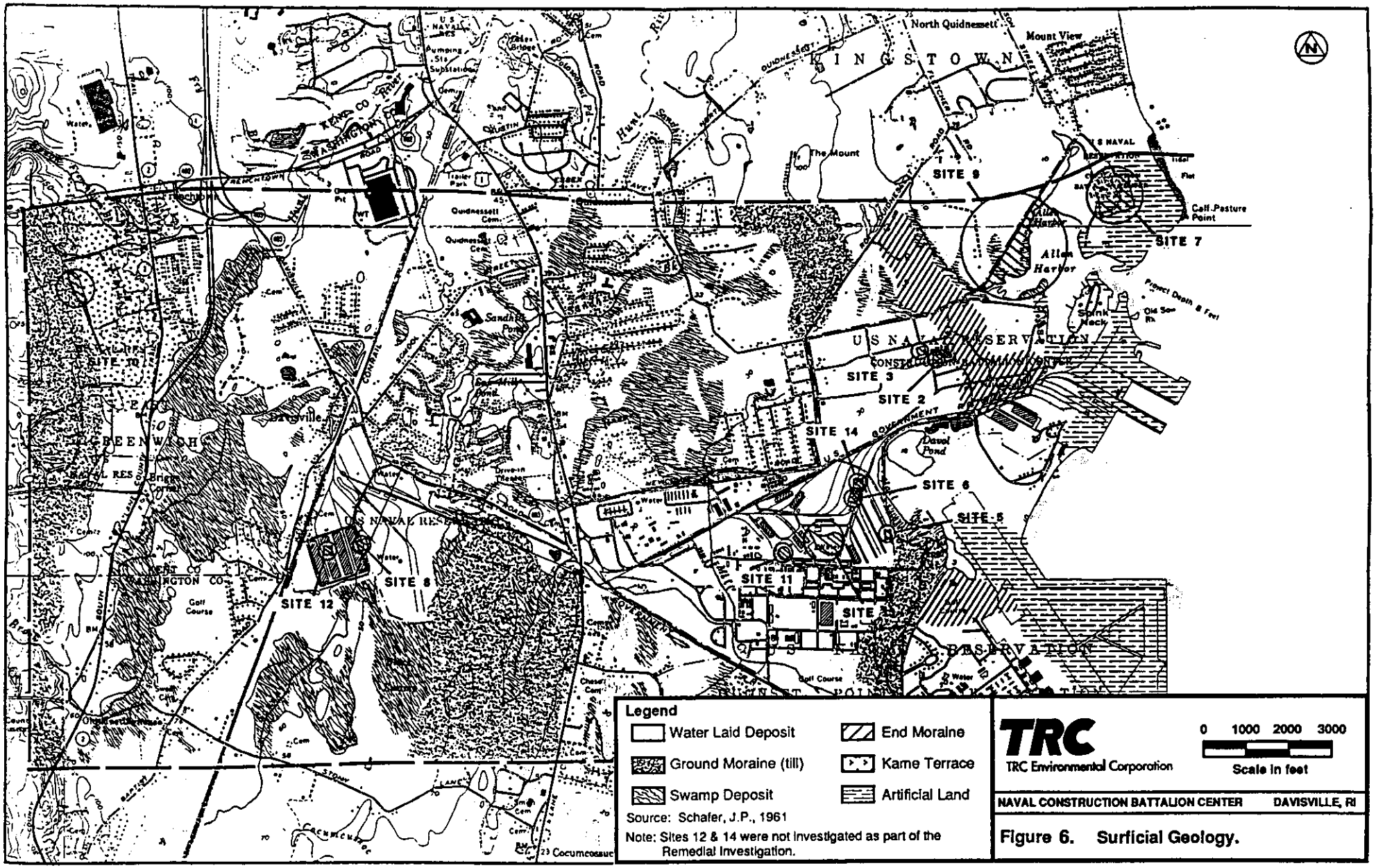
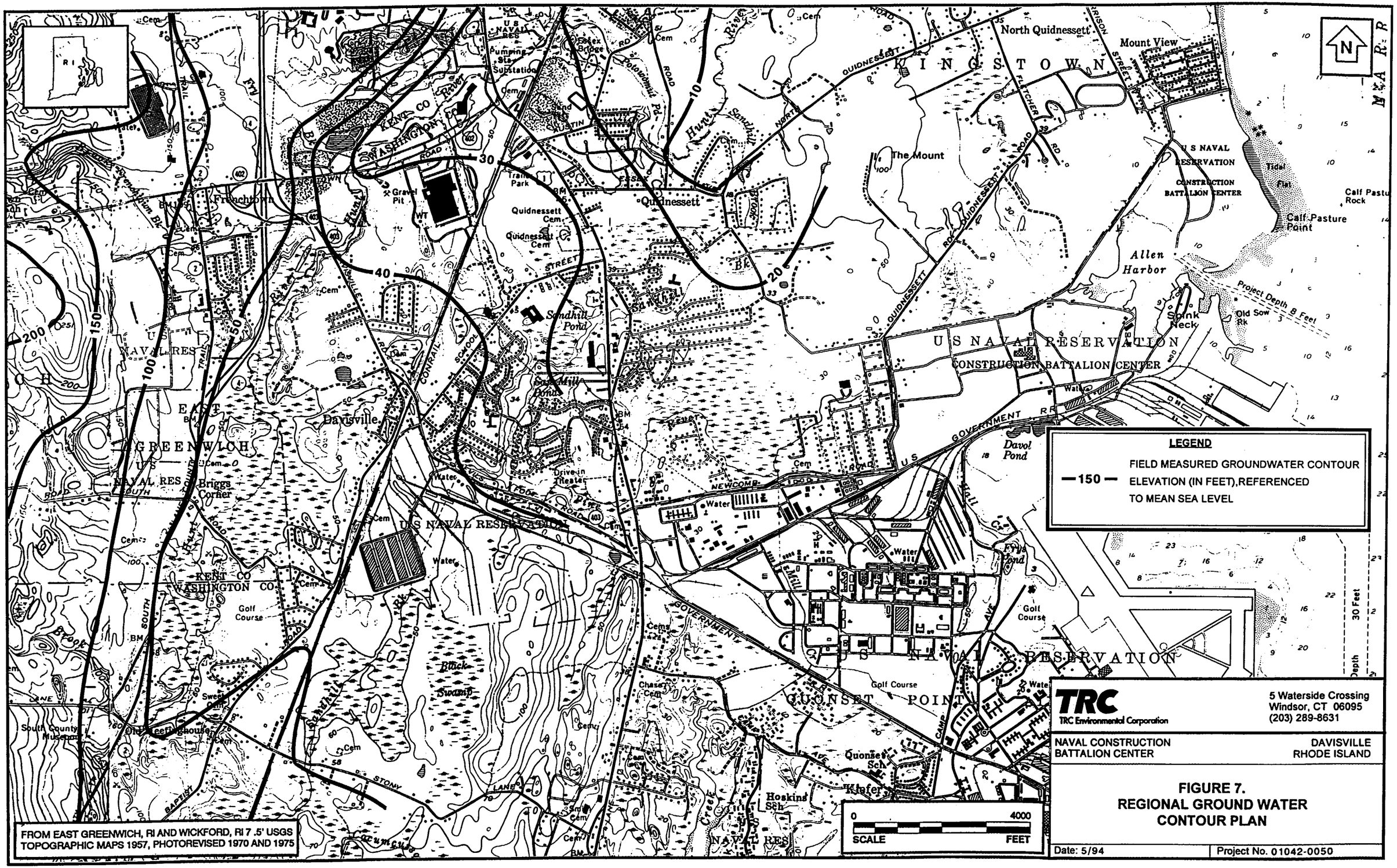


Figure 6. Surficial Geology.


LEGEND
—150— FIELD MEASURED GROUNDWATER CONTOUR ELEVATION (IN FEET), REFERENCED TO MEAN SEA LEVEL
0 4000
SCALE FEET
FROM EAST GREENWICH, RI AND WICKFORD, RI 7.5' USGS TOPOGRAPHIC MAPS 1957, PHOTOREVISED 1970 AND 1975
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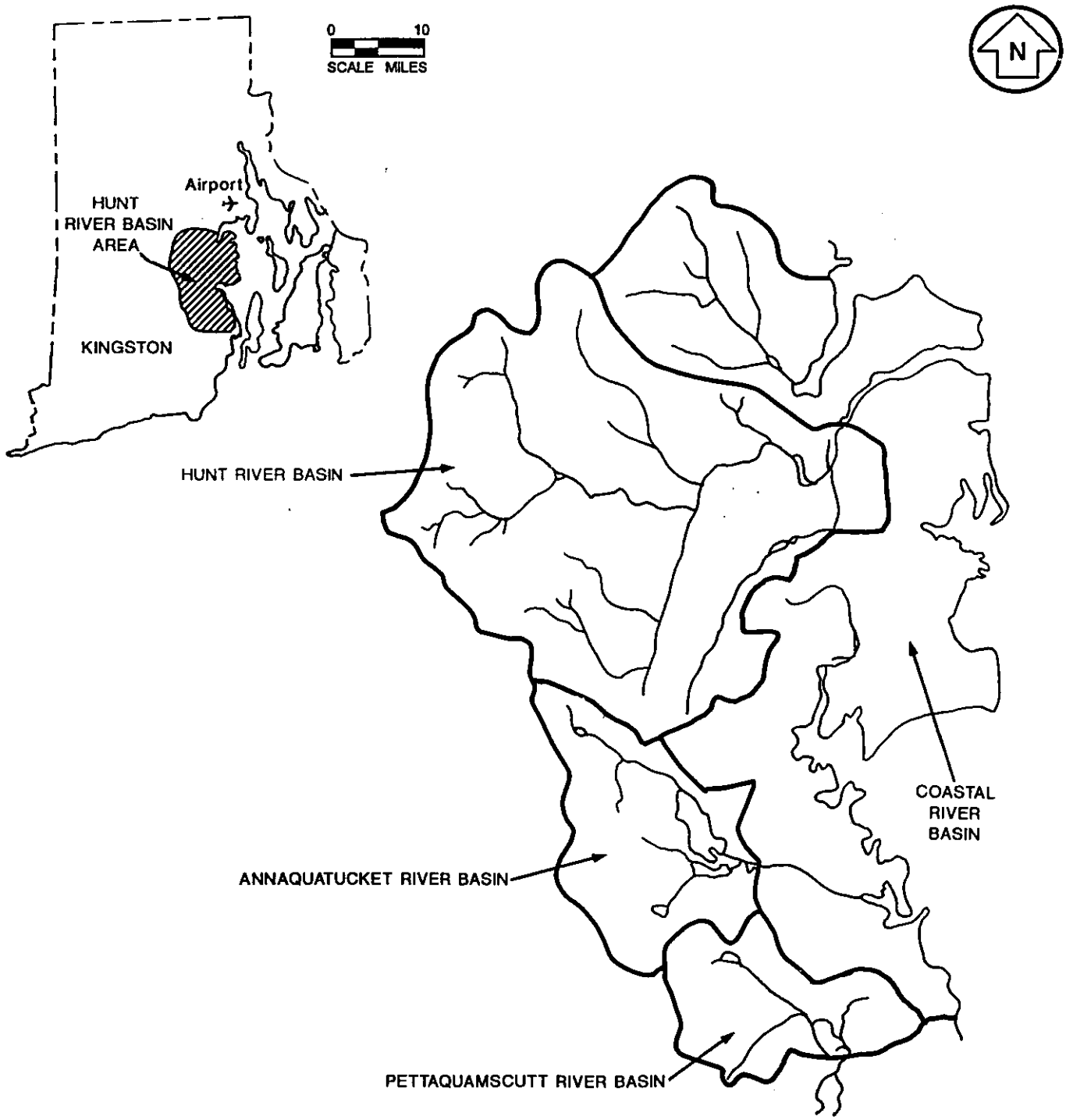
DAVISVILLE RHODE ISLAND
FIGURE 7.
REGIONAL GROUND WATER CONTOUR PLAN
Date: 5/94
Project No. 01042-0050
KINGSTOWN
North Quidnessett
Mount View
The Mount
U S NAVAL RESERVATION
CONSTRUCTION BATTALION CENTER
Allen Harbor
Calf Pasture Point
Tidal Flat
Project Depth 8 Feet
Old Sow Rk
Spink Neck
Davol Pond
Quidnessett
Sandhill Pond
Saw Mill Pond
Davisville
EAST GREENWICH
Briggs Corner
Frenchtown
Gravel Pit
Trailer Park
Drive-in Theater
Golf Course
Black Swamp
Chase Cem
Quonset Point
Quonset Sch
Hoskins Sch
Klefer
South County Museum
Greenhouse
Sweet Cem
Quidnessett Cem
Fox Bridge
Pumping Sta
Substation
Water
Cem
BM
GOVERNMENT RD
NEWCOMB
QUIDNESSETT RD
NORTH QUIDNESSETT RD
FLETCHER ROAD
PRISON STREET
WASHINGTON ROAD
KENT CO
WASHINGTON CO
SOUTH ROAD
STONY LANE
BAPTIST
CONTRAIL
SCHOOL
Hunt River
Sandhill Bk
Fry Brook
Potowomut Rd
ROAD
CAMP AVE
Mill Cr
Fry Pond
Tidal Flat
Depth 30 Feet
N



0 1 2
SCALE MILES

LEGEND

BASIN BOUNDARY

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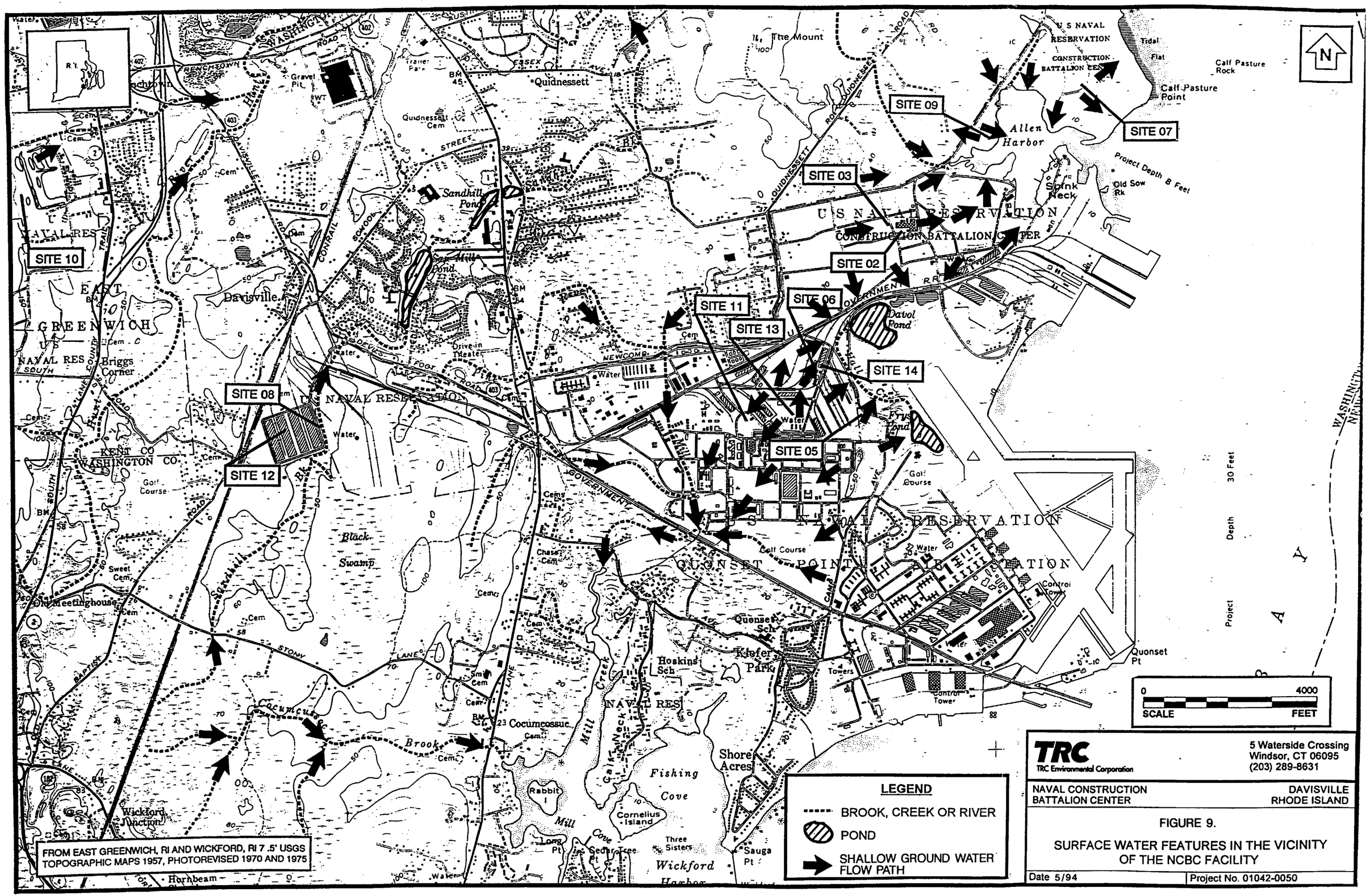
FIGURE 8.
HUNT RIVER DRAINAGE BASIN

Date: 5/94

Drawing No. 01042-0050


SITE 01
SITE 02
SITE 03
SITE 05
SITE 06
SITE 07
SITE 08
SITE 09
SITE 10
SITE 11
SITE 12
SITE 13
SITE 14
U S NAVAL RESERVATION
CONSTRUCTION BATTALION CENTER
Allen Harbor
Sandhill Pond
Davisville
Quidnessett
Davol Pond
Frys Pond
Quonset Point
Quonset Pt
Hoskins Sch
Kiefer Park
Shore Acres
Fishing Cove
Wickford Harbor
Black Swamp
Cocumcussoc Brook
Mill Cove
Wickford Junction
Old Meetinghouse
Briggs Corner
EAST GREENWICH
KENT CO
WASHINGTON CO
Golf Course
Control Tower
Towers
Project Depth 8 Feet
Project Depth 30 Feet
Calf Pasture Rock
Calf Pasture Point
Old Sow Rk
Sprink Neck
Rabbit I
Long Pt
Cedar Tree Pt
Three Sisters
Cornelius Island
Sauga Pt
Hornbeam
0
4000
SCALE
FEET
N
LEGEND
BROOK, CREEK OR RIVER
POND
SHALLOW GROUND WATER FLOW PATH
FROM EAST GREENWICH, RI AND WICKFORD, RI 7 .5' USGS TOPOGRAPHIC MAPS 1957, PHOTOREVISED 1970 AND 1975
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DAVISVILLE RHODE ISLAND
FIGURE 9.
SURFACE WATER FEATURES IN THE VICINITY OF THE NCBC FACILITY
Date 5/94
Project No. 01042-0050

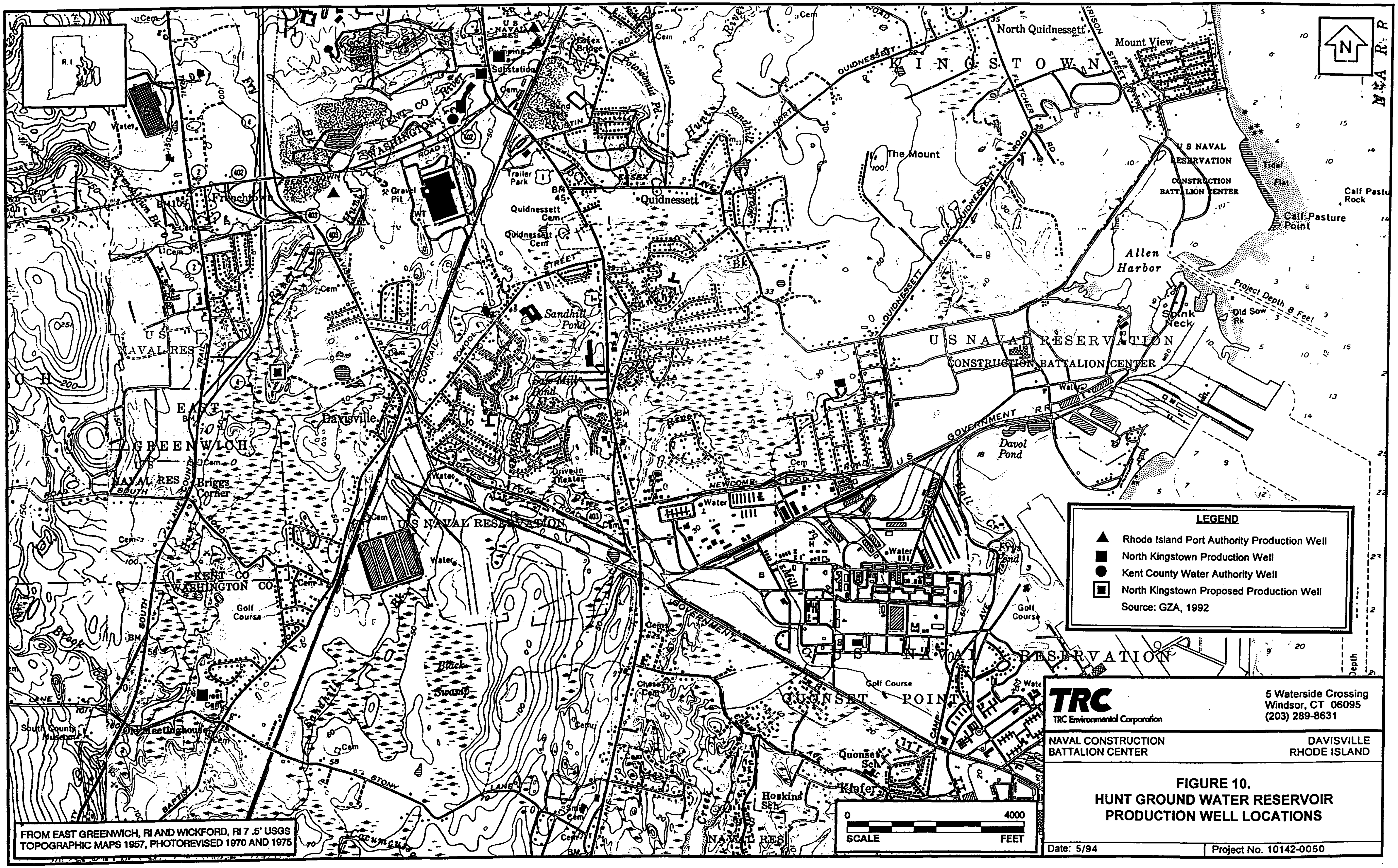
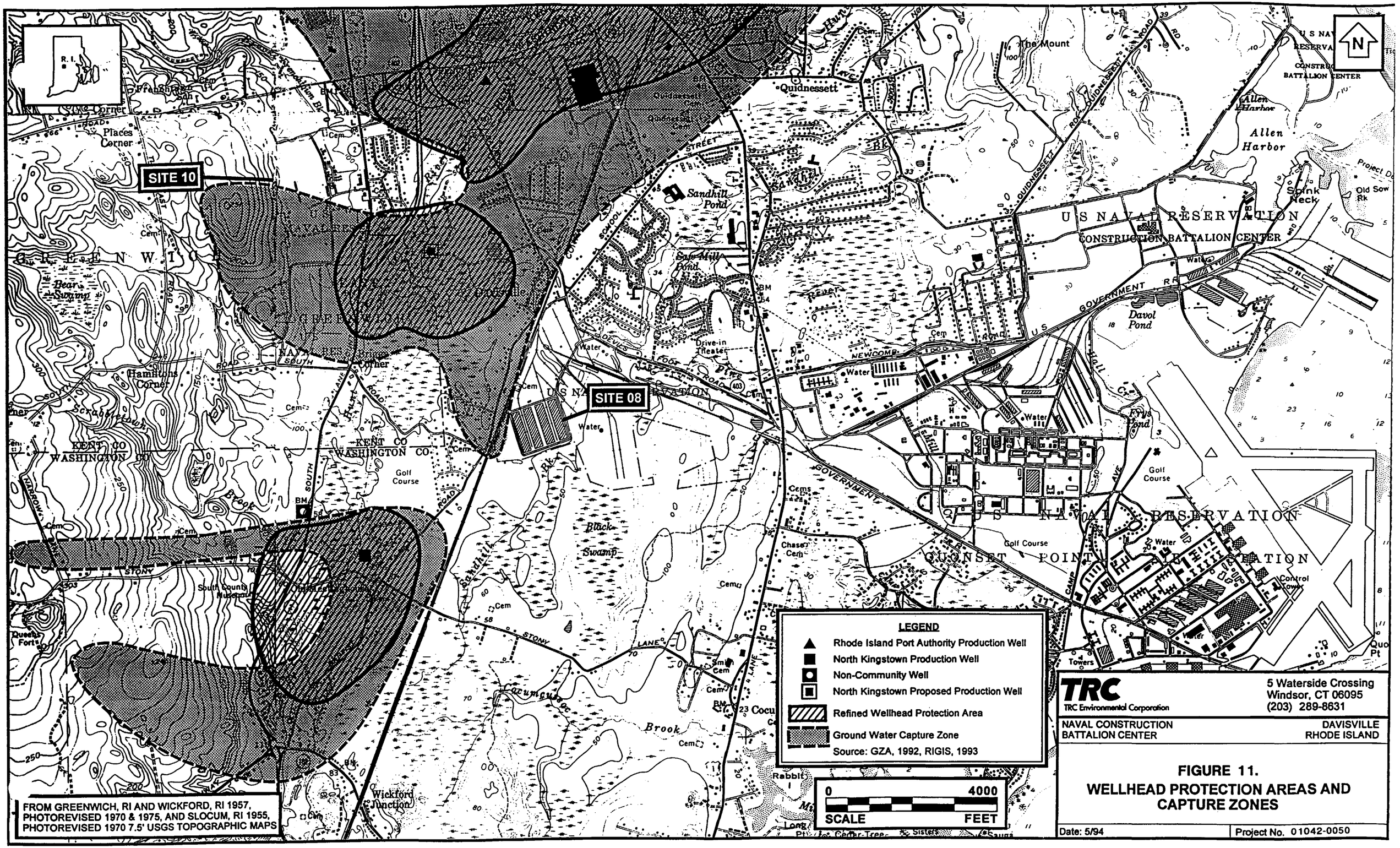


FIGURE 10.
HUNT GROUND WATER RESERVOIR PRODUCTION WELL LOCATIONS


SITE 10
SITE 08
LEGEND
Rhode Island Port Authority Production Well
North Kingstown Production Well
Non-Community Well
North Kingstown Proposed Production Well
Refined Wellhead Protection Area
Ground Water Capture Zone
Source: GZA, 1992, RIGIS, 1993
0
4000
SCALE
FEET
FROM GREENWICH, RI AND WICKFORD, RI 1957, PHOTOREVISED 1970 & 1975, AND SLOCUM, RI 1955, PHOTOREVISED 1970 7.5' USGS TOPOGRAPHIC MAPS
U S NAVAL RESERVATION
CONSTRUCTION BATTALION CENTER
QUONSET POINT
KENT CO
WASHINGTON CO
Allen Harbor
Davol Pond
Sandhill Pond
Golf Course
Quidnessett
The Mount
Wickford Junction
Hamiltons Corner
Places Corner
Bear Swamp
Black Swamp
Drive-in Theater
Control Tower
Towers
TRC
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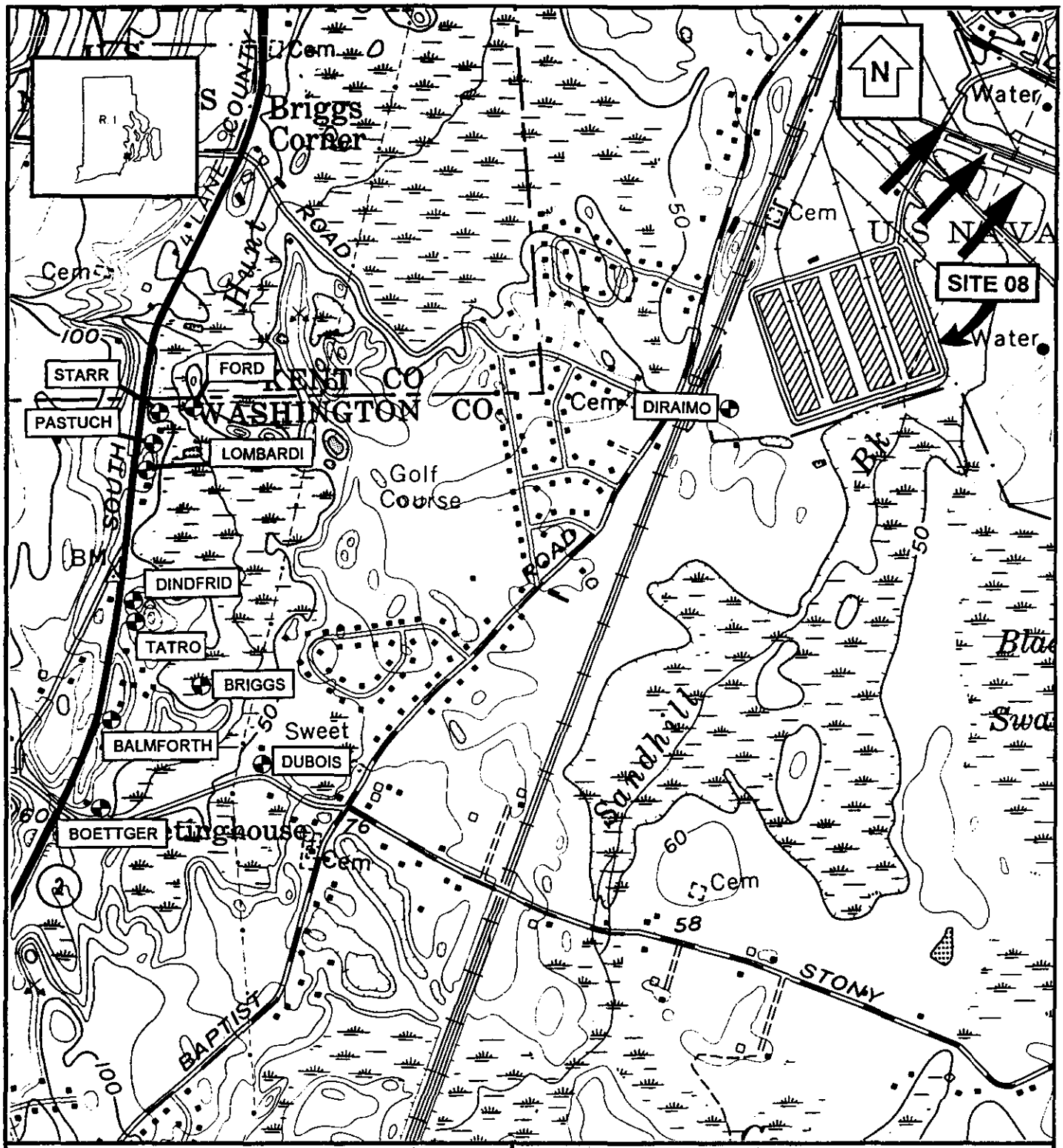
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE
RHODE ISLAND
FIGURE 11.
WELLHEAD PROTECTION AREAS AND CAPTURE ZONES
Date: 5/94
Project No. 01042-0050



0 2000
SCALE FEET

LEGEND

DOMESTIC WELL LOCATION

GROUND WATER FLOW DIRECTION

FROM WICKFORD, RI 7.5' USGS TOPOGRAPHIC MAP 1957, PHOTOREVISED 1975

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NAVAL CONSTRUCTION BATTALION CENTER — DAVISVILLE, RI

FIGURE 12.

SITE 08 - LOCATION OF NEAREST DOMESTIC WELLS

Date: 5/94 | Drawing No. 01042-0050

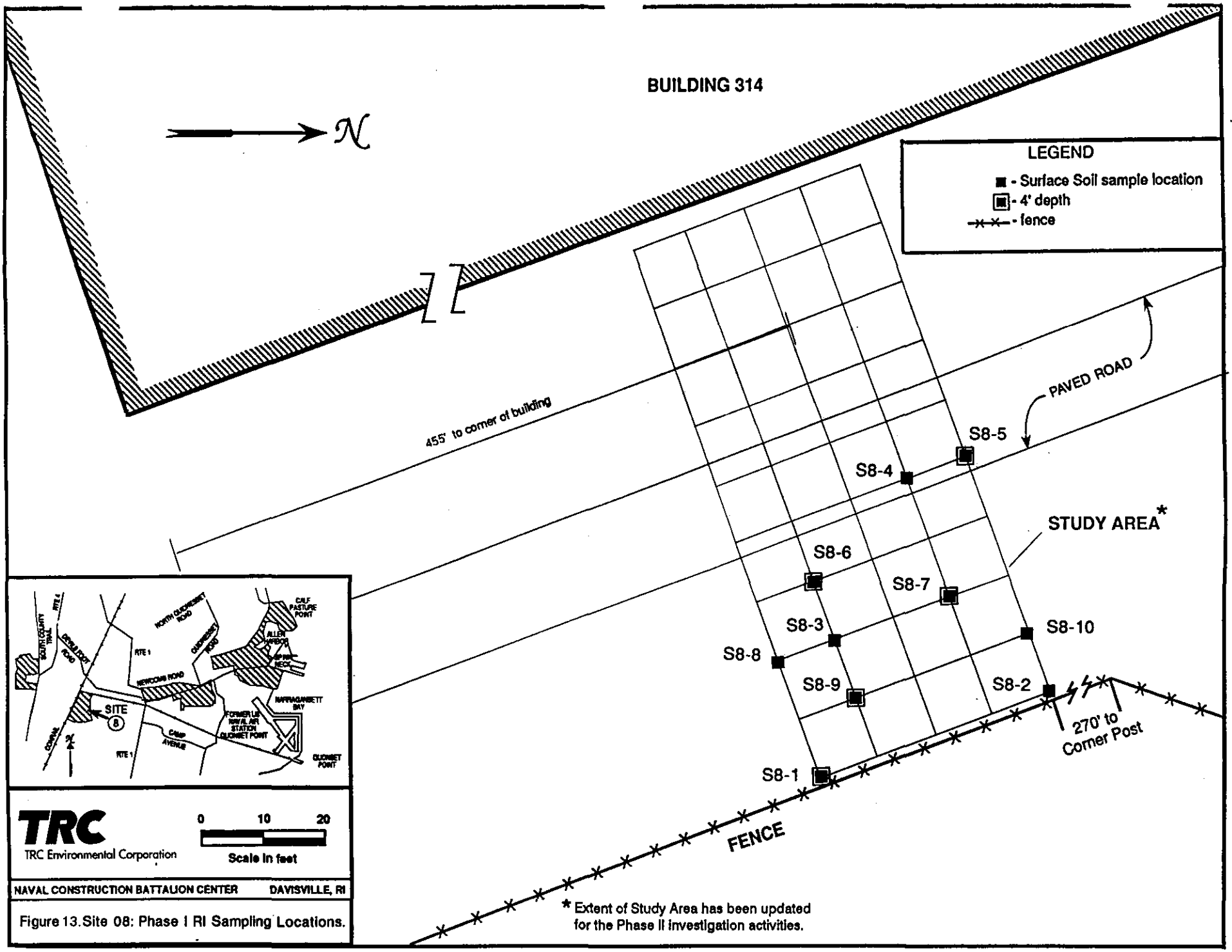


Figure 13. Site 08: Phase I RI Sampling Locations.

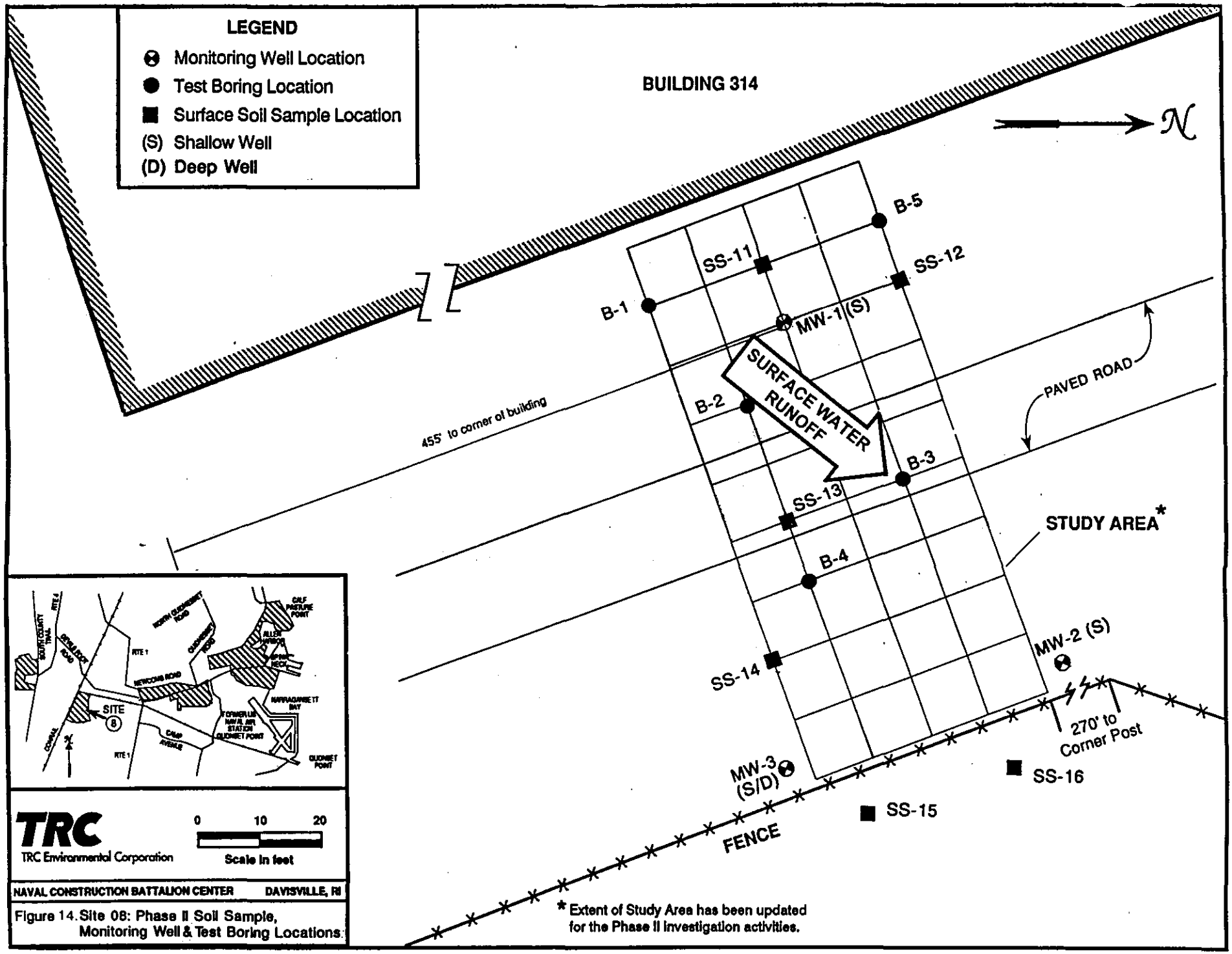
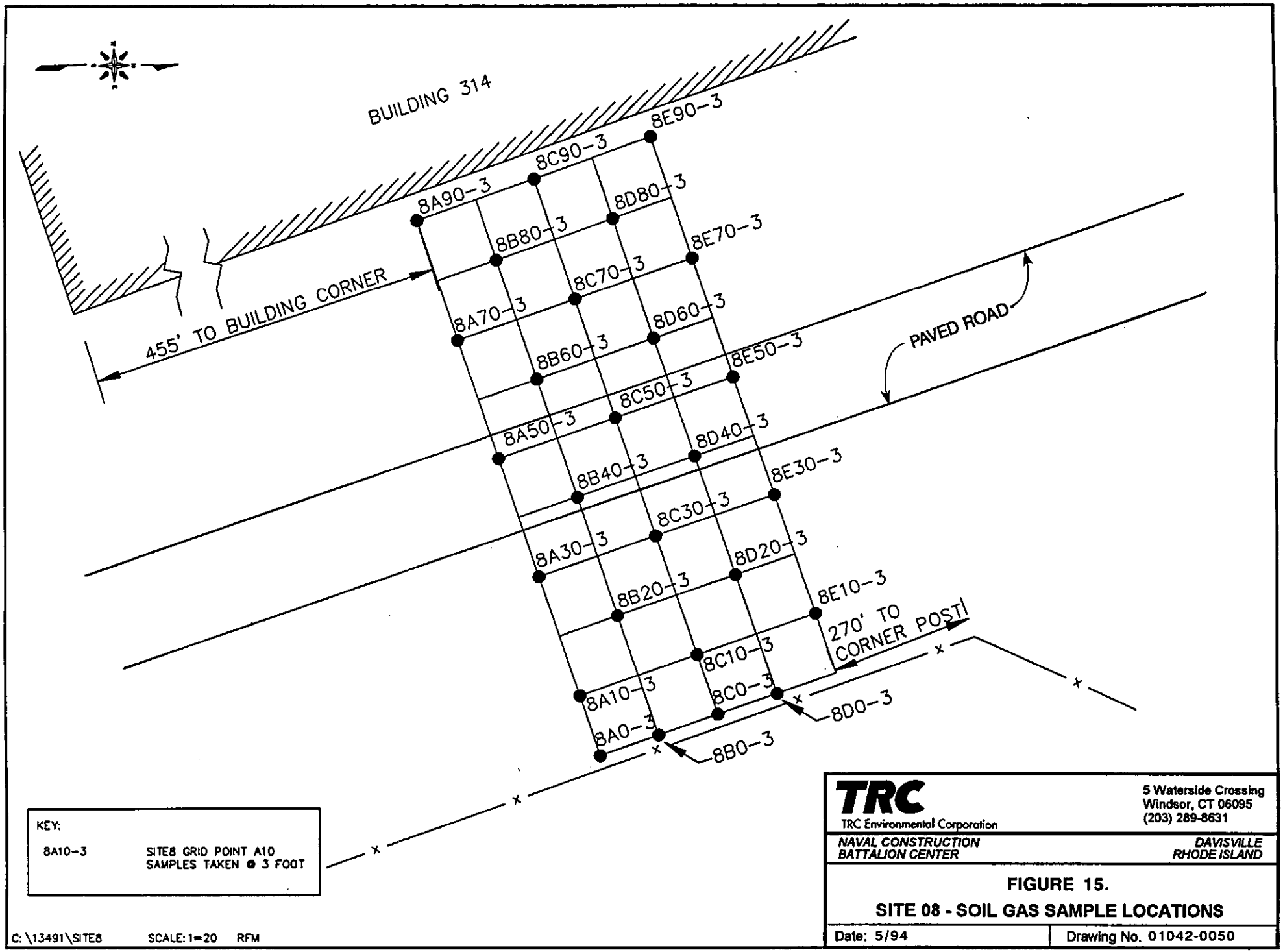


Figure 14. Site 08: Phase II Soil Sample, Monitoring Well & Test Boring Locations


BUILDING 314
455' TO BUILDING CORNER
PAVED ROAD
270' TO CORNER POST
8E90-3
8C90-3
8A90-3
8D80-3
8B80-3
8E70-3
8C70-3
8A70-3
8D60-3
8B60-3
8E50-3
8C50-3
8A50-3
8D40-3
8B40-3
8E30-3
8C30-3
8A30-3
8D20-3
8B20-3
8E10-3
8C10-3
8A10-3
8C0-3
8D0-3
8A0-3
8B0-3
KEY:
8A10-3
SITE8 GRID POINT A10
SAMPLES TAKEN @ 3 FOOT
C:\13491\SITE8
SCALE: 1=20
RFM
TRC
TRC Environmental Corporation
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(203) 289-8631
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE RHODE ISLAND
FIGURE 15.
SITE 08 - SOIL GAS SAMPLE LOCATIONS
Date: 5/94
Drawing No. 01042-0050

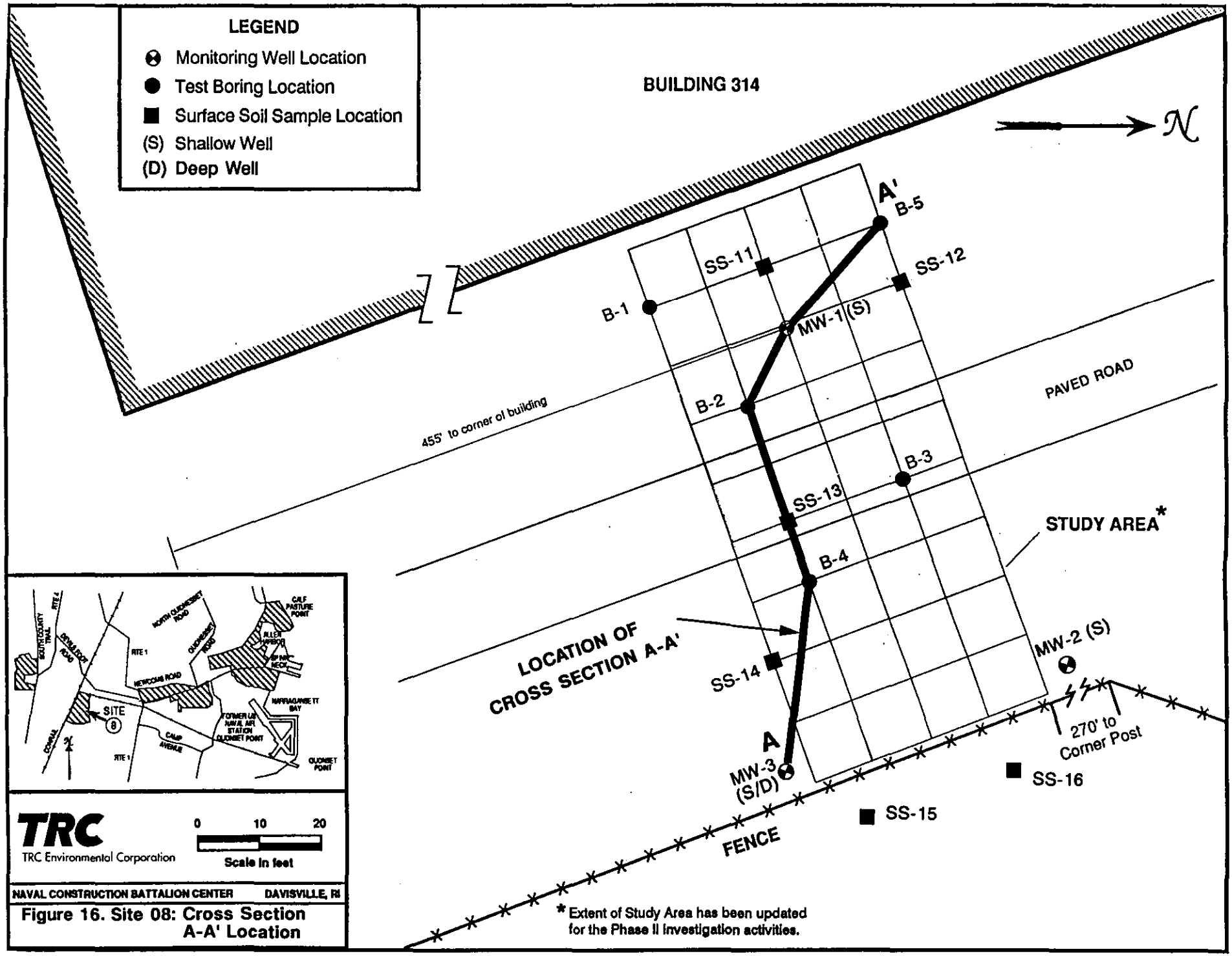
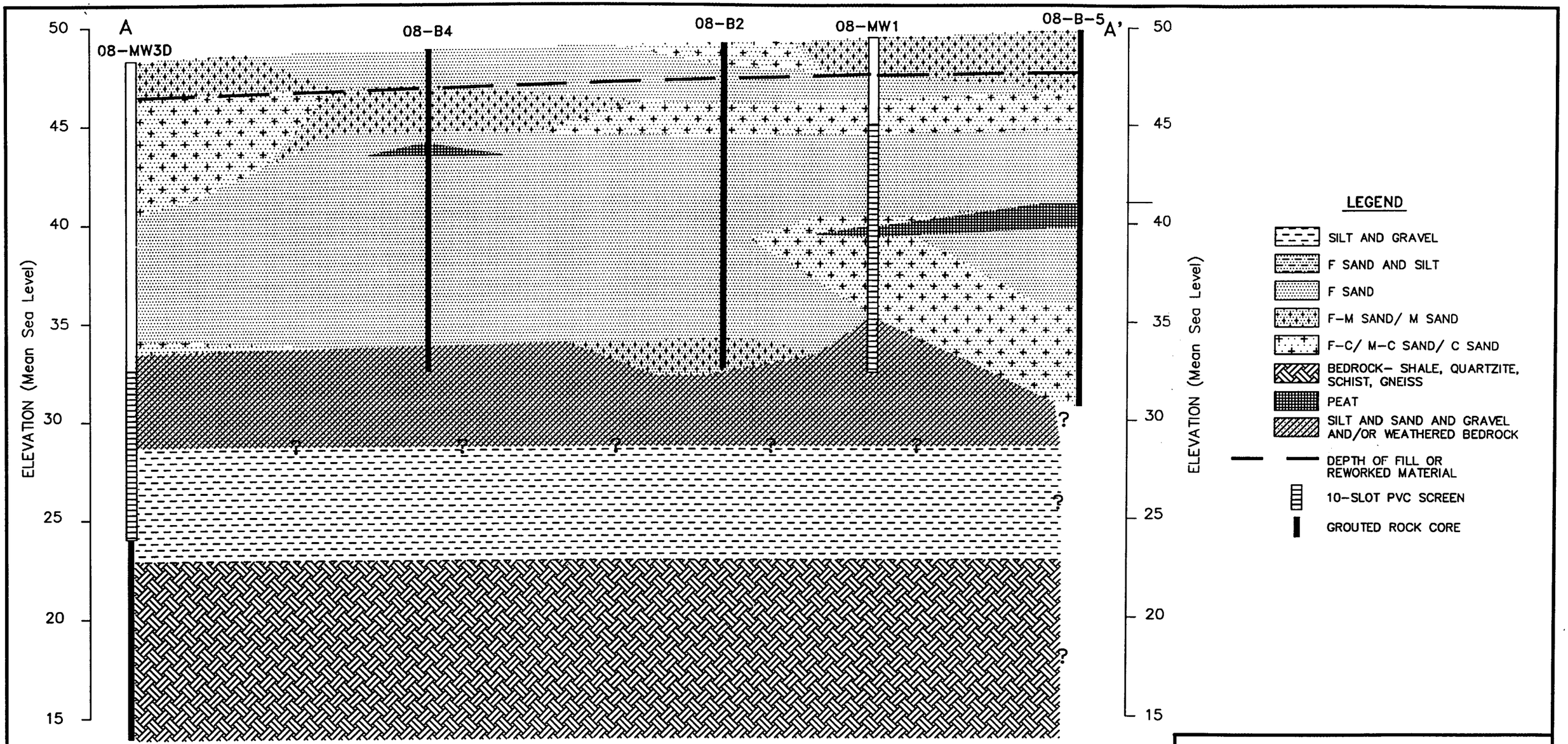


Figure 16. Site 08: Cross Section A-A' Location



0 10 FT. HORIZ.

0 5 FT. VERT.

SCALE

TRC

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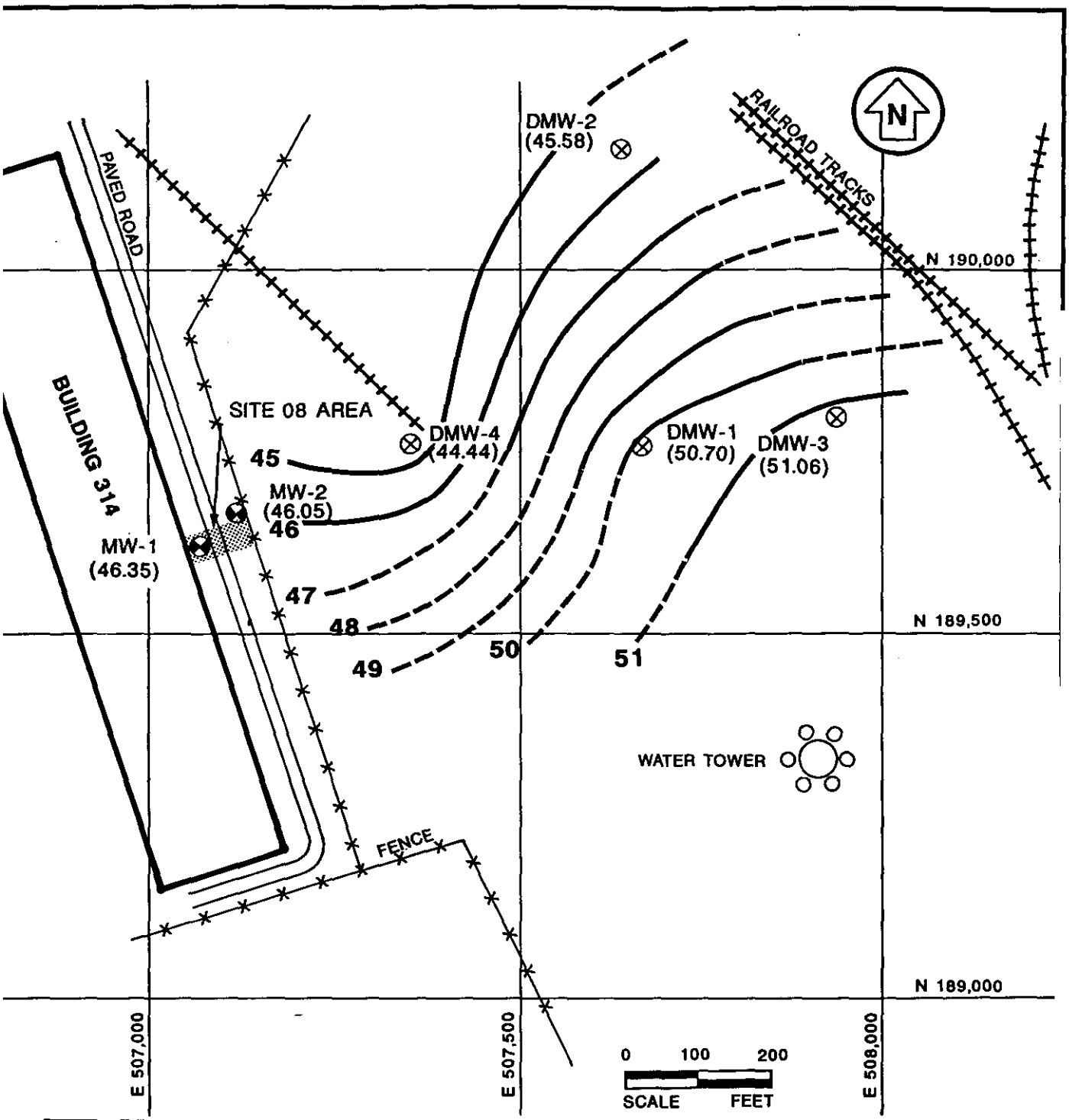
NAVAL CONSTRUCTION BATTALION CENTER — DAVISVILLE RHODE ISLAND

FIGURE 17.
SITE 08-
DPDO FILM PROCESSING DISPOSAL AREA
GEOLOGIC CROSS SECTION A-A'

Date: 5/94 | Project No. 01042-0050

08CSAA.DWG



LEGEND

⊗ WELL LOCATION AND GROUND WATER ELEVATION FROM U.S. ARMY CORP OF ENGINEERS 1988 DEVILS FOOT ROAD DUMP SITE CONFIRMATION STUDY

WELL LOCATION AND GROUND WATER ELEVATION (THIS STUDY)

50 CONTOUR INTERVAL - 1 FOOT

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NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE, RI

FIGURE 18.

SITE 08: AREA GROUND WATER CONTOURS

Date: 5/94 | Drawing No. 10142-0050

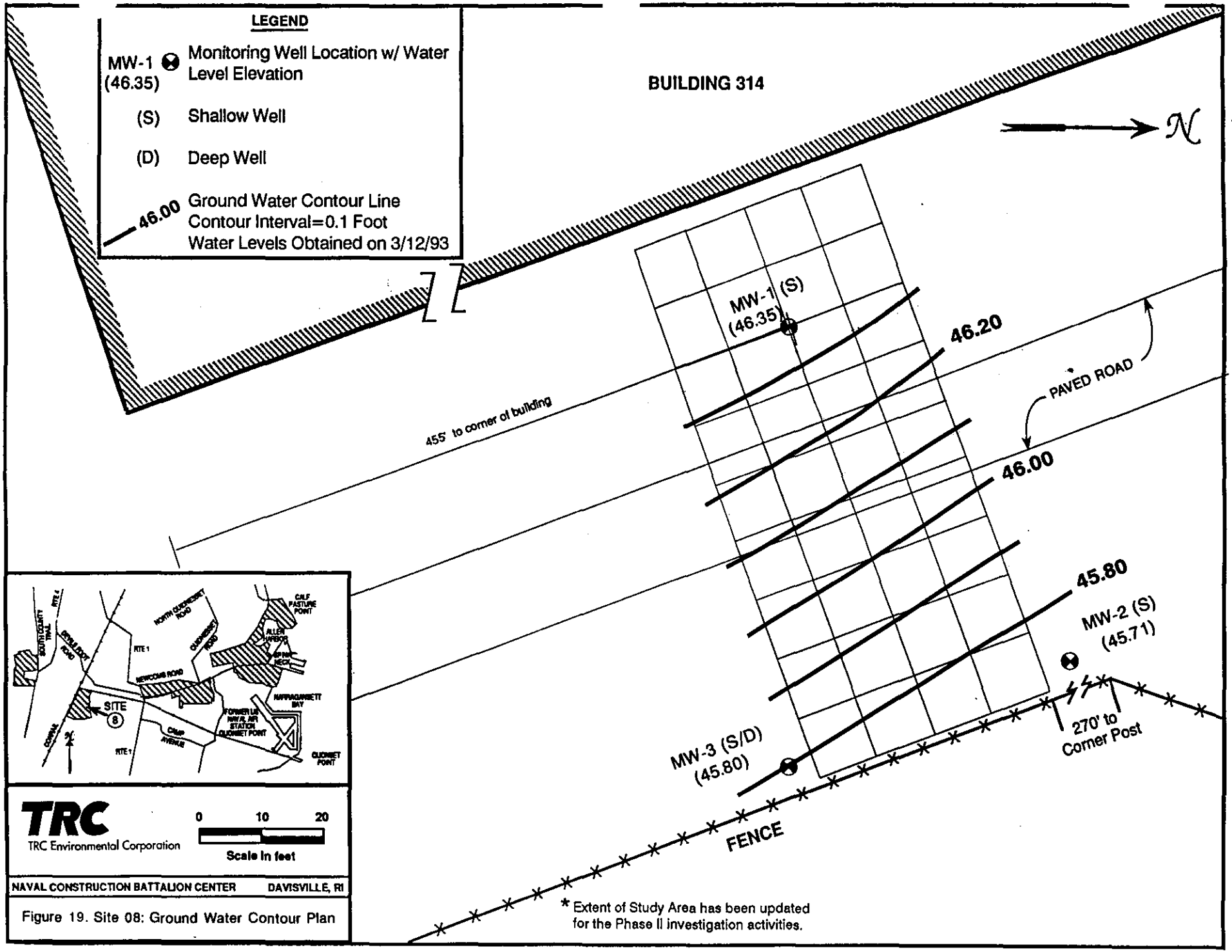
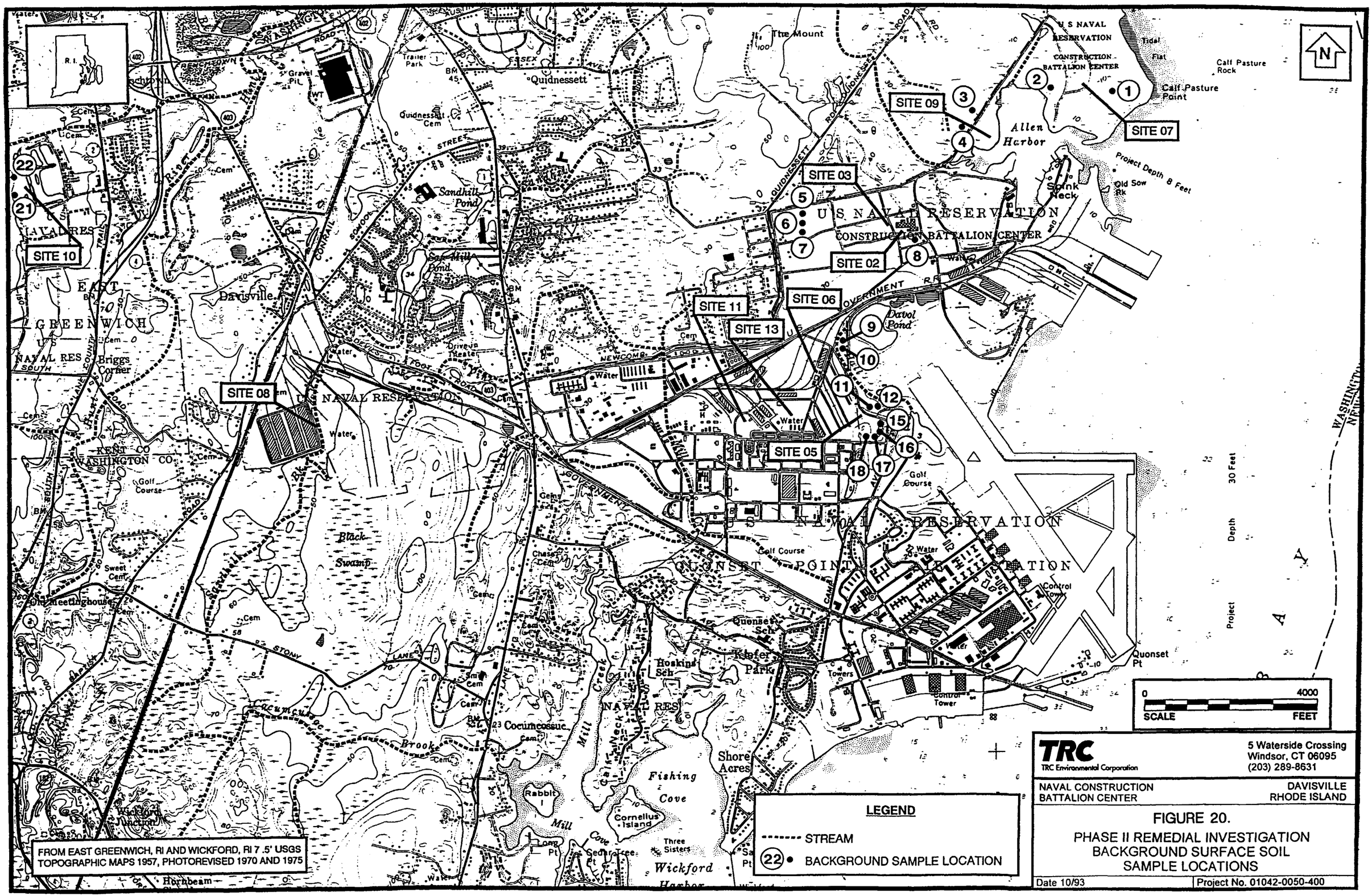


Figure 19. Site 08: Ground Water Contour Plan


SITE 01
SITE 02
SITE 03
SITE 05
SITE 06
SITE 07
SITE 08
SITE 09
SITE 10
SITE 11
SITE 13
U S NAVAL RESERVATION
CONSTRUCTION BATTALION CENTER
Allen Harbor
Davol Pond
Sandhill Pond
Saw Mill Pond
Davisville
Quidnessett
The Mount
Calf Pasture Point
Calf Pasture Rock
Tidal Flat
Project Depth 8 Feet
Old Sow Rk
Sprink Neck
Quonset Pt
Golf Course
Control Tower
Quonset Sch
Hoskins Sch
Kiefer Park
Shore Acres
Fishing Cove
Cornelius Island
Three Sisters
Wickford Harbor
Rabbit I
Mill Cove
Mill Creek
Cocumcussuc
Cocumcussuc Brook
Black Swamp
Sweet Cem
Old Meetinghouse
Briggs Corner
Wickford Junction
Hornbeam
EAST GREENWICH
KENT CO
WASHINGTON CO
NAVAL RES SOUTH
Golf Course
Water
Cem
Trailer Park
Gravel Pit
Quidnessett Cem
Drive-in Theater
Chase Cem
Control Tower
Towers
Depth 30 Feet
Project
SCALE 0 4000 FEET
N
R.I.
FROM EAST GREENWICH, RI AND WICKFORD, RI 7.5' USGS TOPOGRAPHIC MAPS 1957, PHOTOREVISED 1970 AND 1975
LEGEND
STREAM
BACKGROUND SAMPLE LOCATION
TRC
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(203) 289-8631
NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE RHODE ISLAND
FIGURE 20.
PHASE II REMEDIAL INVESTIGATION BACKGROUND SURFACE SOIL SAMPLE LOCATIONS
Date 10/93
Project No. 01042-0050-400

APPENDIX A

SAMPLE INDICES PHASE I AND PHASE II

TABLE A-1
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 -- DPDO FILM PROCESSING DISPOSAL AREA
PHASE I SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES
S-08-01-00-S	09/27/89	0920	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-02-00-S	09/27/89	0930	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-03-00-S	09/27/89	0940	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-04-00-S	09/27/89	0945	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-05-00-S	09/27/89	0950	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-06-00-S	09/27/89	1000	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	

TABLE A-1
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE I SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES
S-08-06-00-SRC	N/A	N/A	SOIL	0-1	TCL VOC	HCL	N/A	Surface Soil Sample – Recollect
					TCL BNA	COOL	N/A	
					TCL Pest/PCB	COOL	N/A	
					TAL Metals	HNO3	N/A	
					Cyanide	None	N/A	
S-08-06-00-SDRC	N/A	N/A	SOIL	0-1	TCL VOC	HCL	N/A	Surface Soil Sample – Duplicate Recollect
					TCL BNA	COOL	N/A	
					TCL Pest/PCB	COOL	N/A	
					TAL Metals	HNO3	N/A	
					Cyanide	None	N/A	
S-08-07-00-S	09/27/89	1010	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-08-00-S	09/27/89	1020	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-09-00-S	09/27/89	1030	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-09-00-SRC	N/A	N/A	SOIL	0-1	TCL VOC	HCL	N/A	Surface Soil Sample – Recollect
					TCL BNA	COOL	N/A	
					TCL Pest/PCB	COOL	N/A	
					TAL Metals	HNO3	N/A	
					Cyanide	None	N/A	

TABLE A-1
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE I SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES
S-08-09-00-SDRC	N/A	N/A	SOIL	0-1	TCL VOC	HCL	N/A	Surface Soil Sample – Duplicate Recollect
					TCL BNA	COOL	N/A	
					TCL Pest/PCB	COOL	N/A	
					TAL Metals	HNO3	N/A	
					Cyanide	None	N/A	
S-08-10-00-S	09/27/89	1040	SOIL	0-1	TCL VOC	HCL	GD	Surface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-01-03-S	09/27/89	0925	SOIL	2.5-3.0	TCL VOC	HCL	GD	Subsurface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-05-03-S	09/27/89	0955	SOIL	2.5-3.0	TCL VOC	HCL	GD	Subsurface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-06-03-S	09/27/89	1005	SOIL	2.5-3.0	TCL VOC	HCL	GD	Subsurface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-07-03-S	09/27/89	1015	SOIL	2.5-3.0	TCL VOC	HCL	GD	Subsurface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	
S-08-09-03-S	09/27/89	1025	SOIL	2.5-3.0	TCL VOC	HCL	GD	Subsurface Soil Sample
					TCL BNA	COOL	GD	
					TCL Pest/PCB	COOL	GD	
					TAL Metals	HNO3	GD	
					Cyanide	None	GD	

TABLE A-1
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE I SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES
S-08-06-S	09/27/89	1000	SOIL	0-1	TCLP VOC	HCL	GD	Surface Soil Sample
					TCLP BNA	COOL	GD	
					TCLP Pest/PCB	COOL	GD	
					TCLP Metals	HNO3	GD	
					TCLP Cyanide	None	GD	
S-08-09-00-S	09/27/89	1030	SOIL	0-1	TCLP VOC	HCL	GD	Surface Soil Sample
					TCLP BNA	COOL	GD	
					TCLP Pest/PCB	COOL	GD	
					TCLP Metals	HNO3	GD	
					TCLP Cyanide	None	GD	
S-08-09-03-S	09/27/89	1025	SOIL	2.5-3.0	TCLP VOC	HCL	GD	Subsurface Soil Sample
					TCLP BNA	COOL	GD	
					TCLP Pest/PCB	COOL	GD	
					TCLP Metals	HNO3	GD	
					TCLP Cyanide	None	GD	

TABLE A-2
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE II SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES	PACE BATCH NUMBER
RB-21793	02/17/93	1000	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-01
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					TOC (125 ml)	H2SO4	JLS		
					CN (1L)	NAOH	JLS		
FB-21793	02/17/93	1015	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Field Blank Sample	SDG-01
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					TOC (125 ml)	H2SO4	JLS		
					CN (1L)	NAOH	JLS		
08-MW11-21793	02/17/93	1205	SOIL	0-2ft	TCL VOC (2 bottles)	COOL	DB	Monitoring well 1 – (0-2ft)	SDG-01
					TCL BNA/PP (1L)	COOL	DB		
					TAL Metals/CN (250)	COOL	DB		
08-MW12-21793	02/17/93	1215	SOIL	2-4ft	TCL VOC (2 bottles)	COOL	DB	Monitoring well 1 – (2-4ft)	SDG-01
					TCL BNA/PP (1L)	COOL	DB		
					TAL Metals/CN (250)	COOL	DB		
08-MW13-21793	02/17/93	1240	SOIL	14-16ft	TOC (250)	COOL	DB	Monitoring well 1 – (14-16ft)	SDG-01
08-MW21-21793	02/17/93	1358	SOIL	0-2ft	TCL VOC (2 bottles)	COOL	DB	Monitoring well 2 – (2-4ft)	SDG-01
					TCL BNA/PP (1L)	COOL	DB		
					TAL Metals/CN (250)	COOL	DB		
08-MW24-21793	02/17/93	1410	SOIL	6-8ft	TOC (250)	COOL	DB	Monitoring well 2 – (6-8ft)	SDG-01
Trip Blank	02/17/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-01
Temperature Blank	02/17/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-01
RB1-21893 (SPLIT SPOON) Will hold analysis	02/18/93	0735	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-01
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					TOC (125 ml)	H2SO4	JLS		
					CN (1L)	NAOH	JLS		

TABLE A-2
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE II SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES	PACE BATCH NUMBER
RB2-21893 (SURFACE SOIL)	02/18/93	0745	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-01
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		
TB1-21893	02/18/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-01
TRB1-21893	02/18/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-01
08-SS12-21893	02/18/93	1100	SOIL		TCL VOC	COOL	JLS	Surface Soil Sample 12	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-SS13-21893	02/18/93	1030	SOIL		TCL VOC	COOL	JLS	Surface Soil Sample 13	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-SS14-21893	02/18/93	940	SOIL		TCL VOC	COOL	JLS	Surface Soil Sample 14	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-SS15-21893	02/18/93	1140	SOIL		TCL VOC	COOL	JLS	Surface Soil Sample 15	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-SS18-21893	02/18/93	1140	SOIL		TCL VOC	COOL	JLS	Duplicate of Surface Soil Sample 15	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-SS16-21893	02/18/93	1145	SOIL		TCL VOC	COOL	JLS	Surface Soil Sample 16	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-MW31-21893	02/18/93	0930	SOIL	0-2ft	TCL VOC	COOL	JLS	Monitoring Well 3 – (0-2ft)	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-MW32-21893	02/18/93	1010	SOIL	2-4ft	TCL VOC	COOL	JLS	Monitoring Well 3 – (2-4ft)	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		

TABLE A-2
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE II SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES	PACE BATCH NUMBER
08-MW41-21893	02/18/93	0930	SOIL	0-2ft	TCL VOC	COOL	JLS	Monitoring Well 3 – (0-2ft)	SDG-01
					TCL BNA/P/P	COOL	JLS		
					TAL Metals/CN	COOL	JLS		
08-MW45-21893	02/18/93	1220	SOIL	9-11ft	TOC	COOL	DB	Monitoring Well 4 – (9-11ft)	SDG-01
						COOL	DB		
TB2-21893	02/18/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-01
TRB2-21893	02/18/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-01
RB-21993	02/19/93	0800	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-02
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		
TB-21993	02/19/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-02
TRB-21993	02/19/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-02
08-MW31-21993	02/19/93	1320	SOIL	0-2ft	TCL VOC	COOL	DB	Monitoring Well 3 – (0-2ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-MW33-21993	02/19/93	1345	SOIL	4-6ft	TCL VOC	COOL	DB	Monitoring Well 3 – (2-4ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-MW41-21993	02/19/93	1135	SOIL	0-2ft	TCL VOC	COOL	DB	Monitoring Well 4 – (0-2ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-MW42-21993	02/19/93	1140	SOIL	2-4ft	TCL VOC	COOL	DB	Monitoring Well 4 – (2-4ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
RB-22293	02/22/93	0710	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-02
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		

TABLE A-2
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE II SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES	PACE BATCH NUMBER
TB-22293	02/22/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-02
TRB-22293	02/22/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-02
08-B11-22293	02/22/93	1450	SOIL	0-2ft	TCL VOC	COOL	DB	Monitoring Well 4 – (0-2ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-B12-22293	02/22/93	1455	SOIL	2-4ft	TCL VOC	COOL	DB	Monitoring Well 4 – (2-4ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-B21-22293	02/22/93	1535	SOIL	0-2ft	TCL VOC	COOL	DB	Monitoring Well 4 – (0-2ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-B22-22293	02/22/93	1540	SOIL	2-4ft	TCL VOC	COOL	DB	Monitoring Well 4 – (2-4ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
RB-22393	02/23/93	0730	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-02
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		
TB-22393	02/23/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-02
TRB-22393	02/23/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-02
08-B51-22393	02/23/93	0920	SOIL	0-2ft	TCL VOC	COOL	DB	Monitoring Well 5 – (0-2ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-B61-22393	02/23/93	0920	SOIL	0-2ft	TCL VOC	COOL	DB	Duplicate of Sample B61-22393	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
08-B52-22393	02/23/93	0935	SOIL	2-4ft	TCL VOC	COOL	DB	Monitoring Well 5 – (2-4ft)	SDG-02
					TCL BNA/P/P	COOL	DB		
					TAL Metals/CN	COOL	DB		
TB1-22393	02/23/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-02
TRB1-22393	02/23/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-02

TABLE A-2
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 – DPDO FILM PROCESSING DISPOSAL AREA
PHASE II SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES	PACE BATCH NUMBER
GROUNDWATER									
TB1-31193	03/11/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-03
TRB1-31193	03/11/93	N/A	WATER	N/A	TCL VOC (2 bottles)	HCL	Lab	Trip Blank	SDG-03
RB-31193	03/11/93	0830	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Rinsate Blank Sample	SDG-03
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		
					COD	H2SO4	JLS		
					BOD	COOL	JLS		
					TSS	COOL	JLS		
08-MW3D-31193	03/11/93	1130	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Monitoring Well 3-deep Ground Water	SDG-03
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml) Total & Filtered	HNO3	JLS		
					CN (1L)	NAOH	JLS		
					COD	H2SO4	JLS		
					BOD	COOL	JLS		
					TSS	COOL	JLS		
08-MW4S-31193	03/11/93	1000	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Duplicate of MW-3D	SDG-03
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml) Total & Filtered	HNO3	JLS		
					CN (1L)	NAOH	JLS		
					COD	H2SO4	JLS		
					BOD	COOL	JLS		
					TSS	COOL	JLS		
08-MW3D-MS	03/11/93	1130	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Duplicate of MW-3D	SDG-03
					TCL BNA (1L)	COOL	JLS	No COD, BOD, TSS, Filtered Metals	
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		

TABLE A-2
US NAVAL CONSTRUCTION BATTALLION CENTER
DAVISVILLE, RHODE ISLAND
SITE 08 -- DPDO FILM PROCESSING DISPOSAL AREA
PHASE II SAMPLE INDEX

SAMPLE NUMBER	DATE	TIME	MATRIX	DEPTH (FT)	ANALYSIS	PRESERVATIVE	SAMPLER	NOTES	PACE BATCH NUMBER
08-MW3D-MSD	03/11/93	1130	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Duplicate of MW-3D	SDG-03
					TCL BNA (1L)	COOL	JLS	No COD, BOD, TSS, Filtered Metals	
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml)	HNO3	JLS		
					CN (1L)	NAOH	JLS		
08-MW3S-31193	03/11/93	1320	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Monitoring Well 3-shallow Ground Water	SDG-03
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml) Total & Filtered	HNO3	JLS		
					CN (1L)	NAOH	JLS		
					COD	H2SO4	JLS		
					BOD	COOL	JLS		
					TSS	COOL	JLS		
08-MW2S-31193	03/11/93	1420	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Monitoring Well 2-shallow Ground Water	SDG-03
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml) Total & Filtered	HNO3	JLS		
					CN (1L)	NAOH	JLS		
					COD	H2SO4	JLS		
					BOD	COOL	JLS		
					TSS	COOL	JLS		
08-MW1S-31193	03/11/93	1600	WATER	N/A	TCL VOC (2 bottles)	HCL	JLS	Monitoring Well 1-shallow Ground Water	SDG-03
					TCL BNA (1L)	COOL	JLS		
					TCL Pest/PCB (1L)	COOL	JLS		
					TAL Metals (500ml) Total & Filtered	HNO3	JLS		
					CN (1L)	NAOH	JLS		
TB2-31193	03/11/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-03
TB3-31193	03/11/93	N/A	WATER	N/A	Temperature	COOL	Lab	Temperature Blank	SDG-03

APPENDIX B

PHASE I SUMMARY TABLES

APPENDIX B

TABLE B-1 SURFACE SOILS
TABLE B-2 SUBSURFACE SOILS
TABLE B-3 TCLP

TABLE B-1

SURFACE SOILS

TABLE B–1
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S–08–01–00–S	S–08–02–00–S	S–08–03–00–S	S–08–04–00–S	S–08–05–00–S	S–08–06–00–S	S–08–07–00–S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
VOLATILES (ug/kg)							
Chloromethane	–	–	–	–	–	–	–
Bromomethane	–	–	–	–	–	–	–
Vinyl chloride	–	–	–	–	–	–	–
Chloroethane	–	–	–	–	–	–	–
Methylene chloride	–	–	–	–	–	–	–
Acetone	–	–	–	–	–	–	–
Carbon disulfide	–	–	–	–	–	–	–
1,1–Dichloroethene	–	–	–	–	–	–	–
1,1–Dichloroethane	–	–	–	–	–	–	–
1,2–Dichloroethene(Total)	–	–	–	–	–	–	–
Chloroform	–	–	3 J	–	–	–	2 J
'1,2–Dichloroethane	–	–	–	–	–	–	–
2–Butanone	–	–	–	–	–	–	–
1,1,1–Trichloroethane	–	–	–	–	–	–	–
Carbon tetrachloride	–	–	–	–	–	–	–
Bromodichloromethane	–	–	–	–	–	–	–
1,2–Dichloropropane	–	–	–	–	–	–	–
Cis–1,3–Dichloropropene	–	–	–	–	–	–	–
Trichloroethene	–	–	–	–	–	–	–
Dibromochloromethane	–	–	–	–	–	–	–
1,1,2–Trichloroethane	–	–	–	–	–	–	–
Benzene	–	–	–	–	–	–	–
Trans–1,3–Dichloropropene	–	–	–	–	–	–	–
Bromoform	–	–	–	–	–	–	–
4–Methyl–2–pentanone	–	–	–	–	–	–	–
2–Hexanone	–	–	–	–	–	–	–
Tetrachloroethene	–	–	–	–	–	–	–
1,1,2,2–Tetrachloroethane	–	–	–	–	–	–	–
Toluene	–	–	–	–	–	–	–
Chlorobenzene	–	–	–	–	–	–	–
Ethylbenzene	–	–	–	–	–	–	–
Styrene	–	–	–	–	–	–	–
Xylenes (Total)	–	–	–	–	–	–	–
Total Volatile Organics:	0	0	3	0	0	0	2

J – The associated numerical value is an estimated quantity.

TABLE B-1
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-08-00-S	S-08-09-00-S	S-08-10-00-S	S-08-06-00-SRC	S-08-06-00-SDRC	S-08-09-00-SRC	S-08-09-00-SDRC
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
VOLATILES (ug/kg)							
Chloromethane	-	-	-	-	-	-	-
Bromomethane	-	-	-	-	-	-	-
Vinyl chloride	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	-
Methylene chloride	-	-	-	-	-	-	-
Acetone	89	-	75	-	-	-	-
Carbon disulfide	-	-	-	-	-	-	-
1,1-Dichloroethene	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-	-	-
1,2-Dichloroethene(Total)	-	-	-	-	-	-	-
Chloroform	1 J	-	2 J	-	-	-	-
'1,2-Dichloroethane	-	-	-	-	-	-	-
2-Butanone	-	-	-	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-	-	-	-
Carbon tetrachloride	-	-	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	-	-	-	-	-	-	-
Trichloroethene	-	-	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	-	-	-	-	-	-	-
Bromoform	-	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-	-
2-Hexanone	-	-	-	-	-	-	-
Tetrachloroethene	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-
Chlorobenzene	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-
Xylenes (Total)	-	-	-	-	-	-	-
Total Volatile Organics:	90	0	77	0	0	0	0

J - The associated numerical value is an estimated quanitity.

TABLE B-1
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-00-S	S-08-02-00-S	S-08-03-00-S	S-08-04-00-S	S-08-05-00-S	S-08-06-00-S	S-08-07-00-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
SEMIVOLATILES (ug/kg)							
Phenol	-	-	-	-	-	-	-
bis(2-Chloroethyl)ether	-	-	-	-	-	-	-
2-Chlorophenol	-	-	-	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-	-	-	-
1,2-Dichlorobenzene	-	-	-	-	-	-	-
2-Methylphenol	-	-	-	-	-	-	-
2,2'-oxybis(1-Chloropropane)	-	-	-	-	-	-	-
4-Methylphenol	-	-	-	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	-	-	-	-	-
Hexachloroethane	-	-	-	-	-	-	-
Nitrobenzene	-	-	-	-	-	-	-
Isophorone	-	-	-	-	-	-	-
2-Nitrophenol	-	-	-	-	-	-	-
2,4-Dimethylphenol	-	-	-	-	-	-	-
bis(2-Chloroethoxy)methane	-	-	-	-	-	-	-
2,4-Dichlorophenol	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-	-	-
'Naphthalene *	-	-	-	-	-	-	-
4-Chloroaniline	-	-	-	-	-	-	-
Hexachlorobutadiene	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-	-	-	-
'2-Methylnaphthalene *	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	-	-	-	-	-	-	-
2-Chloronaphthalene	-	-	-	-	-	-	-
2-Nitroaniline	-	-	-	-	-	-	-
Dimethyl phthalate	-	-	-	-	-	-	-
'Acenaphthylene *	-	-	-	-	-	-	-

J - The associated numerical value is an estimated quantity.
* - PAH
** - CPAH

TABLE B-1
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-00-S	S-08-02-00-S	S-08-03-00-S	S-08-04-00-S	S-08-05-00-S	S-08-06-00-S	S-08-07-00-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
SEMIVOLATILES (ug/kg)							
2,6-Dinitrotoluene	–	–	–	–	–	–	–
3-Nitroaniline	–	–	–	–	–	–	–
'Acenaphthene *	–	–	–	–	–	–	–
2,4-Dinitrophenol	–	–	–	–	–	–	–
4-Nitrophenol	–	–	–	–	–	–	–
Dibenzofuran	–	–	–	–	–	–	–
2,4-Dinitrotoluene	–	–	–	–	–	56 J	–
Diethyl phthalate	–	–	–	–	–	–	–
4-Chlorophenyl phenyl ether	–	–	–	–	–	–	–
'Fluorene *	–	–	–	–	–	–	–
4-Nitroaniline	–	–	–	–	–	–	–
4,6-Dinitro-2-methylphenol	–	–	–	–	–	–	–
N-Nitrosodiphenylamine(1)	–	–	–	–	–	–	–
4-Bromophenyl phenyl ether	–	–	–	–	–	–	–
Hexachlorobenzene	–	–	–	–	–	–	–
Pentachlorophenol	–	–	–	–	–	–	–
'Phenanthrene *	65 J	57 J	84 J	47 J	64 J	40 J	110 J
'Anthracene *	–	–	–	–	–	–	–
Carbazole	–	–	–	–	–	–	–
Benzoic Acid	–	–	–	–	–	–	130 J
Di-n-butyl phthalate	–	–	–	–	–	–	–
'Fluoranthene *	130 J	110 J	570	93 J	140 J	75 J	230 J
'Pyrene *	89 J	81 J	480	87 J	120 J	82 J	170 J
Butyl benzyl phthalate	–	–	–	–	–	–	–
3,3'-Dichlorobenzidine	–	–	–	–	–	–	–
'Benzo(a)anthracene **	50 J	45 J	410	54 J	86 J	47 J	72 J
'Chrysene **	70 J	65 J	500	82 J	110 J	57 J	110 J
bis(2-Ethylhexyl)phthalate	290 J	40 J	70 J	67 J	68 J	200 J	78 J
Di-n-octyl phthalate	–	–	–	–	–	–	–
Benzo(b)/Benzo(k)fluoranthene **	120 J	86 J	650	110 J	230 J	76 J	340 J
'Benzo(a)pyrene **	60 J	53 J	330 J	47 J	93 J	46 J	130 J
'Indeno(1,2,3-cd)pyrene **	–	41 J	200 J	–	40 J	–	58 J
'Dibenzo(a,h)anthracene **	–	–	140 J	–	–	–	–
'Benzo(g,h,i)perylene **	–	46 J	190 J	–	–	–	82 J
TOTAL SEMI-VOLATILES	874	624	3624	587	951	679	1510
TOTAL PAHs	584	584	3554	520	883	423	1302
TOTAL CPAHs	300	336	2420	293	559	226	792

J – The associated numerical value is an estimated quantity.
* – PAH

TABLE B-1
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-08-00-S	S-08-09-00-S	S-08-10-00-S	S-08-06-00-SRC	S-08-06-00-SDRC	S-08-09-00-SRC	S-08-09-00-SDRC
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
SEMIVOLATILES (ug/kg)							
Phenol	-	-	-	-	-	-	-
bis(2-Chloroethyl)ether	-	-	-	-	-	-	-
2-Chlorophenol	-	-	-	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-	-	-	-
1,2-Dichlorobenzene	-	-	-	-	-	-	-
2-Methylphenol	-	-	-	-	-	-	-
2,2'-oxybis(1-Chloropropane)	-	-	-	-	-	-	-
4-Methylphenol	-	-	-	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	-	-	-	-	-
Hexachloroethane	-	-	-	-	-	-	-
Nitrobenzene	-	-	-	-	-	-	-
Isophorone	-	-	-	-	-	-	-
2-Nitrophenol	-	-	-	-	-	-	-
2,4-Dimethylphenol	-	-	-	-	-	-	-
bis(2-Chloroethoxy)methane	-	-	-	-	-	-	-
2,4-Dichlorophenol	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-	-	-
'Naphthalene *	-	-	-	-	-	-	-
4-Chloroaniline	-	-	-	-	-	-	-
Hexachlorobutadiene	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-	-	-	-
'2-Methylnaphthalene *	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	-	-	-	-	-	-	-
2-Chloronaphthalene	-	-	-	-	-	-	-
2-Nitroaniline	-	-	-	-	-	-	-
Dimethyl phthalate	-	-	-	-	-	-	-
'Acenaphthylene *	-	67 J	-	-	-	-	-

J - The associated numerical value is an estimated quantity.
* - PAH
** - CPAH

TABLE B-1
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-08-00-S	S-08-09-00-S	S-08-10-00-S	S-08-06-00-SRC	S-08-06-00-SDRC	S-08-09-00-SRC	S-08-09-00-SDRC
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
SEMIVOLATILES (ug/kg)							
2,6-Dinitrotoluene	–	–	–	–	–	–	–
3-Nitroaniline	–	–	–	–	–	–	–
'Acenaphthene *	–	–	–	–	–	–	–
2,4-Dinitrophenol	–	–	–	–	–	–	–
4-Nitrophenol	–	–	–	–	–	–	–
Dibenzofuran	–	–	–	–	–	–	–
2,4-Dinitrotoluene	–	–	–	–	–	–	–
Diethyl phthalate	–	–	–	–	–	–	–
4-Chlorophenyl phenyl ether	–	–	–	–	–	–	–
'Fluorene *	–	–	–	–	–	–	–
4-Nitroaniline	–	–	–	–	–	–	–
4,6-Dinitro-2-methylphenol	–	–	–	–	–	–	–
N-Nitrosodiphenylamine(1)	–	–	–	–	–	–	–
4-Bromophenyl phenyl ether	–	–	–	–	–	–	–
Hexachlorobenzene	–	–	–	–	–	–	–
Pentachlorophenol	–	–	–	–	–	–	–
'Phenanthrene *	75 J	–	46 J	53 J	170 J	–	–
'Anthracene *	–	–	–	–	–	–	–
Carbazole	–	–	–	–	–	–	–
Benzoic Acid	–	52 J	49 J	88 J	–	140 J	120 J
Di-n-butyl phthalate	–	–	–	–	–	–	–
'Fluoranthene *	150 J	–	120 J	150 J	290 J	–	–
'Pyrene *	150 J	45 J	95 J	130 J	200 J	–	–
Butyl benzyl phthalate	–	–	–	–	–	–	–
3,3'-Dichlorobenzidine	–	–	–	–	–	–	–
'Benzo(a)anthracene **	72 J	–	59 J	68 J	180 J	–	–
'Chrysene **	110 J	59 J	84 J	95 J	170 J	–	–
bis(2-Ethylhexyl)phthalate	78 J	370 J	110 J	88 J	52 J	77 J	130 J
Di-n-octyl phthalate	–	–	–	–	–	–	–
Benzo(b)/Benzo(k)fluoranthene **	140 J	–	130 J	213 J	490 J	–	–
'Benzo(a)pyrene **	80 J	–	59 J	79 J	160 J	–	–
'Indeno(1,2,3-cd)pyrene **	43 J	–	–	–	73 J	–	–
'Dibenzo(a,h)anthracene **	–	–	–	–	40 J	–	–
'Benzo(g,h,i)perylene **	38 J	–	–	–	78 J	–	–
TOTAL SEMI-VOLATILES	936	526	752	964	1903	217	250
TOTAL PAHs	858	104	593	788	1851	0	0
TOTAL CPAHs	483	59	332	455	1191	0	0

J – The associated numerical value is an estimated quantity.
* – PAH

TABLE B-1
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF PESTICIDES/PCBs DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-00-S	S-08-02-00-S	S-08-03-00-S	S-08-04-00-S	S-08-05-00-S	S-08-06-00-S	S-08-07-00-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
PESTICIDES/PCBs (ug/kg)							
Alpha-BHC	-	-	-	-	-	-	-
Beta-BHC	-	-	-	-	-	-	-
Delta-BHC	-	-	-	-	-	-	-
Gamma-BHC (Lindane)	-	-	-	-	-	-	-
Heptachlor	-	-	-	-	-	-	-
Aldrin	-	-	-	-	-	-	-
Heptachlor epoxide	-	-	-	-	-	-	-
Endosulfan I	-	-	-	-	-	-	-
Dieldrin	-	-	-	-	-	-	-
4,4'-DDE	-	-	-	-	-	-	-
Endrin	-	-	-	-	-	-	-
Endosulfan II	-	-	-	-	-	-	-
4,4'-DDD	-	-	-	-	-	-	-
Endosulfan sulfate	-	-	-	-	-	-	-
4,4'-DDT	-	-	-	-	29	-	-
p,p'-Methoxychlor	-	-	-	-	-	-	-
Endrin ketone	-	-	-	-	-	-	-
Endrin aldehyde	-	-	-	-	-	-	-
Alpha chlordane	-	-	-	-	-	-	-
Gamma chlordane	-	-	-	-	-	-	-
Toxaphene	-	-	-	-	-	-	-
Aroclor-1016	-	-	-	-	-	-	-
Aroclor-1221	-	-	-	-	-	-	-
Aroclor-1232	-	-	-	-	-	-	-
Aroclor-1242	-	-	-	-	-	-	-
Aroclor-1248	-	-	-	-	-	-	-
Aroclor-1254	-	-	-	-	-	-	-
Aroclor-1260	-	-	450	190	-	1400	230

J - The associated numerical value is an estimated quantity.

TABLE B-1
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF PESTICIDES/PCBs DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-08-00-S	S-08-09-00-S	S-08-10-00-S	S-08-06-00-SRC	S-08-06-00-SDRC	S-08-09-00-SRC	S-08-09-00-SDRC
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
PESTICIDES/PCBs (ug/kg)							
Alpha-BHC	-	-	-	-	-	-	-
Beta-BHC	-	-	-	-	-	-	-
Delta-BHC	-	-	-	-	-	-	-
Gamma-BHC (Lindane)	-	-	-	-	-	-	-
Heptachlor	-	-	-	-	-	-	-
Aldrin	-	-	-	-	-	-	-
Heptachlor epoxide	-	-	-	-	-	-	-
Endosulfan I	-	-	-	-	-	-	-
Dieldrin	-	-	-	-	-	-	-
4,4'-DDE	-	-	-	-	-	-	-
Endrin	-	-	-	-	-	-	-
Endosulfan II	-	-	-	-	-	-	-
4,4'-DDD	-	-	-	-	-	-	-
Endosulfan sulfate	-	-	-	-	-	-	-
4,4'-DDT	-	-	-	-	-	-	-
p,p'-Methoxychlor	-	-	-	-	-	-	-
Endrin ketone	-	-	-	-	-	-	-
Endrin aldehyde	-	-	-	-	-	-	-
Alpha chlordane	-	-	-	-	-	-	-
Gamma chlordane	-	-	-	-	-	-	-
Toxaphene	-	-	-	-	-	-	-
Aroclor-1016	-	-	-	-	-	-	-
Aroclor-1221	-	-	-	-	-	-	-
Aroclor-1232	-	-	-	-	-	-	-
Aroclor-1242	-	-	-	-	-	-	-
Aroclor-1248	-	-	-	-	-	-	-
Aroclor-1254	-	-	-	-	-	-	-
Aroclor-1260	-	-	-	-	-	-	-

J - The associated numerical value is an estimated quantity.

TABLE B-1
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF METALS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-00-S	S-08-02-00-S	S-08-03-00-S	S-08-04-00-S	S-08-05-00-S	S-08-06-00-S	S-08-07-00-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
METALS (mg/kg)							
Aluminum	4000	4260	3560	2410	5220	3370	6080
Antimony	–	–	–	–	–	–	–
Arsenic	0.77	0.97 B	1	0.74	1.3	0.9	1.9
Barium	7.6	6.9 B	7.6	9.5	9.9	7.1	32.6
Beryllium	0.68	0.71 B	0.65	0.63	1.2	0.6	1.4
Cadmium	–	–	–	–	–	–	–
Calcium	325	299	319	390	416	250	472
Chromium	5.9	5.7	6.4	7.8	8.3	3.9	15.5
Cobalt	2.4	3.2	2.6	3.2	4	–	7.9
Copper	9	9.2	13.3	16.3	17.7	4.3	87.3
Iron	8090	8930	9740	9190	11500	5450	16800
Lead	26	43.4	52	29.5	57.7	9.1	171
Magnesium	781	694	872	842	1240	565	1050
Manganese	59.8	73.5	73.2	84.8	76.2	75.3	92.4
Mercury	0.14	–	–	–	–	–	–
Nickel	–	–	–	–	–	–	30.8
Potassium	–	–	–	–	–	–	1050
Selenium	–	–	–	–	–	–	–
Silver	–	–	–	28	–	–	–
Sodium	–	–	–	–	–	–	–
Thallium	–	–	–	–	–	–	–
Vanadium	11.1	10.4 B	13.2	7.7	19.9	5.5	25.4
Zinc	44.8	42.4	40.4	52.7	40.8	29.7	197

J – The associated numerical value is an estimated quantity.

TABLE B-1
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF METALS DETECTED IN SURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-06-00-S	S-08-09-00-S	S-08-10-00-S	S-08-06-00-SRC	S-08-06-00-SDRC	S-08-06-00-SRC	S-08-07-00-SDRC
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
METALS (mg/kg)							
Aluminum	4560	4410	4910	3150	3150	4700	4630
Antimony	–	11.7	–	–	–	–	–
Arsenic	0.89	0.94	1.3	0.64	1.3 J	2.6 J	0.82 J
Barium	8.2	8.6	10.6	7.7	6.4	8.3	7.9
Beryllium	0.72	0.44	0.47	0.33	0.32	0.32	0.36
Cadmium	–	–	–	–	–	–	–
Calcium	305	314	354	299	277	296	274
Chromium	5.6	7	14.2	5.2	5.6 J	4.8	5.2
Cobalt	–	–	–	2.4	1.1	1.9	1.6
Copper	8.9	9.4	16.4	9.3	10.7	9.7	8.9
Iron	7540	12200	9930	10300	12700 J	8540	8040
Lead	21.3	67.7	160	33.6	32.1 J	23.3	117 J
Magnesium	916	1020	1070	827	823	925	899
Manganese	84.7	59.6	67.7	78.3	73.4	59.1	59
Mercury	–	–	–	–	–	–	–
Nickel	10.2	–	–	–	6.1	–	7.4
Potassium	–	1320	1050	562	398	503	425
Selenium	–	–	–	–	–	–	–
Silver	–	–	–	–	–	–	–
Sodium	–	–	–	–	–	–	–
Thallium	–	–	–	–	–	–	–
Vanadium	9.8	14.9	18.7	15.5	15.9	13.8	13.6
Zinc	43.3	34.9	54.4	30.2	30.6	27.6	26.4

J – The associated numerical value is an estimated quantity.

TABLE B-2

SUBSURFACE SOILS

TRC

TABLE B-2
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-03-S	S-08-05-03-S	S-08-06-03-S	S-08-07-03-S	S-08-09-03-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
VOLATILES (ug/kg)					
Chloromethane	-	-	-	-	-
Bromomethane	-	-	-	-	-
Vinyl chloride	-	-	-	-	-
Chloroethane	-	-	-	-	-
Methylene chloride	-	-	-	-	-
Acetone	-	-	-	-	-
Carbon disulfide	-	-	-	-	-
1,1-Dichloroethene	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-
1,2-Dichloroethene(Total)	-	-	-	-	-
Chloroform	-	-	-	1 J	-
'1,2-Dichloroethane	-	-	-	-	-
2-Butanone	-	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-	-
Carbon tetrachloride	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-
Cis-1,3-Dichloropropene	-	-	-	-	-
Trichloroethene	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-
Benzene	-	-	-	-	-
Trans-1,3-Dichloropropene	-	-	-	-	-
Bromoform	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-
2-Hexanone	-	-	-	-	-
Tetrachloroethene	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-
Toluene	-	-	-	-	-
Chlorobenzene	-	-	-	-	-
Ethylbenzene	-	-	-	-	-
Styrene	-	-	-	-	-
Xylenes (Total)	-	-	-	-	210
Total Volatile Organics:	0	0	0	1	210

J - The associated numerical value is an estimated quantity.

TABLE B-2
NCBC DAVISVILLE, RI - SITE 08
PHASE I - REMEDIAL INVESTIGATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-03-S	S-08-05-03-S	S-08-06-03-S	S-08-07-03-S	S-08-09-03-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
SEMIVOLATILES (ug/kg)					
Phenol	-	-	-	-	-
bis(2-Chloroethyl)ether	-	-	-	-	-
2-Chlorophenol	-	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-	-
1,2-Dichlorobenzene	-	-	-	-	-
2-Methylphenol	-	-	-	-	-
2,2'-oxybis(1-Chloropropane)	-	-	-	-	-
4-Methylphenol	-	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	-	-	-
Hexachloroethane	-	-	-	-	-
Nitrobenzene	-	-	-	-	-
Isophorone	-	-	-	-	-
2-Nitrophenol	-	-	-	-	-
2,4-Dimethylphenol	-	-	-	-	-
bis(2-Chloroethoxy)methane	-	-	-	-	-
2,4-Dichlorophenol	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-
'Naphthalene *	-	-	-	-	-
4-Chloroaniline	-	-	-	-	-
Hexachlorobutadiene	-	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-	-
'2-Methylnaphthalene *	-	-	-	-	2400
Hexachlorocyclopentadiene	-	-	-	-	-
2,4,6-Trichlorophenol	-	-	-	-	-
2,4,5-Trichlorophenol	-	-	-	-	-
2-Chloronaphthalene	-	-	-	-	-
2-Nitroaniline	-	-	-	-	-
Dimethyl phthalate	-	-	-	-	-
'Acenaphthylene *	-	-	-	-	-

J - The associated numerical value is an estimated quantity.
* - PAH
** - CPAH

TABLE B-2
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S-08-01-03-S	S-08-05-03-S	S-08-06-03-S	S-08-07-03-S	S-08-09-03-S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
SEMIVOLATILES (ug/kg)					
2,6-Dinitrotoluene	–	–	–	–	–
3-Nitroaniline	–	–	–	–	–
'Acenaphthene *	–	–	–	–	–
2,4-Dinitrophenol	–	–	–	–	–
4-Nitrophenol	–	–	–	–	–
Dibenzofuran	–	–	–	–	–
2,4-Dinitrotoluene	–	–	–	–	–
Diethyl phthalate	–	–	–	–	–
4-Chlorophenyl phenyl ether	–	–	–	–	–
'Fluorene *	–	–	–	–	1100
4-Nitroaniline	–	–	–	–	–
4,6-Dinitro-2-methylphenol	–	–	–	–	–
N-Nitrosodiphenylamine(1)	–	–	–	–	–
4-Bromophenyl phenyl ether	–	–	–	–	–
Hexachlorobenzene	–	–	–	–	–
Pentachlorophenol	–	–	–	–	–
'Phenanthrene *	–	–	–	–	170 J
'Anthracene *	–	–	–	–	–
Carbazole	–	–	–	–	–
Benzoic Acid	–	–	–	45 J	–
Di-n-butyl phthalate	–	–	–	–	–
'Fluoranthene *	–	46 J	–	–	–
'Pyrene *	–	57 J	–	–	–
Butyl benzyl phthalate	–	–	–	–	–
3,3'-Dichlorobenzidine	–	–	–	–	–
'Benzo(a)anthracene **	–	–	–	–	–
'Chrysene **	–	42 J	–	–	–
bis(2-Ethylhexyl)phthalate	440	280 J	470	–	120 J
Di-n-octyl phthalate	–	–	–	–	–
Benzo(b)/Benzo(k)fluoranthene **	–	54 J	–	–	–
'Benzo(a)pyrene **	–	–	–	–	–
'Indeno(1,2,3-cd)pyrene **	–	–	–	–	–
'Dibenzo(a,h)anthracene **	–	–	–	–	–
'Benzo(g,h,i)perylene **	–	–	–	–	–
TOTAL SEMI-VOLATILES	440	479	470	45	3790
TOTAL PAHs	0	199	0	0	3670
TOTAL CPAHs	0	96	0	0	0

J – The associated numerical value is an estimated quantity.
* – PAH

TABLE B–2
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF PESTICIDES/PCBs DETECTED IN SUBSURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S–08–01–03–S	S–08–05–03–S	S–08–06–03–S	S–08–07–03–S	S–08–09–03–S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
PESTICIDES/PCBs (ug/kg)					
Alpha–BHC	–	–	–	–	–
Beta–BHC	–	–	–	–	–
Delta–BHC	–	–	–	–	–
Gamma–BHC (Lindane)	–	–	–	–	–
Heptachlor	–	–	–	–	–
Aldrin	–	–	–	–	–
Heptachlor epoxide	–	–	–	–	–
Endosulfan I	–	–	–	–	–
Dieldrin	–	–	–	–	–
4,4'–DDE	–	–	–	–	–
Endrin	–	–	–	–	–
Endosulfan II	–	–	–	–	–
4,4'–DDD	–	–	–	–	–
Endosulfan sulfate	–	–	–	–	–
4,4'–DDT	–	–	–	–	–
p,p'–Methoxychlor	–	–	–	–	–
Endrin ketone	–	–	–	–	–
Endrin aldehyde	–	–	–	–	–
Alpha chlordane	–	–	–	–	–
Gamma chlordane	–	–	–	–	–
Toxaphene	–	–	–	–	–
Aroclor–1016	–	–	–	–	–
Aroclor–1221	–	–	–	–	–
Aroclor–1232	–	–	–	–	–
Aroclor–1242	–	–	–	–	–
Aroclor–1248	–	–	–	–	–
Aroclor–1254	–	–	–	–	–
Aroclor–1260	–	–	–	–	–

J – The associated numerical value is an estimated quantity.

TABLE B–2
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF METALS DETECTED IN SUBSURFACE SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	S–08–01–03–S	S–08–05–03–S	S–08–06–03–S	S–08–07–03–S	S–08–09–03–S
LABORATORY:	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM	COMPUCHEM
METALS (mg/kg)					
Aluminum	2220	4890	3910	3430	2890
Antimony	–	–	–	–	–
Arsenic	0.54	0.84	–	0.67	1.3
Barium	7.3	16.2	19.3	8.9	9
Beryllium	0.73	1.4	0.71	0.76	–
Cadmium	–	–	–	–	–
Calcium	212	930	249	251	322
Chromium	11.3	3.1	11.6	3.3	5.5
Cobalt	1.8	3.4	–	3	–
Copper	–	4.2	5.7	4.3	4.4
Iron	4410	11000	6480	5600	5810
Lead	2.6	5.1	6.9	12.7	10
Magnesium	354	744	966	471	664
Manganese	78.9	169	103	83	53.6
Mercury	–	–	–	–	–
Nickel	–	–	–	–	–
Potassium	–	–	1360	657	–
Selenium	–	–	–	–	–
Silver	–	–	–	–	–
Sodium	–	–	–	482	–
Thallium	–	–	–	–	–
Vanadium	–	5.6	7.8	2.8	2.8
Zinc	32.3	68.5	35.7	35.8	33.2

J – The associated numerical value is an estimated quantity.

TABLE B-3

TCLP

TABLE B–3
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF TCLP VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	TP–08–06–S		S–08–09–00–S		S–08–09–03–S	
LABORATORY	COMPUCHEM		COMPUCHEM		COMPUCHEM	
VOLATILES (ug/l)						
Benzene		3 J	–		–	
Bromoform	–		–		–	
Carbon tetrachloride	–		–		–	
Chlorobenzene	–		–		–	
Dibromochloromethane	–		–		–	
Chloroethane	–		–		–	
Chloroform	–		–		–	
Bromodichloromethane	–		–		–	
1,1–Dichloroethane	–		–		–	
1,2–Dichloroethane	–		–		–	
1,1–Dichloroethene	–		–		–	
1,2–Dichloropropane	–		–		–	
Cis–1,3–Dichloropropene	–		–		–	
Ethylbenzene		2 J	–		–	
Bromomethane	–		–		–	
Chloromethane	–		–		–	
Methylene chloride	–		–		–	
1,1,2,2–Tetrachloroethane	–		–		–	
Tetrachloroethene	–		–		–	
Toluene	–		–		–	
1,1,1–Trichloroethane	–		–		–	
1,1,2–Trichloroethane	–		–		–	
Trichloroethene	–		–		–	
Vinyl chloride	–		–		–	
Trans–1,3–Dichloropropene	–		–		–	
Styrene		10		8		57
Acetone		27	–		–	
2–Butanone	–		–		–	
Carbon disulfide	–		–		–	
2–Hexanone	–		–		–	
4–Methyl–2–pentanone		9 J	–		–	
Vinyl acetate	–		–		–	
Xylenes (Total)		21	–			26
1,2–Dichloroethene(Total)		1 J	–		–	
Total Volatile Organics		73		8		83

J – The associated numerical value is an estimated quantity.

TABLE B-3
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF TCLP SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	TP-08-06-S		S-08-09-00-S		S-08-09-03-S	
LABORATORY	COMPUCHEM		COMPUCHEM		COMPUCHEM	
**SEMIVOLATILES (ug/l)						
'Acenaphthene*	–		–		–	
'Acenaphthylene*	–		–		–	
'Anthracene*	–		–		–	
'Benzo(a)anthracene**	–		–		–	
'Benzo(a)pyrene**	–		–		–	
'Benzo(b)fluoranthene**	–		–		–	
'Benzo(g,h,i)perylene**	–		–		–	
'Benzo(k)fluoranthene**	–		–		–	
bis(2-Chloroethoxy)methane	–		–		–	
bis(2-Chloroethyl)ether	–		–		–	
bis(2-Chloroisopropyl)ether	–		–		–	
bis(2-Ethylhexyl)phthalate	–		–		–	
4-Bromophenyl phenyl ether	–		–		–	
Butyl benzyl phthalate	–		–		–	
2-Chloronaphthalene	–		–		–	
4-Chlorophenyl phenyl ether	–		–		–	
'Chrysene**	–		–		–	
'Dibenzo(a,h)anthracene**	–		–		–	
1,2-Dichlorobenzene	–		–		–	
1,3-Dichlorobenzene	–		–		–	
1,4-Dichlorobenzene	–		–		–	
3,3'-Dichlorobenzidine	–		–		–	
Diethyl phthalate	–		–		–	
Dimethyl phthalate	–		–		–	
Di-n-butyl phthalate	–		–		–	
2,4-Dinitrotoluene	–		–		–	
2,6-Dinitrotoluene	–		–		–	
Di-n-octyl phthalate	–		–		–	
'Fluoranthene*	–		–		–	
'Fluorene*		2 J	–			2 J
Hexachlorobenzene	–		–		–	
Hexachlorobutadiene	–		–		–	
Hexachlorocyclopentadiene	–		–		–	

J – The associated numerical value is an estimated quantity.
* – PAH
** – CPAH

TABLE B-3
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF TCLP SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	TP-08-06-S	S-08-09-00-S	S-08-09-03-S
LABORATORY	COMPUCHEM	COMPUCHEM	COMPUCHEM
**SEMIVOLATILES (ug/l)			
Hexachloroethane	–	–	–
'Indeno(1,2,3-cd)pyrene**	–	–	–
Isophorone	–	–	–
'Naphthalene*	11	–	–
Nitrobenzene	–	–	–
N-Nitroso-di-n-propylamine	–	–	–
N-Nitrosodiphenylamine(1)	–	–	–
'Phenanthrene*	6 J	–	–
'Pyrene*	–	–	–
1,2,4-Trichlorobenzene	–	–	–
Benzyl alcohol	–	–	–
4-Chloroaniline	–	–	–
Dibenzofuran	–	–	3 J
'2-Methylnaphthalene*	24	–	16
2-Nitroaniline	–	–	–
3-Nitroaniline	–	–	–
4-Nitroaniline	–	–	–
2-Chlorophenol	–	–	–
2,4-Dichlorophenol	–	–	–
2,4-Dimethylphenol	–	–	–
4,6-Dinitro-2-methylphenol	–	–	–
2,4-Dinitrophenol	–	–	–
2-Nitrophenol	–	–	–
4-Nitrophenol	–	–	–
4-Chloro-3-methylphenol	–	–	–
Pentachlorophenol	–	–	–
Phenol	–	–	–
2,4,6-Trichlorophenol	–	–	–
2-Methylphenol	–	–	–
4-Methylphenol	–	–	–
Benzoic acid	–	–	–
2,4,5-Trichlorophenol	–	–	–
Total Semivolatile organics	43	0	21
Total PAHs	43	0	18
Total CPAHs	0	0	0

J – The associated numerical value is an estimated quantity.
* – PAH
** – CPAH

TABLE B-3
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF TCLP PESTICIDES/PCBs DETECTED IN SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	TP-08-06-S	S-08-09-00-S	S-08-09-03-S
LABORATORY	COMPUCHEM	COMPUCHEM	COMPUCHEM
**PESTICIDES/PCBs			
Aldrin	–	–	–
Alpha-BHC	–	–	–
Beta-BHC	–	–	–
Gamma-BHC (Lindane)	–	–	0.21
Delta-BHC	–	–	–
4,4'-DDT	–	–	–
4,4'-DDE	–	–	–
4,4'-DDD	–	–	–
Dieldrin	–	–	–
Endosulfan I	–	–	–
Endosulfan II	–	–	–
Endosulfan sulfate	–	–	–
Endrin	–	–	–
Heptachlor	–	–	–
Heptachlor epoxide	–	–	–
PCB-1242	–	–	–
PCB-1254	–	–	–
PCB-1221	–	–	–
PCB-1232	–	–	–
PCB-1248	–	–	–
PCB-1260	–	–	–
PCB-1016	–	–	–
Toxaphene	–	–	–
p,p'-Methoxychlor	–	–	–
Endrin ketone	–	–	–
Alpha chlordane	–	–	–
Gamma chlordane	–	–	–

J – The associated numerical value is an estimated quantity.

TABLE B–3
NCBC DAVISVILLE, RI – SITE 08
PHASE I – REMEDIAL INVESTIGATION
SUMMARY OF TCLP METALS DETECTED IN SOIL SAMPLES

TRC SAMPLE IDENTIFICATION:	TP–08–06–S	S–08–09–00–S	S–08–09–03–S
LABORATORY	COMPUCHEM	COMPUCHEM	COMPUCHEM
METALS (ug/kg)			
Antimony	–	–	–
Arsenic	–	–	–
Beryllium	6.8 J	–	–
Cadmium	311	–	–
Chromium	9.1	–	11.9
Copper	–	34.7	20.8
Lead	216	264	135
Mercury	–	–	–
Nickel	366	–	296
Selenium	16 UJ	–	16 UJ
Silver	–	–	–
Thallium	1.3 UJ	–	1.3 UJ
Zinc	7880	444	52
Barium	963	541	128
Iron	1920	2040	6750
Manganese	5600	35.1	176
Vanadium	21	8.6	–
Aluminum	–	6070	8000
Cobalt	74.3	–	–
Magnesium	22300	–	–
Calcium	413000	1060	3190
Sodium	1250000	–	–
Potassium	8770	–	–
Cyanide (ug/l)	–	–	–

J – The associated numerical value is an estimated quantity.