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NAB LITTLE CREEK
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FINAL DECISION DOCUMENT FOR REMOVAL ACTION SITE 11 SCHOOL OF MUSIC PLATING SHOP NAB LITTLE CREEK VA

11/1/1994

BAKER ENVIRONMENTAL, INC.

02.06-10b1/94-00

Final

Decision Document

Site 11: School of Music Plating Shop

Naval Amphibious Base Little Creek
Virginia Beach, Virginia

Prepared For:

Department of the Navy
Atlantic Division
Naval Facilities
Engineering Command
Norfolk, Virginia

Under the

LANTDIV CLEAN Program

Comprehensive Long-Term
Environmental Action Navy

Reference:
Contract
N62470-89-D-48

CTO-0247

November 1994

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Baker Environmental,

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FINAL

DECISION DOCUMENT

for

REMOVAL ACTION

at

SITE 11, SCHOOL OF MUSIC PLATING SHOP
NAVAL AMPHIBIOUS BASE LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

OCTOBER 1994

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

FINAL

DECISION DOCUMENT

SITE 11: SCHOOL OF MUSIC PLATING SHOP
NAVAL AMPHIBIOUS BASE
LITTLE CREEK, VIRGINIA

CONTRACT TASK ORDER 0042

Prepared For:

NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
Norfolk, Virginia

Under:

Contract N62470-89-D-4814

Prepared By:

FOSTER WHEELER ENVIRONMENTAL SERVICES
Livingston, New Jersey

through

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

NOVEMBER 1994

ACTION MEMORANDUM

Site 11, The School of Music Plating Shop
Naval Amphibious Base (NAB) Little Creek
Virginia Beach, Virginia

DATE: July 25, 1994

SUBJECT: REMOVAL ACTION at Site 11,
NAB Little Creek, Virginia Beach, Virginia

FROM: Commander, Atlantic Division
Naval Facilities Engineering Command

TO: Commanding Officer, NAB Little Creek

Site ID#: 11

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed Removal Action described herein for the neutralization tank & ancillary equipment at Site 11, The School of Music Plating Shop, NAB Little Creek, Virginia Beach, Virginia.

II. SITE CONDITIONS AND BACKGROUND

This is a non-time-critical removal. Soil samples taken in the tank indicate chromium concentrations ranging up to 4,200 parts per million (ppm), which has necessitated this Removal Action.

A. Site Description

1. **Removal Site Evaluation**

Sampling and analysis activities at Site 11 have confirmed heavy metal contamination in the neutralization tank and organic contamination in the shallow aquifer. The tank contents are a potentially significant source of groundwater contamination and a possible threat to human health and the environment through overflows or a collapse of the structure. Therefore, a Removal Action is highly recommended.

Surrounding soils have not exhibited contamination of any significant levels, and there are no known potential sources of shallow groundwater contamination other than the tank and the past activities at the site. It is quite probable that if the Removal Action is completed in a timely manner, further remedial actions may not have to be undertaken at the site. Therefore, consideration of the Removal Action is deemed highly desirable.

2. Physical Location

Naval Amphibious Base (NAB) Little Creek is located in Virginia Beach, Virginia. The western portion of the facility is adjacent to the city line of Norfolk. Figure 1 presents the location of NAB Little Creek. Use of land at the base is largely industrial, while land development surrounding the site is primarily suburban and industrial.

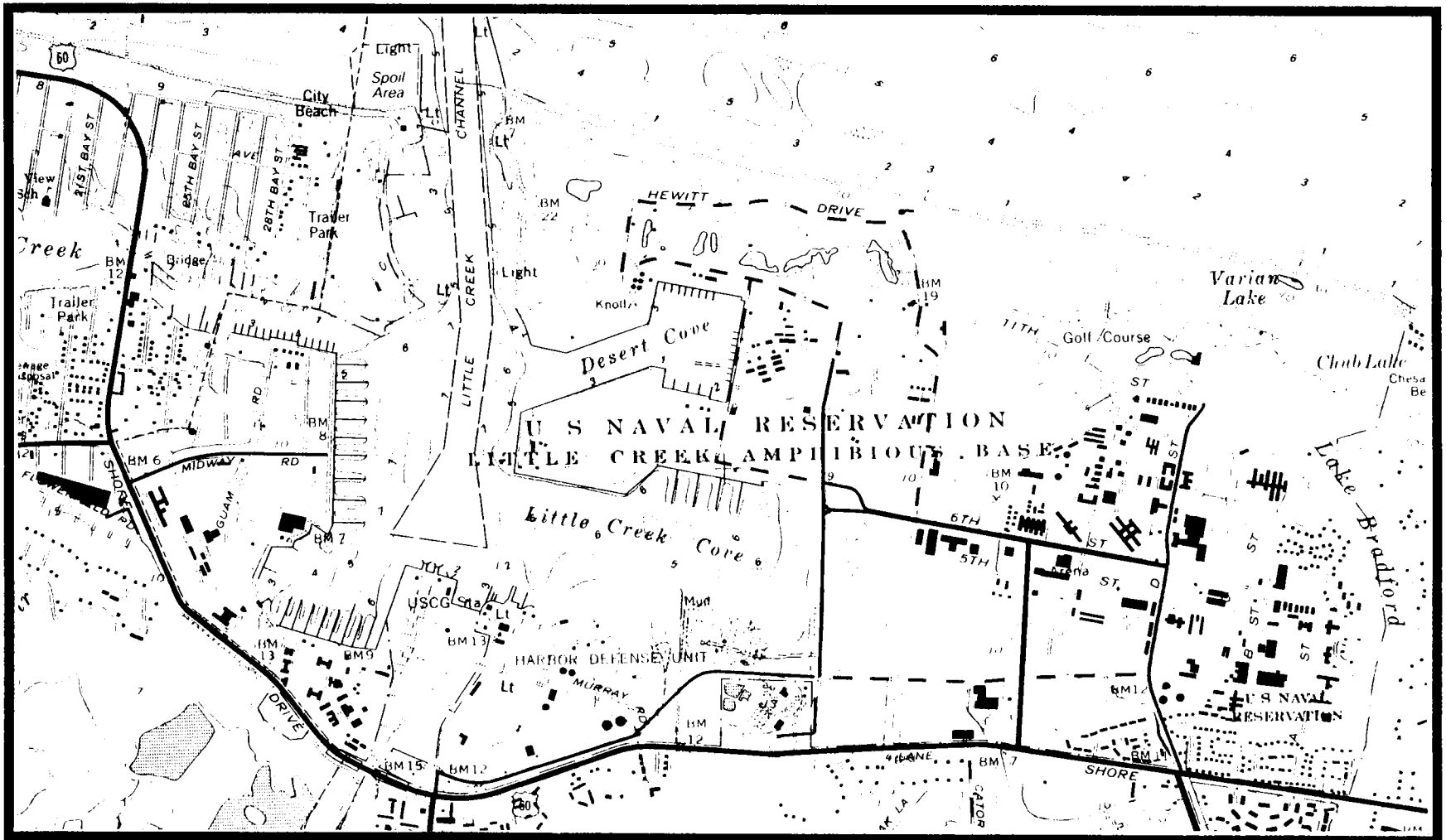
The location of the former School of Music Plating Shop, Site 11, is shown in Figure 2. The School of Music Plating Shop was located in Building 3651. This building is located in the eastern portion of the base, near the intersection of 7th Street and E Street. The School of Music, located in Building 3602, is southwest of the former plating shop.

3. Site Characteristics

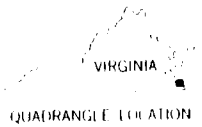
The actual site consists of an in-ground, concrete tank (used to neutralize plating baths) and its associated piping. The tank is approximately 10 feet east of the southeast corner of Building 3651. The neutralization tank for the plating shop has a diameter of 5 feet and depth of 9 feet. Surrounding areas apart from buildings and paved areas are covered with grass and generally level between man-made drainage swales.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

NEESA (1984) reported that plating wastes were discharged into the neutralization tank during a ten-year period beginning in 1964. In 1974, the plating operations and discharges into the neutralization tank were discontinued. During its period of operation, the plating shop reportedly used silver cyanide, copper cyanide, chromic acid (brite dip), nickel plating baths, and various acids. In addition, lacquer strippers and lacquer were also used. Small quantities of these plating baths, acids, and lacquer strippers were disposed down the sink in the plating shop which drains into the neutralization tank and eventually into the sewer system. The IAS reported that approximately 10 gallons of each plating chemical and lacquer stripper were disposed in the shop sinks each year. The IAS determined that contaminants may be migrating in the groundwater from this site. Therefore, further investigations were conducted at the site, as described in Part B. These investigations have identified the target area for Removal Action as shown in Figure 3.

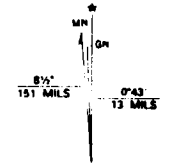


LITTLE CREEK AMPHIBIOUS BASE
VIRGINIA BEACH, VIRGINIA
SITE LOCATION MAP



QUADRANGLE LOCATION

Little Creek, VA Quadrangle
7.5 Minute Series (Topographic)



UTM GRID AND 1986 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Prepared by:
Foster Wheeler Enviresponse, Inc.

Figure 1
Scale: 1" = 2000'

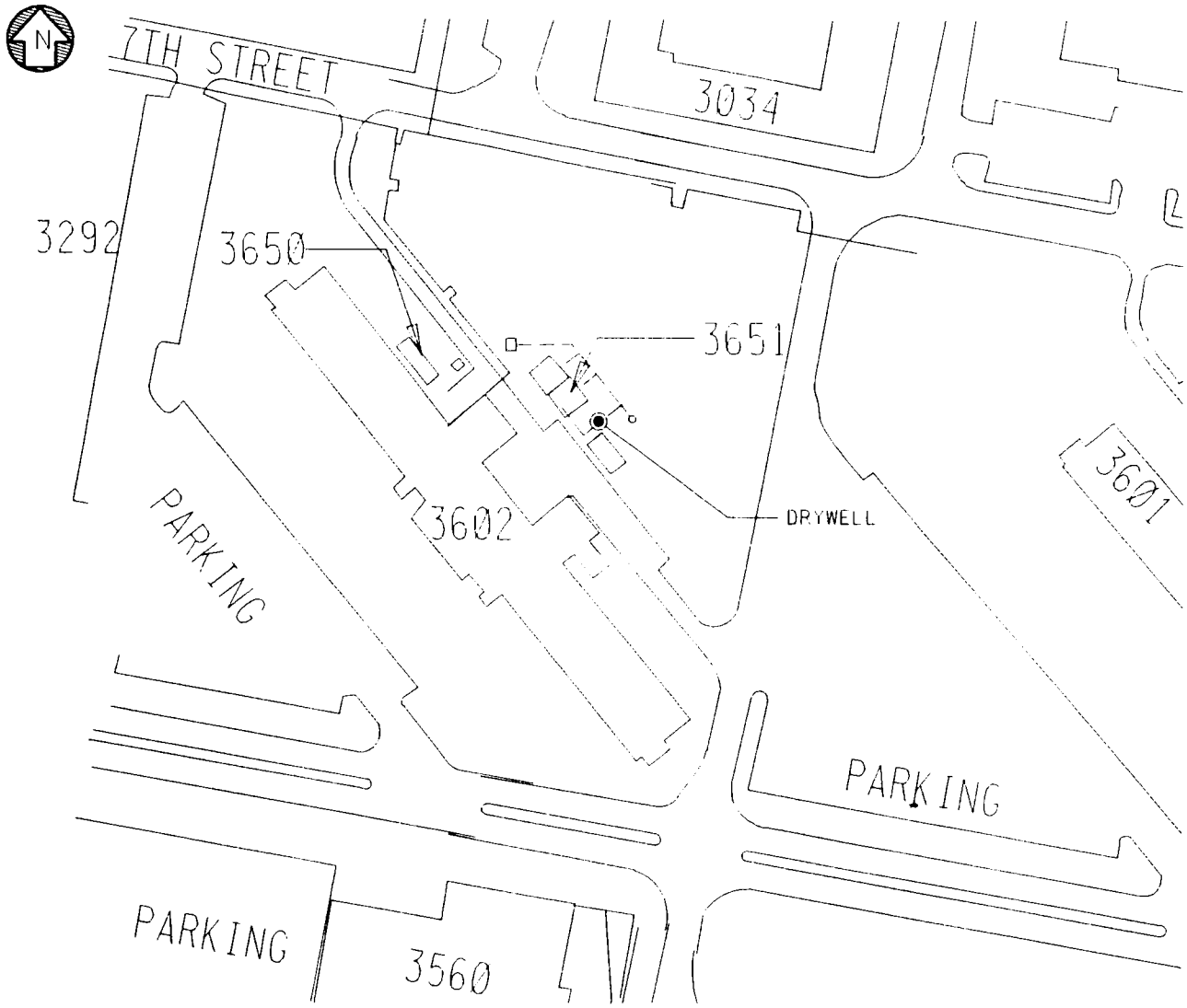


FIGURE 2

THE SCHOOL OF MUSIC PLATING SHOP
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

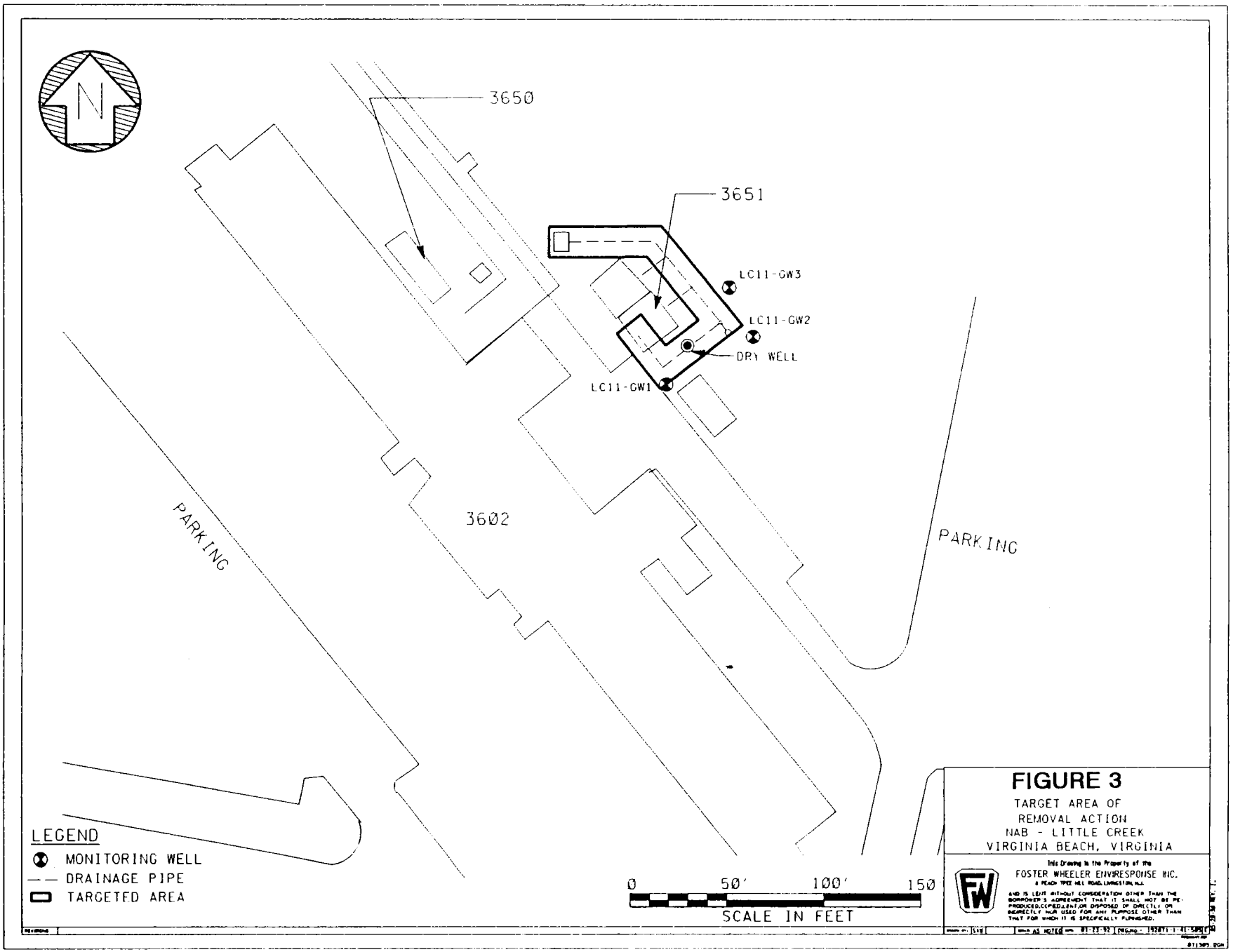


FIGURE 3

TARGET AREA OF
REMOVAL ACTION
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

5. **NPL (National Priorities List) Status**

Site 11 is neither on the NPL nor proposed for the NPL. In a letter to NAB dated July 1993, USEPA Region III conveyed its decision not to put NAB Little Creek sites on NPL, based on the Hazard Ranking System (HRS) scoring performed by EPA. Site 11 is considered a CERCLA site under the Navy's Installation Restoration (IR) Program.

B. Other Actions to Date

1. **Previous Actions**

The Navy has completed three investigations to follow up on the IAS recommendation. These include the Round One Verification Study (RVS), the Interim Remedial Investigation (IRI), and the Remedial Investigation/ Feasibility Study (RI/FS). The recommendation from the IAS was the installation of three monitoring wells between 10 and 30 feet from the edge of the neutralization tank. As part of the recommendations, two soil samples were to be taken from each well site during installation and three soil samples were to be taken from the tank itself.

The RVS included the collection of three groundwater and nine soil samples for analysis. The soil sample from the neutralization tank had elevated (relative to other samples at this location) chromium (4,200 mg/kg) and cyanide (19 mg/kg). Eight Volatile Organic Compounds (VOCs) were observed at monitoring well LC11-GW1. The compounds 1,1-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichloroethene were all present in concentrations above the proposed Maximum Contaminant Levels (MCLs). 1,2-dichloropropane was above the Recommended MCLs. The RVS report concluded that contamination from the plating shop remains in the soil in the neutralization tank but is not currently migrating from the site. The RVS could not attribute VOC contamination at LC11-GW1 to the neutralization tank.

The IRI reported that Site 11 has two separate contamination issues, the neutralization tank system and the shallow groundwater. For the tank, the solid and aqueous materials within it are obviously contaminated with chromium and a variety of other heavy metals. The concrete sides and bottom of the tank are apparently in good condition and not leaking; if the opposite were true, the surrounding groundwater would show signs of heavy metal contamination. The tank does not, on the basis of the 1990 samples, appear to be the source of the volatile organic contamination detected in monitoring well 11-GW-1; however, this linkage cannot be ruled out given the likelihood that both plating baths and solvents would have been components of the waste stream at the plating shop.

The IRI concluded that the discontinuation of both plating operations has served to effectively eliminate the addition of new volatile organic material to the site. The IRI hypothesized that

contaminated soil associated with the drainage or sewer lines near Building 3651 can be the remaining existing source. This hypothesis was further investigated in the RI.

As part of the RI, Thirty-two soil gas samples were collected at a depth of four feet. The analyses did not detect any of the volatile organic compounds. Surface soil samples were collected at ten locations at a depth of 0 to 6 inches. The samples were analyzed for VOCs using the USEPA's Contract Laboratory Program (CLP) methods. No VOCs were detected at the site except acetone and toluene. These occurrences are not attributed to the historical activities at the plating shop. Five soils samples were also analyzed for metals, and low levels of Arsenic, Beryllium, Lead, Manganese, and Zinc were detected. Volatile organics were again detected in 11-GW-01 at low levels. However, none of the constituents detected in soil or groundwater were at a level which pose human health risks.

2. **Current Actions**

Site 11 is currently undergoing a Remedial Investigation/ Feasibility Study (RI/FS) in accordance with CERCLA/SARA. Field work for this RI/FS was conducted in 1993 and a final report is being issued in 1994. The FS recommends future actions at the site, and will take into consideration the impact of the proposed Removal Action.

C. State and Local Authorities' Roles

1. **State and Local Actions to date**

The Commonwealth of Virginia, Department of Environmental Quality (VDEQ) sent a letter on September 13, 1993 recommending that a removal of contaminated soil be performed as soon as possible. The State has reviewed the EE/CA and provided comments, which have been incorporated into the EE/CA.

2. **Potential for continued State/local response**

VDEQ will be kept informed of the work at Site 11, and provided the opportunity to review and comment as appropriate.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

A. Threats to Public Health or Welfare

Access to Site 11, School of Music Plating Shop, is restricted to the Navy personnel and Contractor personnel. Personnel conducting any intrusive activities could come into contact with the contamination. During such intrusive activities, personnel transiting in and around the site are potentially at risk due to accidental/incidental ingestion of contaminated soils via

airborne dust particles and groundwater via contact during dewatering operations. In order to mitigate such risks during the proposed removal action, air monitoring will be undertaken and all intrusive and dewatering activities will be conducted with utmost care.

B. Threats to the Environment

Potential for a heavy metal contamination release to the environment exists if accidental spills, ruptures, or excessive flooding due to heavy rains occur at the tank. Removal and off-site disposal of contaminated material from Site 11 will mitigate the risk of releases of contamination to the groundwater and other areas.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of pollutants and contaminants from this site, if not addressed by implementing the response action in this Action Memorandum, may present potential endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

The proposed action is the excavation and off-site disposal of the neutralization tank, the pipe assembly, and the adjacent soil. The estimated cost for this proposed action is $166,316. The proposed project schedule is:

Action Memorandum approved	11/94
Contractor mobilizes personnel and equipment	12/94
Removal Action complete	3/95

This Removal Action addresses the threats by removing the neutralization tank, associated piping, and surrounding soils, thereby preventing the potential release of contamination into the environment. The EE/CA presents the alternatives considered and their associated costs.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Contamination would most likely remain enclosed in the tank system, but continue to pose a threat of potential release.

VII. OUTSTANDING POLICY ISSUES

None.

VIII. ENFORCEMENT

The Navy can and will perform the proposed removal response promptly and properly.

IX. RECOMMENDATION

Conditions at the site meet the NCP section 300.415(b)(2) criteria for a Removal Action. Therefore, proposed Removal Action is submitted for approval. Response actions should commence immediately upon approval.

Approval by:

Commanding Officer:
NAB Little Creek

Date: 3 NOV 1994

FINAL REPORT

ENGINEERING EVALUATION/ COST ANALYSIS

Prepared By:

FOSTER WHEELER ENVIRONMENTAL SERVICES

for

NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
Norfolk, Virginia

through

BAKER ENVIRONMENTAL, INC.

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1.0 INTRODUCTION

This report presents the Engineering Evaluation/Cost Analysis (EE/CA) of Removal Action alternatives for the School of Music Plating Shop Site, hereafter referred to as Site 11, located at the Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia. This EE/CA has been prepared by Foster Wheeler Environmental Services (FWES), as part of the Baker Environmental, Inc. (Baker) Team, under contract to the Atlantic Division (LANTDIV) Naval Facilities Engineering Command.

This EE/CA study and report have been based on site investigations conducted to-date, which include an Initial Assessment Study (IAS) dated December 1984, a Round One Verification Step (RVS) dated October 1986, an Interim Remedial Investigation (IRI) dated December 1991, as well as an ongoing Remedial Investigation (RI) conducted by the Baker Team between May 1993 and July 1993. These investigations have identified areas of contamination at Site 11 of the NAB Little Creek due to past disposal operations at the site.

1.1 Purpose and Objectives

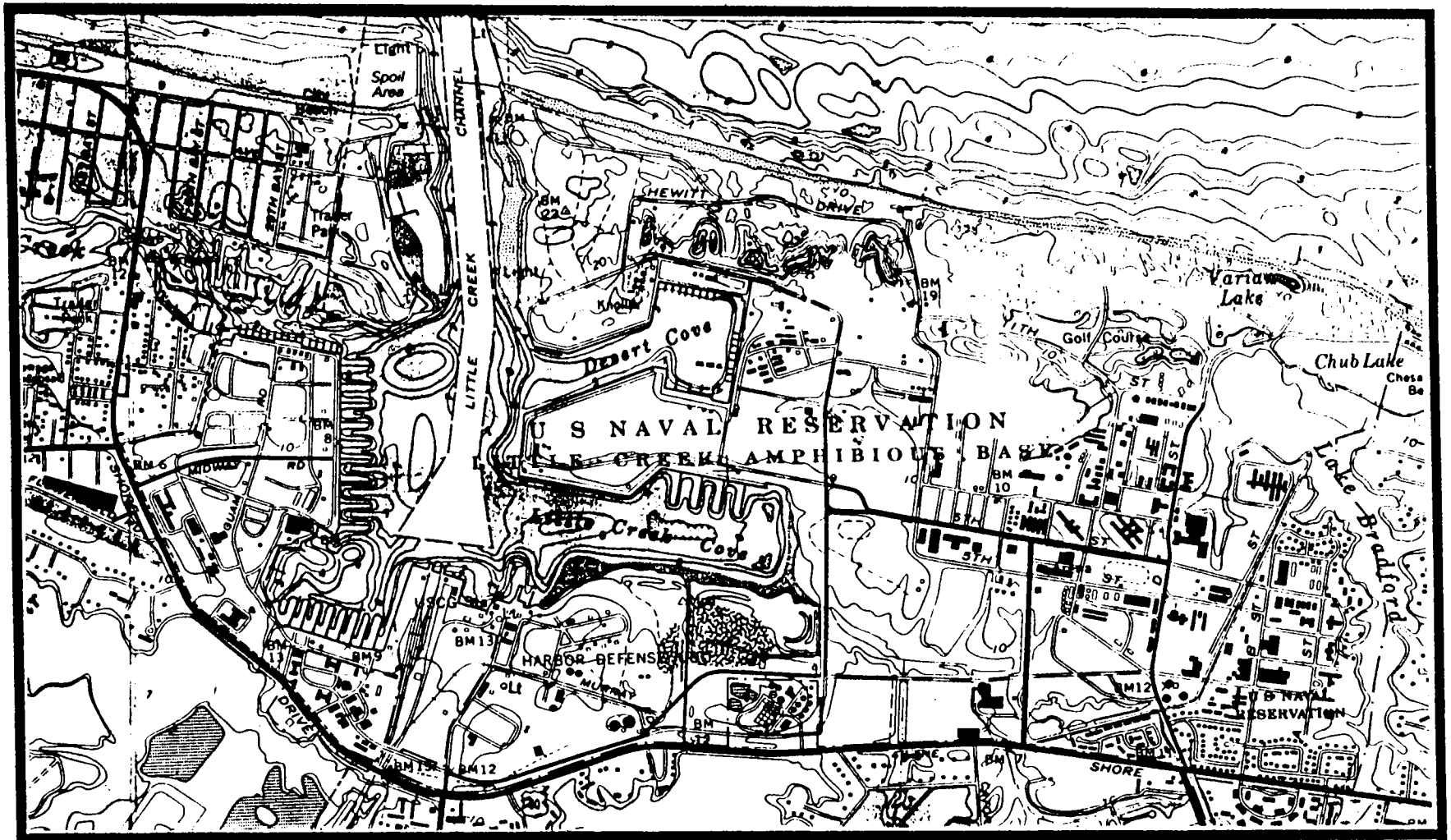
The purpose of this EE/CA is to evaluate the potential removal alternatives for effectiveness in minimizing or stabilizing the threat to public health, consistency with anticipated final remedial action, consistency with applicable or relevant and appropriate requirements (ARARs), and cost effectiveness.

The objective of this EE/CA report is to provide a brief analysis of removal alternatives for a site where cleanup action may be deferred for six months or more to accommodate the six month planning and evaluation period. This analysis is conducted following the removal program guidelines of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), the National Oil and Hazardous Substances Contingency Plan (NCP), and the Draft EE/CA Guidance for Non-Time-Critical Removal Actions dated June 1987, modified on March 30, 1988.

This EE/CA also follows the guidelines published in the Navy/Marine Corps IR Manual dated February, 1992, since the Department of the Navy (DON) has broad authority under CERCLA Section 104 and Executive Order 12580 to carry out removal actions when the release is on, or the sole source of the release is from, the DON installation. The Navy/Marine Corps Installation Restoration (IR) Program was initiated to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at Navy and Marine Corps activities.

1.2 Report Organization

A detailed description of the site, its background, the investigations to date and the nature and extent of contamination is presented in Section 2.0 of this report. Section 3.0 defines the scope of the removal action. Section 4.0 provides a description of potential removal alternatives for the site contaminants. Section 5.0 provides an individual evaluation of removal alternatives selected for the site. Section 6.0 provides a comparative analysis of the strengths and weaknesses of each alternative relative to the others, and Section 7.0 identifies the proposed removal action.



VIRGINIA

QUADRANGLE LOCATION

LITTLE CREEK AMPHIBIOUS BASE
VIRGINIA BEACH, VIRGINIA
SITE LOCATION MAP

Little Creek, VA Quadrangle
7.5 Minute Series (Topographic)

UTM GRID AND 1986 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Figure 2-1
Scale: 1" = 2000'

Prepared by:
Foster Wheeler Enviresponse, Inc.

RI/FS SITES
7 AMPHIBIOUS BASE LANDFILL
9 DRIVING RANGE LANDFILL
10 SEWAGE TREATMENT PLANT LANDFILL
11 SCHOOL OF MUSIC PLATING SHOP
12 EXCHANGE LAUNDRY WASTE DISPOSAL AREA
13 PCP DIP TANK/WASH RACK

SI SITES
5 BUILDINGS 9-11 DISPOSAL AREA
16 POLE 425 PCB SPILL

SITE 10
SITE 9
SITE 13
SITE 7
SITE 5
SITE 11
SITE 16
SITE 12

0 500' 1000' 1500'
1" = 500'

SOURCE: BASE MAP PROVIDED BY LANTDIV

FIGURE 2-2
BASE LOCATION MAP WITH
SITE LOCATIONS
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

FOSTER WHEELER ENVIRESPONSE INC.

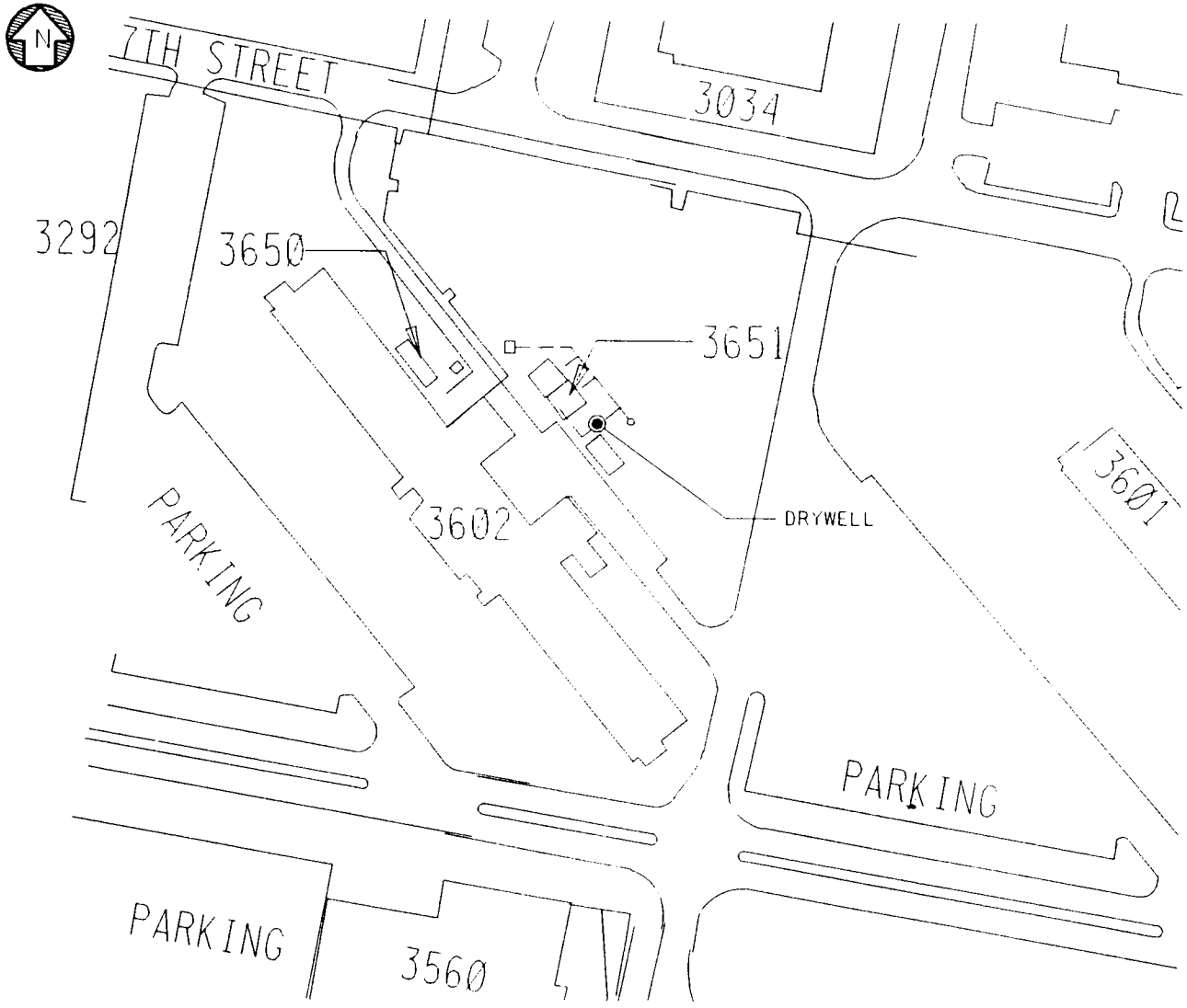
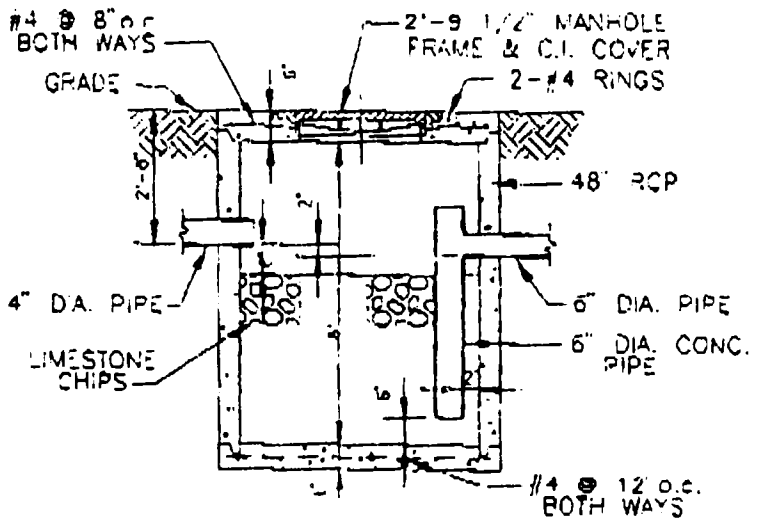
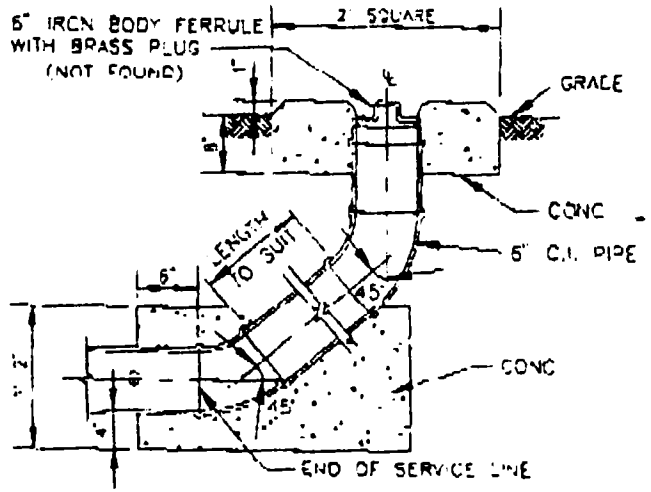


FIGURE 2-3
SITE 11
EE/CA REPORT
THE SCHOOL OF MUSIC PLATING SHOP
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA



ACID NEUTRALIZATION TANK

NOT TO SCALE



CLEANOUT DETAIL

NOT TO SCALE

FIGURE 2-3A
SITE 11
SCHEMATIC DRAWING
OF
NEUTRALIZATION TANK
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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NEESA (1984) reported that plating wastes were discharged into the neutralization tank during a ten-year period beginning in 1964. In 1974, the plating operations were transferred to a separate facility and discharges into the neutralization tank were discontinued. During its period of operation, the plating shop reportedly used silver cyanide, copper cyanide, chromic acid (brite dip), nickel plating baths, and various acids. In addition, lacquer strippers and lacquer were also used. Small quantities of these plating baths, acids, and lacquer strippers were disposed down the sink in the plating shop which drains into the neutralization tank and eventually into the sewer system. The IAS reported that approximately 10 gallons of each plating chemical and lacquer stripper were disposed in the shop sinks each year.

2.1.1 Climate

The climate of the Tidewater area is effected by the proximity of the Chesapeake Bay and the Atlantic Ocean. These two large water bodies attenuate seasonal climatic changes resulting in mild winters and warm summers. Average total annual precipitation is 45 inches, with approximately 56 percent of the rainfall occurring in April through September. The maximum 24-hour rainfall reported at Norfolk was 7.41 inches on August 31, 1964. Snowfall in the area averages approximately 7.2 inches per year (SCS, 1985). Temperatures for the region range from a winter average of 42°F to a summer average of 77°F. The hottest temperature recorded was 103°F on July 23, 1952 and the lowest temperature on record for the area was 5°F on January 17, 1977 (SCS, 1985). Relative humidity in the area ranges from an average of 58 percent at mid-afternoon to an average high of approximately 78 percent at dawn (SCS, 1985; IRI, 1991). The prevailing wind direction is to the northeast with an average speed of 12.2 mph (IAS, NEESA, 1984).

2.1.2 Geology and Hydrogeology

The Tidewater Area has low subdued relief. Elevations at NAB Little Creek range from mean sea level along the Chesapeake Bay and Little Creek Cove to elevations as high as 40 feet above mean sea level at some of the larger dunes along the Bay. The average elevation for the facility is about 10 feet above mean sea level. The primary surface features of the Tidewater Area are the many rivers, lakes and marsh areas.

As topographic relief across the site is slight, surface water or groundwater that is not intercepted by receptors may generally flow northward into either of the lakes located in the eastern part of the Base or into Chesapeake Bay. At the site, underground utilities, such as the dry well and the storm drain, might intercept groundwater flow and, in the case of the linear utilities, act to channel the flow.

Water level measurements from the three groundwater monitoring wells installed at the site do not indicate a defined groundwater flow at the site (RVS and RI). Groundwater is approximately 4 to 6 feet below ground level.

2.2 Site Investigations

2.2.1 Initial Assessment Study (IAS)

The IAS determined that contaminants may be migrating in the groundwater from this site. The recommendation from this study was the installation of three monitoring wells between 10 and 30 feet from the edge of the neutralization tank. Two soil samples were to be taken from each well site during installation and three soil samples were to be taken from the tank itself.

2.2.2 Round One Verification Report

This study included the collection of three groundwater and nine soil samples for analysis. The three shallow groundwater wells installed as part of this study are shown in Figure 2-4. The media sampled and the analyses performed are summarized in Table 2-1. Eight of the soil samples were collected from the boreholes drilled for monitoring well installation. One soil sample was collected from the dry well at a depth between 0.0 and 0.5 feet.

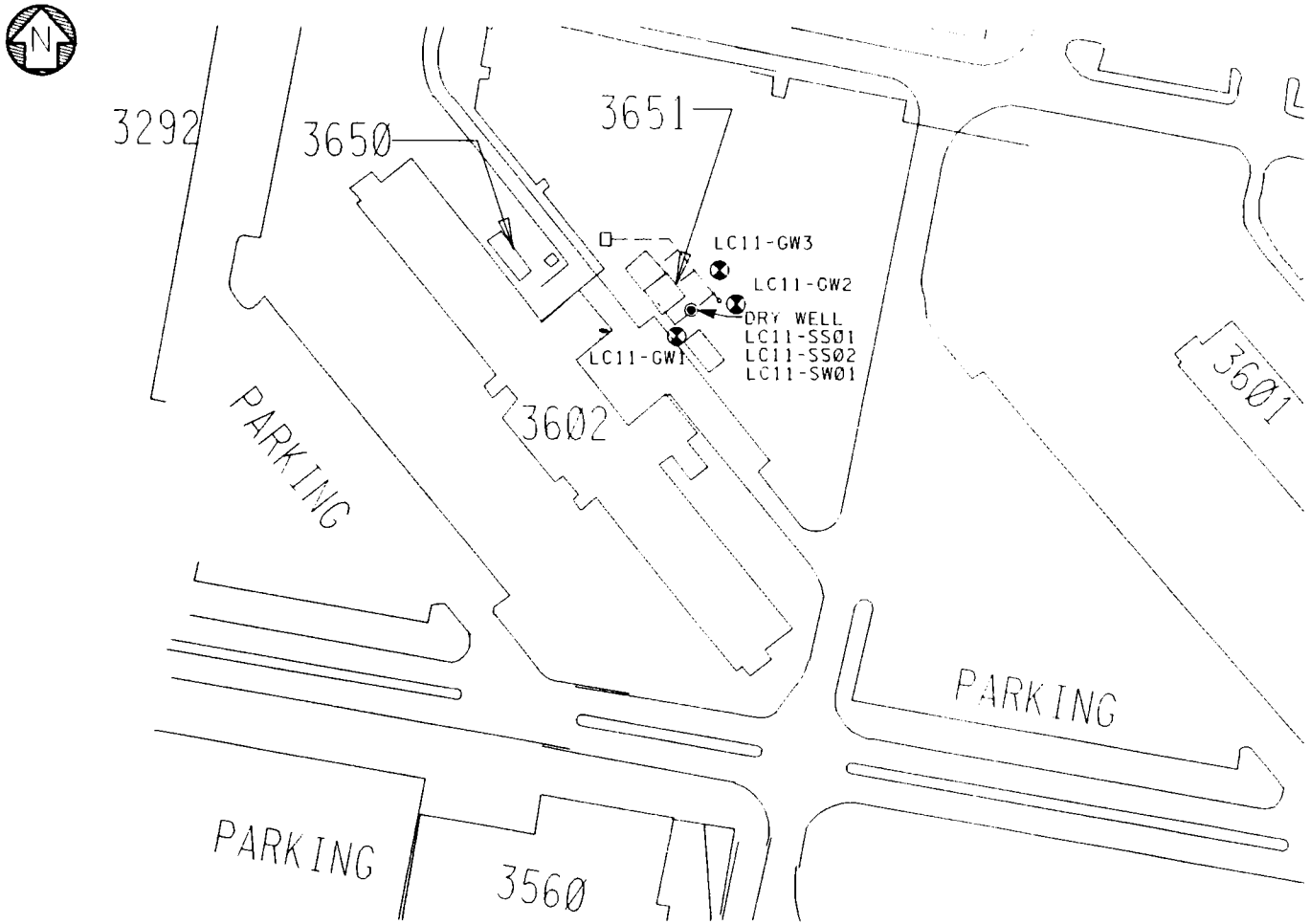


FIGURE 2-4
SITE 11
EE/CA REPORT
RVS AND IRI SAMPLING LOCATIONS
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

LEGEND

MONITORING WELL

0 100' 200' 300'

SCALE IN FEET

TABLE 2-1

SITE 11 – SCHOOL OF MUSIC PLATING SHOP
ROUND 1 VERIFICATION STEP
SUMMARY OF MEDIA SAMPLED AND ANALYSIS

DATE REPORTED: OCTOBER 1986

ANALYSES PERFORMED
ACID EXTRACTABLE ORGANIC COMPOUNDS
BASE-NEUTRAL EXTRACTABLE COMPOUNDS
CHROMIUM (HEXAVALENT)
ETYHYLENE DIBROMIDE
METALS
METHYL ETHYL KETONE
METHYL ISOBUTYL KETONE
OIL & GREASE
PESTICIDES AND PCBs
VOLATILE ORGANIC COMPOUNDS
XYLENE

MEDIA	NUMBER OF SAMPLES
GROUNDWATER	3
SURFACE WATER	0
SEDIMENT	0
SOILS	9

Concentrations of constituents in the samples were generally below or near detection limits. A summary of the constituents present in elevated concentration is provided in Table 2-2. The soil sample from the dry well (LC11-S1) had elevated (relative to other samples at this location) chromium (4,200 mg/kg) and cyanide (19 mg/kg). Methylene chloride was observed in all borehole soil samples; however, because it was not present in groundwater samples and is known to be a common laboratory contaminant, the Round 1 Verification Step concluded that methylene chloride detection was the result of laboratory contamination.

Eight VOCs were observed at LC11-GW1. The compounds 1,1-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichloroethene were all present in concentrations above the proposed MCLs. 1,2-dichloropropane was above the RMCL (Recommended Maximum Contaminant Level). The RVS report concluded that contamination from the plating shop remains in the soil at the dry well but is not currently migrating from the site. VOC contamination at LC11-GW1 was not attributed to the dry well and may have another unidentified source.

2.2.3 Interim Remedial Investigation

The IRI included the collection of representative samples of groundwater, soil and water from the neutralization tank. Table 2-3 presents a summary of the media sampled and the analyses performed. The groundwater samples were collected from each of the three wells on site (Figure 2-4). One soil sample was taken from the tank at a depth of 0.0 to 0.5 feet; another soil sample was collected from the tank at a depth of 1.5 to 2.0 feet. The IRI states that in both cases the sample consisted mostly of limestone chips with minor sediment that has accumulated in the tank. The water sample was obtained from the 12 to 18 inches of standing water present in the tank in December 1990. In addition, water level data were collected to determine groundwater circulation patterns at the site.

Water level data were collected from the Site 11 monitoring wells in December 1990 and March 1991. The IRI interpretation of these data is that groundwater flow is to the south, probably toward the water body south of the Amphibious Drive or possibly toward the canal near the new commissary at Site 12. Average hydraulic gradient observed at the site was 0.01 ft/ft.

A summary of those constituents present in elevated concentrations is summarized and compared to the earlier study in Table 2-4. Previous sampling of the School of Music monitoring wells in 1986 yielded a number of volatile organic compounds in well 11-GW1, including TCE, 1,1,1-trichloroethene (TCA), and 1,2-dichloroethane (DCA); all of these compounds were detected in concentrations above the MCL in the Round 1 samples. Although the same contaminants were again detected in the 1990 sample from well LC11-GW1, the detected concentrations were lower by an order of magnitude (or more) in comparison to 1986 results. Moreover, only TCE (57 ug/1) was detected in the 1990 sample in concentrations above the MCL.

Several other volatile organics, including trans 1,2-dichloroethene (DCE), chloroform and 1,2-dichloropropane, were detected in 1986 but not in 1990. Analysis of groundwater samples for the acid-extractable fraction of the TCL semivolatile organics group yielded only non-detect results in both 1986 and 1990.

No volatile organics or acid-extractable organics were detected in solid samples collected from the neutralization tank in 1990. Volatile organics analyses were not completed on the 1986 samples due to insufficient volume.

Total chromium and hexavalent chromium were the only inorganic parameters reported for groundwater from the 1986 round of sampling. All 3 of the monitoring well samples reported concentrations below detection limits. The concentrations of chromium (total), cadmium, and lead were slightly elevated in the 1990 groundwater samples. Filtered analyses were not conducted because none of the heavy metals were detected in concentrations exceeding the MCL. The trend observed at the other sites where filtered samples were collected (i.e., high concentrations in unfiltered samples are apparently associated with suspended sediment and not representative of actual water chemistry in the aquifer) would most likely have been observed at Site 11 as well.

TABLE 2-2

SITE 11 - SCHOOL OF MUSIC PLATING SHOP
SUMMARY OF DETECTED ELEVATED CONSTITUENT CONCENTRATIONS
ROUND 1 VERIFICATION STEP

DATE REPORTED: OCTOBER 1986

CONSTITUENT	SOIL mg/kg LC11-S1	RISK-BASED ACTION LEVLES mg/kg (developed by EPA Region III)	GROUNDWATER ug/l LC11-GW1	FEDERAL MCLs ug/l
Chromium (total)	4,200	5100 (1)	5 U	100
Cyanide	19	20000	5 U	200 (2)
1,1-Dichloroethene			34	7
1,1-Dichloroethane			17	
1,2-Dichloroethane			37	5
Trans 1,2-Dichloroethene			1.9	100
Chloroform			3.2	100 (3)
1,1,1-Trichloroethane			340	200
Trichloroethene			490	5
1,2-Dichloropropane			6.5	5

NOTE: (1) The standard is for Chromium-VI, No data was reported for Chromuim-VI in 1986 due to matrix interference.
(2) This is a Federal Water Quality Criteria, although not an MCL.
(3) for total trihalomethanes

TABLE 2-3

SITE 11 – SCHOOL OF MUSIC PLATING SHOP
INTERIM REMEDIAL INVESTIGATION
SUMMARY OF MEDIA SAMPLED AND ANALYSIS

REPORTED NOVEMBER, 1991

MEDIA SAMPLED	CONSTITUENT				
	TCL			TAL METALS	
	VOC	ACID EXTRACTABLES	CYANIDE	UNFILTERED	CR(+6)
GROUNDWATER					
Number of locations sampled	3	3	3	3	3
SEDIMENT (FROM TANK)					
Number of locations sampled	2	2	2	2	2
SUFACE WATER (FROM DRY WELL)					
Number of locations sampled	1	1	1	1	1

NOTE:
All three monitoring wells which were installed at Site 11 during the Round 1 Verification Step were re-sampled.

TABLE 2-4

SITE 11: SCHOOL OF MUSIC PLATING SHOP
SUMMARY OF CONSTITUENT DETECTED IN ELEVATED CONCENTRATIONS

ROUND 1 VERIFICATION STEP
AND
INTERIM REMEDIAL INVESTIGATION

	1990	SOIL (IN TANK) mg/kg			RISK-BASED	GROUNDWATER µg/l						Federal MCL
	TANK AQUEOUS	1986	1990		ACTION LEVELS by EPA Region III	1986			1990			µg/l
CONSTITUENT	LC11-SW1	LC11-S1	LC11-S1	LC11-S2	mg/kg	LC11-GW1	LC11-GW2	LC11-GW3	LC11-GW1	LC11-GW2	LC11-GW3	
Barium	2,490				72000							2000
Cadmium	59.0				510	NA	NA	NA	8.0	5.0	5.0(e)	5
Chromium (total)	36,700	4,200	12,300	732	5100	<5	<5	<5	40	40		100
Copper	31,500	NA	12,200	382	38000							1,000
Cyanide		19	NA	NA	20000							200
Lead	1,670	NA	743	36		NA	NA	NA	24	23	3.2(b)	15
Mercury		NA	14	3.8	310							2
Nickel		NA	2220(e)	49	20000							100
Silver		NA	1410	117	5100							100
Zinc	12,300	NA			310000							5,000

NOTE:

No sampling and analysis of aqueous material from the tank was performed in 1986.

(a) Text in IRI report describes values as PPM while their table reports values in PPB.

(b) Blank contamination.

(e) Estimated.

BMDL indicates Below Method Detection Limit.

NA indicates Not Analyzed

ND indicates Not Detected

+ The Nickel value is Virginia Surface Water Standard for Protection of Human Health.

TABLE 2-4 (CONTINUED)

SITE 11: SCHOOL OF MUSIC PLATING SHOP
SUMMARY OF CONSTITUENT DETECTED IN ELEVATED CONCENTRATIONS

ROUND 1 VERIFICATION STEP
AND
INTERIM REMEDIAL INVESTIGATION

	1990	SOIL (IN TANK) mg/kg			RISK-BASED	GROUNDWATER µg/l						Federal MCL
	TANK AQUEOUS	1986	1990		ACTION LEVELS by EPA Region III	1986			1990			µg/l
CONSTITUENT	LC11-SW1	LC11-S1	LC11-S1	LC11-S2	mg/kg	LC11-GW1	LC11-GW2	LC11-GW3	LC11-GW1	LC11-GW2	LC11-GW3	
1,1-Dichloroethane					100000	17	BMDL	BMDL	*	*	*	
1,2-Dichloroethane					31	37	BMDL	BMDL	ND**	ND**	ND**	5
1,1-Dichloroethene					4.8	34	BMDL	BMDL	6.49	0.1(e)	0.1(e)	7
1,1,1-Trichloroethane						340	BMDL	BMDL	33.56	0.1(e)	0.1(e)	200
1,1,1-Trichloroethene						490	BMDL	BMDL	57.0	0.1(e)	0.1(e)	5
1,2-Dichloropropane						6.5	BMDL	BMDL	ND***	ND***	ND***	5
Trans 1,2-Dichloroethene						1.9	BMDL	BMDL	****	****	****	100
Chloroform						3.2	BMDL	BMDL	ND	ND	ND	100 (c)

NOTE:

No sampling and analysis of aqueous material from the tank was performed in 1986.

(a) Text in IRI report describes values as PPM while their table reports values in PPB.

(b) Blank contamination.

(e) Estimated.

BMDL indicates Below Method Detection Limit.

ND indicates Not Detected

* IRI report gives two results for 1,1-dichloroethane.

** The IRI report incorrectly states that the 1986 concentration for 1,2-dichloroethane was 6.5 ppm.

*** The IRI report incorrectly states that the 1986 concentration for 1,2-dichloropropane was 1.9 ppm.

**** Analysis for 1,2-dichloroethene was not reported.

(c) for total trihalomethanes

Inorganic constituents were significantly elevated in the waste samples from the neutralization tank, particularly in the soil matrix. Only chromium (total) was reported from the Round 1 sample of soil in the tank, although the reported concentrations were high (4,200 mg/kg). In the 1990 soil samples, high levels of chromium, lead, mercury, silver and other metals were reported. Many of these metals were detected in concentrations greater than 1000 mg/kg in the shallow sample (0-0.5 feet) from the tank. The deeper sample (1.5-2.0 feet) contained significantly lower concentrations than the shallow sample, in most cases at least one order of magnitude less.

The aqueous sample from the neutralization tank contained high concentrations chromium (36,700 ug/1), cadmium (59 ug/1), lead (1,670 ug/1), barium (2,490 ug/1) zinc (12,300 ug/1) and copper (31,500 ug/1). The liquids in the tank were not sampled in 1986.

The IRI reports that Site 11 has two separate contamination issues, the neutralization tank and the shallow groundwater. For the tank, the solid and aqueous materials within it are obviously contaminated with chromium and a variety of other heavy metals. The concrete sides and bottom of the tank are apparently in good condition and not leaking; if the opposite were true, the surrounding groundwater would show signs of heavy metal contamination. The tank does not, on the basis of the 1990 samples, appear to be the source of the volatile organic contamination detected in monitoring well 11-GW-1; however, this linkage cannot be ruled out given the likelihood that both plating baths and solvents would have been components of the waste stream at the plating shop.

For groundwater, the general trend between 1986 and 1990 was a decrease in the number of contaminants and in the magnitude of contamination detected. In 1990, only one well, 11-GW-1, yielded a sample with contamination; this well had also yielded the highest concentrations of volatile organics in 1986. Assuming the well is downgradient of the source of volatile organic contamination and the direction of flow identified on the basis of the 1990-91 water level readings is constant, the source area for the solvent could be the neutralization tank. A southerly groundwater flow has been observed and 11-GW-1 lies south-southeast from the tank.

Discontinuation of both plating operations and the transfer of wastes into the neutralization tank have served to effectively eliminate the addition of new volatile organic material to the site. The lack of new material means that the existing source, most likely contaminated soil associated with the drainage or sewer lines near Building 3651, is slowly being depleted but continues to be an active (albeit diminishing) source of contamination. Continued depletion of the source will occur due to flushing, volatilization, biodegradation and other processes.

2.2.4 Remedial Investigation

The Baker Team is currently performing an RI/FS at the site. Phase I of the investigations consisted of a soil gas survey and collection of ten surface soil samples in May 1993. Figure 2-5 shows the soil gas and surface soil sampling locations. Phase II consisted of the collection of groundwater samples from each of the three monitoring wells in July 1993.

Thirty-two soil gas samples were collected at a depth of four feet, except samples 206 and 222 which were collected at 2 feet due to probe refusal. The initial soil gas samples were screened on-site with a portable Photovac gas chromatograph (GC) equipped with a PID in order to guide the placement of subsequent sampling locations. No BTEX compounds were detected in this on-site PID screening. Subsequently the samples were subjected to dual analyses according to both EPA Method 601 on a GC equipped with an ECD, and EPA Method 602 on a GC equipped with a FID. Chlorinated hydrocarbons were selected for standardization in the first method of analyses and BTEX compounds were selected for standardization in the second method. The analyses did not detect any of these compounds.

Surface soil samples were collected at ten locations at a depth of 0 to 6 inches. The samples were analyzed for TCL VOCs using the EPA CLP methods. No VOCs were detected at the site except acetone and toluene. Acetone was detected at seven of the ten locations sampled to a maximum concentration of 29 ppb. These occurrences are not attributed to the historical activities at the plating shop. Toluene was detected in only one of the ten samples at an estimated concentration of 3 ppb. The concentration is estimated because it is below the Contract Required

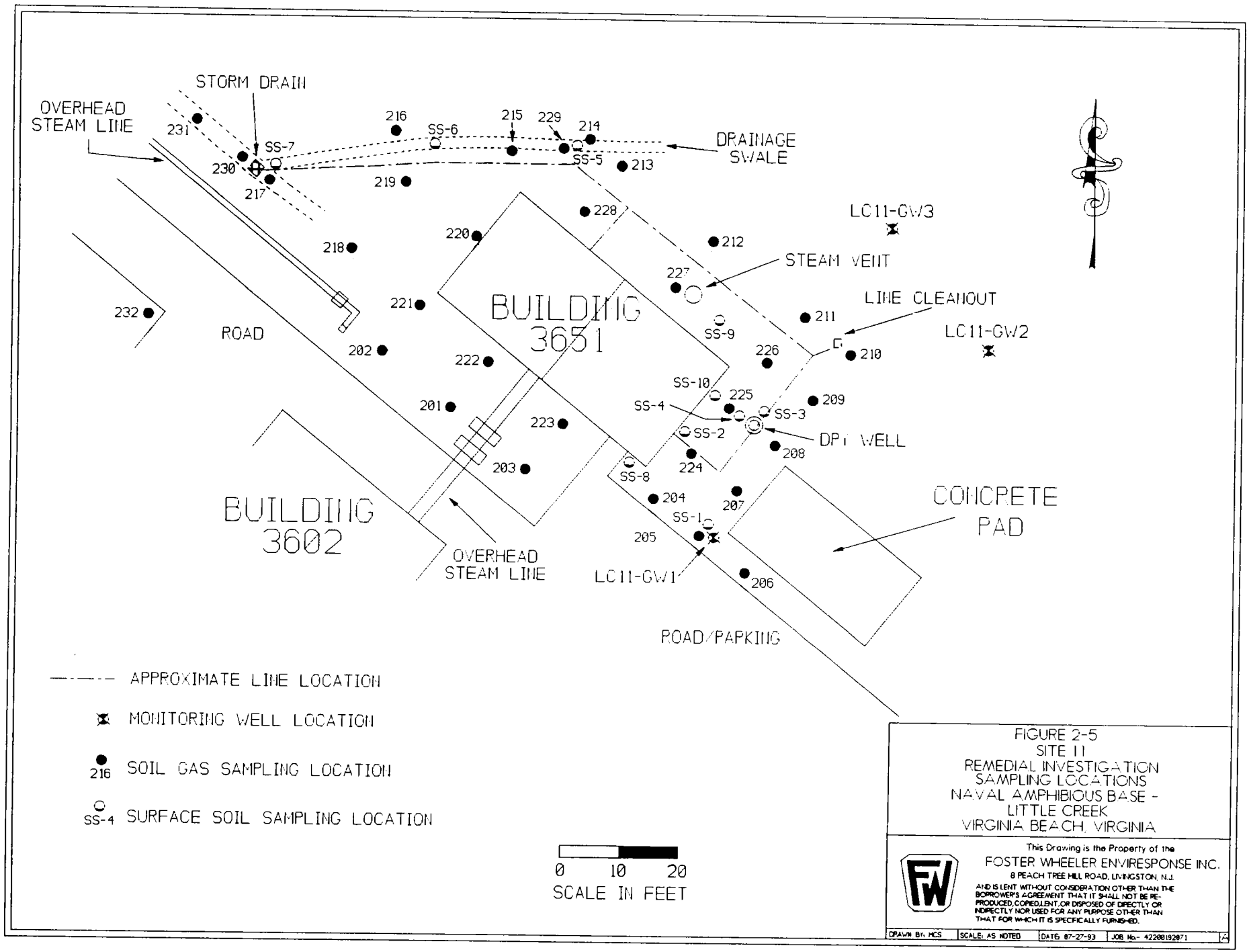


FIGURE 2-5
SITE 11
REMEDIAL INVESTIGATION
SAMPLING LOCATIONS
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

DRAWN BY: MCS | SCALE: AS NOTED | DATE 07-27-93 | JOB No- 4220B192071 | A

Quantitation Limit (CRQL) of 10 ppb. The concentration is well below the Virginia regulated cleanup level of 10 ppm.

Water level data were collected during Phase II of the investigation in July 1993. A southwesterly groundwater flow was observed with a hydraulic gradient of 0.0055 ft/ft. This tends to confirm the IRI findings that the source of contamination observed in LC11-GW1 may be in the vicinity of the neutralization tank. Analytical results of the Phase II investigations are not yet available. However, only groundwater samples were collected in Phase II and groundwater remedial activities are not part of the scope of this action.

2.3 Site Conditions That Justify a Removal

Sampling and analysis activities at Site 11 have confirmed heavy metal contamination in the neutralization tank and organic contamination in the shallow aquifer. The tank contents are a potentially significant source of groundwater contamination and a possible threat to human health and the environment through overflows or a collapse of the structure. Therefore, a removal response action is highly recommended.

Surrounding soils have not exhibited contamination of any significant levels so far, and there are no potential sources of shallow groundwater contamination other than the tank and the past activities at the site. It is quite probable that if the removal action is completed in a timely manner, further remedial actions may not have to be undertaken at the site. Therefore, consideration of analysis of removal alternatives is deemed highly desirable, which is the objective of this report.

3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

The objectives of this removal action is to address any potential sources of soil and groundwater contamination at Site 11. The neutralization tank, its contents, and the associated piping have been identified as potential sources during the site investigation to-date. Therefore, the objective of the removal alternatives is to address these sources in order to reduce the potential threat to human health and the environment.

This removal is considered to be partial site remediation. While complete remediation of all media will be considered further in the ongoing RI/FS, the removal action should be consistent with the anticipated final remedial action.

3.1 Statutory Limits on Removal Action

The National Contingency Plan dictates statutory limits of $2 million and 12 months on EPA fund-financed removal actions, with statutory exemptions for emergencies and actions consistent with the remedial action to be taken. This removal action will not be EPA fund-financed. The Navy/Marine Corps IR Manual does not limit the cost or duration of the removal action; however, cost effectiveness is a recommended criterion for evaluation of removal action alternatives. In any event, removal action at Site 11 is not expected to require any exemptions on cost and schedule limits. This EE/CA will carry out the selection of the removal alternatives to meet the cost effectiveness criterion.

3.2 Removal Action Scope

The scope of this removal action includes the neutralization tank and the associated piping, upstream from Building 3651 and downstream to the drainage ditch. The surrounding soils are included in the scope of this removal action. But the shallow groundwater has been excluded, since its source can not be conclusively traced to the neutralization tank. The remediation of groundwater will be considered as part of the base-wide RI/FS, currently being conducted by the Baker Team. Figure 3-1 shows the area targeted for this removal action. The removal action will consist of excavation, storage, sampling, disposal of some or all of the affected areas, and subsequent restoration of the disturbed areas.

A list of the items of work involved in this removal action varies with removal alternatives. Hence, such a list is presented with the discussion of alternatives in Section 5.0.

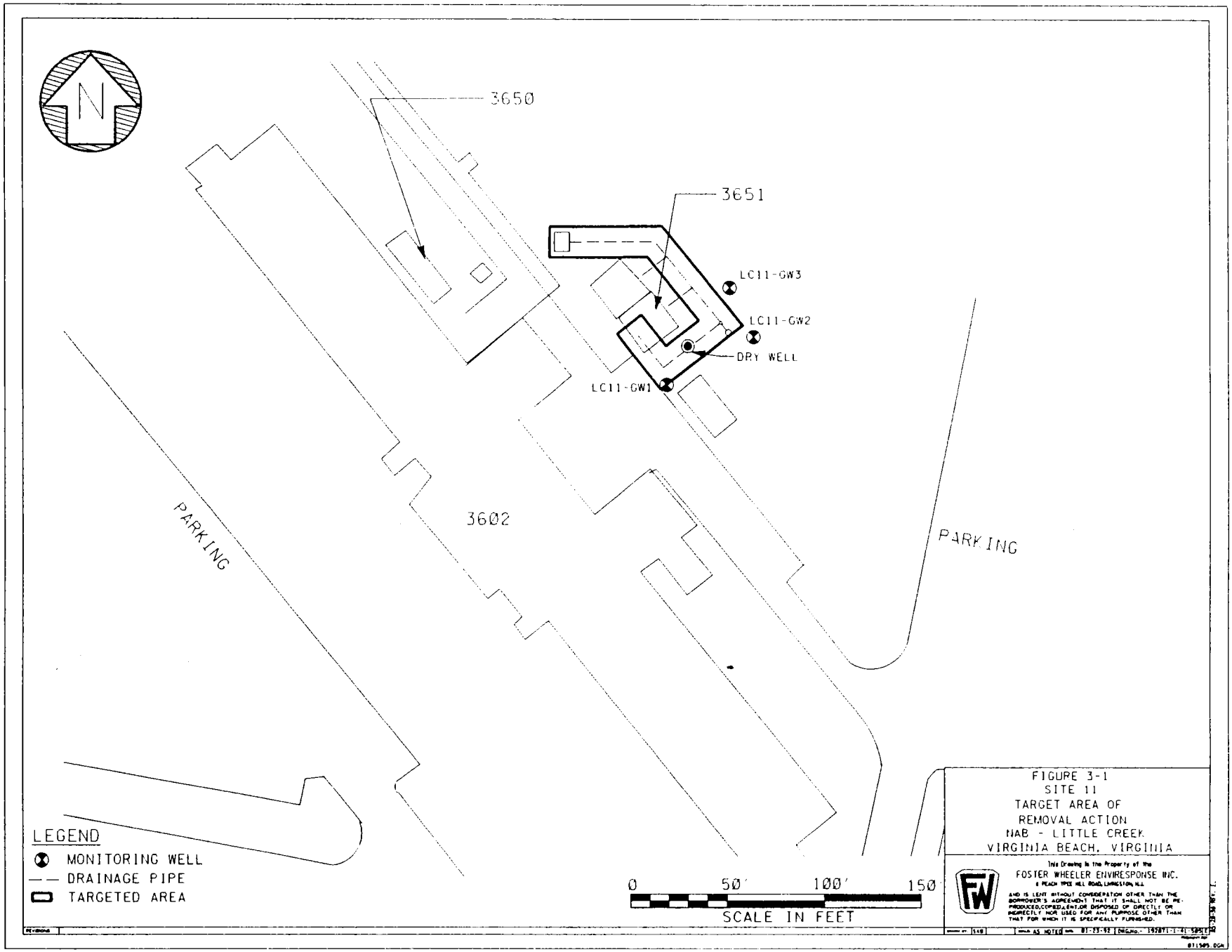
3.3 Removal Action Schedule

The schedule objective for the Removal Action is completion within 12 months from the time of approval of the Action Memorandum. Since this Removal Action has been designated non-time-critical, the start date will be determined by factors other than the urgency of the threat. Possible factors include weather conditions, the availability of resources, normal procurement periods, and other activities at the site. Review periods and public comment periods will not affect the time-frame, since these issues will be accounted for prior to the release of the Action Memorandum.

A preliminary breakdown of the schedule is provided below:

- Action Memorandum : Day Zero
- Contract Award : Day 30
- Contract Completion : Day 210

This schedule is expected to be similar for all alternatives involving actual removal. This schedule can be expedited if 48-hour turnaround for laboratory analyses is requested at an additional cost.



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3.4 Applicable or Relevant and Appropriate Requirements (ARARs)

The 1990 National Oil and Hazardous Substances Pollution Contingency Plan (NCP), while not requiring that removal actions attain applicable or relevant and appropriate Federal and State requirements, recommends that to the extent practicable they be attained. These guidelines, which are known as ARARs for the site, may be specific to the conditions present on the site or may be meant to address similar situations and, therefore, are suitable for use at the site.

The Department of the Navy, which is the lead agency for this site, has determined the federal ARARs for this removal action and listed the proposed state ARARs. USEPA will play a major role in reviewing the federal ARARs for the Removal Action. The Virginia Department of Environmental Quality will confirm the identification of state ARARs and provide additional ARARs, if necessary.

Three factors are applied to determine whether the identification and attainment of ARARs is practicable in a particular removal situation: (1) the exigencies of the situation; (2) the effect of ARAR attainment on the statutory limits for removal action duration and cost; and (3) the criteria listed under SARA section 121(d)4 providing conditions under which ARARs may be waived. The first two factors do not apply to this action. This EE/CA by definition is for a non-time-critical removal action, and as such, urgent conditions do not constrain or preclude efforts to attain ARARs. Statutory limits on removal time and cost are not applicable for removal actions not funded by the EPA or State. Therefore the attainment of ARARs should not be affected by the exigencies of the situation or by the statutory limit in the scope of the removal action.

The criteria listed under SARA section 121(d)4 for which ARARs may be waived include the following:

- Interim remedy waiver
- Greater risk to health and the environment
- Technical impracticability
- Equivalent standard of performance
- Inconsistent application of State requirements

The analysis of removal alternatives will determine if all ARARs can be attained at a site and if the action qualifies for an exception under SARA. If all ARARs cannot be attained, the removal action will be evaluated against those ARARs which are most crucial to the proper stabilization of the site and to the proper protection of public health and the environment until removal action can provide additional protection.

ARARs are generally divided into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are particular to individual contaminants. Location-specific ARARs depend upon the location of the contamination and potential restrictions on activities conducted in these areas (i.e., wetlands, floodplains, etc.) Action-specific ARARs, as the name implies, govern the removal actions. Action-specific ARARs are usually technology- or activity-based directions or limitations that control actions taken at CERCLA sites sites.

The following sections present the ARARs which must be attained or considered as part of the removal action scope at Site 11. Included are the recommended clean up goals for contaminated soils.

3.4.1 Chemical-Specific ARARs

- Site Specific Cleanup Goals for Soil - The contaminant cleanup levels, listed on the next page, have been developed to assure removal of all contaminated soil to levels which do not pose a health risk due to direct contact with the soil in an industrial setting. These levels have been established in the latest EPA Region III Risk-based Concentration Tables, Second Quarter 1993. Unless noted otherwise, cleanup goals for carcinogens have been derived for an incremental cancer risk of 10^{-6}, and noncarcinogenic cleanup levels have been derived for a Hazard Index (HI) of 0.2. Confirmation samples taken after excavation of contaminated soil and debris must be lower than these levels for the removal to be considered complete.

Chemical of Concern	Cleanup Goal for Industrial Soil (mg/kg)
Barium	72,000
Cadmium	510
Chromium (III)	1,000,000
Chromium (VI)	5,100
Copper	38,000
Cyanide	20,000
Mercury	310
Nickel	20,000
Silver	5,100
Zinc	310,000
1,1-Dichloroethane (DCA)	100,000
1,2-Dichloroethane (DCA)	31
1,1-Dichloroethylene (DCE)	4.8
Trans 1,2-Dichloroethylene (DCE)	20,000
1,2-Dichloropropane	42
Trichloroethene (TCE)	260
Toluene	200,000

- Identification and Listing of Hazardous Waste - The criteria for identifying the characteristics of hazardous waste and for listed hazardous wastes are provided in RCRA, 40 CFR Part 261 and Virginia Waste Management Regulations VR 672-10-1. Any wastes found to be RCRA hazardous wastes will be stored, treated and/or disposed according to the applicable regulations in these sections.

This removal action will not address groundwater contamination as stated in Section 3.2. Surface waters will not be impacted.

Air emissions are not expected to be a concern during these removal activities. However, the following standards regulate the air emissions resulting from such activities:

- National Ambient Air Quality Standards - The Clean Air act gives the criteria and requirements for ambient air quality monitoring and the requirements for reporting ambient air quality data and information. Virginia DEQ has been delegated authority to implement these standards using Virginia Air Pollution Control Regulations. Based on these regulations, air at and around NAB Little Creek Site 11 will be monitored to ensure compliance with these standards.

3.4.2 Location-Specific ARARs

- Endangered Species Act (16 USC 153) - The Endangered Species Act requires action to avoid jeopardizing the continued existence of listed endangered or threatened species or modifications to their habitat. There are no endangered species observed at the site in the area targeted for removal action.

- National Historic Preservation Act (NHPA) - LANTDIV natural resource personnel have reviewed the proposed Removal Action and determined that the action does not constitute an undertaking and Section 106 of the NHPA does not apply. The removal action is confined to an historically disturbed area so that no National Register eligible archeological properties will be affected.

3.4.3 Action-Specific ARARs

The following action specific ARARs are relevant to the planned removal activities:

1. Excavation/Offsite Disposal of Soils is regulated under Virginia Waste Management Act, Code of Virginia Sections 10.1-1400 et seq.; Virginia Hazardous Waste Management Regulations (VHWMR) (VR 672-10-1); Virginia Solid Waste Management Regulations (VSWMR) (VR 672-20-10), as well as the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U. S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Parts 107, 171.1-172.558.

   a. If the remedial response contemplated involves storage, treatment or disposal of a VHWMR/RCRA hazardous waste, various VHWMR/RCRA requirements may need to be complied with as specified in VHWMR and/or the applicable 40 CFR Parts. Because Virginia administers an authorized state RCRA program, the Virginia Hazardous Waste Management Regulations (VHWMR) will serve as the governing ARAR in place of the RCRA regulations contained in the 40 CFR Parts, except for the Land Disposal Restrictions of 40 CFR Part 268.

   b. The transportation of hazardous waste must be conducted in compliance with VHWMR (VR 672-10-1) Part V (Manifest Regulations for Hazardous Waste Management),and Part VII (Regulations Applicable to Transporters of Hazardous Waste), VHWMR (VR 672-30-1) Regulations Governing the Transportation of Hazardous Materials, and 49 CFR Parts 107, 171.1-172.558.

   c. The deposits of any soil, debris, sludge or any other solid waste from a site must be done in compliance with VSWMR (VR 672-20-10). Contaminated material from the site that is not classified as hazardous may be classified as a special waste under Part VIII of VSWMR. Specific authorization from VDWM is required before a landfill operator in Virginia can accept special wastes.

2. Land Disturbing Activities are regulated under the Virginia Stormwater Management Act, Sec. 10.1-603.1 et seq.; Virginia Stormwater Management Regulations (VR 215-02-00), the Virginia Erosion and Sediment Control Law, Code of Virginia 10.1-560 et seq., the Virginia Erosion and Sediment Control Regulations (VR 625-02-00), as well as local stormwater management and sediment and erosion control programs administered by the County Design. Plans concerning these activities will be submitted by the DEQ-Waste Division to the locality for review before any land-disturbing activity.

The following regulations should be referenced on an as-needed basis during the removal action:

- RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264) - This regulation play a role in determining the final destination of the excavated soils or other disposal materials from the site. 40 CFR Part 264 regulates the treatment, storage and disposal of hazardous waste. It will be determined which chemicals found on site are RCRA listed or characteristic hazardous wastes. If RCRA hazardous wastes are found to be present on site, all applicable rules and regulations as stated in 40 CFR Part 264 will be followed and the appropriate coordination will be obtained.

- RCRA Land Disposal Restrictions (40 CFR 268) - 40 CFR Part 268 identifies those RCRA hazardous wastes that are restricted from land disposal. Waste that is land disposal restricted would be shipped off site for disposal with the proper labels, manifests, and notification forms indicating that the waste is land disposal restricted.

- OSHA (29 CFR 1910, 1926, 1940) - These regulations provide occupational safety and health requirements applicable to workers engaged in on site field activities. It is required that the regulations be followed for site workers during construction and operation of removal activities. Therefore, all workers will be made aware of the regulations and they will be enforced by the Site Health and Safety Officer during all removal activities.

- DOT Rules for Hazardous Materials Transport (49 CFR 107, 171.1 - 171.500) -The wastes from the removal activities will be classified for transportation based on the chemicals present in the material.

Shipping papers (including hazardous waste manifests) will be prepared that describe the hazardous material offered for transportation and will include contents, shipper's name, proper shipping name, hazard class, identification number, total quantity, and certification that the material is presented according to DOT regulations. All wastes will be packaged according to DOT regulations with the proper markings on each container.

4.0 IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

The following section presents a discussion of potential removal action technologies for the School of Music Plating Shop site. Three alternatives are identified to accomplish the removal action objectives identified in Section 3.0. The latest EE/CA guidance, dated March 30, 1988, does not requires the No Action Alternative for evaluation. Furthermore, the initial screening of alternatives is not required. Therefore, all removal alternative are presented briefly in this section, and analyzed in detail in Section 5.0.

4.1 Alternative 1: Institutional Control

Institutional controls are non-engineering solutions to prevent public access to the site or movement of contaminated media. Applicable restrictions at Site 11 would involve notification to the base personnel not to undertake any intrusive activities at the location of the tank or the drainage pipe. This alternative may also include periodic monitoring and analyses of surface soil and groundwater samples at the site to determine when or if an alternative response action may be implemented.

4.2 Alternative 2: Removal of the Tank Contents

The contents of the tank will be removed and collected in 55-gallon drums and roll-off boxes for disposal. The aqueous contents of the tank will be pumped out in the form of a slurry. The solid contents of the tank will be removed using earth-moving equipment, if necessary. The tank will be rinsed/ flushed with clean water to remove any trace constituents of concern remaining. Then the tank will be filled with clean soil and abandoned in place. The pipeline will not be flushed/cleaned as part of this alternative. The materials removed from the tank will be sampled for analyses of RCRA characteristics; ignitability, corrosivity, reactivity, and toxicity; using Toxicity Characteristic Leaching Procedure (TCLP) and then disposed off at an appropriate disposal facility.

4.3 Alternative 3: Removal of the Tank and Associated Piping

The contents of the tank will be removed and collected in 55-gallon drums and roll-off boxes for disposal. The aqueous contents of the tank will be pumped out in the form of a slurry. The solid contents of the tank will be removed using earth-moving equipment, if necessary. The soil around the tank and the drain pipe will be excavated to facilitate removal of the tank and the pipe. Excavations away from these fixtures are not deemed necessary, since constituents of concern have not been found in the surrounding soil. The tank and pipe assembly will be removed and disposed of at a RCRA-permitted facility as a hazardous waste.

5.0 ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section presents a detailed analysis of the removal alternatives developed in Section 4.0. This analysis is conducted to provide sufficient information to adequately compare the alternatives, select an appropriate removal action for the site, and demonstrate satisfaction of the CERCLA removal selection requirements in the Action Memorandum. Each alternative will be evaluated individually based on the criteria cited in the EPA Guidance for EE/CA, dated March 30, 1988. These criteria are:

- Effectiveness,
- Implementability,
- Costs.

The Navy/Marine Corps IR Manual, which parallels the EPA guidance document, recommends that criteria for evaluation removal alternatives include:

- Effectiveness to minimize the threat to public health,
- Consistency with anticipated final remedial action,
- Consistency with ARARs, and
- Cost effectiveness.

Together, these two guidance documents will form the basis for this evaluation.

5.1 Alternative 1: Institutional Control

This alternative consists of the following items of work:

(1) Access to the site will not be restricted; since the current conditions do not pose any threat to human health.

(2) A clear sign prohibiting any intrusive activities at the location of the neutralization tank will be exhibited.

(3) Three surface soil samples will be collected semi-annually for a period of one year. These samples will be analyzed for VOCs and TAL inorganics.

(4) At the end of one year, site conditions will be reevaluated to assess the need for any further action.

(5) Further remedial activities will be conducted at the site, if the on-going RI/FS recommends such actions.

5.1.1 Effectiveness

Protectiveness : No contaminants of concern have been found in the soils surrounding the neutralization tank. The source of groundwater contamination can not be conclusively traced to the site soils or previous site activities. The heavy metal contaminants in the tank itself are secure and restricted to the inside of the tank and do not pose any significant exposure risks to the on-site personnel. These wastes can be handled as part of the base-wide RI/FS. Therefore, this alternative does not compromise the protection of human health and the environment. However, the tank has not been tested for leaks, and future threats to the human health and the environment can not be ruled out. Chemical-specific ARARs will not be attained since the heavy metals will remain on site. In addition, warning signs are not highly reliable in preventing intrusive activities.

Use of Alternatives to Land Disposal: This evaluation criteria is not applicable to the Institutional Control alternative.

5.1.2 Implementability

Technical Feasibility: Sampling and analysis techniques are routine and feasible. A conclusive review of the data at the end of a one-year period should be feasible. However, this alternative does not meet the SARA requirement that the removal actions should contribute to the efficient performance of long-term remedial actions.

Availability: Equipment, materials, and personnel to implement this alternative are readily available. Availability of a proper location to display the warning sign, should be checked with the NAB personnel since it is an administrative issue.

Administrative Feasibility: The implementations of this alternative does not require any permits. However, the likelihood of public and state acceptance of this alternative is low.

5.1.3 Costs

Total costs to implement this alternative are $14,950. Details of the costs are shown in Table 5-1.

5.2 Alternative 2: Removal of the Tank Contents

This alternative consists of the following items of work:

(1) Access to the site will be restricted during the performance of removal activities.

(2) The liquid waste in the tank will be pumped out to the 55-gallon drums. The volume of liquid waste in the tank is expected to be 205 gallons, which will need five drums. The limestone chips as well as any associated sediment or sludges from the neutralization tank will then be removed using earth-moving equipment, if necessary. The volume of such materials is expected to be 2.5 cubic yards, but no more than six cubic yards. These materials will be temporarily stored in a roll-off box at the site. The tank will be flushed with clean water and the contaminated water will be stored in 55-gallon drums. The volume of this water is expected to be about 400 gallons or eight 55-gallon drums, or two cubic yards.

(3) Two samples will be analyzed for RCRA characteristics. One sample each will be taken for aqueous and solid contents of the tank.

(4) Once the sampling results are available, the liquid and solid waste will be transported to an appropriate disposal facility. For the purposes of cost estimation, it is assumed that none of the waste will exhibit RCRA characteristics except the liquids removed from the tank with a volume of 205 gallons.

(5) Three surface soil samples will be collected semi-annually for a period of one year. One sample will be a composite of samples collected from the top of the backfilled tank, and one each will be composited on the downstream and upstream ends of the drain pipe. These samples will be analyzed for VOCs and TAL Inorganics.

(6) After completion of all of the activities associated with this removal action, a report will be prepared documenting the results.

(7) Further remedial activities will be conducted at the site, if the on-going RI/FS recommends such actions.

TABLE 5–1

COSTS OF REMOVAL ALTERNATIVES

ALTERNATIVE 1 : INSTITUTIONAL CONTROLS

ENGINEERING EVALUATION/ COST ANALYSIS REPORT

NAB LITTLE CREEK : SITE 11 : SCHOOL OF MUSIC PLATING SHOP

NAVY CLEAN CTO–0042

COST ELEMENT	UNITS	UNIT COSTS	COSTS
Institutional Controls	LS	$2,000	$2,000
Mobilization and Preparatory Work	LS		$0
Removal of Tank Contents (cu. yds.)			$0
Storage of Contaminated Materials (cu. yds.)			$0
Sampling of Contaminated Materials			$0
RCRA Charaterization (TCLP)			$0
Disposal of Contaminated Materials (cu.yds.)			$0
Site Restoration and Demobilization	LS		$0
Post–Removal Monitoring – Soil	6	$750	$4,500
TECHNICAL OVERSIGHT	LS	$5,000	$5,000
TOTAL COSTS			$11,500
Health & Safety Contingency @10%			$1,150
Engineering Contingency @10%			$1,150
Scope Contingency @10%			$1,150
FINAL COST ESTIMATE			$14,950

5.2.1 Effectiveness

Protectiveness: This alternative permanently eliminates the risk of release of tank contents into the environment. The risk reduction is reliable in the long-term. However, residual risks exist due to soils on the outer walls of the tank, which can be potentially contaminated. In addition, the removal of the contents of the drainage pipes will not be performed. The performance of this alternative will not ensure compliance with the chemical-specific ARARs, since the soil beneath the tank won't be sampled. All location and action-specific ARARs should be met.

Short-term risks to the on-site workers and the community can be mitigated by undertaking proper dust control measures and controlling exposure to the excavated waste materials. The total duration of the on-site activities is expected to be no more than two weeks and confirm to the schedule shown in Section 3.3.

Use of Alternatives to Land Disposal: Since the volume of waste generated during the removal action is expected to be minimal, less than 10 cubic yards, treatment alternative to land disposal have not been evaluated.

5.2.2 Implementability

Technical Feasibility: Removal of tank contents is a standardized technique for tank closures. The existing manhole is 30 inches in diameter, but a manway of four feet in diameter can be created for removal, if necessary. The limestone chips may have solidified and may need loosening in place prior to removal. Subsequent sampling and analysis techniques are routine and feasible. This alternative meets the SARA requirement that the removal actions should contribute to the efficient performance of long-term remedial actions.

Availability: Equipment, materials, and personnel to implement this alternative are readily available. Availability of a proper staging area for the removed waste should be checked with the NAB personnel, since these wastes will be kept on-site during the RCRA analysis.

Administrative Feasibility: The implementations of this alternative does not require any permits for on-site activities based on exemptions granted under CERCLA 121(e). It will be ensured that the disposal and transporting contractors have the appropriate permits. Transportation loads would require manifests. The likelihood of public and state acceptance of this alternative is moderate to high.

5.2.3 Costs

Total costs to implement this alternative are $45,598. Details of the costs are shown in Table 5-2.

5.3 Alternative 3: Removal of the Tank and Associated Piping

This alternative consists of the following items of work:

(1) Access to the site will be restricted during the performance of removal activities.

(2) The liquid waste in the tank will be pumped out to the 55-gallon drums. The volume of liquid waste in the tank is expected to be 205 gallons, which will need five drums. The limestone chips as well as any associated sediment or sludges from the neutralization tank will then be removed using earth-moving equipment, if necessary. The volume of such materials is expected to be 2.5 cubic yards, but no more than six cubic yards. These materials will be temporarily stored in a roll-off box at the site. Additional tank cleaning may be required. For cost estimation purposes, it is assumed that 100 gallons of contaminated water will be generated during such cleaning.

(3) The soil around the tank and the drainage pipes will be excavated to facilitate their removal. A minimum of two feet area will be excavated around the perimeter of the tank. The excavations will be sloped to provide sufficient soil stability. Therefore, the excavation may be up to four feet wide around the top perimeter of the tank. For cost estimation purposes, 19 cu. yds. of excavations are calculated using an average width of three feet around the perimeter of the tank.

TABLE 5-2

COSTS OF REMOVAL ALTERNATIVES

ALTERNATIVE 2 : REMOVAL OF TANK CONTENTS ONLY

ENGINEERING EVALUATION/ COST ANALYSIS REPORT

NAB LITTLE CREEK : SITE 11 : SCHOOL OF MUSIC PLATING SHOP

NAVY CLEAN CTO-0042

COST ELEMENT	UNITS	UNIT COSTS	COSTS
Institutional Controls	LS	$1,000	$1,000
Mobilization and Preparatory Work	LS	$5,000	$5,000
Removal of Tank Contents (cu. yds.)	3.5	$150	$525
Tank Cleaning (generates 400 gals.)	LS	$1,000	$1,000
Storage of Contaminated Materials (cu. yds.)	5.5	$100	$550
Confirmatory Sampling and Analysis	0	$750	$0
RCRA Charaterization (TCLP)	2	$1,000	$2,000
Disposal of limestone chips as RCRA waste	2.5	$1,000	$2,500
Disposal of RCRA Liquid wastes (gals.)	600	$5	$3,000
Site Restoration and Demobilization	LS	$5,000	$5,000
Post-Removal Monitoring - Soil	6	$750	$4,500
CONTRACTOR OVERSIGHT	LS	$10,000	$10,000
TOTAL COSTS			$35,075
Health & Safety Contingency @10%			$3,508
Engineering Contingency @10%			$3,508
Scope Contingency @10%			$3,508
FINAL COST ESTIMATE			$45,598

Similarly, two feet of soil will be excavated below the bottom of the tank. These excavated soils, from an area nine feet in diameter and two feet deep, are expected to be around five cubic yards. Other associated excavations of 27 cy are anticipated to facilitate removal.

The approximate length of the pipe is 135 feet, and the six inch diameter pipe is approximately 2.5 feet below the ground surface. The overburden excavation around the pipe is expected to be 1.5 feet wide by two feet deep, resulting in approximately 16.5 cubic yards of soil. Soil around the pipe, six inches in diameter, and soil below the pipe to a total depth of five feet will be excavated, resulting in an additional 24 cubic yards of soil. These excavated soils will be temporarily stored in separate roll-off boxes at the site.

(4) The 48-inch diameter reinforced concrete tank including its sides, base and cover, as well as 135 feet of drainage piping will be removed. A Condition Report provided by the removal contractor will outline the exact method for removal of the tank for disposal. During excavation of the tank, soil and debris (piping, manways, cleanouts, backfill) will also be excavated for disposal. Approximately six feet of pipe inside the building will also be removed. The opening created in the floor drain inside the building would be plugged with concrete.

The disposal of tank and pipe assembly will be determined by analysis of core samples. Disposal facility requirements will determine the actual number of core samples. For cost estimation purposes, collection of three samples is assumed. These three samples may be collected from the bottom of the tank, upstream and the downstream ends of the pipe. It should be noted that further cleaning may be recommended by the disposal facility.

The volume of the tank and pipe assembly would be approximately four cubic yards, when completely crushed and compacted. For the purposes of cost estimation, it is assumed that this material will have be disposed of as hazardous waste.

(5) Eighteen confirmatory soil samples will be collected. Six samples will be collected from the sides of the tank. Another six samples will be collected on the downstream ends of the drain pipe and six will be collected from the upstream ends. These samples shall be taken from areas around pipe joints and visible areas of pipe deterioration. These samples will be analyzed for TAL inorganics, and TCL organics. In addition, these samples will be analyzed for Total Cyanide, hexavalent chromium, and ketones and alcohols using method 8015. This analyses will enable identification of constituents which may characterize the waste as listed waste. If these analyses exhibit any constituents of concern above action levels, additional excavations will be necessary. These excavations will be continue in two feet intervals, and only constituents above ARARs will be analyzed. This iterative procedure,of sampling followed by excavations, must be repeated until all contamination is removed, as determined by the Navy Technical Representative. However, such an event is highly unlikely based on the analysis of soils samples available.

(6) The excavated area will be backfilled with clean fill and compacted to 95 percent of ASTM D 698 maximum density. Approximately sixty cubic yards of fill is required at the tank location and approximately fifty cubic yards of fill is required for the trench created by the removal of the drainage pipe.

(7) Four samples will be analyzed for RCRA characteristics. One sample each will be taken from aqueous and solid contents of the tank. One sample will be composited from the soil excavated around the tank and underneath the piping, since both materials are anticipated to be contaminated. The fourth soil sample will be composited from the overburden excavations around the pipe, and other areas which are not suspected to be contaminated.

(8) Once the sampling results are available, the liquid and solid waste will be transported to an appropriate disposal facility. If the waste is hazardous, as defined under 40 CFR 261, it will be disposed of in a RCRA-permitted facility. For the purposes of cost estimation, it is assumed that none of the waste will exhibit RCRA characteristics except the liquids removed from the tank with a volume of 205 gallons.

(9) After completion of all of the activities associated with this removal action, a report will be prepared documenting the results.

(10) Further remedial activities will be conducted at the site, if the on-going RI/FS recommends such actions.

5.3.1 Effectiveness

Protectiveness: Removal and off-site disposal of contaminated material from Site 11 will mitigate the risk of releases of contamination to the groundwater and other areas. The heavy metals contained in the tank material would be removed from the site. Potentially contaminated soil surrounding the tank and drain lines would be excavated, thereby eliminating current and potential sources of groundwater contamination.

This alternative ensures long-term protection of the environment since it is permanent in nature. Compliance with all chemical-specific and location-specific ARARs is expected. Confirmatory samples would further ensure compliance with chemical-specific ARARs. On-site activities and off-site transport and disposal would comply with all action-specific ARARs. Short-term impact on the health of the site workers will be mitigated by using appropriate measures as dust control and containment of excavated waste.

Use of Alternatives to Land Disposal: Since the volume of waste generated during the removal action is expected to be minimal, less than 100 cubic yards, treatment alternatives to land disposal have not been evaluated.

5.3.2 Implementability

Technical Feasibility: Removal of tank contents is a standardized technique for tank closures. The existing manhole is 30 inches in diameter, but a manway of four feet in diameter can be created for removal, if necessary. The limestone chips may have solidified and may need loosening in place prior to removal. Excavation and removal of soil, debris, and tank assembly is a demonstrated and commercially available technology nationwide. Subsequent sampling and analysis techniques are routine and feasible. This alternative meets the SARA requirement that the removal actions should contribute to the efficient performance of long-term remedial actions.

During implementation of this alternative, significant scope changes may occur if the confirmatory soil samples indicate constituents of concern above the soil action levels. Further rounds of excavations and sampling will be necessary. The duration of the on-site activities may significantly increase as compared to the one shown in Section 3.3 schedule.

Availability: Equipment, materials, and personnel to implement this alternative are readily available. Availability of a proper staging area for the removed waste should be checked with the NAB personnel, since these wastes will be kept on-site during the pre-disposal analysis. Availability of disposal facilities is not expected to be a concern.

Administrative Feasibility: The implementations of this alternative does not require any permits for on-site activities based on exemptions granted under CERCLA 121(e). It will be ensured that the disposal facilities have the appropriate permits. Transportation would be performed by licensed hazardous waste haulers. Transportation loads would require manifests. The likelihood of public and state acceptance of this alternative is high.

5.3.3 Costs

Total costs to implement this alternative are $166,316. Details of the costs are shown in Table 5-3.

TABLE 5-3

COSTS OF REMOVAL ALTERNATIVES

ALTERNATIVE 3 : REMOVAL OF TANK AND ASSOCIATED PIPING

ENGINEERING EVALUATION/ COST ANALYSIS REPORT

NAB LITTLE CREEK : SITE 11 : SCHOOL OF MUSIC PLATING SHOP

NAVY CLEAN CTO-0042

COST ELEMENT	UNITS	UNIT COSTS	COSTS
Institutional Controls	LS	$1,000	$1,000
Mobilization and Preparatory Work	LS	$10,000	$10,000
Removal of Tank Contents (cu. yds.)	3.5	$150	$525
Tank Cleaning (generates 100 gals.)	LS	$500	$500
Soil Excavations (cu. yds.)	90	$50	$4,500
Tank & Pipe Removal	LS	$1,000	$1,000
Storage of Contaminated Materials (cu. yds.)	100	$50	$5,000
Core/ Chip Sampling and Analyses	3	$1,000	$3,000
Confirmatory Sampling and Analyses (soil)	18	$1,545	$27,810
RCRA Charaterization (TCLP)	4	$1,300	$5,200
Disposal of non-RCRA Soils (cu.yds.)	90	$300	$27,000
Disposal of RCRA Wastes (cu.yds.)	3.5	$1,400	$4,900
Disposal of RCRA Liquid wastes (gallons)	300	$5	$1,500
Tank & Pipe Disposal (assumed RCRA waste)	4	$1,000	$4,000
Site Restoration and Demobilization	LS	$12,000	$12,000
Post-Removal Monitoring - Soil	0	$750	$0
CONTRACTOR OVERSIGHT	LS	$20,000	$20,000
TOTAL COSTS			$127,935
Health & Saefty Contingency @10%			$12,794
Engineering Contingency @10%			$12,794
Scope Contingency @10%			$12,794
FINAL COST ESTIMATE			$166,316

6.0 COMPARATIVE ANALYSIS

Table 6-1 presents a summary of evaluation of each of the three removal alternatives. This table is focussed on bringing out the differences among the alternative in order to facilitate the selection of the removal alternative.

TABLE 6-1

COMPARATIVE ANALYSIS OF REMOVAL ALTERNATIVES

ENGINEERING EVALUATION/ COST ANALYSIS REPORT

NAB LITTLE CREEK : SITE 11 : SCHOOL OF MUSIC PLATING SHOP

NAVY CLEAN CTO-0042

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Effectiveness			
Protectiveness	Chemical-specific ARARs are not met.	Compliance with chemical-specific ARARs can not be confirmed. A potential source of contamination is permanently removed from the site.	Compliance with chemical-specific and all other ARARs. A potential source of contamination is permanently removed from the site.
Use of Land Disposal Alternatives	Not Applicable	Does not use an alternative to land disposal since waste volume is only 5.5 cu. yds.	Does not use an alternative to land disposal (waste volume is approx. 90 cu. yds.), but tank/piping may be disposed as construction debris.
Implementability			
Technical Feasibility	Well demonstrated, commercial techniques. Does not contribute towards long-term remediation goals (SARA requirements)	Well demonstrated, commercial techniques. Meets SARA requirements that the removal action should contribute towards long-term remediation.	Well demonstrated, commercial techniques. Meets SARA requirements, but potential exists for significant scope and schedule changes.
Availability	Is not expected to be a concern.	Is not expected to be a concern.	Is not expected to be a concern.
Administrative Feasibility	Likelihood of public and state acceptance is low.	Likelihood of public and state acceptance is moderate to high. Disposal facility and transporter need appropriate permits.	Likelihood of public and state acceptance is high. Disposal facility and transporter need appropriate permits.
Costs			
Capital Costs	$9,100	$39,748	$166,316
O&M Costs	None	None	None
Post-removal Site Monitoring	$5,850	$5,850	$0

7.0 PROPOSED REMOVAL ACTION

The recommended removal action for the neutralization tank at Site 11 is the removal of the tank and associated piping along with their contents and surrounding soils, as identified in Alternative 3. High concentrations of chromium, cadmium, lead, and other heavy metals indicate the tank is associated with a potentially significant risk to human health and the environment. The tank contents can also be a potential source for groundwater contamination. Therefore, their removal is deemed necessary. The soils away from the tank and piping have not exhibited any significant levels of contamination; therefore, no additional soil will be removed unless the confirmatory soil samples indicate otherwise.

This recommendation essentially entails source control remediation, in which the hazardous substances remaining at or near the area in which they were originally located, are removed to prevent or minimize migration of hazardous substances from the neutralization tank.

Appropriate remedial measures for the shallow groundwater at the site may be recommended in the base-wide RI/FS, which is on-going.

APPENDIX A

List of Acronyms/Abbreviations

Acronym/Abbreviation	Description	Page First Listed
ARARs	applicable or relevant and appropriate requirements	1-1
ASTM	American Society for Testing and Materials	5-6
BTEX	benzene, toluene, ethylbenzene, xylenes	2-12
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980	1-1
CFR	Code of Federal Regulations	3-4
CLP	Contract Laboratory Program	2-12
CRQL	Contract Required Quantitation Limit	2-12
DCA	dichloroethane	2-8
DCE	dichloroethene	2-8
DEQ	Department of Environmental Quality	3-6
DON	Department of Navy	1-1
DOT	Department of Transportation	3-7
ECD	electron capture device	2-12
EE/CA	Engineering Evaluation/Cost Analysis	1-1
EPA	Environmental Protection Agency	2-12
FID	flame ionization device	2-12

Acronym/Abbreviation	Description	Page First Listed
FWES	Foster Wheeler Environmental Services	1-1
GS	gas chromatograph	2-12
HI	Hazard Index	3-3
IAS	Initial Assessment Study	1-1
IR	Installation Restoration	1-1
IRI	Interim Remedial Investigation	1-1
IRP	Installation Restoration Program	2-1
LANTDIV	Atlantic Division	1-1
MCLs	Maximum Contaminant Levels	2-8
µg/l	micrograms/liter (equivalent to ppb)	2-8
mg/kg	milligrams/kilogram (equivalent to ppm)	2-8
NAB	Naval Amphibious Base	1-1
NACIP	Navy Assessment and Control of Installation Pollutants	2-1
NCP	National Oil and Hazardous Substances Contingency Plan	1-1
NEESA	Naval Energy and Environmental Support Activity	2-1
OSHA	Occupational Safety and Health Agency	3-7
PID	photoionization device	2-12
ppb	parts per billion	2-12
ppm	parts per million	2-14
PSI	Preliminary Site Inspection	2-1
RCRA	Resource Conservation and Recovery Act	3-4

Acronym/Abbreviation	Description	Page First Listed
RI	Remedial Investigation	1-1
RI/FS	Remedial Investigation/Feasibility Study	3-1
RMCL	Recommended Maximum Contaminant Level	2-8
RVS	Round I Verification Step	1-1
SARA	Superfund Amendments and Reauthorization Act of 1986	1-1
SCS		2-5
TAL	Target Analyte List	5-1
TCA	trichloroethane	2-8
TCE	trichloroethene	2-8
TCL	Target Compound List	2-8
TCLP	Toxicity Characteristic Leaching Procedure	4-1
ug/l	micrograms/liter	2-8
USC		3-5
USEPA	United States Environmental Protection Agency	3-3
VDWM	Virginia Department of Waste Management	3-6
VHWMR	Virginia Hazardous Waste Management Regulations	3-5
VOCs	volatile organic compounds	2-8
VR	Virginia Regulation	3-4
VSWMR	Virginia Solid Waste Management Regulations	3-6

RESPONSIVENESS SUMMARY

for

REMOVAL ACTION

at

SITE 11, SCHOOL OF MUSIC PLATING SHOP
NAVAL AMPHIBIOUS BASE LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

OCTOBER 1994

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

Response to State of Virginia Comments
Draft Final Engineering Evaluation/Cost Analysis
Site 11: School of Music Plating Shop
Naval Amphibious Base, Little Creek, Virginia

Section 2.1, Site Descriptions

1. On page 2-5, it would be beneficial to include the history of the operation and the specific regulatory jurisdictions concerning the tank, i.e., the tank was never cleaned out after the operations ceased, storage of a listed hazardous waste occurred. Therefore, the tank and ancillary equipment are a RCRA regulated unit.

RESPONSE: The site history is included on Pages 2-1, 2-2 and 2-5. The removal of the tank and ancillary equipment is being conducted in accordance with CERCLA. RCRA requirements have been included as an Applicable or Relevant and Appropriate Requirement (ARAR).

Section 2.2, Site Investigations

2. Please note that on Table 2-2 the Federal MCL for 1,1-dichloroethene is 7 ug/1, not 100 ug/1; and the MCLs for 1,2-dichloroethane and trans 1,2-dichloroethene are 5 ug/l and 100 ug/l, respectively.

RESPONSE: Table 2-2 and associated text sections will be corrected to reflect the appropriate MCLs as promulgated in the Drinking Water Regulations published by USEPA in May 1993. Section 2.0 tables were originally published in either 1986 or 1991 reports, therefore, old MCLs may have been reported in these tables.

3. On Table 2-4, the Risk-Based Action levels reported are for commercial/industrial soils, the levels for residential soils are much lower. You might want to specify the media for which the numbers apply.

RESPONSE: Table 2-4, page 3-4 table, and associated text sections will be revised to reflect the appropriate industrial soil RBCs as published by USEPA Region III in July 1994, since it is not the goal of this removal action to clean up the site suitable for residential use. It should be noted, however, that most of the constituents of concern are detected at levels which are below residential and industrial levels. Further, EPA Region III publishes these levels as a guideline.

4. Also on Table 2-4, the numbers reported for Federal MCLs for barium, copper, cyanide, lead (there is no MCL for lead; 15 ppb is the action level), nickel, silver (again, there is no MCL for silver; 50 ppb is the Federal Ambient Water Quality Criterion for this metal), and zinc are incorrect. Attached you will find the May 1993 "Drinking Water Regulations and Health Advisories," which has the latest MCLs, MCLGs, and Health Advisories for the contaminants in question.

RESPONSE: Table 2-4 and associated text sections will be corrected to reflect the appropriate MCLs as promulgated in the Drinking Water Regulations published by USEPA in May 1993. The MCLs for copper, silver, and zinc are secondary MCLs; regulatory levels for barium and lead are derived from VSWCB standards, which will be noted in the footnotes. The purpose of this table is to provide the lowest regulatory level for each chemical.

5. On Table 2-4 (continued), the MCL for 1,2-dichloroethane is 5 ppb; for 1,1-dichloroethene the MCL is 7 ppb.

RESPONSE: Table 2-4 and associated text sections will be corrected to reflect the appropriate levels as indicated.

6. On pages 2-8, have you taken tidal influences into consideration in attempting to determine groundwater flow direction? There is a possibility that the three groundwater monitoring wells may actually be located upgradient from the source.

RESPONSE: Tidal survey was not conducted as part of Site 11 investigations. However, a 30-day tidal survey was conducted at Site 13 at NAB Little Creek, which is approximately 1/3 miles west-northwest of Site 11 and is closer to Little Creek Cove. Since there were no clear signs of any tidal influence at Site 13 (Draft RI/FS, October 1993), it can be inferred that Site 11 has no tidal influence either.

Section 3.4.1, Chemical-Specific ARARs

7. The site specific cleanup goals for soils are based on an industrial versus residential scenario. While the present use of the land at Little Creek is industrial, the surrounding community is residential, and future potential use may well see this land used as a residential area. Unless you can document that the land will have no future potential residential use, then you should consider using the RBC Table values for residential soils. In the event of a base closure, the Navy could be required to go back to this site and clean it up to residential levels before land transfer or sale could be concluded.

RESPONSE: The Base Master Plan for NAB Little Creek does not identify any future residential use of the site. It should be noted further that most of the constituents of concern are detected at levels which are below residential and industrial levels. Therefore, if compliance is achieved at residential levels, it will be documented. If the site is ever turned over to the public by the Navy, constituent levels will have to be reevaluated against residential levels under the Base Realignment and Closure (BRAC) program.

8. On page 3-4, the identification and listing of hazardous waste section should be clarified. The DEQ Waste Division has determined that the tank contents would be a listed hazardous waste (F006) and must be disposed of as a listed hazardous waste.

RESPONSE: The potential for existence of listed waste, F001-F009, is recognized. The EE/CA will be modified to reflect the extensive sampling to be conducted for this purpose, prior to disposal.

9. Any emission from the treatment disturbance of soil at a site, or treatment of soil or water, must meet the Virginia air emission standards for toxic pollutants, particulate emissions, and volatile organic compounds. The citation for these regulations is: Virginia Air Pollution Control Law, Code of Virginia Sections 10.1-1300 et seq; Virginia Regulations for the Control and Abatement of Air Pollution (VR 120-01).

RESPONSE: Based on the following engineering calculations for the site, air emissions due to site disturbance will not exceed 7 tons/year. Therefore, Virginia Air Emission Standards are not applicable. Air monitoring will still be conducted for personnel protection.

The air emission calculations are based on a maximum 200 cubic yard (cy) of soil excavations. The actual excavations are anticipated to be of the order of 100 cy. With a specific gravity of 1.5, 200 cy correspond to 300 tons. The available VOC data provides sufficient confidence to conclude that the volatile content of the soil is not more than one percent, at a maximum. This constitutes to three tons of volatiles. Therefore, even if 100 % of these volatiles escape into atmosphere during the removal activities, the limit of seven tons for volatile emissions is not breached.

Section 3.4.2, Location-Specific ARARs

10. It is not clear in your reference to the National Historic Preservation Act (NHPA) whether you have already taken steps to determine if your actions are in compliance with the NHPA, or if this is something that you would like the state ARARs Coordinator to

do as a function of the DSMOA.

RESPONSE: LANTDIV has already taken the steps to ensure compliance with NHPA.

Section 3.4.3, Action-Specific ARARs

11. Page 3-5, # 1.c., a distinction needs to be made concerning the solid waste which may be generated. The tank and ancillary equipment would be contaminated with a listed waste. Contaminated soil which has not been contaminated with the listed waste and that is not classified as hazardous may be classified as a special waste.

RESPONSE: Extensive sampling proposed in the Final EE/CA will identify if the soils should be disposed of as a listed waste. Contaminated material from the site that is not classified as listed or characteristic hazardous waste may be disposed of as a special waste.

12. For item #2, Before the state can submit plans concerning land disturbing activities that are regulated under stormwater management regulations, and/or erosion and sediment control regulations, the contractor or facility must make those plans available to the state. If you have a stormwater management and sediment and erosion plan, you can either check with the local authority to see if the plan meets the minimum requirements, or you can send a copy to the DEQ-Waste Division, Superfund Program, and we will contact the state and local authorities to see if the plans are in compliance with the necessary requirements.

RESPONSE: The authority to approve erosion and sedimentation control plans has been delegated to LANTDIV for construction projects under their jurisdiction, by an Erosion and Sedimentation Control Agreement with the VA Department of Conservation and Recreation Division of Soil and Water Conservation.

Section 4.2, Alternative 2: Removal of the Tank Contents

13. The material removed from the tank is a listed hazardous waste F006. F006 is wastewater treatment sludge from electroplating operations. The waste may also be characteristic hazardous waste. This waste must be treated as a hazardous waste and disposed of properly. This includes all the labeling, storage and transportation requirements of a generator of hazardous waste.

RESPONSE: It is recognized that waste handling must take into consideration the hazardous nature of the waste. Proper security, storage, labelling, and documentation steps will be taken. These details will be provided in the Removal Action Work Plan,