MEMORANDUM

DATE: 28 September 1994

SUBJECT: Approval of plan for final disposition of soil piles at Navy Fuel Farm, Naval Air Station (NAS) Willow Grove, Pennsylvania.

FROM: Northern Division Naval Facilities Engineering Command

TO: Technical Review Committee for NAS Willow Grove

THROUGH: EA Engineering, Science, and Technology, Inc.

1. PURPOSE

The purpose of this Action Memo is to document PADER concurrence with the proposed final disposition described herein for the soil piles located at the Navy Fuel Farm, NAS Willow Grove, PA.

2. SITE CONDITIONS AND BACKGROUND

2.1 Site Description

The Navy Fuel Farm is located along the north side of Privet Road, immediately south of the Air National Guard Facility. From 1950 to 1991, two partially buried 210,000-gal JP-4/JP-5 aviation fuel tanks were located at the site. In 1991, the storage tanks were removed and construction of a new Navy Fuel Farm begun. Based on visual inspection, soil and concrete excavated during the tank removal and construction of the new fuel farm were segregated into three stockpiles: "contaminated" soil, "clean" soil, and "contaminated" concrete. Approximately 3,500 yd^3 of soil were categorized as "contaminated," 3,000 yd^3 "clean," and approximately 250 yd^3 of concrete were considered to be "contaminated." Approximately 240 yd^3 of petroleum-impacted soil has been added to the "clean" stockpile since 1991.

2.2 Site Characteristics

The site is currently occupied by the soil piles. A fueling station and the aboveground storage tanks (ASTs) of the new Navy Fuel Farm (not currently in use) are located adjacent to the soil stockpiles. The surrounding area is occupied by the Air National Guard installation.

2.3 Physical Location

The Navy Fuel Farm facility is bordered on all sides by NAS grounds. West of the subject site, across an access road, sits the aircraft parking apron off runway 15. To the east, at the previous location of building 157, sits the newly constructed Navy Fuel Farm facility. Abutting the Navy Fuel Farm facility to the north are Air Reserve Facility (ARF) buildings 330, 340, and 345. According to the draft wetlands inventory map for this area (U.S. Department of the Interior [USDOI] 1985), there is a small wetlands area (approximately 0.3 acres) located approximately 0.75 miles SW from the Navy Fuel Farm. A larger area of marsh habitat occupies topographically low areas just north of the runway end zone (approx. 0.75 miles NW of the Navy Fuel Farm) and covers several acres. This area has not been mapped as wetlands by USDOI. There are two man-made ponds located on the base, however, there are no perennial streams existing within the base boundaries.

The area surrounding the NAS is mainly suburban residential with some light industrial areas. A day care/nursery school exists on base within ¼ mile NE of the fuel farm and a school is located off base within approximately ½ mile of the site.

2.4 Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

The materials stored in the two partially buried storage tanks were JP-4 and JP-5 jet fuel. Common routes of exposure to these constituents within the soil piles include ingestion of the soil or ground water, or dermal contact with the soil or ground water.

The soil piles and concrete pile were sampled on 25-30 April 1994. Analytical results for the soil samples are presented in Table 1. The soil piles were divided into 28 grids of approximately 250 yd^3. Composite soil samples were collected and analyzed for: benzene, toluene, ethylbenzene, and xylenes (BTEX); methyl ethyl ketone (MEK); total petroleum hydrocarbons (TPH) as JP-4; acetone; and methylene chloride. Total BTEX concentrations were all below the laboratory detection limit except for one grid which reported 8.81 μg/kg. TPH as JP-4, acetone, and MEK were below laboratory detection limits for all of the soil samples. Methylene chloride was detected in samples from all of the piles at low concentrations. A composite concrete sample was also collected and analyzed for: benzene, toluene, ethylbenzene, and xylenes (BTEX); methyl ethyl ketone (MEK); total petroleum hydrocarbons (TPH) as JP-4; acetone; and methylene chloride. The concrete sample was below the laboratory detection limit for TPH, BTEX, acetone, and MEK. Methylene chloride was detectable in small amounts, 6.09 μg/kg (0.006 mg/kg). Based on the results of these analyses, the levels of the chemicals of concern are below values given in *Cleanup Standards for Contaminated Soils*, Pennsylvania Department of Environmental Resources interim report dated December 1993. The cleanup standards were developed using assumed ingestion rates of 200 mg/day (upper bound value), 100 mg/day (child incidental soil

ingestion rate), and 50 mg/day (adult incidental soil ingestion rate). Table 2 summarizes the cleanup standards for the constituents of concern at the Navy Fuel Farm.

2.5 NPL Status

The Navy Fuel Farm at Willow Grove NAS is presently managed under the Installation Restoration (IR) Program. The site was placed on the proposed National Priorities List (NPL) on 23 August 1994 (Federal Register, Vol. 59, No. 162) and is undergoing final review for inclusion on the NPL.

2.6 Maps, Pictures, and Other Graphic Representations

Figure 1 identifies the location of the soil piles and Figure 2 is a site plan of the Navy Fuel Farm area. The PADER and NAS approved soil disposal area is shown in Figure 3.

2.7 State and Local Authorities' Roles

The Technical Review Committee (TRC), comprised of representatives from regulatory agencies and community groups, has reviewed and approved the recommended disposition of the soil. In addition, the Pennsylvania Department of Environmental Resources (PADER) has reviewed and approved the final disposition of the soil. PADER approval was communicated in a letter dated 15 August 1994 from Ms. Marcella Goldberg (PADER, Environmental Cleanup Program) to Mr. James Colter (NORTHDIV).

3. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES/ENDANGERMENT DETERMINATION

The concentrations of the chemicals of concern are below the PADER interim guidance for cleanup standards for contaminated soil and are not considered a threat to public health or the environment. The soil stockpiles themselves are located near the flightline and the height presents a potential safety hazard to flightline operations.

4. PROPOSED ACTIONS AND ESTIMATED COSTS

Pre-design sampling and analysis of the soil piles was conducted on 25-30 April 1994. The data from these analyses indicated the soil did not exceed the levels given in *Cleanup Standards for Contaminated Soils*, Pennsylvania Department of Environmental Resources, interim report dated December 1993. As a result, the following action was proposed.

4.1 Proposed Action Description

The soil will be removed from its present location and utilized as fill in the PADER approved area shown in Figure 3. Good management techniques will be followed to minimize potential impacts to ground and surface waters. These management techniques include:

- Soil will not be placed in direct contact with or within 4 vertical ft of groundwater existing in a saturated zone (including the seasonal high water table).
- Land application of soil will be prohibited within 25 ft of bedrock outcrop, within 100 ft of a sinkhole or carbonate areas subject to dissolution, within 100 ft of a wetland, or within 100 ft of an intermittent or perennial stream.
- Soil will not be placed on or in close proximity to recreational areas, including playgrounds, picnic areas, etc.
- The area currently occupied by the soil stockpiles will be cleared and graded, thereby removing potential hazards to the flightline operations.

The concrete will be disposed of offsite at a landfill such as the Pottstown Landfill and Recycling Center.

4.2 Description of Alternative Technologies

The following options were evaluated for the remediation and disposal of the soil stockpiles (EA February 1994):

ONSITE	OFFSITE
Landfarming	Landfilling
Bioventing	Low temperature thermal treatment
Slurry phase bioremediation	High temperature thermal treatment
Soil venting	Asphalt incorporation (hot mix)
Soil washing	Asphalt incorporation (cold or warm mix)
Asphalt incorporation (hot mix)	
Asphalt incorporation (cold or warm mix)	
Low temperature thermal treatment	
High temperature thermal treatment	
Vitrification	

The above mentioned options were considered before the pre-design sampling and analysis was performed. Since the level of jet fuel constituents in the soil did not exceed the PADER interim guidance, no further remediation of the soil is necessary before the proposed final disposal action.

4.3 Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs determined to be practicable for the site are the *Cleanup Standards for Contaminated Soils*, Pennsylvania Department of Environmental Resources, interim report dated December 1993.

4.4 Estimated Costs

Costs for off-site disposal of the soil piles are outlined in Table 3. These costs are for moving the soil only and do not reflect site-specific costs associated with site selection and approval. Other assumptions used to arrive at these costs are listed in the table.

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

The levels of constituents of concern in the soil piles are below the cleanup standards given by PADER, therefore, delayed action will not increase public health risks or risks to the environment.

6. OUTSTANDING POLICY ISSUES

The site for final disposition has been approved by NAS Willow Grove and PADER. A definitive project schedule and cost estimate will be coordinated with NORTHDIV and NAS Willow Grove.

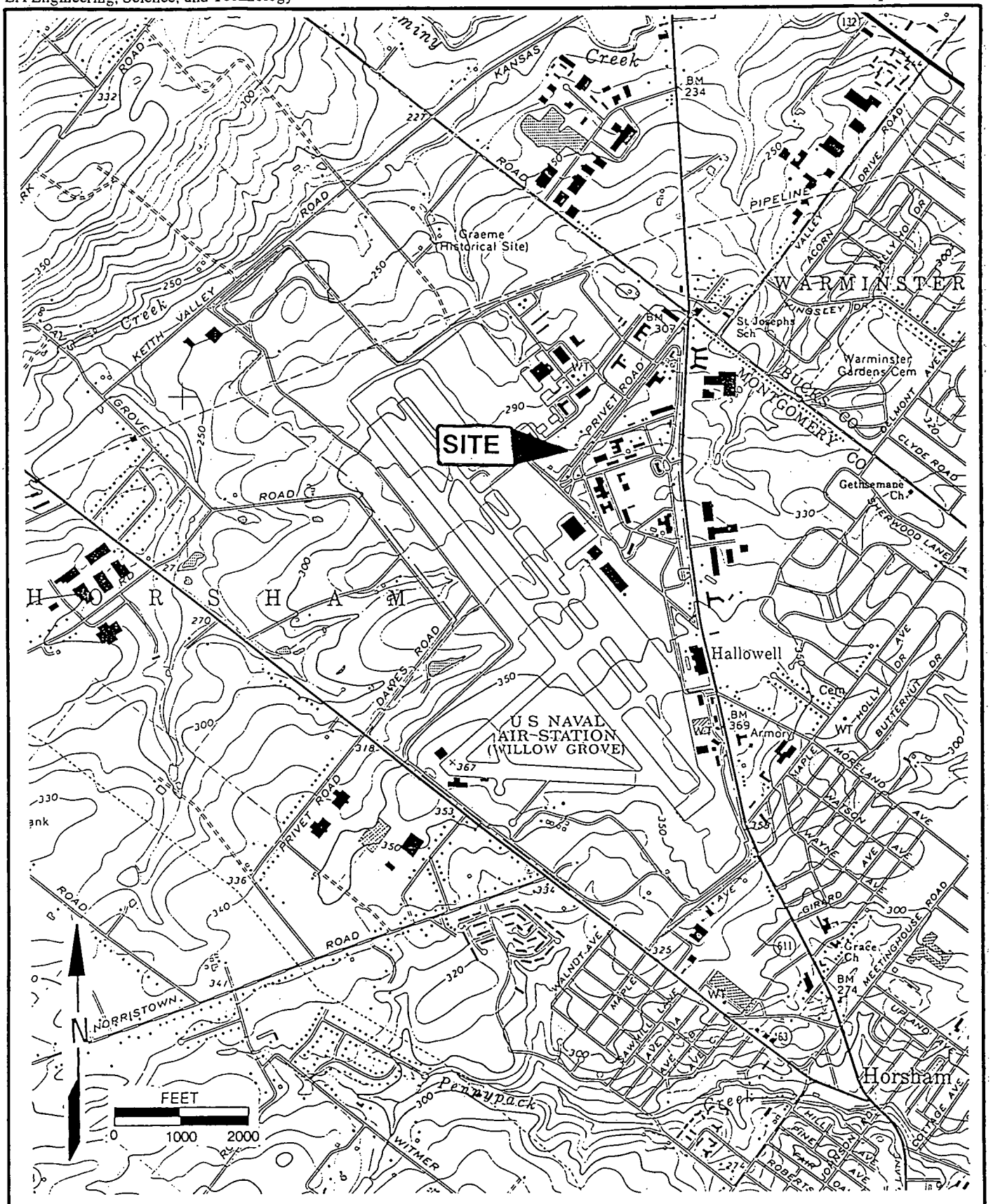
REFERENCES

EA Engineering, Science, and Technology. 1994. *Evaluation of Remedial Alternatives for Soil Piles, Navy Fuel Farm, NAS Willow Grove*. Final Report. February.

U.S. Environmental Protection Agency. 1994. *Federal Register*, Vol. 59, No. 162, Tuesday, 23 August 1994. Proposed Rules. August.

Pennsylvania Department of Environmental Resources. 1993. *Interim Cleanup Standards for Contaminated Soils*. PADER. December.

U.S. Department of the Interior (USDOI). 1985. National Wetlands Inventory. Ambler, PA. 7.5-minute quadrangle.



Figur 1. Site location map, NAS Willow Grove, Navy Fuel Farm

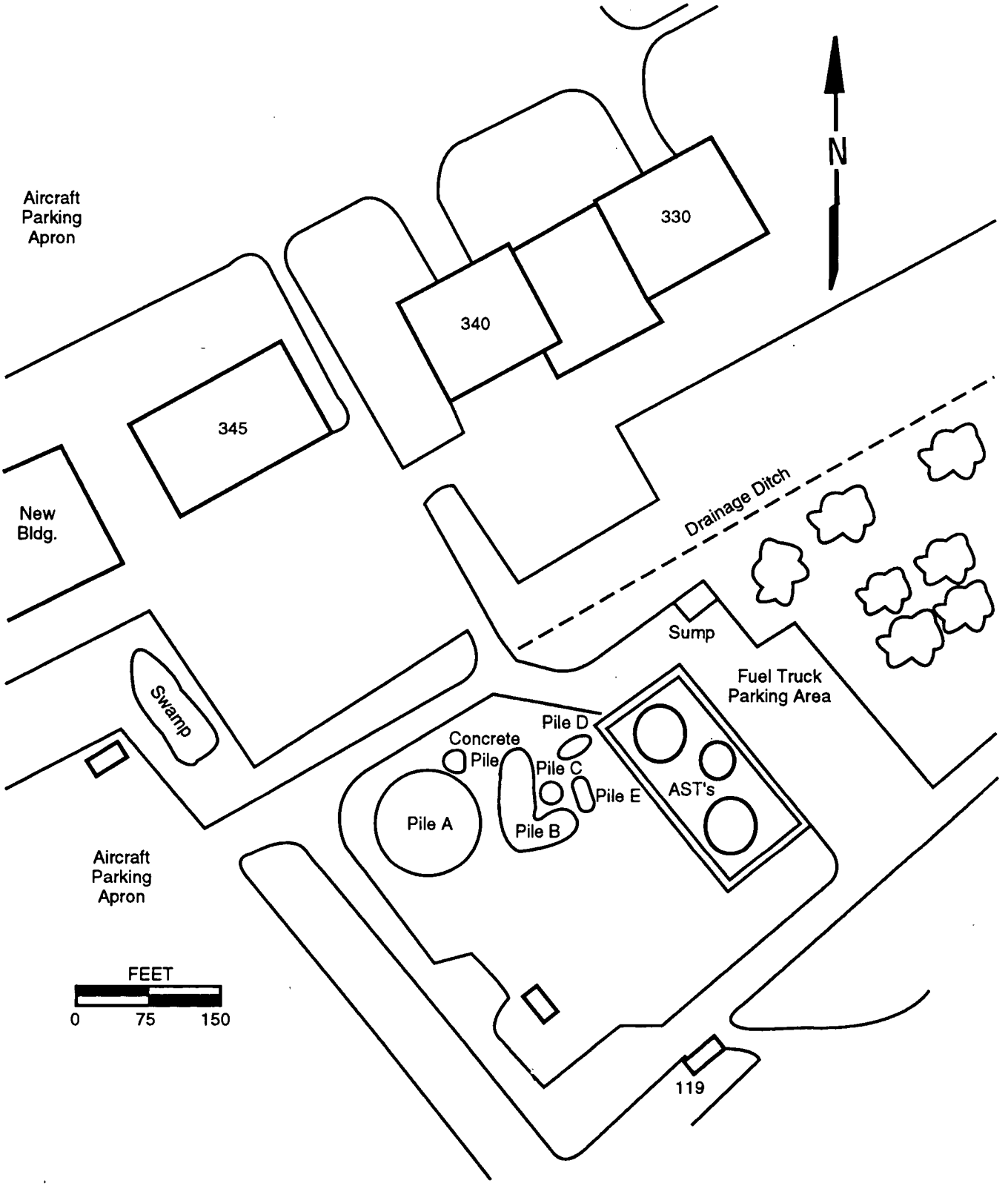
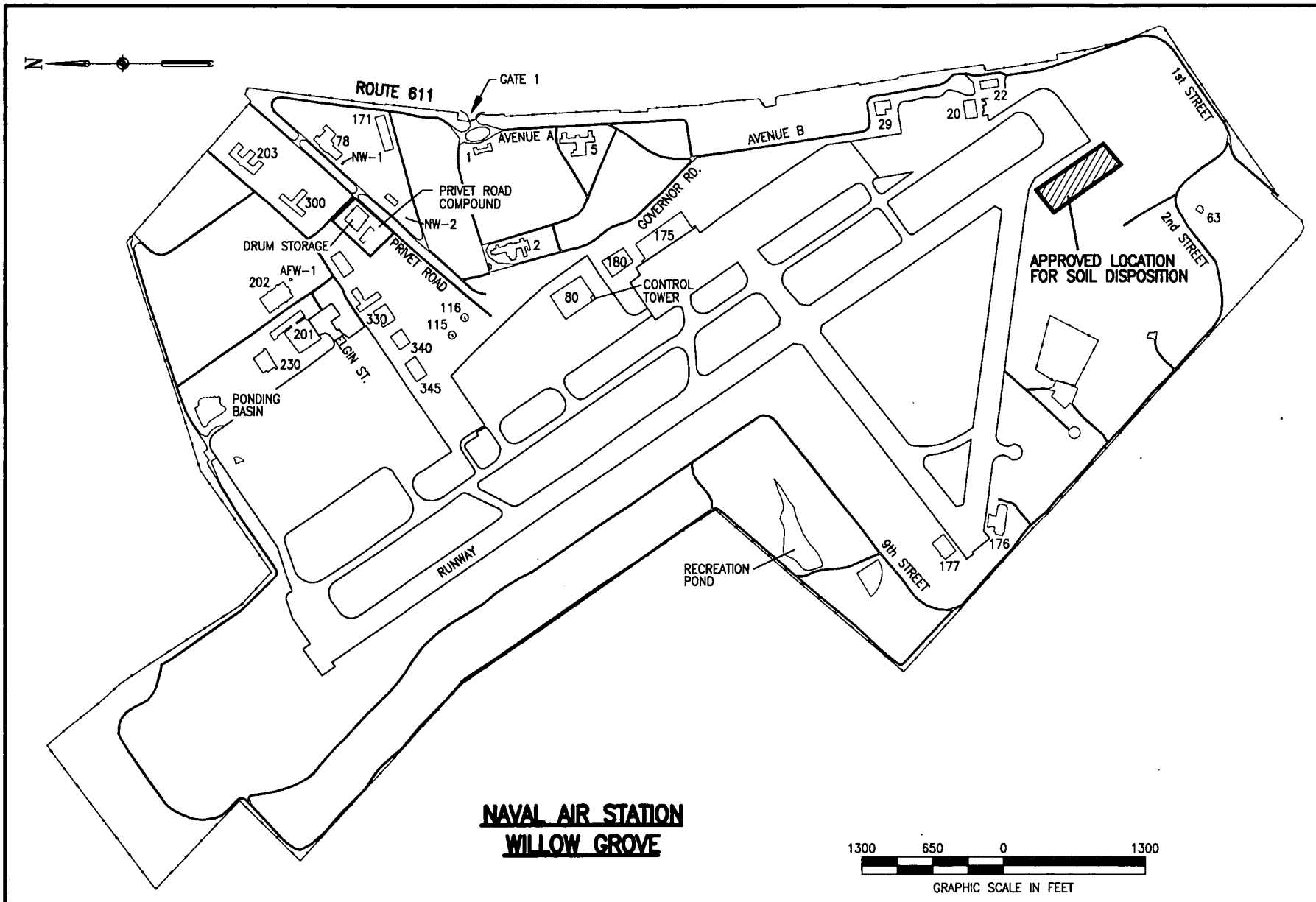


Figure 2. Sit map - 1993 NAS Willow Grove, Navy Fuel Farm, sh wing location of soil stockpil s.



FILE: SS1

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVAL AIR STATION WILLOW GROVE HORSHAM TOWNSHIP, PENNSYLVANIA	APPROVED LOCATION FOR DISPOSITION OF NAVY FUEL FARM SOIL PILES	DESIGNED BY SCS	DRAWN BY PMS	DATE 9-21-94	PROJECT NO. 29600.23
			CHECKED BY CR	PROJECT MGR. CR	SCALE 1"=1300'	FIGURE NO. 3

TABLE 1 NAS WILLOW GROVE: RESULTS OF PREDESIGN SAMPLING AND ANALYSIS OF SOIL PILES AT THE NAVY FUEL FARM

Grid No.	Sample Date	Lab Sample ID	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylene (µg/kg)	O-Xylene (µg/kg)	M&P Xylene (µg/kg)	Total BTEX (µg/kg)	TPH as JP-4 (mg/kg)	Acetone (µg/kg)	Methyl ethyl ketone (µg/kg)	Methylene Chloride (µg/kg)
1	25-Apr-94	01\02 COMP	ND (6.18)	ND (6.18)	ND (6.18)	ND(12.4)	ND (6.18)	ND (6.18)	ND	ND (12.3)	ND (12.4)	ND(12.4)	7.3
2	26-Apr-94	03/04/05 COMP	ND (5.82)	ND (5.82)	ND (5.82)	ND (11.7)	ND (5.82)	ND (5.82)	ND	ND (10.0)	ND (11.6)	ND (11.6)	12.4
4	26-Apr-94	07/08 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.8)	ND (11.8)	ND (11.8)	9.75
5	26-Apr-94	09/10/11/12 COMP	ND (5.74)	ND (5.74)	ND (5.74)	ND (11.5)	ND (5.74)	ND (5.74)	ND	ND (11.5)	ND (11.5)	ND (11.5)	10.4
6	26-Apr-94	13/14 COMP	ND (5.74)	ND (5.74)	ND (5.74)	ND (11.5)	ND (5.74)	ND (5.74)	ND	ND (11.5)	ND (11.5)	ND (11.5)	9.19
7	26-Apr-94	15/16 COMP	ND (5.95)	ND (5.95)	ND (5.95)	ND(11.9)	ND (5.95)	ND (5.95)	ND	ND (11.9)	ND (11.9)	ND (11.9)	9.59
3	26-Apr-94	06/17/18/19 COMP	ND (5.82)	ND (5.82)	ND (5.82)	ND (11.7)	ND (5.82)	ND (5.82)	ND	ND (11.6)	ND (11.6)	ND (11.6)	4.65 J
-	26-Apr-94	Concrete Comp	ND (5.16)	ND (5.16)	ND (5.16)	ND (10.4)	ND (5.16)	ND (5.16)	ND	ND (10.4)	ND (10.3)	ND (10.3)	6.09
-	25-Apr-94	EA29600 FB1	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	ND (1.00)	52.2	33.0	24.4
-	25-Apr-94	EA29600 RB1	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	ND (1.00)	74.6	ND (10.0)	22.3
-	26-Apr-94	EA29600 FB2	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	ND (1.00)	127	34.1	21.5
-	26-Apr-94	EA29600 RB2	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	ND (1.00)	123	24.2	23.8
-	26-Apr-94	Trip Blank	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	NA	ND (10.0)	ND (10.0)	2.66 J
12	27-Apr-94	21/22 COMP	ND (5.82)	ND (5.82)	ND (5.82)	ND (11.7)	ND (5.82)	ND (5.82)	ND	ND (11.6)	ND (11.6)	ND (11.6)	ND (5.82)
17	27-Apr-94	23/24/25 COMP	ND (5.68)	ND (5.68)	ND (5.68)	ND (11.4)	ND (5.68)	ND (5.68)	ND	ND(11.4)	ND (11.4)	ND (11.4)	9.81 J
16	27-Apr-94	26/27/28/29/30 COMP	ND (5.68)	ND (5.68)	ND (5.68)	ND (11.4)	ND (5.68)	ND (5.68)	ND	ND (11.3)	ND (11.4)	ND (11.4)	27.6

TABLE 1 (Cont.)

Grid No.	Sample Date	Lab Sample ID	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylene (µg/kg)	O-Xylene (µg/kg)	M&P Xylene (µg/kg)	Total BTEX (µg/kg)	TPH as JP-4 (mg/kg)	Acetone (µg/kg)	Methyl ethyl ketone (µg/kg)	Methylene Chloride (µg/kg)
15	27-Apr-94	31/32/33 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.8)	ND (11.8)	ND (11.8)	21.7
11	27-Apr-94	34/35/36/37 COMP	ND (5.74)	ND (5.74)	ND (5.74)	ND (11.5)	ND (5.74)	ND (5.74)	ND	ND (11.4)	ND (11.5)	ND (11.5)	17.2
10	27-Apr-94	38/39/40 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.7)	ND (11.8)	ND (11.8)	13.1
9	28-Apr-94	41/42/43/44 COMP	ND (5.44)	ND (5.44)	ND (5.44)	ND (10.9)	ND (5.44)	ND (5.44)	ND	ND (10.9)	ND (10.9)	ND (10.9)	12.1
14	28-Apr-94	45/46/47 COMP	ND (5.68)	ND (5.68)	ND (5.68)	ND (11.4)	ND (5.68)	ND (5.68)	ND	ND (11.4)	ND (11.4)	ND (11.4)	24.7
13	28-Apr-94	48/49/50/51 COMP	ND (5.62)	ND (5.62)	ND (5.62)	ND (11.3)	ND (5.62)	ND (5.62)	ND	ND (11.3)	ND (11.2)	ND (11.2)	8.29
13	28-Apr-94	DUP 1 COMP	ND (5.62)	ND (5.62)	ND (5.62)	ND (11.3)	ND (5.62)	ND (5.62)	ND	ND (11.3)	ND (11.2)	ND (11.2)	7.36
18	28-Apr-94	52/53 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.8)	ND (11.8)	ND (11.8)	24.3
29	28-Apr-94	54/55/56/57 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.8)	ND (11.8)	ND (11.8)	5.84 J
-	27-Apr-94	Trip Blank	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	NA	ND (10.0)	ND (10.0)	4.08 J
-	27-Apr-94	EA29600RB3	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	ND (1.00)	6.56 J	ND (10.0)	2.36 J
19	29-Apr-94	58/59/60/61 COMP	ND (5.95)	ND (5.95)	ND (5.95)	ND (11.9)	ND (5.95)	ND (5.95)	ND	ND (11.9)	ND (11.9)	ND (11.9)	13.6
20	29-Apr-94	62/63 COMP	ND (6.02)	ND (6.02)	ND (6.02)	ND (12.1)	ND (6.02)	ND (6.02)	ND	ND (12.0)	ND (12.0)	ND (12.0)	2.78 J
21	29-Apr-94	64/65/66/67/68 COMP	ND (6.18)	ND (6.18)	ND (6.18)	ND (12.4)	ND (6.18)	ND (6.18)	ND	ND (12.3)	ND (12.4)	ND (12.4)	4.94 J
21	29-Apr-94	DUP 2 COMP	ND (6.02)	ND (6.02)	ND (6.02)	ND (12.1)	ND (6.02)	ND (6.02)	ND	ND (12.0)	ND (12.0)	ND (12.0)	10.2
-	29-Apr-94	Trip Blank	ND (5.00)	ND (5.00)	ND (5.00)	ND (10.0)	ND (5.00)	ND (5.00)	ND	NA	ND (10.0)	ND (10.0)	7.60 B
22	30-Apr-94	69/70/71 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.8)	ND (11.8)	ND (11.8)	4.62 J
23	30-Apr-94	72/73/74 COMP	ND (5.88)	ND (5.88)	8.81	ND (11.8)	ND (5.88)	ND (5.88)	8.81	ND (11.7)	ND (11.8)	ND (11.8)	7.10

TABLE 1 (Cont.)

Grid No.	Sample Date	Lab Sample ID	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylene (µg/kg)	O-Xylene (µg/kg)	M&P Xylene (µg/kg)	Total BTEX (µg/kg)	TPH as JP-4 (mg/kg)	Acetone (µg/kg)	Methyl ethyl ketone (µg/kg)	Methylene Chloride (µg/kg)
24	30-Apr-94	75/76/77 COMP	ND (5.95)	ND (5.95)	ND (5.95)	ND (11.9)	ND (5.95)	ND (5.95)	ND	ND (12.0)	ND (11.9)	ND (11.9)	4.18 J
25	30-Apr-94	78/79/80/81/82 COMP	ND (5.88)	ND (5.88)	ND (5.88)	ND (11.8)	ND (5.88)	ND (5.88)	ND	ND (11.8)	ND (11.8)	ND (11.8)	3.75 J
26	30-Apr-94	83/84/85 COMP	ND (6.02)	ND (6.02)	ND (6.02)	ND (12.1)	ND (6.02)	ND (6.02)	ND	ND (12.1)	ND (12.0)	ND (12.0)	4.20 J
27	30-Apr-94	86/87/88/89/90 COMP	ND (5.95)	ND (5.95)	ND (5.95)	ND (11.9)	ND (5.95)	ND (5.95)	ND	ND (11.9)	ND (11.9)	ND (11.9)	7.55
28	30-Apr-94	91/92/93/94/95 COMP	ND (5.95)	ND (5.95)	ND (5.95)	ND (11.9)	ND (5.95)	ND (5.95)	ND	ND (11.8)	ND (11.9)	ND (11.9)	7.41
28	30-Apr-94	DUP 3 COMP	ND (5.95)	ND (5.95)	ND (5.95)	ND (11.9)	ND (5.95)	ND (5.95)	ND	ND (11.8)	ND (11.9)	ND (11.9)	12.8

ND - Below laboratory detection limit, detection limit is in parenthesis.
NA - Not analyzed.
J - As estimated value, below method detection limit.
B - Indicates that the compound was found in the associated blank.

TABLE 2 PADER INTERIM CLEANUP LEVELS FOR CONTAMINATED SOIL

ANALYTE	CONCENTRATION
Benzene	0.2 mg/kg
Toluene	0.5 mg/kg
Ethylbenzene	1 mg/kg
Total Xylenes	0.7 mg/kg
TPH	200 mg/kg
Methylene Chloride	0.05 mg/kg
Methyl Ethyl Ketone	0.01 mg/kg

SOURCE: Pennsylvania Department of Environmental Resources. 1993. *Cleanup Standards for Contaminated Soils*. Interim Report. December.

TABLE 3 ESTIMATED COSTS FOR FINAL DISPOSITION OF SOIL PILES
NAVY FUEL FARM, NAS WILLOW GROVE, PENNSYLVANIA

Activity	Unit Cost	Units	Total
HAULING AND GRADING			
12-yd^3 dump truck with 3-mi round trip to site and grading with bulldozer at site	\$7.27 per yd^3	6,750 yd^3	\$49,073
LOADING			
Hydraulic crawler mounted backhoe 3-yd^3 capacity	\$1.52 per yd^3	6,750 yd^3	\$10,260
TOPSOIL			
Material costs and 300-hp bulldozer	\$262.45 per 1,000 ft^2	121,500 ft^2	\$31,888
GRASS SEEDING			
Utility mix grass seed with tractor spreader	\$17.61 per 1000 ft^2	121,500 ft^2	\$2,140
CONCRETE DISPOSAL			
Tipping fee	\$59.00 per ton	507 tons	\$29,913
Hauling - 12-yd^3 dump truck with 4-mi round trip	\$3.71 per yd^3	250 yd^3	\$928
TOTAL COSTS FOR FINAL DISPOSITION OF SOIL AND LANDFILLING OF CONCRETE			\$124,202

1. Construction costs taken from Means Building Construction Cost Data; 52nd Annual Edition; 1994.
2. Density of concrete is approximately 150 lb/ft^3.
3. Concrete to be disposed of offsite in a landfill such as Pottstown Landfill and Recycling Center.
4. Round trips are assumed and may be further than originally designated.