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NAB LITTLE CREEK
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TECHNICAL MEMORANDUM PRELIMINARY DELINEATION OF ABRASIVE BLAST
MATERIAL SOLID WASTE MANAGEMENT UNIT 8 WEST ANNEX SANDBLAST AREA WITH
TRANSMITTAL NAB LITTLE CREEK VA

CH2MHILL

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From: Donna Caldwell

Attn: Bob Schirmer
Date: April 12, 2000

Re: NAB Little Creek Technical Memo
SWMU 8 Preliminary Field Investigation of the Extent of Blast Grit

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Technical Memorandum
Preliminary Delineation of Abrasive Blast Material
SWMU-8 West Annex Sandblast Area

Naval Amphibious Base (NAB) Little Creek
Virginia Beach, Virginia

CTO - 0098
April 2000

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Under the

LANTDIV CLEAN II Program
Contract N62470-95-D-6007

Prepared by



1.0 INTRODUCTION

This technical memorandum documents a preliminary field investigation conducted at SWMU 8 West Annex Sandblast Area at Naval Amphibious Base (NAB) Little Creek. SWMU 8 is a vacant lot in the vicinity of the northwestern boundary of NAB Little Creek near the intersection of Midway Road and Amphibious Drive. This area was previously used for sandblasting activities to remove paint from boats. Between 1949 and 1954 sandblasting and residue storage occurred at SWMU 8 (Figure 1). An estimated 5.125 cubic yards of abrasive blast material (ABM) residue was stored in the area between 1949 and 1954, and an additional 3.525 cubic yards were stored between 1954 and 1971.

A reconnaissance of the area in 1999 noted ABM on the ground surface in the area surrounding water tower 1553 and in non-grassy areas of the open field southwest and northeast of the water tower. As part of the NAB Little Creek Installation Restoration Program a Site Investigation Work Plan for SWMU 8 was submitted to the EPA and Virginia DEQ for review and approval. In an effort to immediately assess potential removal alternatives, a preliminary field investigation of these areas of visible ABM at the ground surface was conducted in March 2000. The objectives of the preliminary investigation are to:

- Provide a preliminary assessment of the horizontal and vertical extent of ABM in these areas
- Estimate the quantity of ABM for potential removal
- Characterization of ABM for disposal

2.0 Field Investigation Activities

On March 15, 2000 a field investigation was conducted at SWMU 8 West Annex Sandblast Area to delineate the extent of ABM in areas where it is visibly present at the ground surface. Shallow one-foot deep borings were constructed using a hand auger, and in some areas a shovel, to expose the shallow subsurface soil. The borings were logged for the presence/absence of ABM and for lithology of the surface soil material. Each location was marked with a pin flag and labeled with boring identification number. Borings were identified as LW08-01 through LW08-36. In the vicinity of water tower 1553, along the northern boundary fence line, and in non-grassy areas northeast of the water tower a shovel was used to expose surface soil in numerous locations, which were not individually labeled but are identified on the site map.

All hand auger and shovel sampling points were located using a tape measure and/or by pacing distances to known structures such as roadways, parking areas, and power poles. None of the locations were surveyed in and all locations should be considered approximate.

The presence/absence of ABM in each boring was identified visually. An estimate of the percentage of soil to blast grit was made where appropriate. The thickness of ABM or ABM/soil mixtures was determined using a measuring tape.

Prior to the visual delineation of ABM at SWMU 8, three surface samples of ABM were collected for characterization analysis on January 21, 2000. These samples are identified as LW08-01-SS-00, LW08-02-SS-00, and LW08-03-SS-00. Sample LW08-01-SS-00 was collected underneath water tower 1553, sample LW08-02-SS-00 was collected in the central part of the site where ABM is exposed, and sample LW08-03-SS-00 was collected in the non-grassy area where ABM is exposed near Midway Road in the vicinity of a storm drain (Figure 2). Each surface grab sample of ABM was collected from 0 to 4 inches and was biased for the presence of paint chips to obtain a "worst case" characterization of the ABM. All three samples were immediately placed on ice for preservation and transportation to the laboratory for

analysis of full Toxicity Leaching Characteristic Procedure (TCLP), target analyte list (TAL) metals, pesticides, and polynuclear aromatic hydrocarbons (PAHs). Samples were submitted to PDP laboratories for standard-turnaround analysis.

3.0 Summary of Findings

Boring locations from the field investigation are shown on Figure 2, and a summary of boring data is presented in Table 1.

Extent of Blast Grit

Findings of the field investigation at SWMU 8 indicate that blast grit at the site is generally limited to the upper six inches in the soil profile, and in most areas is limited to the upper four inches. The maximum depth of blast grit with a grit-soil mixture of 50% or greater was 10 inches noted in boring LW08-19 located near the southern boundary of the area along Midway Road. Borings adjacent to LW08-19 indicate this thickness is limited to a very small (50 square foot area or less) area and is likely the result of surface runoff and deposition. Although in two of the borings (LW08-08 and LW08-21) blast grit was noted at depths of 12 and 8 inches, respectively, only a trace of blast grit was present in the sandy soil profile.

Areas of 100% blast grit are limited to the ground surface and upper two inches or less near water tower 1553, and in small areas of bare ground southwest of the water tower including the southern boundary near Midway Road. Northeast of water tower 1553 two areas with sparse to no grass cover are present. Blast grit in these areas is present only at the ground surface and with only minor surface coverage of about 10% to 20%. The remainder of SWMU 8 north of Midway Road consists of grassy / gravel ground cover. With the exception two small grass/gravel covered areas, no blast grit was observed at the surface or in the shallow subsurface in the remaining portions of SWMU 8 north of Midway Road. The two exceptions are a small grassy/gravel area west of the water tower and a small area adjacent to the parking lot southeast of the water tower (area noted by "SG" in Figure 2). Blast grit is only present at the ground surface in these areas with about 30% to 50% ABM covering the surface. Excavations using a shovel were made along the grassy northern boundary of the site adjacent to the fence line and residential area. No blast grit was encountered along the property boundary adjacent to the houses.

Throughout most of the site blast grit is mixed with dark to medium brown, fine to medium grained sand. A fine to medium grained, light brown and tan, well sorted sand with no blast grit was encountered in nearly all borings at depths between five and 10 inches. All borings were terminated at a depth less than 12 inches below ground surface.

Estimated Volume

Based on the preliminary field investigation to identify the extent of blast grit at SWMU 8, approximately 2,400 cubic yards of ABM and soil material is estimated for removal to remediate the site. This estimate is based on excavating the following areas:

- Excavating an estimated area of 300 ft by 300 ft to a depth of six inches in the open area southwest of water tower 1553
- Excavating an estimated area of 100 ft by 50 ft to a depth of six inches in the vicinity of water tower 1553
- Excavating an estimated area of 280 ft by 40 ft to a depth of ten inches in the area along Midway Road
- Excavating an estimated area of 320 ft by 120 ft to a depth of two inches in the open area northeast of water tower 1553

Characterization of Blast Grit

Results of analysis of the three blast grit samples (LW08-01-SS-00, LW08-02-SS-00, and LW08-03-SS-00) are presented on Tables 2 (TCLP results) and 3 (total metals, pesticides, and PAHs). Samples collected for characterization of blast grit were grab surface samples biased for the presence of paint chips. Analytical results for TCLP show that lead (5.42 mg/L) is the only parameter to exceed TCLP criteria (5 mg/L) and this was exceeded in only one sample (LW08-01-SS-00), located under water tower 1553. All remaining TCLP parameters, including reactivity, corrosivity, and ignitability were below TCLP criteria for defining a hazardous waste.

Blast grit samples were also submitted for analysis of total metals, pesticides and PAHs (Table 3). Results were compared to residential and industrial risk based concentrations (RBCs) developed by Region III EPA. A value of 400 mg/kg (current EPA guidance) was the criteria used for comparison to lead results. Results for total metals show that lead and arsenic in blast grit samples exceed residential RBCs. Several PAHs were detected in the sample from beneath the water tower (LW08-01-SS-00), five of which exceeded residential RBCs. Three pesticides were also detected in the samples, but all values were well below residential RBCs.

Although some compounds exceed residential RBCs, for the purposes of waste disposal, ABM/soil excavated for removal can be considered non-hazardous. The TCLP sample from the small area around water tower 1553 represents a grab sample biased for the presence of paint chips, and when excavated, a composite sample of the waste would likely also be considered non-hazardous.

TABLE 1
NAB Little Creek
SWMU 8 West Annex Sandblaster Area
Summary of Boring Data

Boring Location	Boring Depth (inches)	Grit Top (inches)	Grit Bottom (inches)	Soil Top (inches)	Soil Bottom (inches)	Grit Description	Soil Description	Comments
LW08-01	6	0	4	4	6	100% grit to 1"; 30 to 60 % grit to 4"	medium brown silty sand, dry - sand,	Sample collected January 00 TCLP/TAL/PAH
LW08-02	10	0	6.5	6.5	10	0-4" soil/grit 50%; 4-6.5" 100% blast grit	light brown, fine to medium grained, well sorted sand	Sample collected January 00 TCLP/TAL/PAH
LW08-03	12	0	7	7	12	80-100% grit mixed w/soil	very pale brown sand, dry, well sorted, fine grained, loose	Sample collected January 00 TCLP/TAL/PAH
LW08-04	8	0	6	6	8	grass and gravel at surface - soil mixed w/20% grit	tan sand, medium grain, subround, well sorted, dry	
LW08-05	7	2	4	0	2	blast grit, no soil	topsoil tan sand, fine grained, well sorted, dry	
				4	7			
LW08-06	9	4	6	0	4	grit mixed w/soil, 40% grit	silty sand, medium brown, dry, loose, well sorted light tan sand, well sorted, dry, loose, fine grained	
				6	9			
LW08-07	10	0	4	4	10	medium brown silty sand, trace grit at surface and at 4"	medium brown to light brown silty sand, well sorted, dry, loose, fine grained	
LW08-08	14	0	12	12	14	traces of grit, wood, dark/medium brown silty sand, poorly sorted	light tan sand, dry, well sorted, loose, fine grained.	
LW08-09	10			0	10		topsoil, sand, light brown, well sorted, loose, dry	
LW08-10	13			0	13		silty sand, medium/dark brown, dry light brown sand, loose, moist, well sorted, fine grained	
LW08-11	8			0	8		medium/dark sand w/some silt, loose, dry - very pale orange sand, fine grained, loose, moist, well sorted	
LW08-12	12			0	12		medium/dark sand w/some silt, loose, dry - very pale brown sand, fine grained, loose, moist, well sorted	
LW08-13	7	0	5	5	7	80% grit	very pale brown sand, fine grained, loose, moist, well sorted	
LW08-14	6	0	2	2	6	soil mixed with grit 20% grit	very pale brown sand, fine grained, loose, moist, well sorted	

TABLE 1
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SWMU 8 West Annex Sandblaster Area
Summary of Boring Data

Boring Location	Boring Depth (Inches)	Grit Top (Inches)	Grit Bottom (Inches)	Soil Top (Inches)	Soil Bottom (Inches)	Grit Description	Soil Description	Comments
LW08-15	7	0	2	2	7	soil mixed with 30% grit	very pale brown sand, fine grained, loose, dry, well sorted	
LW08-16	10	0	5	5	10	20-30% grit mixed w/medium brown soil	very pale brown sand, dry, well sorted, fine grained, loose	
LW08-17	6	0	3	3	6	medium brown soil with trace grit to 3", loose, dry	very pale brown sand, fine grained, loose, moist, well sorted	
LW08-18	8	0	5	5	8	30% grit mixed w/soil	very pale brown sand, dry, well sorted, fine grained, loose	
LW08-19	14	0	10	10	14	grit and soil mixture, 60-70% grit	very pale brown sand, dry, well sorted, fine grained, loose	
LW08-20	7	0	5	5	7	0-3" 10% grit mixed w/soil; 3-5" 50% grit	very pale brown sand, dry, well sorted, fine grained, loose	
LW08-21	9	0	8	8	9	medium brown sand with trace of blast grit	well sorted sand, very pale brown silt and gravel, loose, dry, medium brown	
LW08-22	7			0	7		dark yellowish orange silt, dry, loose, well sorted - very pale brown sand, loose, well sorted, dry	
LW08-23	9			0	9		very dense silt and gravel, dark yellowish orange, dry	
LW08-24	3			0	3		medium brown sandy silt mixed w/gravel, poorly sorted, dry	
LW08-25	10			0	10		gravel and silt, loose, dry, very pale brown sand, loose, dry, well sorted	
LW08-26	8			0	8		topsoil and gravel, very pale brown sand, loose, well sorted, fine grained, subround grains	
LW08-27	8			0	8		topsoil and gravel, very pale brown sand, loose, well sorted, fine grained, subround grains	
LW08-28	8			0	8		20% grit, sand, dark gray, strong petroleum odor	
LW08-29	14	0	12	12	14		very pale brown sand, loose, well sorted, fine grained, petroleum odor	
LW08-30	8	0	2	2	8	10% grit mixed w/soil	silty sand, dark yellowish orange, loose, dry - pale brown sand, loose, fine grained, dry, well sorted	
LW08-31	7			0	7	30-50 % grit at surface only	gravel and dark yellowish orange silt	

TABLE 1
NAB Little Creek
SWMU 8 West Annex Sandblaster Area
Summary of Boring Data

Boring Location	Boring Depth (inches)	Grit Top (inches)	Grit Bottom (inches)	Soil Top (inches)	Soil Bottom (inches)	Grit Description	Soil Description	Comments
LW08-32	8	0	4	4	8	30% grit mixed w/soil	sand, very pale brown, loose, dry, fine grained	
LW08-33	8	0	6	6	8	silty sand trace blast grit	sand, very pale brown, loose, dry, fine grained	
LW08-34	8	0	4	4	8	silty sand and trace blast grit	sand, very pale brown, loose, dry, fine grained	
LW08-35	8	0	5	5	8	soil mixed w/10% grit	sand, very pale brown, loose, dry, fine grained	
LW08-36	6	0	0.5	0.5	6	grit 100% at surface	medium brown silty sand, dry - sand, very pale brown, loose, dry, fine grained	

TABLE 2
SWMU 8 West Annex Sandblast Area
Blast Grit TCLP Sample Results
 January 21, 2000

Constituents	LW08-01-SS-00	LW08-02-SS-00	LW08-03-SS-00	TCLP Limits mg/L
TCLP METALS (mg/L)				
Arsenic	ND	0.155	0.084	5
Barium	0.520	0.337	0.259	100
Cadmium	ND	ND	ND	1
Chromium	ND	ND	ND	5
Lead	5.42	1.18	0.469	5
Mercury	ND	ND	ND	0.2
Selenium	ND	ND	ND	1
Silver	ND	ND	ND	5
TCLP-SEMIVOLATILE (ug/L)				
1,4-Dichlorobenzene	ND	ND	ND	7.5
2,4,5-Trichlorophenol	ND	ND	ND	400
2,4,6-Trichlorophenol	ND	ND	ND	2
2,4-Dinitrotoluene	ND	ND	ND	0.13
2-Methylphenol	ND	ND	ND	
3+4-Methylphenol	ND	ND	ND	
Hexachlorobenzene	ND	ND	ND	0.13
Hexachlorobutadiene	ND	ND	ND	0.5
Hexachloroethane	ND	ND	ND	3
Nitrobenzene	ND	ND	ND	2
Pentachlorophenol	ND	ND	ND	100
Pyridine	ND	ND	ND	5
TCPL RCI				
CORROSIVITY pH	5.90	6.28	5.80	<2.5; >12
IGNITABILITY	ND	ND	ND	
REACTIVE CYANIDE(COLOROMETRIC)	ND	ND	ND	200
REACTIVE SULFIDE	ND	0.95	ND	500

TABLE 3
SWMU 8 West Annex Sandblast Area
Blast Grit Sample Results
NAB Little Creek
January 21, 2000

Constituents Depth	LW08-01-SS-00	LW08-02-SS-00	LW08-03-SS-00	Soil RBC Residential mg/kg	Soil RBC Industrial mg/kg
TOTAL METALS (mg/kg)					
Aluminum	1080 *	9080 *	9520 *	7800	2000000
Antimony	10.5 N	41.1 N	43.9 N	31	8
Arsenic	0.56 U	11	16	0.43	3.82
Barium	125	331	327	5500	140000
Beryllium	0.18 B	10.00	9.60	160	4100
Cadmium	0.55 B	0.37 B	0.86	39	1000
Calcium	203 B	5420	5390		
Chromium	177	142	47.4	235	6132
Cobalt	3 B	106	69.3	4693	122640
Copper	42.1	3430	1090	3129	81760
Iron	5250.0	50900.0	55900.0	23464	613200
Lead	1820 E	1550 E	1070 E	400 guidance	
Magnesium	220 B	2930	3140		
Manganese	56.9	695	714	1564	40880
Mercury	0.11 U	0.11 U	0.11 U		
Nickel	7.7	433	55.7	1564	40880
Potassium	398.0 B	1810.0	2430.0		
Selenium	0.67 UN	2.9 N	3.1 N	391	10220
Silver	3.3	0.67 B	0.17 U	391	10220
Sodium	1640.0	10200.0	9290.0		
Thallium	0.37 U	0.38 U	0.35 U	5	143
Vanadium	2.6 B	24.1	20.6	548	14308
Zinc	1640 E*	9130 E*	8900 E*	23464	613200
Cyanide	0.11 U	ND	ND	1564	40880
PESTICIDES (ug/kg)	LW08-01-SS-00	LW08-02-SS-00	LW08-03-SS-00	RBC Res mg/kg	RBC Ind mg/kg
4,4'-DDT	11.00	2.40 JP	2.20 JP	1.9	170
4,4-DDE	ND	1.50 J	ND	1.9	170
4,4-DDD	ND	0.890 JP	ND	2.7	240
SEMIVOLATILES (ug/kg)	LW08-01-SS-00	LW08-02-SS-00	LW08-03-SS-00	RBC Res mg/kg	RBC Ind mg/kg
Phenanthrene	1100	ND	ND		
Anthracene	200 J	ND	ND	23,000	61,000
Carbazole	190 J	ND	ND	32	290
Fluoranthene	4900 D	ND	ND	31,000	82,000
Pyrene	5600 D	ND	ND	2,300	61000
bis (2-Ethylhexyl) phthalate	45000 D	310 J	320 J	46	410
Benzo (a) anthracene	2700	ND	ND	0.87	7.8
Chrysene	2400	ND	ND	87	780
Benzo (b) fluoranthene	2700	ND	ND	0.87	7.8
Benzo (k) fluoranthene	1400	ND	ND	8.7	78
Benzo (a) pyrene	1700	ND	ND	0.087	0.78
Indeno (1,2,3-cd) pyrene	1300	ND	ND	0.87	7.8
Dibenz (a,h) anthracene	510	ND	ND	0.087	0.78
Benzo (g, h, i) perylene	250 J	ND	ND		

Note: bold values exceed Residential RBCs

N- spiked sample recovery was not within control limits

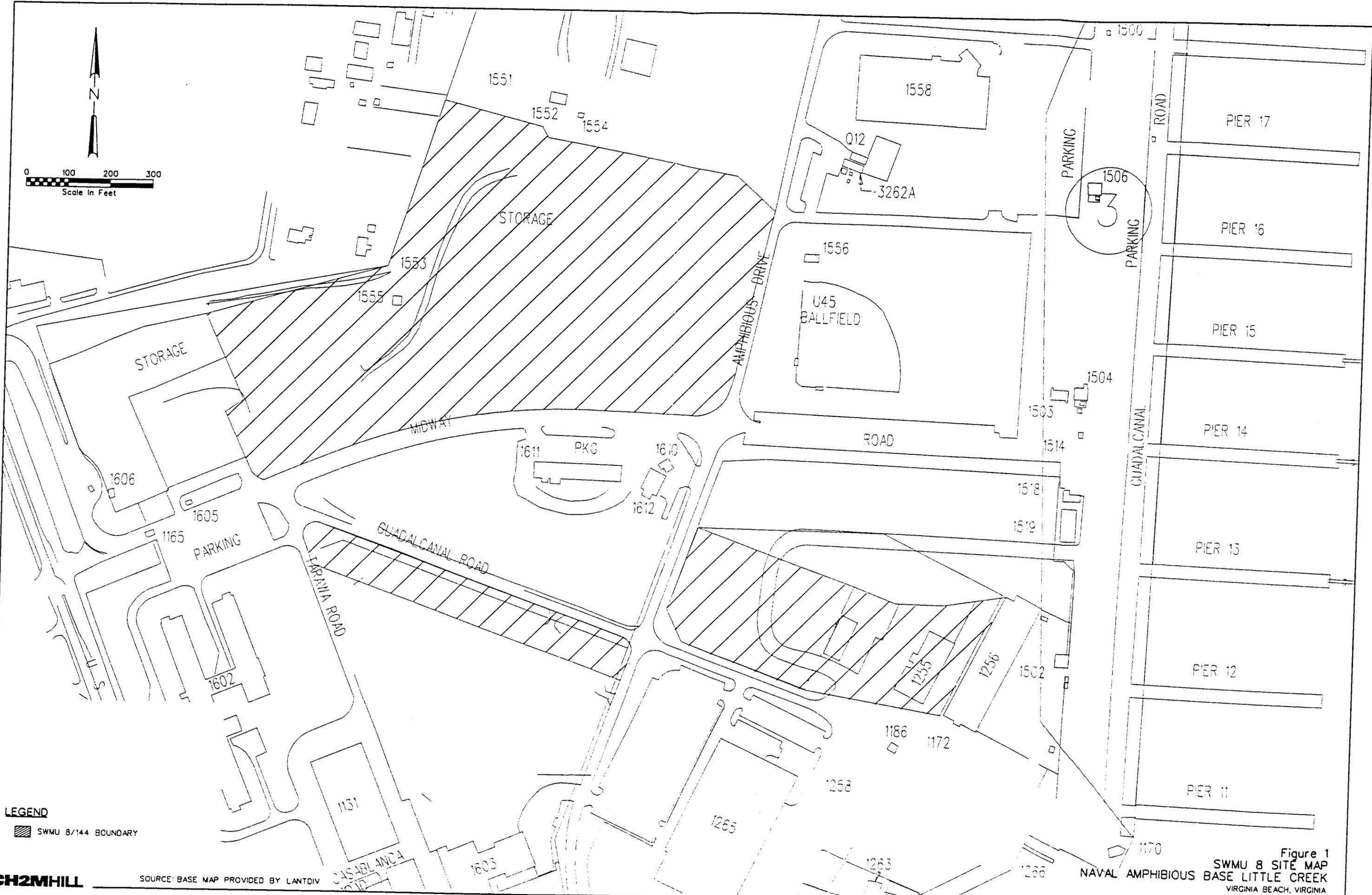
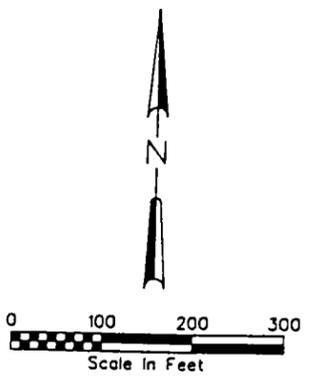
J- estimated below the contract required quantitation limit

E- organics exceeded calibration range; E inorganic is estimated because of interference

B- for inorganics only below the contract required detection limit but above the instrument detection limit

D- from diluted run

* duplicate analysis was not within the control limits

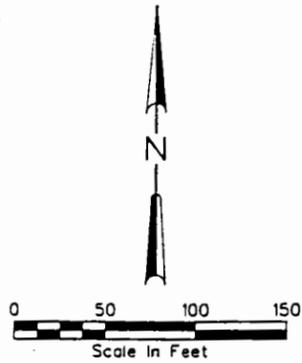


LEGEND
SWMU 8/144 BOUNDARY

CH2MHILL

SOURCE: BASE MAP PROVIDED BY LANTDIV

Figure 1
SWMU 8 SITE MAP
NAVAL AMPHIBIOUS BASE LITTLE CREEK
VIRGINIA BEACH, VIRGINIA



- LEGEND**
- HAND AUGER BORING LOCATION
 - ↓ SHOVEL LOCATION USED TO IDENTIFY EXTENT OF GRIT
 - APPROXIMATE EXTENT OF BARE GROUND/GRIT AT SURFACE
 - 6 THICKNESS OF BLAST GRIT OR BLAST GRIT/SOIL MIXTURE (LW08-01 THROUGH LW08-36) (INCHES FROM GROUND SURFACE)
 - SG BLAST GRIT AT GROUND SURFACE ONLY
 - ND BLAST GRIT NOT DETECTED
 - LW08-01-SS-00 SURFACE BLAST GRIT SAMPLE

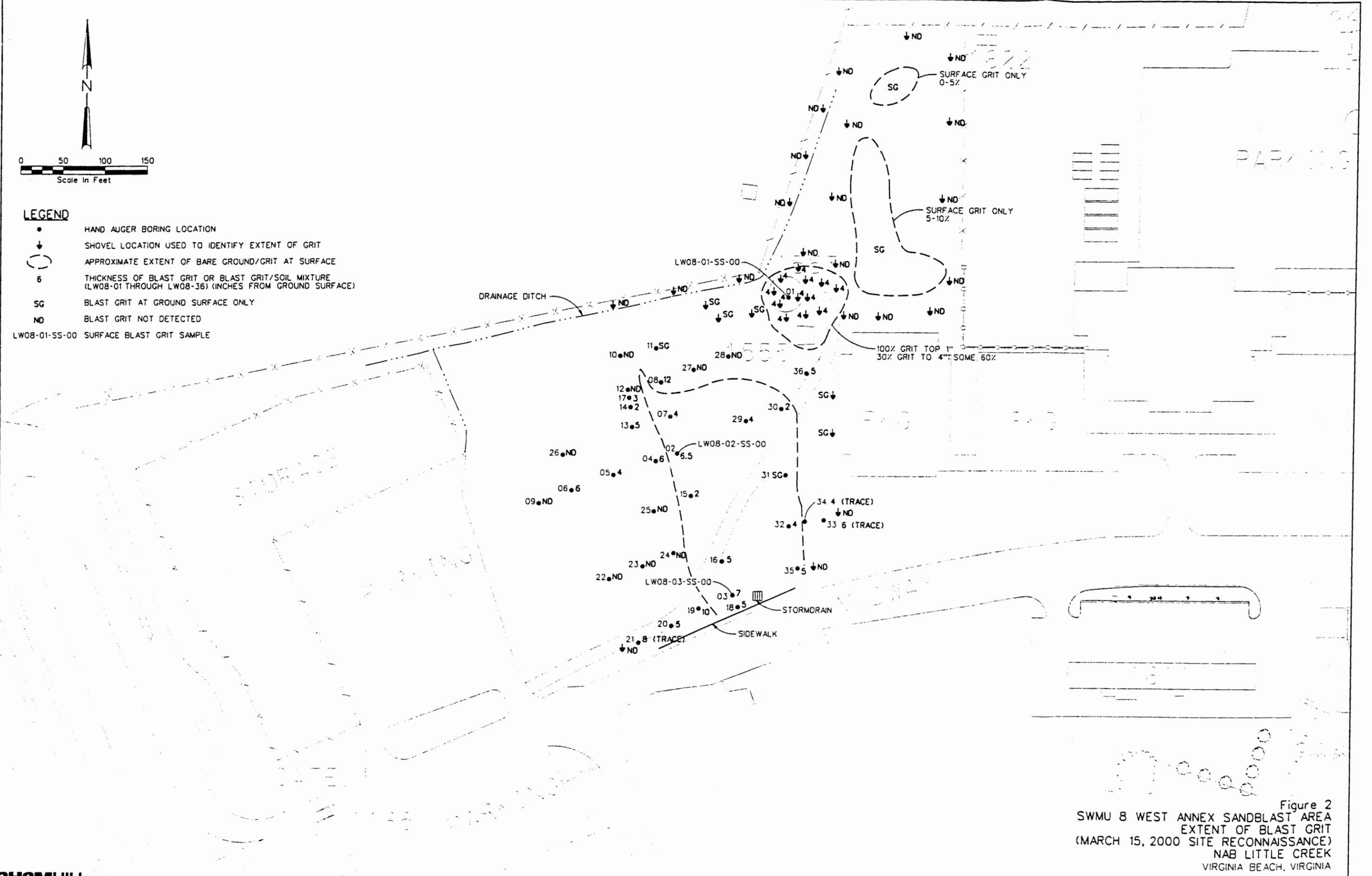


Figure 2
 SWMU 8 WEST ANNEX SANDBLAST AREA
 EXTENT OF BLAST GRIT
 (MARCH 15, 2000 SITE RECONNAISSANCE)
 NAB LITTLE CREEK
 VIRGINIA BEACH, VIRGINIA