RCRA FACILITY INVESTIGATION
FINAL WORK PLAN
VOLUME I OF II

U.S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

GERAGHTY
& MILLER, INC.
Environmental Services
Jacksonville, Florida

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DOCUMENT 1

RCRA FACILITY INVESTIGATION
FINAL WORK PLAN
FORT STEWART, GEORGIA

June 1, 1992

Prepared for

Department of Army
Savannah District Corps of Engineers
Savannah, Georgia

Geraghty & Miller Project No. JF24006

Prepared for

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ATTACHMENTS (VOLUME II)

A. Quality Assurance Project Plan
B. Health and Safety Plan

EXECUTIVE SUMMARY

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This Resource Conservation and Recovery Act (RCRA) Facility Investigation Work Plan has been prepared for Fort Stewart Military Installation, Georgia (Facility). The preparation of this RFI work plan (Phase I) is part of the requirements of the hazardous waste permit (HW-045 [S&T]) issued to Fort Stewart on August 14, 1987 and amended on September 27, 1989.

The purpose of this RCRA Facility Investigation (RFI) work plan (Phase I) is to document procedures to be utilized for RCRA investigations at 22 solid waste management units (SWMUs), consisting of potential sources of contamination identified at the Facility. Three of those 22 units (FST-004, FST-025, and FST-027) consist of more than one unit. Also the RFI plan (Phase I) outlines methods for evaluating exposure pathways and health risks associated with contamination that may be present. A multi-phased investigation is planned.

Phase I field investigations will include the installation of a minimum ground-water detection system at some of the sites. Ground water and soil sampling, preparation of maps, and interviews with installation personnel will be conducted. That information will be evaluated, along with existing data from past investigations to confirm if any releases have occurred. Based on the results of the Phase I field investigation, a Phase I RFI report will be submitted to the Georgia Environmental Protection Division (GA EPD) that summarizes the results of all work completed with recommendations for further investigation, if needed, or no further action, if warranted.

A Phase II investigation will be conducted at those sites, if any, where contamination is confirmed. The Phase II work will be based on the requirements that the GA EPD develops from their review of the Phase I RFI report.

Several quality assurance documents have been prepared which describe the procedures and protocols necessary for sample collection, sample analysis, and data validation. Included are checklists to be used for documenting the decision process and compliance to data quality objectives.

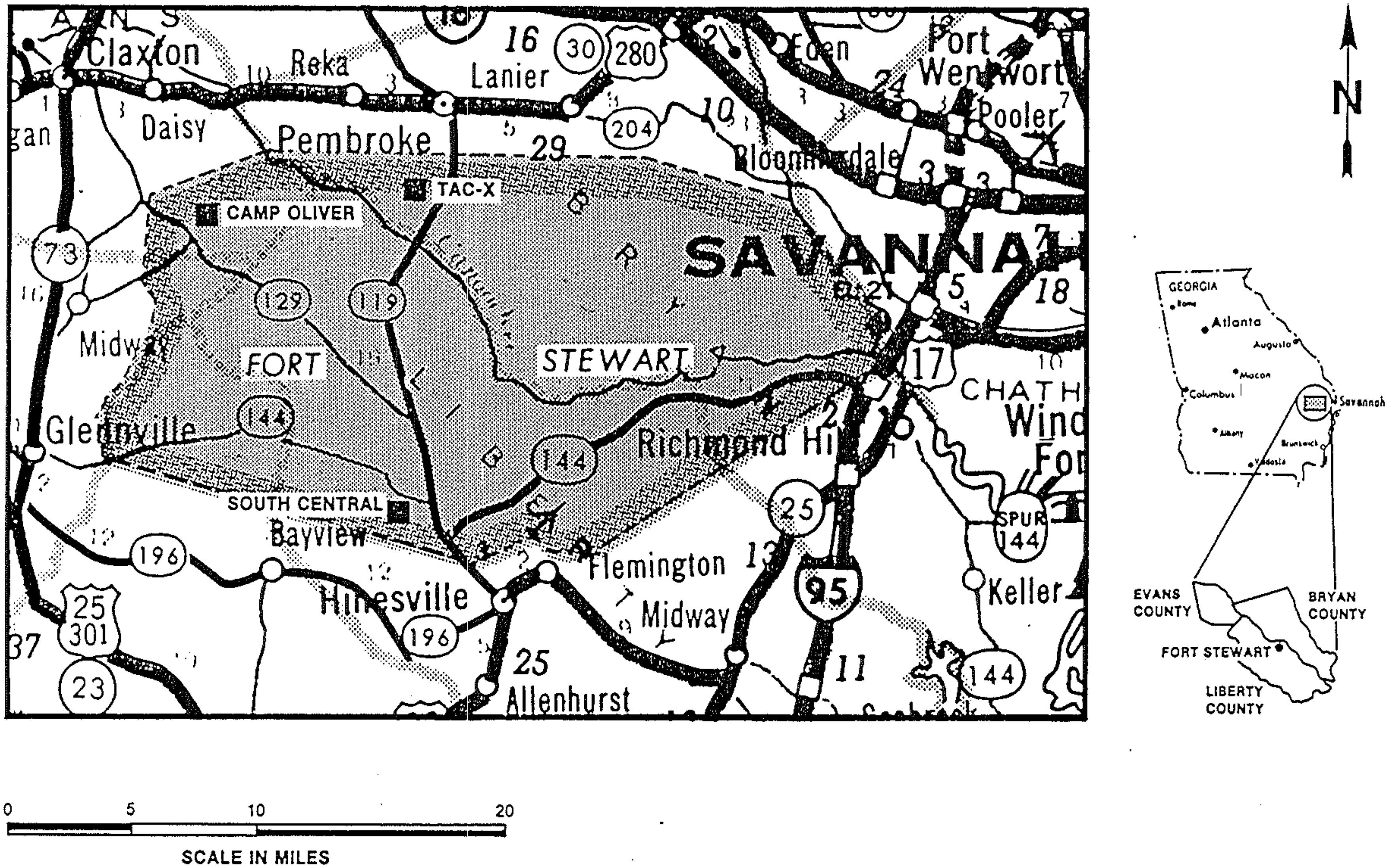
Additionally, this RFI work plan (Phase I) will be used as the foundation for site specific work plans prepared for investigations at selected SWMUs. The RFI work plan (Phase I) comprehensively applies to all RCRA investigations conducted at the Facility; the site specific plans will precisely document field tasks for site characterization including sampling locations and analytical parameters; potential exposure pathways; concentration limits for chemicals of concern; and classification of potential remedial actions, if necessary. 27

1.0 INTRODUCTION

Fort Stewart, Georgia was issued a RCRA Part B permit (HW-045 [S&T]) on August 14, 1987, by GA EPD to store and treat hazardous waste. The initial RCRA Facility Assessment (RFA) completed in April 1987 (U.S. Army Environmental Hygiene Agency 1987), listed 25 total solid waste management units (SWMUs) with 9 requiring further action. On September 27, 1989, the hazardous waste permit was amended to include an expanded Section III on corrective action for SWMUs and other releases, specifying those units identified in the initial RFA which required a RCRA facility investigation (RFI). The amended permit listed 16 of the original SWMUs and 4 new units that would require an RFI. In June 1990, a supplemental RFA report was issued by the GA EPD that added 5 additional SWMUs to the list of 20. This resulted in a final list of twenty-five (25) SWMUs in the RFA Report submitted to GA EPD in June 1990. However, sites 14 and 22 of that list are the same site (FST-020). Therefore, the final number of SWMUs that require some type of RFI action is 24.

The detailed scope of work (SOW) to conduct a RFI, based on GA EPD's recommendations (Georgia Environmental Protection Division, 1988, 1989), was issued by the Army Corps of Engineers on August 17, 1990. The scope of work listed 24 total SWMUs, but excluded two units from this investigation. The sites not included in this work are the FST-008 EOD Area and FST-013 which is the Fire Training Pit. These sites are described in the April 1987 report prepared by the U.S. Army Environmental Hygiene Agency. The required work at these sites was conducted utilizing two other contracts. The work, as detailed in this RFI work plan (Phase I) for the remaining 22 SWMUs is to be conducted in a phased approach. The object of the Phase I Field Investigation is to determine if a release to the environment has occurred.

In the past, Fort Stewart, which is located approximately 34 miles southwest of Savannah, Georgia (Figure 1.1) has engaged in a variety of activities that may have resulted in the release of hazardous materials. These activities include landfill operations, open burning of timber and demolition debris, explosive ordinance disposal, fire-training exercises, hazardous waste storage, industrial waste-water treatment operations and sludge disposal, sewage treatment operations, radiator and battery shops, waste-oil storage and disposal, tanker purging operations, motor pools, recirculating wash impoundment, asphalt and diesel storage tanks.



SOURCE: E.S.E., 1982

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FORT STEWART

RCRA FACILITY INVESTIGATION
LOCATION MAP, FORT STEWART, GEORGIA

3

GEORGIA

FIGURE
1.1

CORPS OF ENGINEERS

U. S. ARMY

NOTE:

SWMUS WITHIN THE CANTONMENT AREA ARE LOCATED ON PLATE 2.

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RCRA FACILITY INVESTIGATION

LOCATION OF SWMU SITES OUTSIDE THE CANTOMENT AREA

FORT STEWART GEORGIA

SIZE	INVITATION NO.	FILE NO.	PLATE
F	DACA-21-90-0079		1

SCALE: AS SHOWN
SHEET

D. GOODSON 29

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RCRA FACILITY INVESTIGATION

LOCATION OF SWMU SITES INSIDE THE CANTOMENT AREA

FORT STEWART GEORGIA

SIZE	INVITATION NO.	FILE NO.	PLATE
F	DACA-21-90-0079		2

SCALE: 1" = 500'
SHEET

33

All 22 SWMUs are located within Fort Stewart property boundaries (Plates 1 and 2) and have been designated as follows in the scope of work.

- South Central Landfill (FST-001)
- Camp Oliver Landfill (FST-002)
- Tac-X Landfill (FST-003)
- Burn Pits (FST-004A through FST-004G)
- EOD Area (FST-009)
- EOD Area (FST-010)
- EOD Area (FST 011)
- Current EOD Area (FST-012)
- Old Fire Training Pit (FST-014)
- DRMO Hazardous Waste Storage Area (FST-017)
- Industrial Waste-Water Treatment Plant (FST-018)
- Old Sludge Drying Beds (FST-019)
- Wright Air Field Sewage Disposal Beds (Land Spray Application and Lagoon) (FST-020)
- Radiator Shop (Building 1070) (FST-024A and FST-024B)
- 86 Waste Oil Tanks (FST-025)
- 724th Tanker Purging Station (FST-026)
- Motor Pools (Wash Racks, Grease Racks and Steam Racks) (FST-027)
- 724th Battery Shop (FST-028)
- Evans Army Heliport POL Storage Facility (FST-029)
- Recirculating Wash Impoundment ("Bird Bath") (FST-030)
- 3 DEH Asphalt Tanks (FST-031)
- Supply Diesel Tank (FST-032)

Previous work has addressed potential contamination at most sites including the following:

1. The 1982 ESE study of the potential for landfills to contaminate ground water, surface water, and air.

2. The 1983 ESE study of potential contamination at motor pools, radiator shops, fire fighting training areas, POL storage, industrial waste-water disposal, sanitary sewer systems, battery shop, landfills, and explosive ordnance disposal areas.

3. The 1987 U.S. Army Environmental Hygiene Agency Investigation of Soil Contamination at the fire training and explosive ordinance disposal areas.

4. The 1987 U.S. Army Environmental Hygiene Agency Investigation Evaluation of Solid Waste Management Units including the landfills, burn pits, EOD areas, fire training pits, DRMO HW storage area, IWTP sludge tanks, old sludge drying beds, sewage disposal bed, Wright Army Airfield waste POL point, radiator shop, and the waste oil tanks.

5. The 1988 U.S. Army Environmental Hygiene Agency Environmental Program Review including landfills, USTs, fire training pits, motor pools, burn pits, EOD areas, POL storage, DRMO, battery shop, sewage treatment plant, and the industrial waste-water treatment plant.

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2.0 FACILITY DESCRIPTION AND HISTORY

2.1 Base History

Fort Stewart (named in honor of the Revolutionary War Brigadier General Daniel Stewart) was established in June 1940 as an Antiaircraft Artillery Center to prepare artillery troops for overseas deployment. Training activities associated with World War II (WWII) decreased by the end of 1944. Between January and September 1945, the installation operated as a Prisoner of War (POW) camp, housed two Italian units, and served as a separation center. The post was inactivated in September 1945 (ESE, 1983).

In August 1950, Fort Stewart was reactivated to train antiaircraft artillery units for the Korean Conflict. The training mission was expanded to include armor training concurrent with antiaircraft artillery training in 1953. In 1956, Fort Stewart was designated a permanent Army installation and an element of the U.S. Army Aviation School from Fort Rucker, Alabama. The aviation school was stationed there from 1966 to 1973 (ESE, 1983).

The 1st Battalion, 75th Infantry (Ranger) was activated at Fort Stewart on January 31, 1974. As a result, Fort Stewart became a training and maneuver area, providing tank, field artillery, helicopter gunnery, and small arms training for regular Army, USAR, and National Guard units. The 24th Infantry Division was permanently stationed at Fort Stewart in 1975 (ESE, 1983).

2.2 Meteorology

Fort Stewart has a humid subtropical climate with long hot summers. Average temperatures range from 50°F in the winter to 80°F in the summer. Average annual precipitation is 48 inches, with slightly over half falling from June through September. Prolonged drought is rare in the study area, but severe local storms (tornadoes and hurricanes) do occur. Under normal conditions, wind speeds rarely exceed 5 knots, but gusty winds of over 25 knots may occur during summer thunderstorms (Paulk, 1980).

2.3 Ecology

Approximately 7.811 square miles of the 436.815 square miles at Fort Stewart comprise the cantonment area. The remainder is used for ranges and training areas (~11 percent) or held as non-use areas.

Eighty-four percent of the land is forested (approximately 367.179 square miles). Sixty-six percent of this is pine forest with the major species including the slash pine, loblolly pine, and the longleaf pine. Thirty-four percent of the forest is composed of river bottom lands and swamps whose major species include the tupelo, other gum trees, water oak, and bald cypress trees. The open range and training areas comprise 11 percent of the base and consist of grasses, shrubs, and scrub tree (oak) growth.

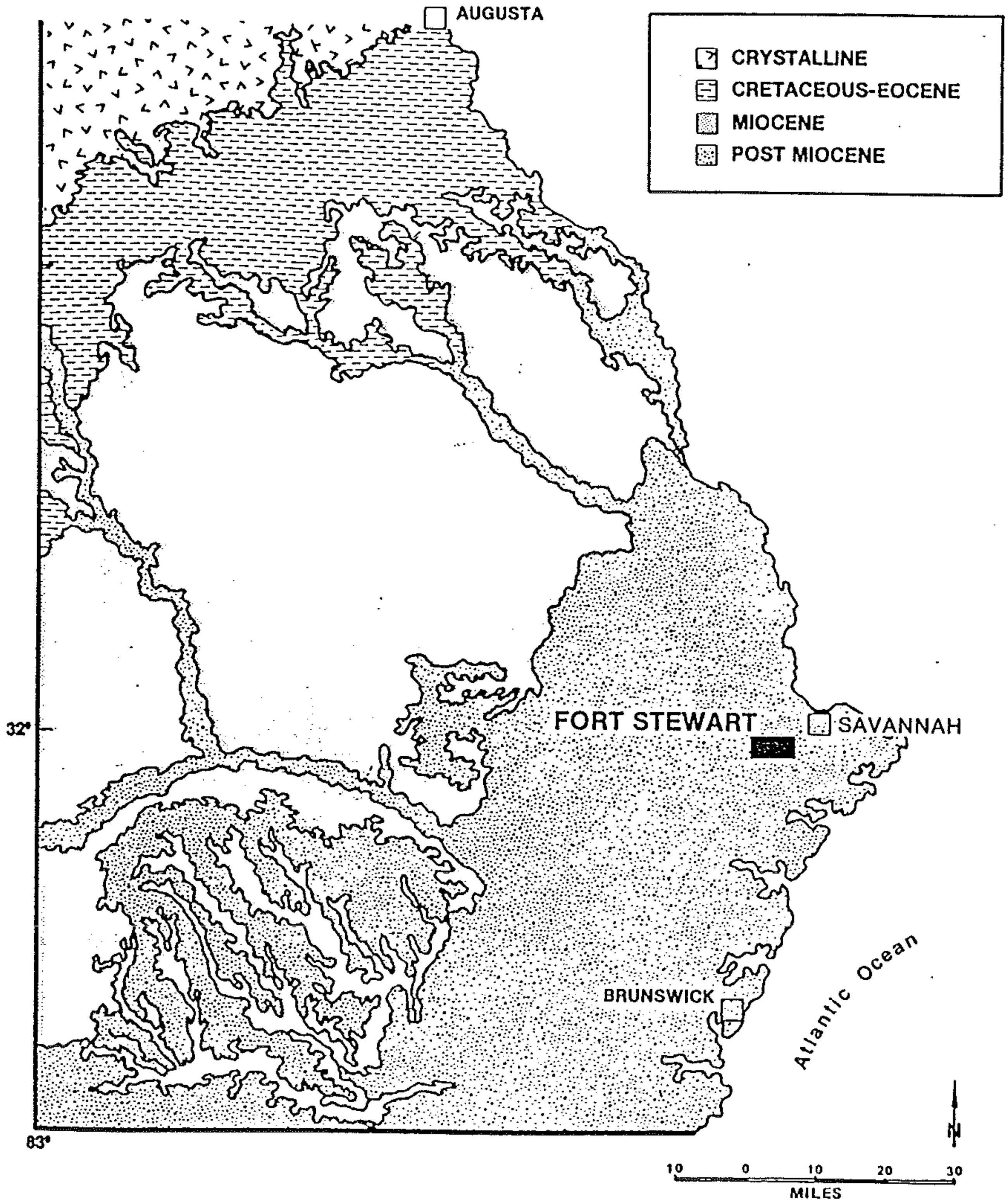
Aquatic habitats on Fort Stewart include a number of natural or man-made ponds and lakes; the Canoochee River, Canoochee Creek and tributaries, and a number of bottom land swamps and pools. The Ogeechee River borders the installation along its northeast boundary. Organic detritus content is high and dark coloring of the water is not unusual. Dense growths of aquatic vegetation are also typical, especially during the summer months.

Both terrestrial and aquatic fauna are abundant in the unimproved areas of Fort Stewart. Major game species found on the installation include white-tailed deer, feral hog, wild turkey, rabbit, squirrel, and bobwhite in addition to numerous mammal, bird, reptile, and amphibian species (Environmental Science and Engineering 1983). Dominant fish include bluegill, largemouth bass, crappie, sunfish, channel catfish, minnows, and shiners. Three federally listed threatened or endangered species reside at Fort Stewart; the American alligator, Eastern indigo snake, and the red-cockaded woodpecker.

2.4 Hydrogeologic Setting

2.4.1 Regional Geology

Fort Stewart lies within the Southern Atlantic Lower Coastal Plain (Figure 2.1), with most surface elevations on the flat forested lands of the reservation ranging from 6 to 100 feet above mean sea level (msl). In the northwestern portion of the installation, the topographic relief is



SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING, 1982.

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SAVANNAH, GEORGIA

RCRA FACILITY INVESTIGATION
OUTCROP GEOLOGY OF THE REGION

FORT STEWART *GEORGIA*

FIGURE
2.1

45

greater with elevations ranging from 100 to 182 feet msl. The Canoochee River bisects the installation providing some topographic relief. About 60 percent of the eastern half of the installation is comprised of marshes and swamps with rolling hills formed by erosion. A small portion of the extreme western margin flows into the Altamaha River System by way of Beards Creek.

The principal surface waters on Fort Stewart drain into the Canoochee River which joins the southward-flowing Ogeechee River (part of the northeastern boundary of the reservation). A small portion of the extreme western margin flows into the Altamaha River System via Beard's Creek. Some streams along the eastern margin drain into the Ogeechee River while others along the southeastern margin flow southward to the Ohoopee, Jerico, and North Newport Rivers.

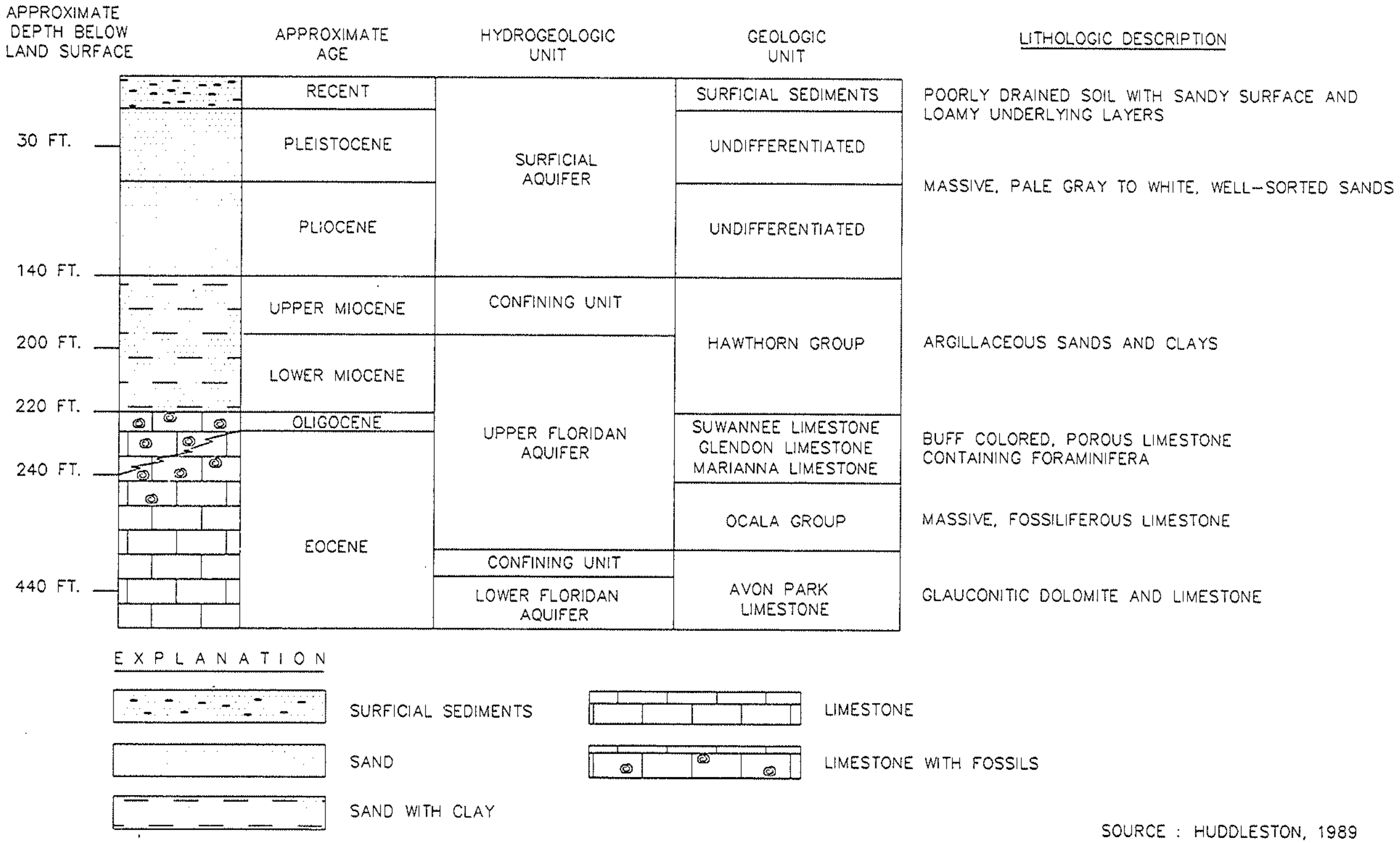
The lower Coastal Plain region of Georgia is underlain by a moderately thick wedge of unconsolidated and semi-consolidated sediments ranging in age from Recent to Cretaceous (Herrick and Vorhis, 1963). Generally, the sediments thicken and dip eastward toward the coast. The underlying Cenozoic Coastal Plain sediments are dominated by clastics (sand, silt, and clay) to the west, near the fall line, and become more carbonaceous (limestone and dolomite) near the coast (Herrick and Vorhis, 1963).

Ground water in the study area occurs within two major water-bearing zones, the surficial aquifer and the Floridan Aquifer. While these two systems are separate, under certain conditions, an exchange of water occurs between them (Environmental Science and Engineering 1982). Figure 2.2 shows the stratigraphic relationships of the aquifer systems near Fort Stewart.

2.4.2 The Surficial Aquifer

The surficial aquifer is under water-table conditions and is localized and discontinuous in distribution, ranging in depth from 2 to 10 feet below land surface to approximately 140 feet below land surface. Included in this aquifer are undifferentiated deposits of Pliocene to recent age.

The surficial sediments consist of poorly drained soils that have a sandy surface layer over loamy underlying layers (Looper 1982, Paulk 1980). The hydraulic conductivity of the surface soils range from 8.3 x 10^{-5} to 8.3 x 10^{-3} feet per second, with most values in the lower ranges. Beneath these soils lie the loose, generally structureless and massive, pale gray, buff and white,



SOURCE : HUDDLESTON, 1989
CLARKE, HACKE & PECK, 1990

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COMPOSITE GEOLOGIC COLUMN

FORT STEWART

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GEORGIA

FIGURE
2.2

undifferentiated, well sorted, fine to medium grained Holocene surficial sands that are up to 25 feet thick. The base of the aquifer sediments are undifferentiated, Miocene to Pleistocene paludal and lacuestrine deposits composed of a higher clay and silt content than the surficial sediments (Huddlestun 1989).

Ground water produced from the surficial aquifer is used primarily for domestic lawn and irrigation throughout most of the coastal areas. Wells screened in the surficial aquifer will yield from about 2 to 180 gallons per minute. The estimated transmissivity ranges from about 14 to 6,700 ft^2/day. Tidal influences in the surficial aquifer generally occur east of the 20 foot topographic contour line; therefore, any fluctuations to the water table at Fort Stewart due to tidal influences would be minimal, occurring only in the eastern wetlands.

2.4.3 Floridan Aquifer

The principal regional and continuous aquifer in the area of Fort Stewart, Georgia is known as the Floridan Aquifer. The unit, composed of argillaceous sands and clays at the top with massive limestones at the base, is divided into the upper and lower Floridan Aquifers.

The geologic formations which constitute the upper Floridan Aquifer are the lower Hawthorn Group, the Oligocene Swannee Limestone (when present), the Oligocene Glendon Limestone (when present), the Oligocene Marianna Limestone (when present), and the upper Eocene Ocala Group. The thickness of the upper Floridan Aquifer ranges from less than 200 feet to 260 feet. Generally, this confined aquifer is shallowest near the northeastern part of the Georgia coast. In the area of Fort Stewart, the lower Middle Miocene Hawthorn Group's argillaceous sands and clays act as an upper confining unit for the Floridan Aquifer. The Oligocene Formations that may be present are the Swannee Limestone, the Glendon Limestone and the Marianna Limestone. These units consist of buff-colored, porous, limestone that contain foraminfera. The thickness of the Oligocene unit reaches about 120 feet, generally in the northeast, but is absent in other areas.

Beneath the Miocene or Oligocene sediments lies the upper Eocene Ocala Group. The Ocala is a massive, fossiliferous limestone that contains Bryzoan remains, foraminfera, and mollusk shells. Thicknesses of the Ocala Group range from 200 to 400 feet thick (Clarke et al 1990).

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The upper Floridan Aquifer is most productive where it is thickest and where secondary permeability is most developed. The transmissivity of the aquifer in the Savannah area ranges from about 28,000 to 33,000 ft^2 per day (Krause and Randolph 1989). Pumping in the Savannah area is evenly distributed between industrial and public supply. Withdrawals in Savannah during 1986 were about 73 million gallons per day resulting in substantial cone of depression (Clarke et al 1990).

The lower Floridan Aquifer consists of Middle Eocene and older units. The estimated depth to the top of the aquifer is 450 feet in the Fort Stewart area (U.S. Army Environmental Hygiene Agency 1988). Usually the uppermost portion of the lower Floridan Aquifer is the most permeable (Clarke et al. 1990); however, ground water produced from this aquifer is brackish in this area.

2.5 Background Conditions

2.5.1 Ground-Water Quality

Ground-water quality on water samples from the deep artesian aquifer are provided in Appendix F of the assessment conducted by Environmental Science and Engineering (1983). As described in that report, water from the area is considered to be of good quality, has a relatively constant temperature, and is free of biological contamination and sediment. The water, which is moderately hard to hard, is treated by softeners; and, except for chlorination and fluoridation, it is otherwise untreated before use. Hydrogen sulfide is detectable in water supplies.

Ground-water samples are scheduled to be collected from a number of sites. At each site, samples will be collected from an upgradient well and analyzed in the same manner as the downgradient wells. The results of analysis for the downgradient wells will be compared to background levels and by either state or federal drinking water standards, naturally occurring concentrations as established in the upgradient well, or the method detection limits for those constituents not naturally occurring in ground water (i.e. volatile organics). The background levels will be set in accordance with 40 CFR 264.94 of Subpart F, Releases from Solid Waste Management Units.

2.5.2 Soils

The major soil types in the area of Fort Stewart Military Reservation were briefly described in two reports by Environmental Science and Engineering (1982 and 1983). A later description was provided in an environmental program review conducted by U.S. Army Environmental Hygiene Agency (1988). Briefly, the descriptions indicated that the soils ranged from well drained, nearly pure sand to poorly drained mixtures of loam, sand, and clay. The overall area is affected by seasonably high water table due to lower elevations and flat terrain. The soils lack natural strength and are vulnerable to erosion if denuded.

A soil investigation was conducted in March 1987, in which samples were collected in the Fire Training Areas and the EOD area (U.S. Army Environmental Hygiene Agency 1987). Background samples were collected from depths of 0 to 1 feet and 3 to 6 feet in Boring 9 collected at Zouck's Cemetery. The background sample indicated the following concentrations: mercury 0.398 to 0.399 ug/L, barium 1.99 to 6.19 ug/L, lead 3.98 to 35.9 ug/L, and arsenic at 3.99 ug/L. Chromium, cadmium, and selenium were all reported at below the method detection limit.

Soil samples collected during the RFI field investigation will be analyzed for volatile organic aromatics (EPA Method 8240), total petroleum hydrocarbons (EPA Method 8015), and TCLP. Background levels for each constituent identified will be determined from established state and federal levels.

The State of Georgia has established action levels for those constituents identified as present in soils by the analysis for TPH (EPA Method 8015) and volatile organic aromatics (EPA Method 8240). The Georgia action levels to be used during the investigation are 20 parts per million (ppm) BTEX (EPA Method 8240) and 100 ppm TPH, if a private water-well exists within a one-half mile radius or three miles of a public water well (Georgia Underground Storage Tank regulations). The action levels increase to 100 ppm BTEX and 500 ppm TPH where the water well sources are at distances greater than that mentioned above.

The concentrations of metals determined through the TCLP method will be compared to levels established in the federal regulations for the maximum concentrations of contaminants for toxicity characteristics. Those levels are provided in Table 1 of 40 CFR 261.24.

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2.5.3 Surface Water

Water-quality data supplied for the Ogeechee River by the EPA was used to establish background conditions for surface waters in the area (Environmental Science and Engineering 1983). As reported in that document, the water is generally soft with a total hardness of 1.4 mg/L and an alkalinity of 14.2 mg/L. The values for the Canoochee River were slightly different with a hardness of 55 mg/L and an alkalinity of 6.4 mg/L. Background values for chlorides, nitrates, and sulfates as indicated in that report were approximately 6.0 mg/L, 0.04 mg/L, and 6.0 mg/L, respectively.

Surface-water samples are scheduled to be collected during Phase I field investigation of the RFI. Samples will be collected and analyzed, background samples will be collected from an upstream location to establish the approximate background levels.

2.6 Identification of Potential Receptors

A demographic profile of the area, according to the 1970 census, shows that the five-county area, encompassing Fort Stewart, has a population of 56,186 (Environmental Science and Engineering 1982). All of the land on the Fort Stewart Reservation is used for military operations. Although timber harvest is part of the multi-use function of army lands, it is not held in tracks for pulp and paper companies. All land is solely government owned in fee simple. Paper and pulp companies are the purchasers of the facility timber resources. Hunting is permitted and prominent on Fort Stewart land.

The major bodies of surface water on the facility are classified by the State of Georgia, in Table 2.1, as either fishing, possible fishing area if NPDES permit requirements are met, or recreational. Water sampling data (from previous testing) indicate that the State of Georgia criteria for fishing use are being met.

According to an Environmental Science and Engineering report (1983), range and training activities, along with operations at Fort Stewart, do not have a significant adverse effect on the biota. No fish kills due to unnatural toxic or hazardous materials have been documented, nor have stresses on vegetation or wildlife due to contaminant materials been recorded. Primary impacts on biota would include disturbance of soil and vegetation by vehicle maneuvers, clearing of areas for

Table 2.1 Surface Water Classifications Around Fort Stewart

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Body of Water	Georgia Classification
FST	
Taylors Creek	Fishing
Canoochee Lake Creek	Fishing
Canoochee River	NPDES/Fishing
Ogeechee River	Recreation

Source: Environmental Science and Engineering 1983

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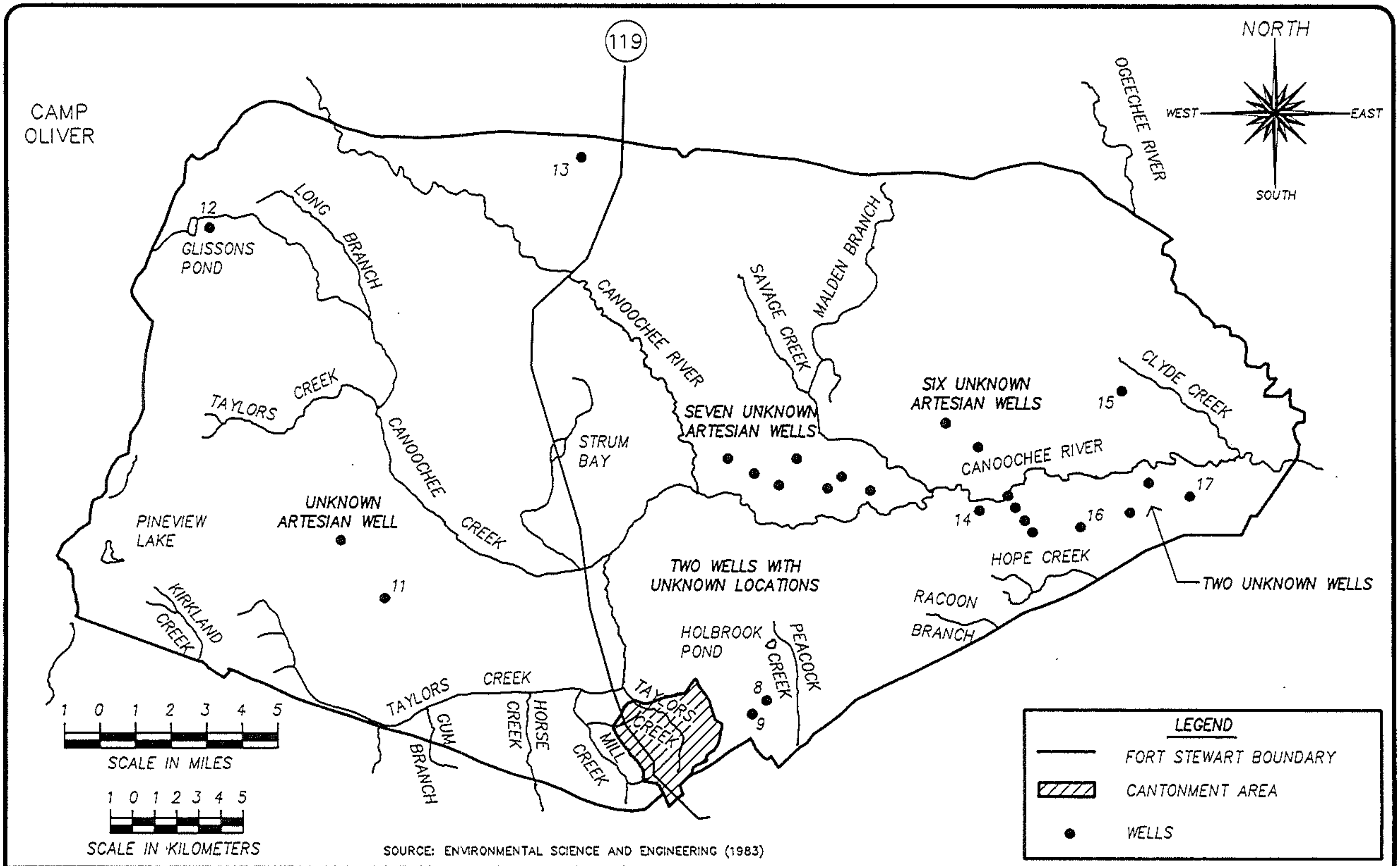
development of ranges and training areas, and the physical and noise impacts of range firing and training upon vegetation and wildlife (Environmental Science and Engineering 1983). Localized habitat reductions, increased soil erosion and runoff, and the displacement of noise-sensitive wildlife would be results of these impacts. None of these elements are commonly or widely observed at Fort Stewart. In addition, a large percentage of Fort Stewart remains relatively undisturbed by noise or physical disturbance impacts.

Thirty one production wells are reportedly present at Fort Stewart: 9 in use, 20 unused, and 2 on standby (Figures 2.3 and 2.4). Five production wells, ranging in depth from 500 to 800 feet, provide water for the main cantonment area, (U.S. Army Environmental Hygiene Agency 1988). Outside of the cantonment area, Wright Army Airfield, Tac-X, and Camp Oliver each have one or more wells. The Fort Stewart well information is provided in Appendices 2.1 and 2.2. A water-quality engineering study was performed in 1976 by U.S. Army Environmental Hygiene Agency and is summarized in Tables 2.2 A&B.

The deeper wells in the area (surrounding counties) are used for drinking water, while the shallow wells are used for observation and other possible Army municipal uses. Some of the wells are not being used. The future usage of these wells probably will not change as the area is not being developed. However, Fort Stewart ground-water levels are affected by heavy ground-water use in the Savannah area. An average of 70 million gallons per day is pumped from the Floridan Aquifer by Savannah, equal to 98 percent of the ground-water demand in the area. The present rate of withdrawal exceeds the rate of recharge in the area (U.S. Army Environmental Hygiene Agency 1988).



SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING (1983)

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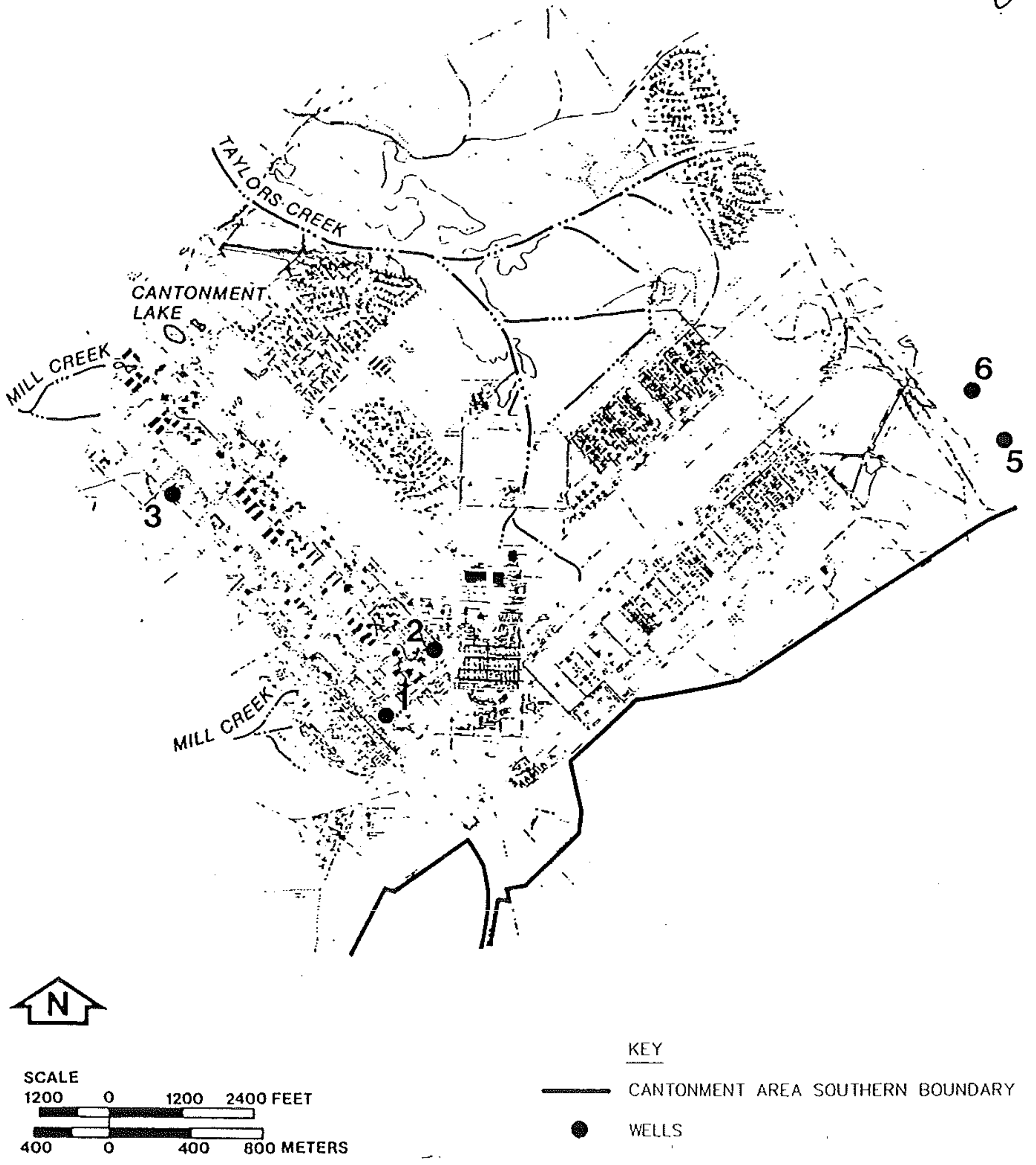
FORT STEWART

RCRA FACILITY INVESTIGATION
FORT STEWART WATER SUPPLY WELL LOCATION MAP

GEORGIA

FIGURE
2.3



SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING, 1983.

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CORPS OF ENGINEERS
SAVANNAH, GEORGIA

RCRA FACILITY INVESTIGATION
CANTONMENT AREA WATER SUPPLY WELLS
FORT STEWART *GEORGIA*

FIGURE
2.4

Table 2.2B Sample Locations for USAEHA Water Quality Study at Fort Stewart (1976).

Designation	Location
A	Unnamed drainage ditch--Upstream of FST post STP discharge
B	Unnamed drainage ditch--Downstream of post STP discharge
C	Taylors Creek--Upstream of the junction with the unnamed drainage ditch which conveys STP effluent
D	Taylors Creek--Downstream of the junction with the unnamed drainage ditch which conveys STP effluent
E	Canoochee Creek--Upstream of the junction with Taylors Creek
F	Canoochee Creek—Downstream of the junction with Taylors Creek

Source: Environmental Science and Engineering 1983

Table 2.2A Analytical Data, 1976 Water Quality Study, Around Fort Stewart.

Parameter*	Station A	B	C	D	E	F
BOD (mg/l)	2	10	<1	1	<1	1
COD (mg/l)	11	49	59	52	77	59
Ortho Phosphate (mg/l)	0	2.03	0.05	0.06	0.05	0.53
Total Phosphate (mg/l)	0.13	3.41	0.15	0.77	0.44	0.71
Ammonia Nitrogen (mg/l)	0.3	7.5	0.3	0.1	0.1	0.3
Nitrates (mg/l)	0.03	0.04	0.03	0.72	0.04	0.99
Nitrites (mg/l)	0.009	0.016	0.045	0.063	0.013	0.067
Alkalinity (mg/l)	23	105	25	21	1	16
Acidity (mg/l)	4.1	13.5	7.2	7.1	13.3	6.5
Chlorides	5.8	17.8	8.5	11.1	7.6	10.8
Sulfates	—	18.5	7.8	9.4	6.0	8.6
Turbidity	4	12	8	29	15	34
Specific Conductivity (ohms/cm^2)	78	307	82	118	43	93
Total Solids	75	129	84	116	76	85
Total Volatile Solids	20	42	63	58	84	45

* ohms/cm^2 = ohms per square centimeter.

Source: Environmental Science and Engineering 1983

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3.0 PROJECT MANAGEMENT PLAN

3.1 Data Management Procedures and Guidelines

The data management for the Phase I RFI is designed to control, inventory, and track investigation data and document results. After data are generated by field and laboratory operations, it will be properly handled to maintain its integrity, the integrity of subsequent reports, and for future enforcement or legal actions. Data will be maintained using hardcopy (field logs, laboratory reports) and computer files. A central administrative file will be maintained by a designated "Document Custodian" at Geraghty & Miller, Inc.'s Jacksonville office. Field log books, chain-of-custody records, laboratory reports, photos, maps, correspondence, and reports will be maintained as part of the data record. The data management procedures outlined in this section are intended to provide for proper inventory, control, storage, and retrieval of data and information collected during the investigation. The various formats to be used to present the raw data and conclusions of the investigation are also discussed in this management plan. The sample labeling procedures, and other field documentations are discussed in the QAPP contained in Volume II, Attachment A. Chain-of-custody procedures are also discussed in the QAPP.

3.1.1 Records Control

Incoming investigation-related documents will be stamped with the date received and filed. If distribution is required, the appropriate copies will be made and distributed to project personnel. A listing of personnel intended to receive copies will be attached to the original document.

Information generated from field activities will be documented on the appropriate forms presented throughout the various sections of this RFI work plan (Phase I) and the QAPP. These include the following:

- Soil/coring log
- Well construction log
- Soil/sediment sampling log
- Drilling and sampling daily checklists
- Copies of field notes

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Analytical documentation received from the laboratory will be retained and filed. Laboratory documentation will be maintained for purposes of validating the data collected during the investigation.

Notes from project meetings and telephone conversations also will be documented. A file of these notes will be maintained by the project coordinator. The project manager and the project coordinator will be responsible for reviewing and filing these documents as they are generated.

3.1.2 Document Filing and Access

Project files containing investigation-related data, transmittals, and reports generated during the investigation will be maintained at Geraghty & Miller, Inc.'s Jacksonville office according to the procedures outlined in this section. Access to the project files will be monitored and limited to project personnel.

A central file will be maintained in a secure, limited access area and under custody of the project manager. As soon as practical, incoming originals of correspondence, documents, and records will be placed in the project central file. The file shall include data, logs, field notes, pictures, QA/QC audit reports, progress reports, and other relevant records generated. Unless otherwise specified, the analytical laboratories will be required to maintain laboratory-generated documents for a period of three years after completion of the project.

Ongoing project data and reports will be distributed through the Army Corps of Engineers (ACOE), Savannah. The project manager will maintain a log of project documents forwarded to ACOE.

3.1.3 Computer Data Storage

During the implementation of this investigation, a large volume of various types of information will be compiled. Data related to the investigation will be stored in a computer database (either Excel or Lotus 123). This database will contain ground-water data collected during the Phase I RFI. When possible, data from the laboratory will be provided to Geraghty & Miller on a diskette as well as in hard copy. Well construction information from monitoring wells installed during the Phase I RFI, together with new water-level data will be entered into the database. Soil-vapor data collected during this investigation will also be entered into the database. All information will be stored on hard drive with backup on double-sided, high density diskettes. The data files will be available to Fort Stewart upon request.

When required, data entry will be performed by designated Geraghty & Miller personnel. Computerized data bases will be checked against the original data (maintained in the project file) to determine if it was entered correctly. Data entered into the database system will be drawn from field records as well as laboratory analysis sheets. Data records will contain the following types of information:

- Unique sample or field measurement codes
- Sampling or field measurement location and sample or measurement type
- Sampling or field measurement raw data
- Laboratory analysis ID number (if appropriate)
- Property or component measured (including store code if applicable
- Result of analysis (e.g., concentration)

3.1.4 Data Reduction Methods

Using the database-management system, data will be manipulated to provide integrated and detailed organization of the existing information. Data will be categorized and compiled according to information type to assist in defining the hydrogeologic system and existing contamination conditions. Information types may include: (1) geologic characterization, (2) hydraulic properties, (3) water-level data from wells and streams, (4) water-quality data, and (5) soil-vapor analyses.

The reduced data will be presented to the ACOE in either tabular or graphical formats. The following types of data will be presented in tabular format:

- Unsorted (raw) data;
- Results for each medium, or for each constituent monitored; and
- Summary data.

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Other types of data that might be presented in an appropriate graphical format (e.g. bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.) are as follows:

- Sampling locations and sampling grids;
- Boundaries or sampling areas and areas where more data are required;
- Contamination levels, averages, and maxima;
- Geographical extent of contamination;
- Changes in concentration in relation to distance from the source, time, depth, or other parameters;
- Features affecting intramedia transport and potential receptors; and
- Ground-water elevation maps.

3.1.5 Project-Related Progress Reports

Monthly progress reports will be submitted to the ACOE. These progress reports will contain the following elements for each ongoing work activity.

- Identification of sites and activity
- Status of work at the sites and progress to date
- Difficulties encountered during the reporting period
- Actions being taken to rectify problems
- Activities planned for the next month
- Significant correspondence and telephone conversations
- Any significant contamination found will be summarized

3.2 Organization

The Geraghty & Miller personnel who have contributed to the preparation of the Phase I RFI work plan (Phase I) and who will have significant contribution to the Phase I RFI study are shown on the Phase I RFI Organizational Chart (Figure 3.1). Also included in the Phase I RFI Organizational Chart are the ACOE contact, and the types of subcontractors who will be participating in this project and providing support to Geraghty & Miller.

RFI PROJECT ORGANIZATION

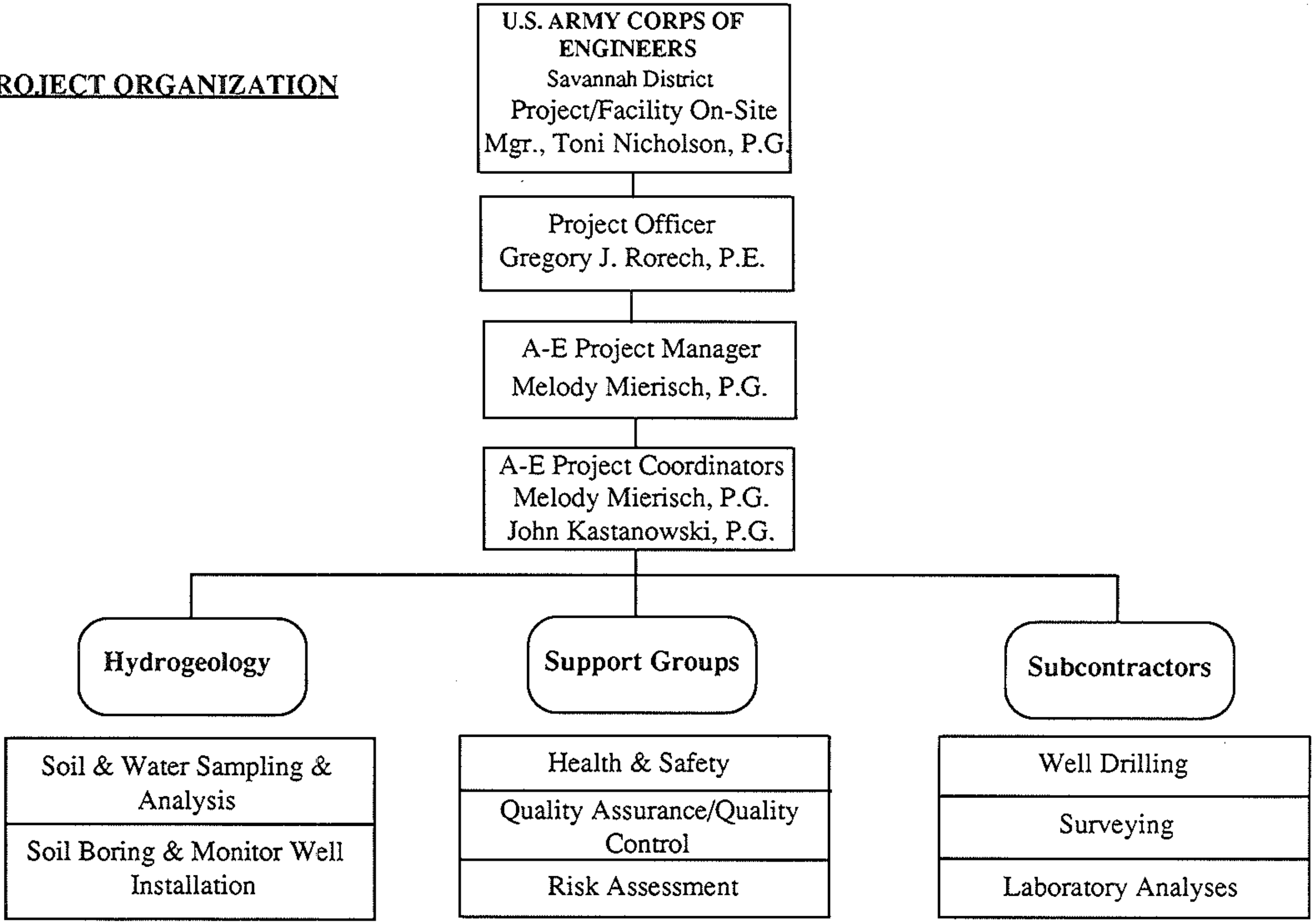

Figure 3.1 RFI Project Organization

Client Name: U.S. Army Corps of Engineers
Savannah District
Fort Stewart, Georgia

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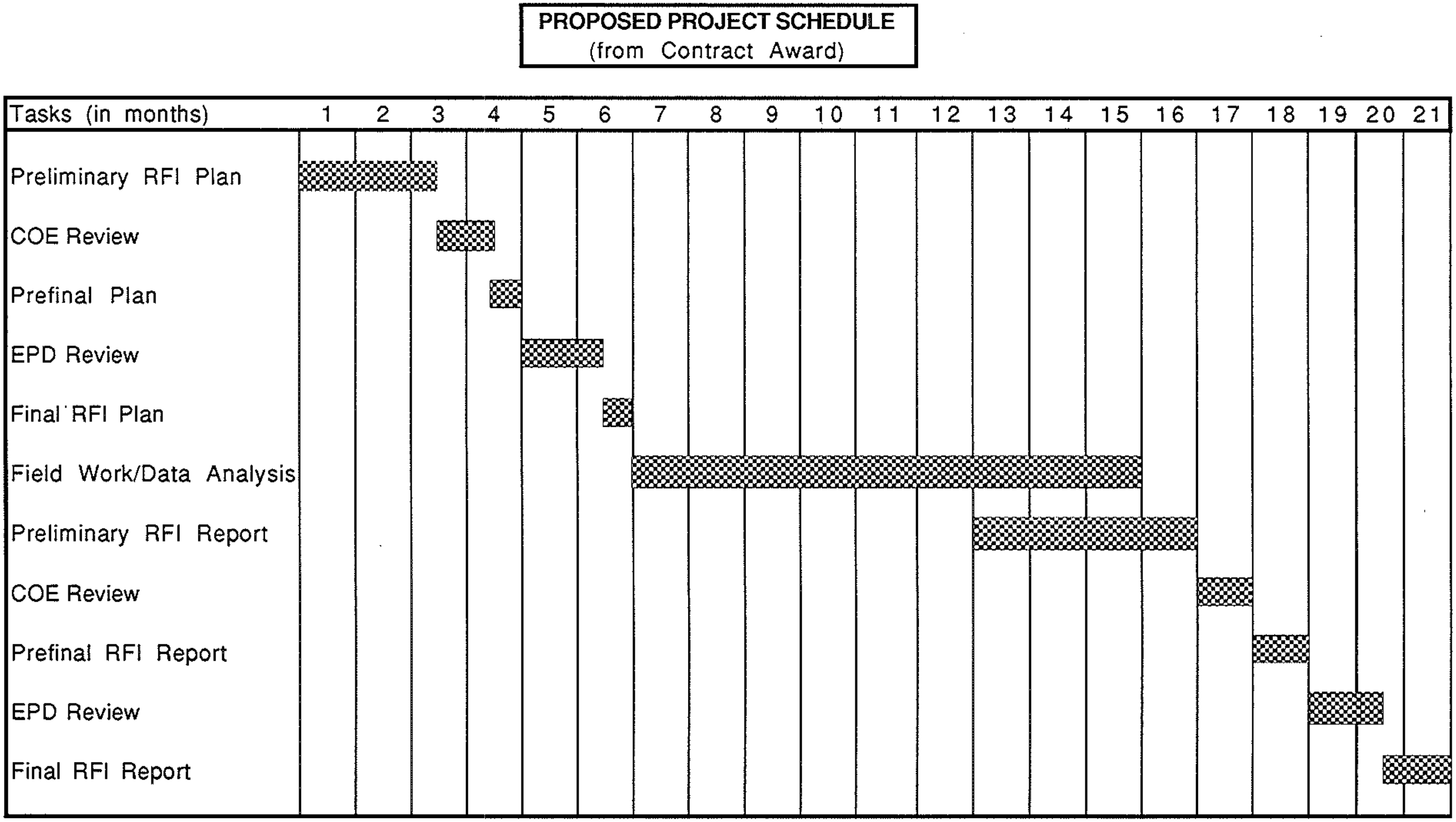
3.3 Schedule of Implementation

The schedule for implementation of the RFI work plan (Phase I) at the facility is shown on Figure 3.2. As indicated in that figure, it is anticipated that the GA EPD will review the RFI work plan (Phase I) in 45 days from receipt. Comments from the GA EPD to the RFI work plan (Phase I) will be incorporated within 2 weeks of receipt. Upon approval by the GA EPD to proceed, field activities will be initiated immediately and are anticipated to be completed within nine months. A preliminary Phase I RFI report will be completed within 30 days and submitted to the COE for review. Sixty days after that submittal, the Pre-final Phase I RFI report will be submitted to the GA EPD for review. Thirty days after receipt of the GA EPD comments, the final Phase I RFI report will be submitted.

Figure 3.2 Proposed Schedule for the Phase I Investigation of SWMUs, Fort Stewart, Georgia.



4.0 DESCRIPTION OF CURRENT SITE CONDITIONS AND PROPOSED WORK FOR THE PHASE I INVESTIGATION

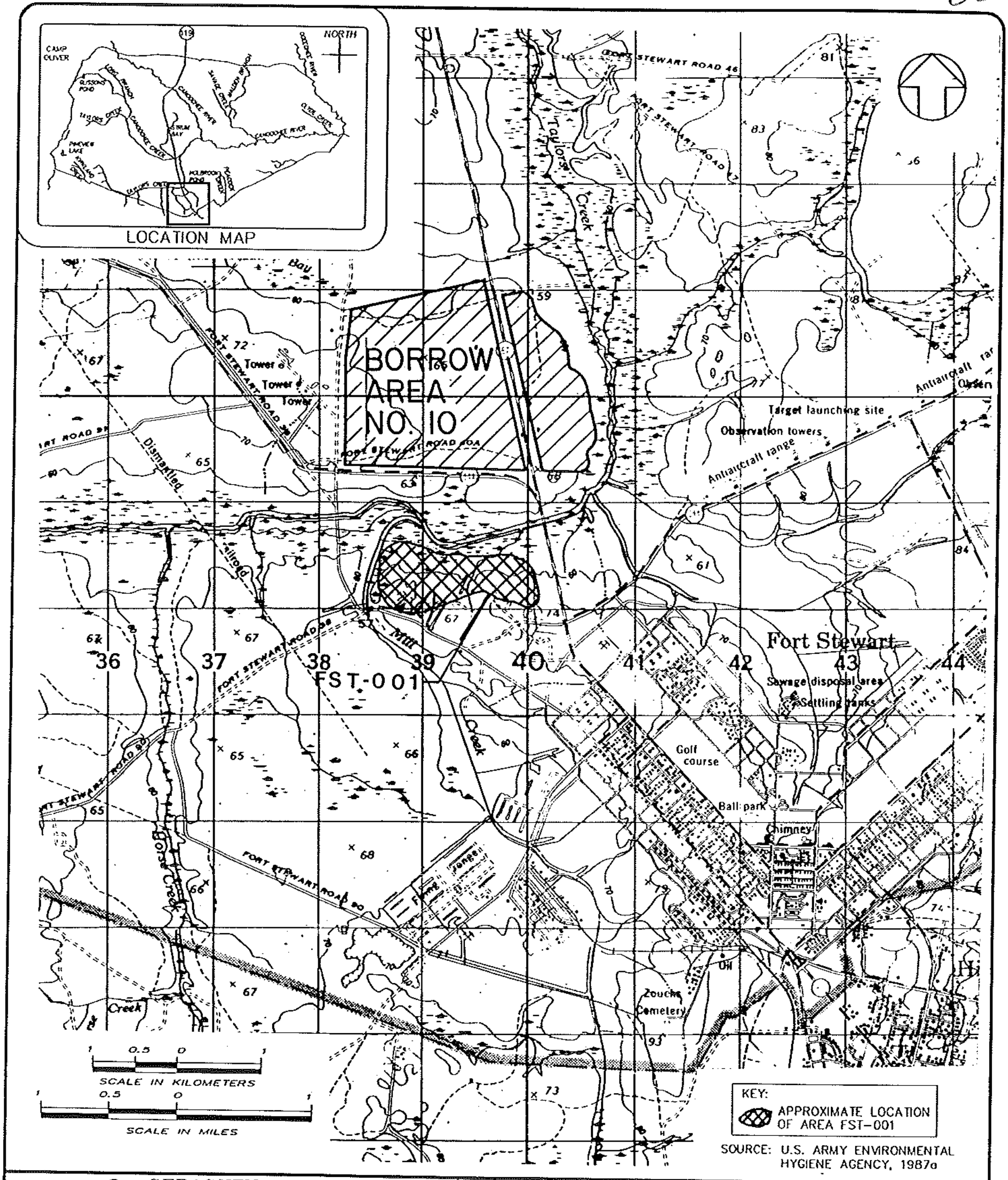
The RFI work plan (Phase I) for the 22 SWMUs addressed in this document will be conducted in a phased approach. Phase I of the RFI is designed to utilize all existing information, the minimum detection system as required by the GA EPD, and additional investigations to confirm any releases present. The work proposed in this work plan, under the Phase I investigation, is based on the deficiencies and recommendations outlined in the GA EPD report titled "Site Characterization Review" (GA EPD, 1988). Because site conditions at a few units have changed considerably since this report was written, present conditions will be described and the work proposed will be based on the present conditions identified at those units. Documentation generated from past investigations will be used in conjunction with a combination of ground-water samples, soil samples, and interviews with personnel familiar with site histories to confirm if any releases have occurred and to make the necessary recommendations for further investigations, if needed. If no contamination is found at a SWMU further investigation is not anticipated. If contamination is confirmed, additional work as part of a Phase II investigation may be recommended in the Phase I RFI report in order to fully delineate the extent of any contamination identified. Table 4.1 summarizes the work effort at each site.

A description of the current conditions, including a site description and history, and a discussion of the nature and extent of the potential of contamination is given for each SWMU. The site description includes a brief introduction, site history, and reported site activities, previous investigations, and the nature and extent of potential of contamination. Based on this evaluation, recommendations for additional data needs and work are provided for each SWMU.

4.1 The South Central Landfill (FST-001)

4.1.1 Site Description and History

The South Central Landfill (FST-001) is located northwest of the main cantonment area of Fort Stewart. This 87-acre site (Figure 4.1) is situated on a point of land bounded on three sides (north, south, and west) by Mill Creek, a tributary to Taylors Creek, and Taylors Creek (see Figure 4.1). The landfill is currently active and has been in operation since 1940 (Environmental



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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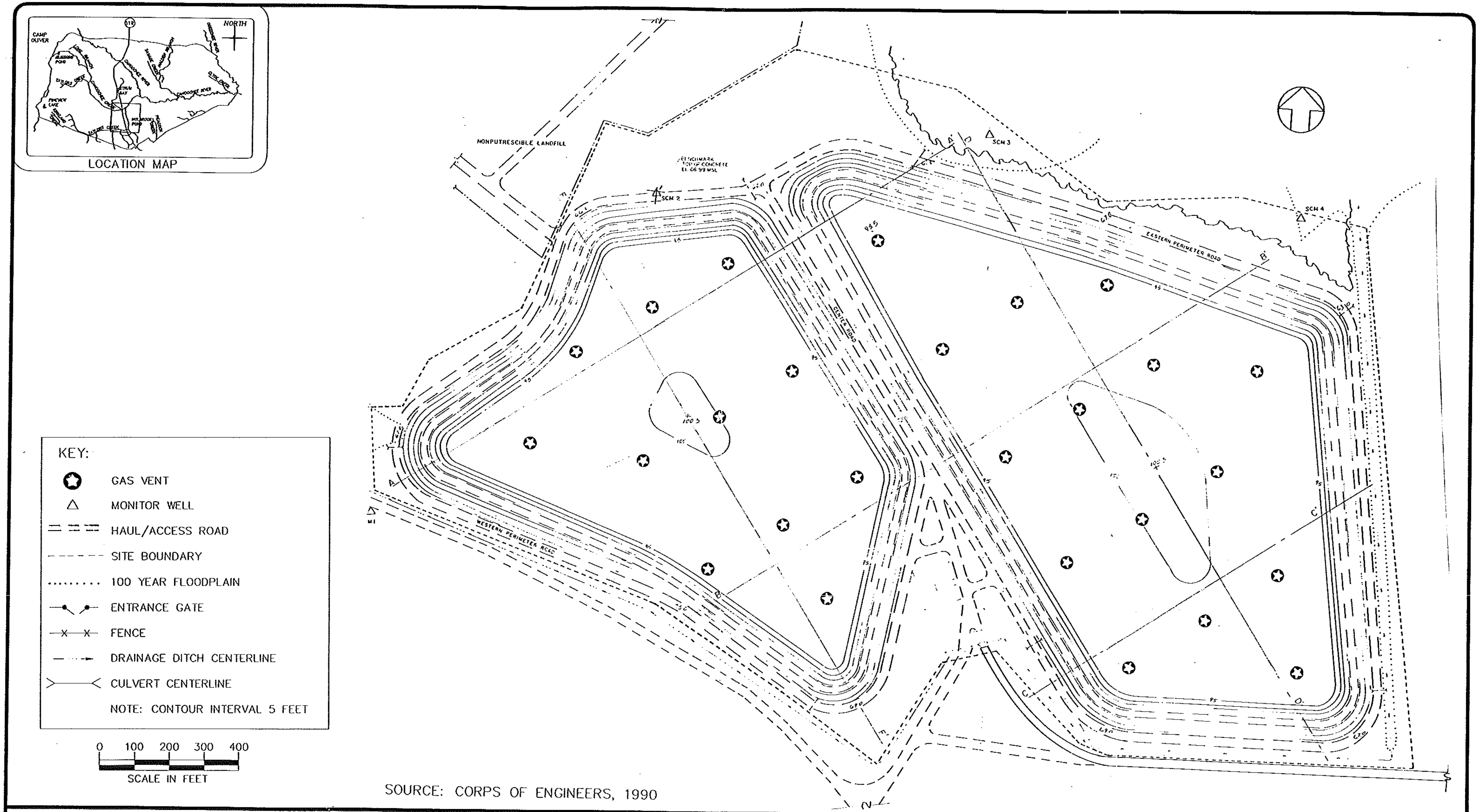
RCRA FACILITY INVESTIGATION
SOUTH CENTRAL - LANDFILL LOCATION MAP FST-001
FORT STEWART
GEORGIA

FIGURE
4.1



SOURCE: CORPS OF ENGINEERS, 1990

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RCRA FACILITY INVESTIGATION
SOUTH CENTRAL DESIGN AND OPERATION PLAN FST-001

FORT STEWART

GEORGIA

FIGURE
4.2

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Science and Engineering, 1982). The South Central Landfill's design and operation plan are shown in Figure 4.2.

According to the description provided in the Final Engineering Report (Environmental Science and Engineering, 1982), from 1940 to 1970, the eastern section of the landfill operated as a burn pit for garbage, paper waste, and construction debris. Other wastes included sludge from the waste-water treatment plant, waste air filters from the paint booth in the DOL Allied Trades Shop, dewatered sludge from the sewage treatment plant, autoclaved infectious wastes bagged in special containers and incinerator ash. From 1970 to 1982, the trench and fill method was used in the eastern part of the landfill. The operation moved west, restoring previously used land to forest land. Georgia's EPD determined that the trench method was unacceptable for this site because the water table is within 10 feet of the surface and the potential for movement of leachate to the ground water was possible (Environmental Science and Engineering, 1982). From 1982 to present, the area fill method was then used in the west section of the site.

4.1.2 Previous Investigations

Two previous reports were published regarding this site: (1) 1982 RCRA Final Engineering Report by Environmental Science and Engineering, and (2) 1983 Installation Assessment of Headquarters by Environmental Science and Engineering. Both of these reports, resulting from one investigation conducted in 1982, are referenced in the 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency, the 1987 Hazardous Waste Consultation No. 37-26-1382-88, Evaluation of Solid Waste Management Units by the U.S. Army Environmental Hygiene Agency, and the 1989 RCRA Facility Assessment Report (RFA) by the EPD.

Six ground-water monitoring wells and seven observation wells were initially installed by the Corps of Engineers in January 1980 (Appendix 4.1 through 4.5). Ground-water analyses were conducted quarterly, as prescribed by the permit, until 1985. In 1985, the GA EPD reduced the monitoring requirement to annual analyses for chloride and specific conductance.

In 1982, Environmental Science and Engineering drilled 14 soil borings (Figure 4.3) to total depths of 50 feet, with two borings (SC-B1 and SC-B15) drilled to total depths of 100 feet. The purpose of these borings was to gather geotechnical information including soil descriptions

Table 4.1 Field Work and Laboratory Analyses Summary

SWMU NO.: **FST-001**
Description: Post-South Central Landfill

Tasks:
Collect water level data. Construct potentiometric map.
Sample ground water in 6 wells. Sample surface water.
Research ignition source.
Construct surface water flow map.
Construct cross-sections from available data.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
pH,spc	various	8	2	10	GW/SW
VOCs	8240	8	3	11	GW/SW
RCRA metals	various	8	2	10	GW/SW
pest/PCBs	8080	8	2	10	GW/SW
RA-226/8	900	8	2	10	GW/SW
				51	

SWMU NO.: **FST-002**
Description: Camp Oliver Landfill

Tasks:

Abandon damaged monitoring well.
Install two monitoring wells to replace damaged ones.
Install well protection around new and existing wells.
Sample ground water in four wells.
Sample surface water.
Determine ground-water flow direction.
Collect water level data. Construct potentiometric map.
Construct surface water flow map.
Construct cross-sections from available data.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
pH,spc	various	6	0	6	GW/SW
VOCs	8240	6	0	6	GW/SW
RCRA metals	various	6	0	6	GW/SW
pest/PCBs	8080	6	0	6	GW/SW
				24	

SWMU NO.: **FST-003**
Description: Tac-X Landfill

Tasks:

Existing well construction info to be submitted.
Submit leachate analysis or sample leachate.
Document site description.
Sample ground water in four wells.
Sample surface water.
Construct surface water flow map.
Determine ground-water flow direction.
Install well protection around existing wells.
Construct potentiometric map.
Construct cross-sections from available data.
Investigate soil permeability.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
pH,spc	various	6	0	6	GW/SW
VOCs	8240	6	1	7	GW/SW
RCRA metals	various	6	0	6	GW/SW
pest/PCBs	8080	6	0	6	GW/SW
pH,spc	various	1	2	3	leachate
VOCs	8240	1	2	3	leachate
RCRA metals	various	1	2	3	leachate
pest/PCBs	8080	1	2	3	leachate
				12	

SWMU NO.: **FST-004A-004F**
Description: Burn Pits A-F

Tasks:
Install twenty-four monitoring wells.
Install well protection around new wells.
Sample ground water in twenty-four wells.
Determine ground-water flow direction at six sites.
Construct potentiometric map.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
VOCs	8240	24	4	28	GW
RCRA metals	various	24	2	26	GW
ph, spc	various	24	2	26	GW
				80	

Table 4.1 Field Work and Laboratory Analyses Summary

SWMU NO.: **FST-004G**
Description: Burn Pit G

Tasks:
Detailed description of the site.

SWMU NO.: **FST-009**
Description: EOD Area

Tasks:

Site map showing locations and depths of samples.
Collect six soil samples.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
RCRA metals	various	6	2	8	Soil
pH, spc	various	6	2	8	Soil
Explosive res	8350	6	2	8	Soil
				24	

SWMU NO.: **FST-010**
Description: EOD Area

Tasks:

Site map showing locations and depths of samples.
Collect six soil samples.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
RCRA metals	various	6	0	6	Soil
pH, spc	various	6	0	6	Soil
Explosive res	8350	6	0	6	Soil
				18	

SWMU NO.: **FST-011**
Description: EOD Area

Tasks:

Site map showing locations and depths of samples.
Collect six soil samples.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
RCRA metals	various	6	0	6	Soil
pH, spc	various	6	0	6	Soil
Explosive res	8350	6	2	8	Soil
				20	

SWMU NO.: **FST-012**
Description: Current EOD Area

Tasks:

Site map showing locations and depths of samples.
Collect six soil samples.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
RCRA metals	various	6	0	6	Soil
pH, spc	various	6	0	6	Soil
Explosive res	8350	6	0	6	Soil
				18	

SWMU NO.: **FST-014**
Description: Old Fire Training Pit

Tasks:

Install four monitoring wells.
Install well protection around new wells.
Sample ground water in four wells.
Determine ground-water flow direction.
Collect water level data. Construct potentiometric map.
Construct cross-sections from available data.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
pH,spc	various	4	2	6	GW
VOCs	8240	4	3	7	GW
RCRA metals	various	4	2	6	GW
TPH	8015	4	2	6	GW
pH	various	4	2	6	Soil
VOCs	8240	4	3	7	Soil
RCRA metals	various	4	2	6	Soil
TPH	8015	4	2	6	Soil
				50	

Table 4.1 **Field Work and Laboratory Analyses Summary**

SWMU NO.: **FST-017**
Description: DRMO Hazardous Waste Storage Area

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
VOCs	8240	4	0	4	Soil
all TCLP	various	4	0	4	Soil
				8	

Tasks:

Collect soil samples.
Description of the current site conditions.

SWMU NO.: **FST-018**
Description: Industrial Wastewater Treatment Plant

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
all TCLP	various	1	3	4	Sludge
pest/PCBs	8080	1	2	3	Sludge
VOCs	8240	1	2	3	Sludge
pH/spc	various	1	2	3	Sludge
VOCs	8240	4	0	4	Soil
RCRA metals	various	4	0	4	Soil
TPH	8015	4	0	4	Soil
all TCLP	various	1	1	2	sldg/sed
pest/PCBs	8080	1	0	1	sldg/sed
VOCs	8240	1	0	1	sldg/sed
pH	various	1	0	1	sldg/sed
pH/spc	various	2	2	4	WW
VOCs	8240	2	1	3	WW
RCRA metals	various	2	0	2	WW
pest/PCBs	8080	2	2	4	WW
all TCLP	various	7	3	10	Sed
pest/PCBs	8080	7	2	9	Sed
VOCs	8240	7	3	10	Sed
pH	various	7	2	9	Sed
pH	various	7	0	7	SW
VOCs	8240	7	0	7	SW
RCRA metals	various	7	0	7	SW
pest/PCBs	8080	7	0	7	SW
				109	

Tasks:

Sample sludge.
Sample wastewater influent & effluent.
Sample sediment in sand filters.
Sample sediment & groundwater in equalization basin.
Sample sediment & groundwater near influent.
Sample soil by UST.
Description of sludge tanks and site.

SWMU NO.: **FST-019**
Description: Old Sludge Drying Beds

Tasks:

Description of site.
Research abandonment procedures.

SWMU NO.: **FST-020**
Description: Wright Air Field Sewage Disposal Bed (Land Spray, Lagoon).

Tasks:

Decription of site.
NPDES permit status.
Research existing ground water data.
Investigate loading rate of priority pollutants.
Expand summary of 2 previous investigations.

Table 4.1 Field Work and Laboratory Analyses Summary

SWMU NO.: FST-024
Description: Radiator Shop

Tasks:

Sample sludge.
Sample sediment from former drain field.
Desription of site.
Investigate date encapsulating practice ceased.
Reseach descaling process.
Research paint booth drainage schematics.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
pH	various	1	0	1	Sludge
VOCs	8240	1	0	1	Sludge
all TCLP	various	1	1	2	Sludge
all TCLP	various	3	1	4	Sludge
				8	

SWMU NO.: FST-025
Description: 86 Waste Oil Tanks

Tasks:

List of tanks with features.
Revise waste oil tank map.
Walk-over inspection of each tank.
Sample soil by USTs without concrete cover.
Perform tightness tests for USTs with concrete cover.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
TPH	8015	11	2	13	Soil
all TCLP	various	11	3	14	Soil
pH	various	11	2	13	Soil
VOCs	8240	11	2	13	GW
RCRA metals	various	11	0	11	GW
TPH	8015	11	0	11	GW
pH	various	11	0	11	GW
				86	

SWMU NO.: FST-026
Description: 724th Tanker Purging Station

Tasks:
Sample soil near purging area.
Research if tightness tests performed.
Description of site.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
TPH	8015	4	2	6	Soil
all TCLP	various	4	3	7	Soil
pH	various	4	0	4	Soil
VOCs	8240	4	3	7	Soil
				24	

SWMU NO.: FST-027
Description: 25 Motor Pools (wash racks, grease racks, and steam racks)

Tasks:

Inventory of motor pools.
Description of site.
Update site map.
Research process schematic draings for 3 separators.
Sample drainage ditch.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
TPH	8015	3	0	3	Soil
all TCLP	various	3	0	3	Soil
pH	various	3	0	3	Soil
VOCs	8240	3	1	4	Soil
				13	

SWMU NO.: FST-028
Description: Battery Shop

Tasks:

Description of site.
Sample soil near visually impacted areas.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
TPH	8015	4	0	4	Soil
all TCLP	various	4	1	5	Soil
pH	various	4	0	4	Soil
				13	

Table 4.1 Field Work and Laboratory Analyses Summary

SWMU NO.: **FST-029**
Description: Evans Army Heliport POL Storage Facility

Tasks:

Sample soil inside and outside berm.
Sample soil at loading areas.
Investigate past spill history.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
TPH	8015	8	0	8	Soil
all TCLP	various	8	1	9	Soil
VOCs	8240	8	1	9	Soil
				26	

SWMU NO.: **FST-030**
Description: Recirculating Wash Impoundment 'Birdbath'

Tasks:

Sample sludge.
Description of site.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
VOCs	8240	2	0	2	Sludge
pH	various	2	0	2	Sludge
TPH	8015	2	2	4	Sludge
all TCLP	various	2	1	3	Sludge
				11	

SWMU NO.: **FST-031**
Description: DEH Asphalt Tanks

Tasks:

Sample soil.
Site description.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
VOCs	8240	6	1	7	Soil
TPH	8015	6	0	7	Soil
pH	various	6	0	7	Soil
				21	

SWMU NO.: **FST-032**
Description: Supply Diesel Tank

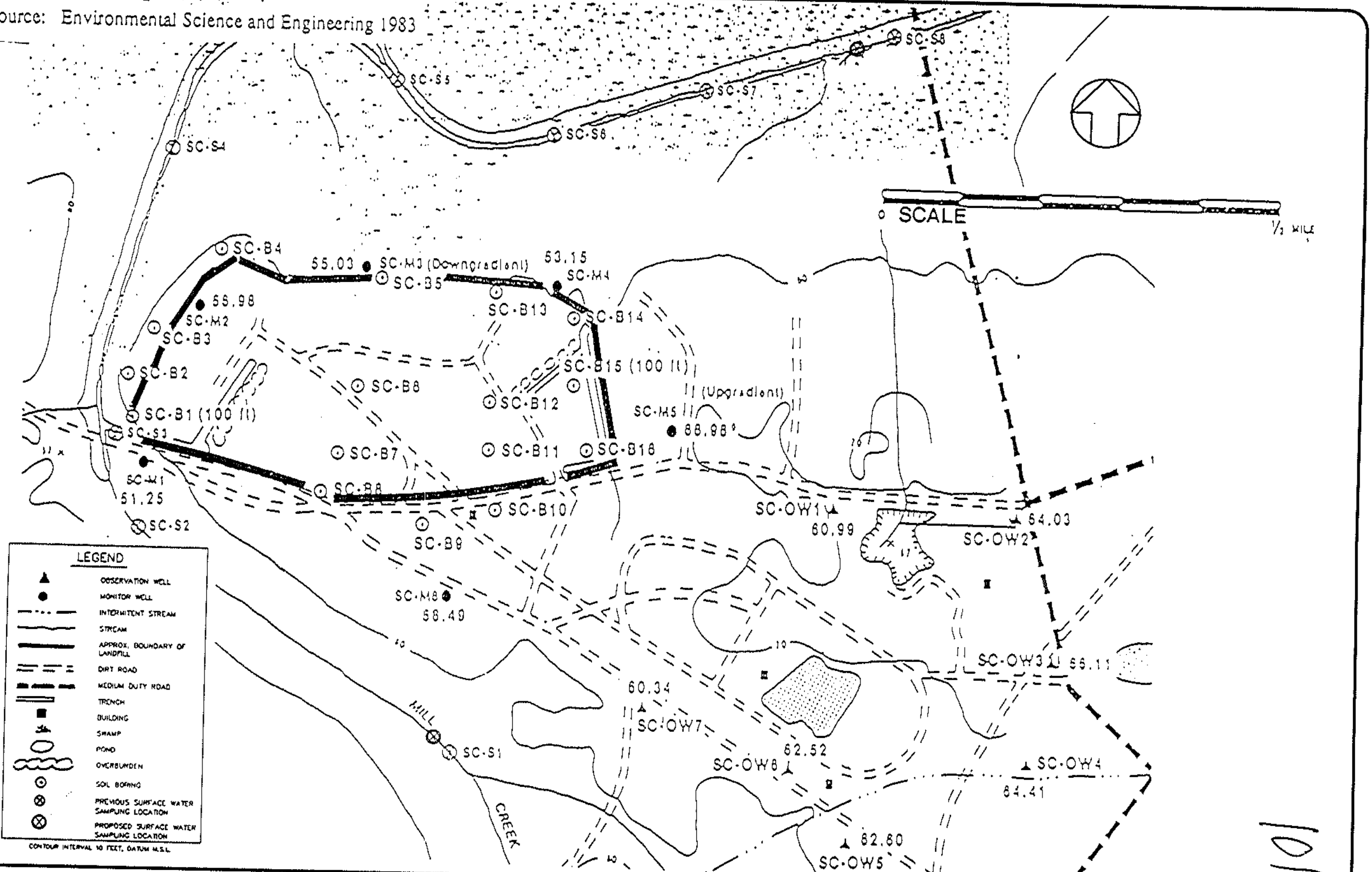
Tasks:

Sample soil.
Description of site.

Laboratory Analyses:

Type	*EPA Method*	*Qty.*	*QA/QC*	*Total*	*Medium*
VOCs	8240	6	0	6	Soil
TPH	8015	6	0	6	Soil
				12	

Source: Environmental Science and Engineering 1983



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RCRA FACILITY INVESTIGATION
SOUTH CENTRAL SOIL BORING LOCATION MAP FST-001

GEORGIA

FIGURE
4.3

and aquifer parameters. Subsequently, in 1983, Environmental Science and Engineering prepared the Installation Assessment. The purpose of this report was to determine the existence of toxic or hazardous materials and related contamination at Fort Stewart and Hunter AAF.

4.1.3 Waste Characterization

The waste characterization of the South Central Landfill (FST-001) includes garbage, paper waste, construction debris, sludge from the waste-water treatment plant, dewatered sludge from the sewage treatment plant, waste air filters from the paint booth in the DOL Allied Trades Shop, autoclaved infectious wastes bagged in special containers and incinerator ash (Environmental Science and Engineering 1982). A Fort Stewart engineer (personal communication with Thomas Houston) indicated that no fuel source was used in the burning of solid wastes at the landfill. The incinerator ash present was generated from solid waste burned at the three medical incinerators on base (medical, pathological and veterinarian). Although there is no evidence of release of contamination, Environmental Science and Engineering (1982) noted that leachate production was apparent as were numerous seeps into the trenches.

4.1.4 Potential for Releases/Known Releases

4.1.4.1 Ground Water

Six monitoring wells were sampled quarterly at this site from January 1980 until 1985 for the constituents approved by the GA EPD (Tables 4.2 and 4.3). The results from that previous analyses dated June 1980 are provided in Appendices 4.6 through 4.13. In 1985, the GA EPD reduced the monitoring requirements to annual analyses for chloride and specific conductance. Analytical results dated September 12, 1988, are provided in Appendix 4.6. The most recent analytical results from July and September 1989 and September 1990 are also provided in Appendix 4.6.

A potentiometric map was published at the site in 1982 by Environmental Science and Engineering (Figure 4.4). As indicated on this map, the general ground-water flow direction is from the southeast to northwest which agrees somewhat with the topographic map of the landfill (Figure 4.5). The 1982 Environmental Science and Engineering report also indicated that the vertical movement of ground water at the site appeared to be limited by partially cemented, silty,

Table 4.2 List of Analytical Parameters, South Central Landfill (FST-001)

Surface and Ground Water Analytical Parameters*	Additional Parameters for Upgradient Monitor Well No. SC-M5 and Downgradient Monitor Well No. SC-M3 at the South-Central Landfill
COD	Arsenic
BOD	Barium
TKN	Mercury
Chlorides	Selenium
Nitrate	Silver
TDS	Fluoride
TSS	Endrin
pH	Lindane
Specific Conductivity	Methoxychlor
Color	Toxaphene
Temperature	2,4-D
Radiation (gross alpha and beta)	2,4,5-TP
Fecal Coliform	Ra-226
Dissolved Oxygen†	Ra-228
Iron	
Cadmium	
Lead	
Chromium	

* TKN = total Kjeldahl nitrogen.
TDS = total dissolved solids.
Ra-228 = radium-228.

† Surface water samples only.

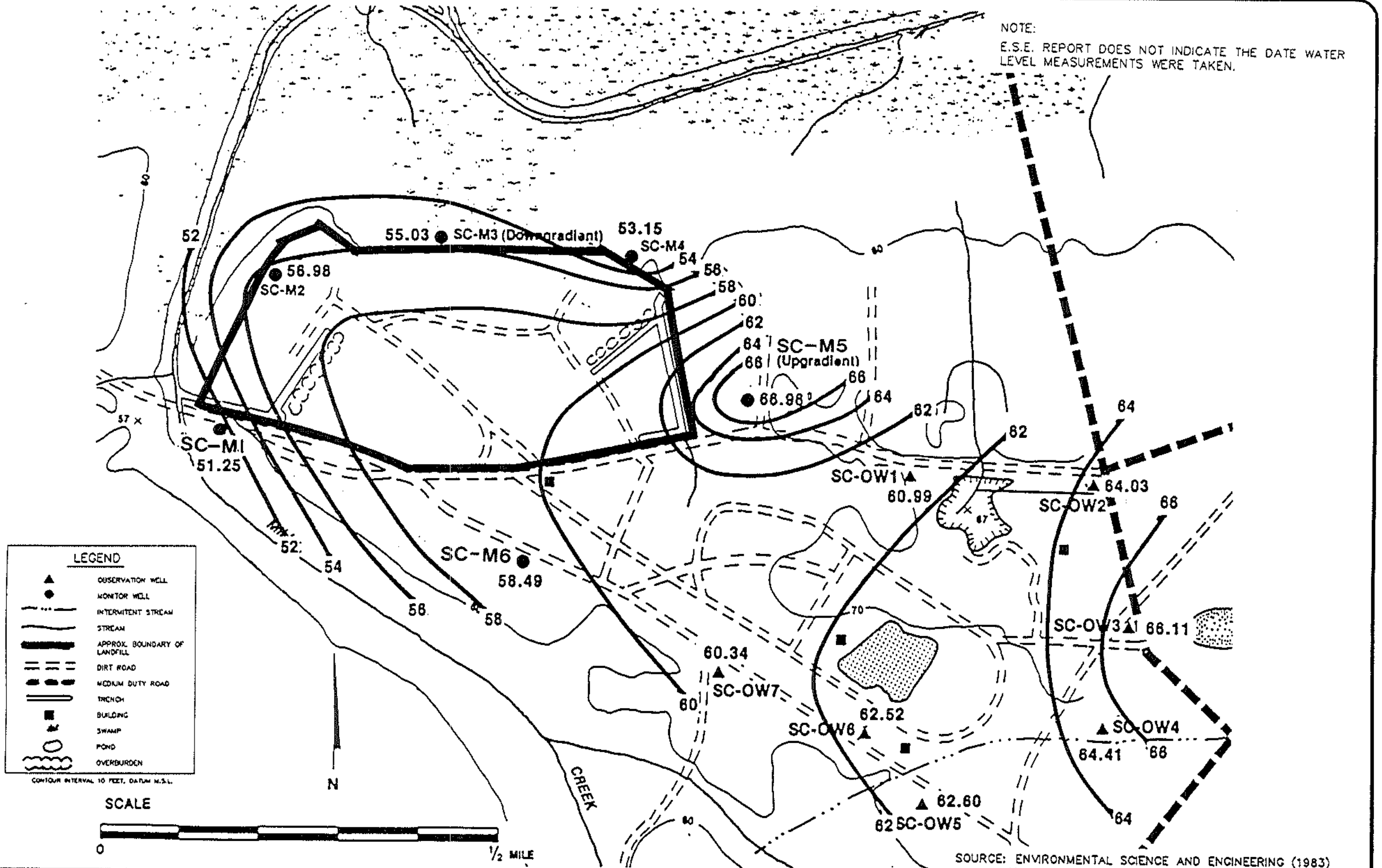
Source: Environmental Science and Engineering 1982

Table 4.3 Analytical Parameters for Quarterly Ground Water Monitoring at the South-Central Landfill (FST-001)

Analytical Parameter
BOD
COD
Total Dissolved Solids
Total Suspended Solids
pH
Specific Conductivity

Source: Environmental Science and Engineering 1983

NOTE:
E.S.E. REPORT DOES NOT INDICATE THE DATE WATER LEVEL MEASUREMENTS WERE TAKEN.



SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING (1983)

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RCRA FACILITY INVESTIGATION
SOUTH CENTRAL POTENTIOMETRIC MAP FST-001

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GEORGIA

FIGURE
4.4

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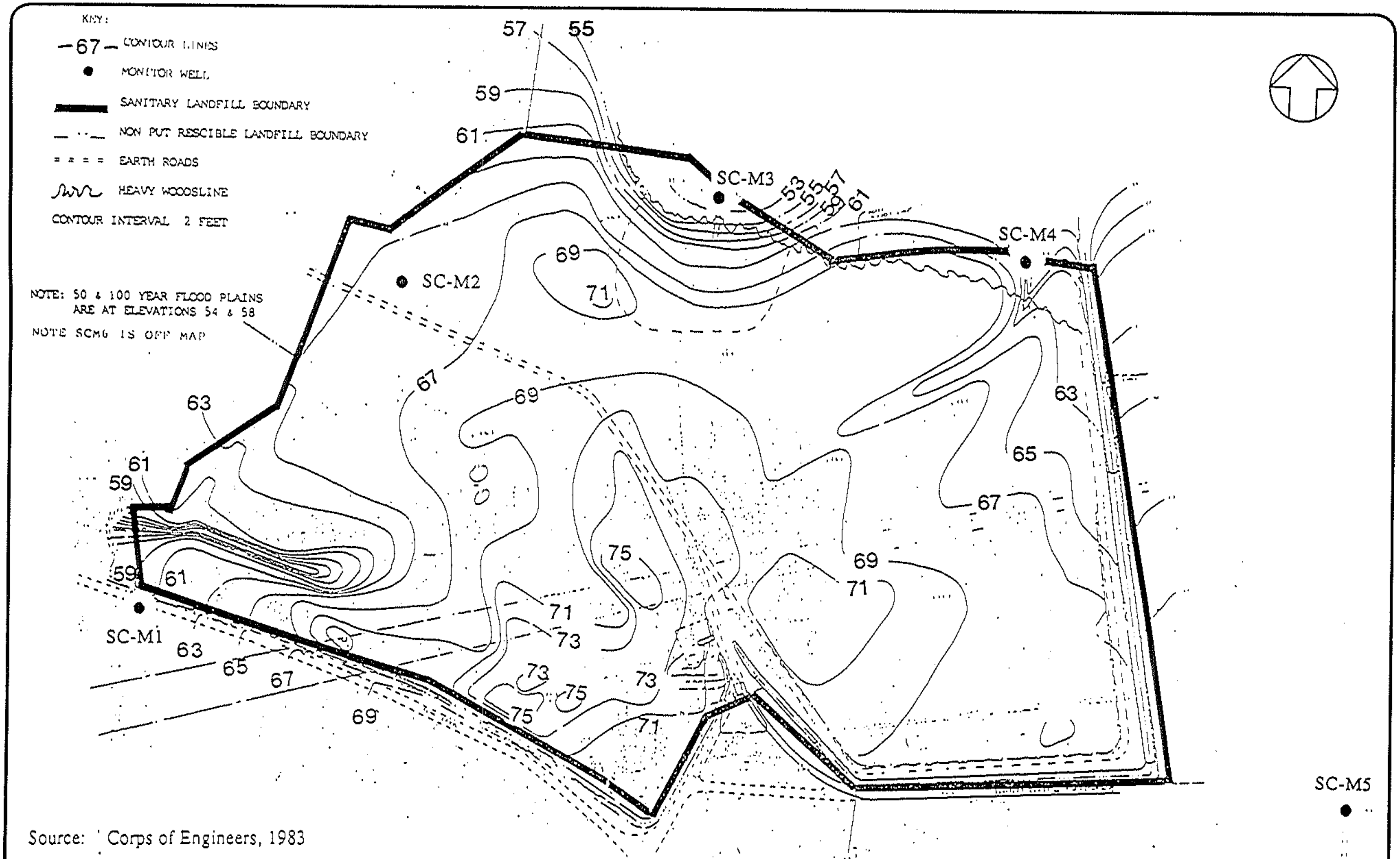

Source: ' Corps of Engineers, 1983

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RCRA FACILITY INVESTIGATION
SOUTH CENTRAL TOPOGRAPHIC MAP FST-001

FORT STEWART

GEORGIA

FIGURE
4.5

fine sands present at an approximate depth of 30 feet. The permeability of this soil zone, as reported by Environmental Science and Engineering (1982), ranged from 10^{-6} to 10^{-8} cm/sec. Potential migration pathways are inferred to follow the ground-water flow direction.

The past analytical results indicated that only one parameter exceeded drinking water standards as set by the National Interim Secondary Drinking Water Regulations. Iron had been reported as present in concentrations that range from 1.2 ppm to 10.9 ppm, which are above the federal level of 0.3 ppm. The 1982, Environmental Science and Engineering report indicated that the sources for the high iron concentrations are the natural soils and the presence of iron waste products in the landfill. The remaining information collected at the South Central Landfill has indicated that there have been no releases to the uppermost aquifer at the site. However, because of the close proximity of the water table to the base of the landfill, the potential for a release to ground water is high.

4.1.4.2 Soil

Soil samples were taken at 5-foot intervals during the 1982 Environmental Science and Engineering survey. The soil pH in the zone just below the waste cells was generally found to be 6.0. This creates conditions conducive to heavy metal precipitation (Griffin et al. 1977). In some areas where construction debris was deposited, pH values were found to be much higher. The localized high soil pH zones are attributed to the concentration of alkali-rich materials (i.e. concrete) within specific and discontinuous zones of the soil column. A thick layer of clay was placed on the site and compacted to form the base of the landfill and serve to limit migration of leachate downward. The potential for impact by leachate to soil beneath the landfill and adjacent to the landfill is high.

4.1.4.3 Surface Water

Eight surface-water sampling locations, SC-S1 through SC-S8 were sampled in the 1982 Environmental Science and Engineering report (see Figure 4.2). Iron concentrations in the surface water reached maximum values in the vicinity of Sampling Station SC-S3, located near the intersection of Mill Creek and a drainage canal from the landfill. Concentrations dropped off significantly between SC-S3 and SC-S4, but stabilized at a value of approximately 2.1 ppm in the interval between SC-S5 and SC-S8.

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The chemical data from the site indicated that the surface water in the area was not being significantly degraded by operation of the South Central Landfill. Although iron concentrations in the surface water near the landfill were high (1.09 ppm to 17.3 ppm), concentrations for iron near background values were reported a short distance from the landfill. Therefore, the potential for releases to surface water are low.

4.1.5 Proposed Work and Sample Analyses

4.1.5.1 General

Past investigations and ground-water monitoring of the landfill indicate no releases or impact to the environment. The landfill is currently regulated under a solid waste permit. The following work is proposed for the Phase I investigation.

1) All information pertaining to construction of the existing wells is provided in Appendices 4.1, 4.2, 4.3, 4.4, and 4.5.

2) Potentiometric and topographic maps are provided as Figures 4.4 and 4.5, respectfully.

3) One round of water-level data will be collected from the existing wells and used to determine the ground-water flow direction in accordance with procedures in the QAPP (Attachment A, Section 4.3.1). The rate of ground-water flow will be determined by tests conducted during the Phase II Investigation, if necessary.

4) The most recent water sampling data is provided in Appendices 4.6 through 4.13.

5) The existing six wells will be sampled and analyzed according to GA EPD recommendations for pH, specific conductance, volatile organic compounds (VOCs), RCRA metals, pesticides, PCBs, RA-226 and RA-228.

6) Two surface water samples (one upgradient and one downgradient) will be collected from Mill Creek (Figure 4.3) and analyzed according to GA EPD recommendations for pH, specific conductance, VOCs, RCRA metals, pesticides, PCBs, RA-226 and RA-228.

7) An attempt will be made to determine the ignition sources from 1940 to 1970 and what hazardous waste or hazardous waste constituents were present in the sludge and ash taken to the landfill. Information will be compiled from available sources and interviews with Fort Stewart personnel.

8) One representative north-south and one east-west cross section of the existing six monitoring wells in the south central landfill will be constructed using the information provided by Fort Stewart, and included within the final RFI report (Phase I).

9) Analytical results for metals, endrin, lindane, methoxychlor, toxaphene, 2, 4-D and 2,4,5-TP from samples collected at monitoring wells SCM-3 and SCM-5 are included in Appendix 6. The landfill permit does not require testing of the above constituents for other wells at the landfill; therefore analyses for the other wells are not available.

10) A surface water flow map will be included in the Phase I RFI report.

4.1.5.2 Field Sampling Plan

In accordance with the EPD's recommendations, the existing six wells will be sampled one time and the samples will be submitted for analyses of pH by EPA Methods 9040/9045, specific conductance by EPA Method 9050, VOCs by EPA Method 8240, RCRA metals by EPA Methods (6010 + 7470/7471 + 7060 + 7421 + 7740), pesticides and PCBs by EPA Method (8080), and RA-226/RA-228 by EPA Method 900. One upgradient and one downgradient surface water sample will be collected and analyzed for the same constituents as the six monitoring wells. If further drainage ditches are identified, than an additional upgradient and downgradient surface water sample for each drainage ditch will be collected and analyzed. One sample set will be submitted for laboratory duplication/split analysis. One equipment blank and one trip blank will be submitted for

QA/QC analysis. Field measurements for specific conductivity and pH will be recorded at each well. Refer to Table 6.1 for sampling summary. Field sampling procedures are found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Additional sampling, if needed, will be proposed for the Phase II Investigation.

4.2 The Camp Oliver Landfill (FST-002)

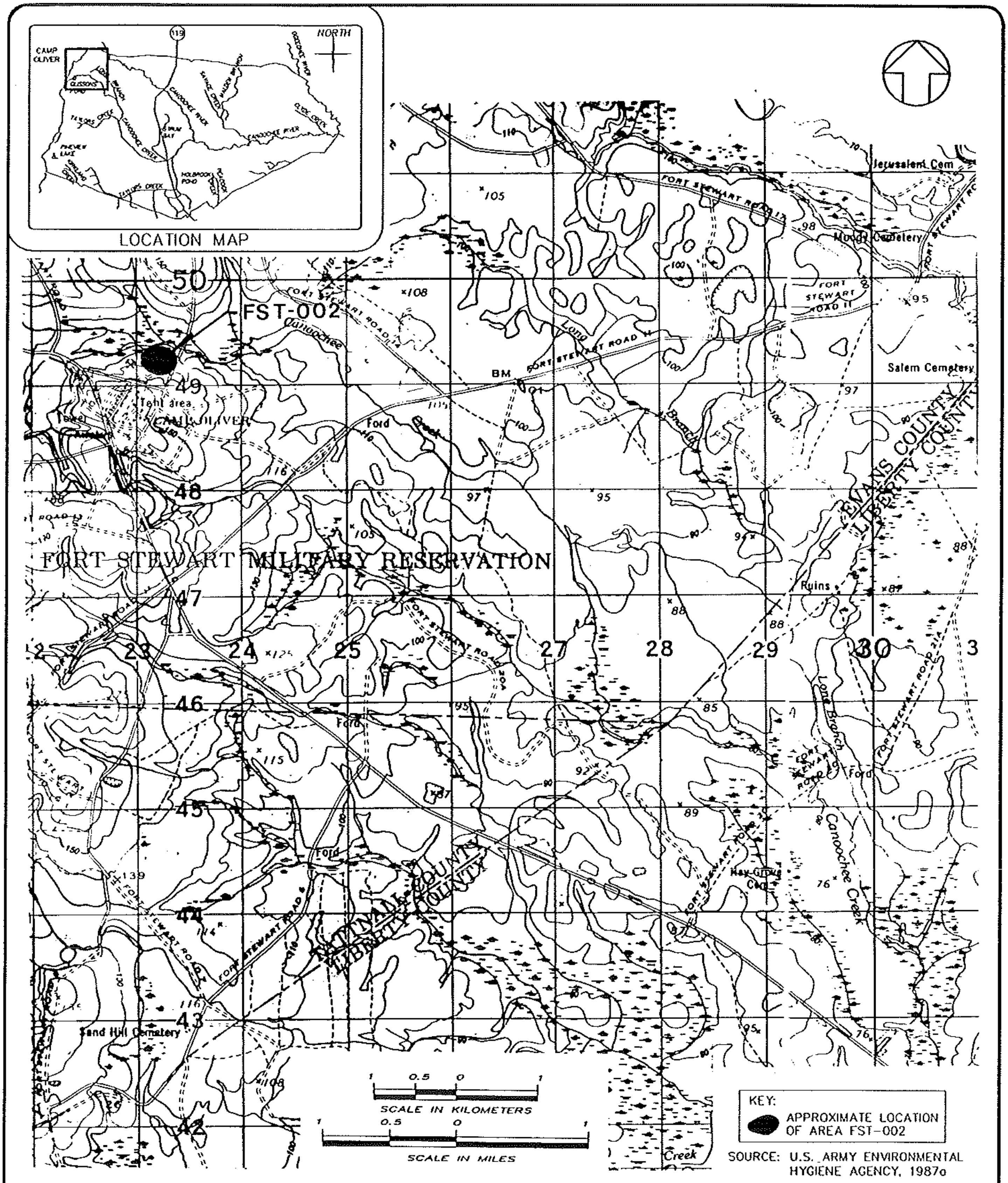
4.2.1 Site Description and History

The Camp Oliver Landfill is located about 16 miles northwest of the cantonment area on State Highway 129, north of the Bivouac area (Figure 4.6). The landfill is located in an area of approximately 2 acres and is situated on the side of a small hill which slopes downward from south to north. There is approximately 25 feet of relief across the site. The landfill dimensions are 15 feet wide by 300 feet long by 5 to 6 feet deep. No surface evidence exists of a landfill or open dumping area except for some small dirt piles. Grass, small trees, and bushes now cover the area.

From the 1960s to 1979, the area was used for disposal of refuse from troop training activities and nearby residents by open pit burning. Although this landfill was officially closed in 1979, the trench method of solid waste disposal was still used, according to the Environmental Program Review (U.S. Army Environmental Hygiene Agency 1988). General refuse from ground maintenance activities and construction debris was dumped in the landfill from 1979 to 1984, during the annual 3 to 4-month training activities.

4.2.2 Previous Investigations

Two previous reports were published on this site: (1) 1982 RCRA Final Engineering Report by Environmental Science and Engineering, and (2) 1983 Installation Assessment of Headquarters by Environmental Science and Engineering. These reports resulted from one investigation conducted in 1982 and one investigation conducted January 17-21, 1983, respectively. The investigations are referenced in the 1988 Environmental Program Review No. 32-24-7038-89 by the USEAH, the 1987 Hazardous Waste Consultation No. 37-26-1382-88 Evaluation of Solid Waste Management Units by the USEAH and the 1989 RCRA Facility Assessment Report by GA EPD.



KEY:

● APPROXIMATE LOCATION OF AREA FST-002

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987o

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RCRA FACILITY INVESTIGATION

CAMP OLIVER – LANDFILL LOCATION MAP FST-002

FORT STEWART *GEORGIA*

FIGURE 4.6

Four ground-water monitoring wells were installed in June 1980 by the Corps of Engineers (Figure 4.7). Ground water and surface-water samples were taken in 1980 (by the COE) and in 1981 by Environmental Science and Engineering. The results are included in Appendices 4.6 through 4.13. The upgradient well (CO-M1) has been broken off at the surface and CO-M4 cannot be found.

During the 1982 Environmental Science and Engineering investigation, five soil borings were completed to gather geotechnical data. Subsequently, Environmental Science and Engineering prepared the Installation Assessment Report in 1983. The purpose of this report was to determine the existence of toxic or hazardous materials and related contamination of Fort Stewart and Hunter AAF.

4.2.3 Waste Characterization

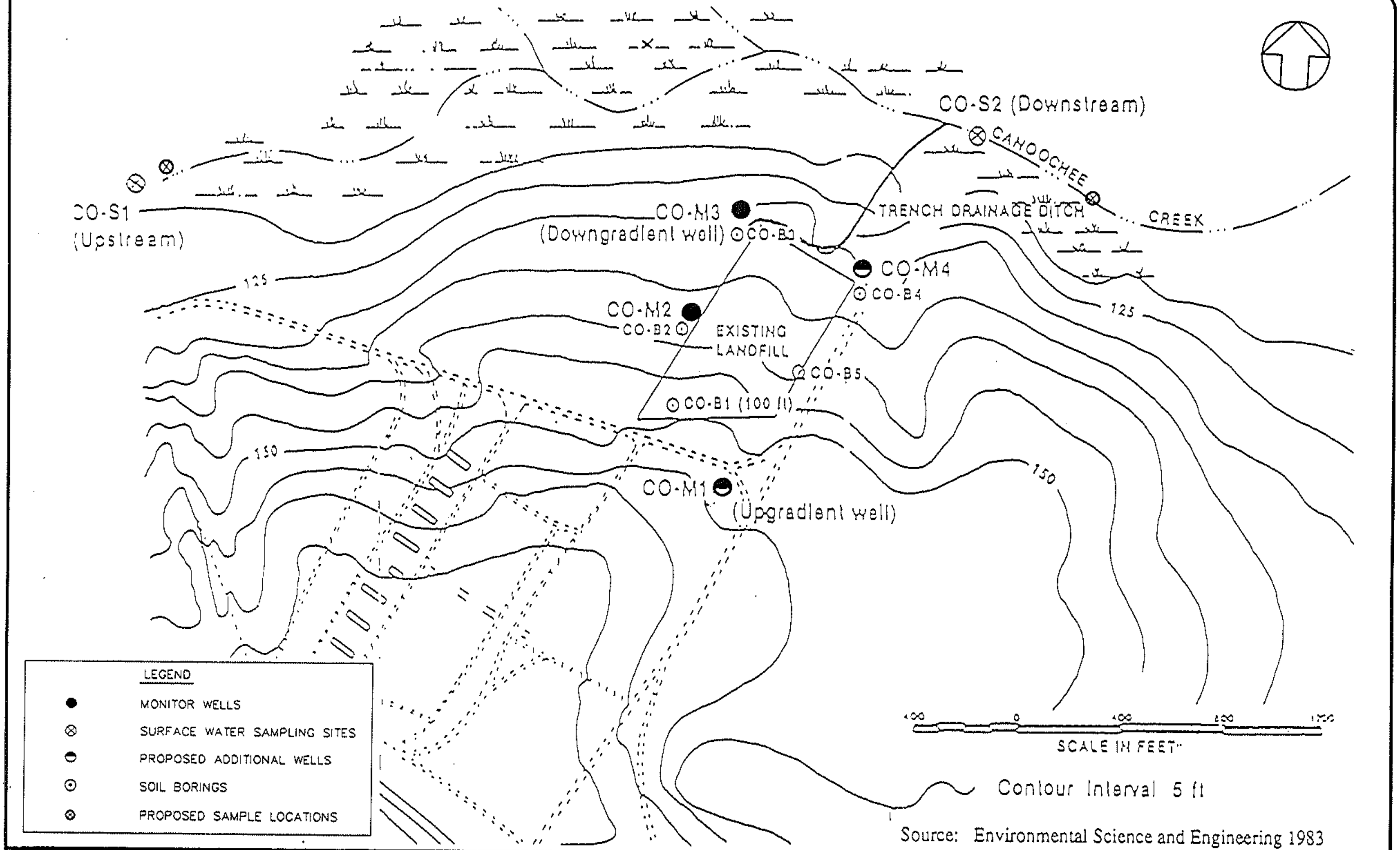
The waste characterization of the Camp Oliver Landfill include garbage and refuse, grass clippings, tree branches, root stumps, and chunks of asphalt and concrete. No evidence of disposal of toxic or hazardous wastes was found in the records searched by Environmental Science and Engineering (1982).

4.2.4 Potential for Releases/Known Releases

4.2.4.1 Ground Water

The two remaining monitoring wells were sampled in June 1980. The results of the 1980 analyses are provided in Appendices 4.6 through 4.13. The analytical results indicated that only one parameter exceeded drinking water standards as set by the National Interim Primary Drinking Water Regulations. Iron had been reported as present in concentrations that range from 0.684 ppm to 8.750 ppm, above the federal level of 0.3 ppm. The 1982 Environmental Science and Engineering report indicated that the sources for the high iron concentrations are the natural soils and the presence of iron waste products in the landfill.

The topography of the area is shown in Figure 4.7. A potentiometric map was prepared for the site in 1982 by Environmental Science and Engineering (Figure 4.8). As indicated by this map, ground-water flow direction is from southwest to northeast. According to the 1982



Source: Environmental Science and Engineering 1983

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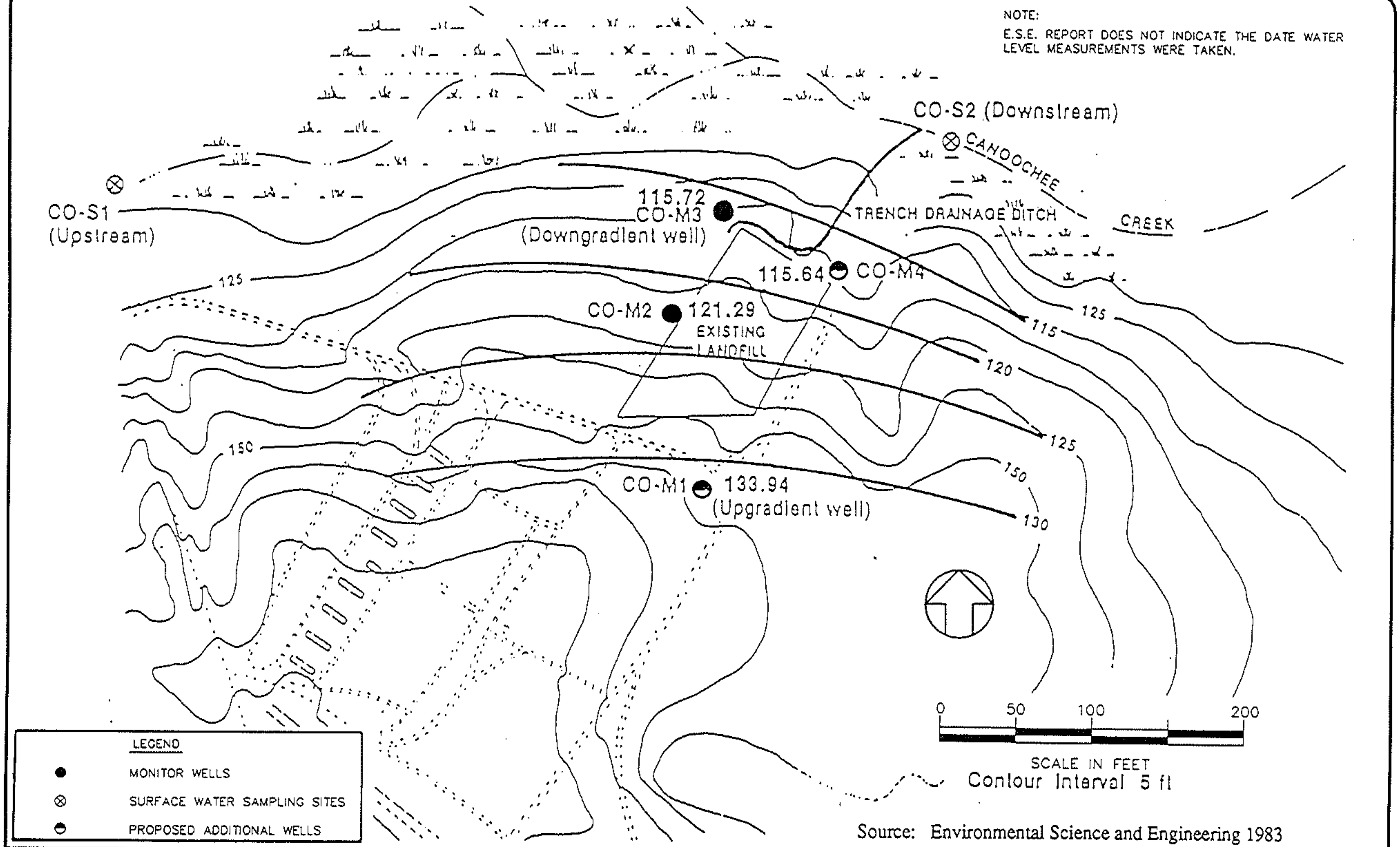
RCRA FACILITY INVESTIGATION
CAMP OLIVER MONITORING WELL & SOIL BORING ELEVATIONS AND LOCATIONS MAP FST-002
FORT STEWART
GEORGIA

FIGURE
4.7



NOTE:
E.S.E. REPORT DOES NOT INDICATE THE DATE WATER LEVEL MEASUREMENTS WERE TAKEN.

Source: Environmental Science and Engineering 1983

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RCRA FACILITY INVESTIGATION
CAMP OLIVER POTENTIOMETRIC MAP FST-002

FORT STEWART

GEORGIA

FIGURE
4.8

Environmental Science and Engineering report, it is very unlikely that the ground-water moves at anything other than a very low semi-saturated condition in the waste cells. Possible leachate formation would not move beyond the landfill boundary either horizontally or vertically (Environmental Science and Engineering 1982).

Information collected at the Camp Oliver Landfill has indicated that there have been no releases to the uppermost aquifer at the site. However, because of the close proximity of the water table to the base of the landfill, the potential for release to ground water is high.

4.2.4.2 Soil

Four soil borings (CO-B2 through CO-B5) were drilled to a depth of 50 feet with one boring drilled to a depth of 100 feet, during 1982 Environmental Science and Engineering study. The subsurface soils encountered by Environmental Science and Engineering were predominantly poorly sorted sands, silt/sand mixtures, and clay/sand mixtures. Soil borings from CO-B2 and CO-B5 and monitoring well CO-M2 encountered a coarse sand and gravel unit which extended from a depth of 10 feet to the bottom of the borings at 50 feet (Environmental Science and Engineering 1982). This highly permeable unit appeared to be a linear feature primarily upgradient. As determined from existing data, the potential for impact to adjacent surface soils is low. However, the potential for impact by leachate to soil directly beneath the landfill is high.

4.2.4.3 Surface Water

Surface-water samples were collected at two sampling locations, CO-S1 (upstream) and CO-S2 (downstream) as indicated in the 1982 Environmental Science and Engineering report (see Figure 4.7). The results of analysis indicated that fecal coliform was detected at the two surface-water sampling sites. This was attributed to public fishing use and Army personnel use (Environmental Science and Engineering 1982). Iron concentrations in the surface water near the landfill were reported as high (1.35 to 2.83 ppm), however, concentrations near background values for iron were reported a short distance downstream from the landfill.

The 1982 Environmental Science and Engineering report indicated that possible leachate is contained and/or attenuated on the site. Chemical data from the site indicated that the surface water

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in the area was not being significantly degraded by the previous operation of the Camp Oliver Landfill. Therefore, the potential for releases to surface water is low.

4.2.5 Proposed Work and Sample Analyses

4.2.5.1 General

The following work is proposed for the Phase I investigation of the Camp Oliver Landfill (FST-002):

1) Four groundwater monitoring wells were constructed in 1980. The upgradient well has been broken off at the surface and CO-M4 could not be found. The other two monitoring wells appear to be in good condition. The wells were constructed with 4 inch PVC well casing and the concrete pads are intact.

2) Existing topographic and potentiometric maps are submitted for review (see Figures 4.7 and 4.8).

3) All existing well construction information is submitted for review (Appendix 4.7).

4) The surface and ground-water analyses already performed are submitted (Appendices 4.6 through 4.13).

5) The existing upgradient well will be abandoned per GA EPD recommendations.

6) Two new wells will be installed to replace two of the 1980 wells. They will be constructed near the former wells.

7) The existing and new wells will be sampled and analyzed according to GA EPD recommendations for pH, specific conductance, VOCs, RCRA metals, pesticides, and PCBs.

8) One upgradient and one downgradient surface water sample will be collected from Canoochee Creek and analyzed according to GA EPD recommendations for pH, specific conductance, VOC, RCRA metals, pesticides, and PCBs.

9) Well protection will be installed at all four wells to include locking well covers and protective posts at the corners of the well pads, approximately 2 feet in height.

10) One round of water-level data will be collected and used to determine ground-water flow direction. The rate of movement will be determined in Phase II, if necessary.

11) One representative north-south and one east-west cross section of the four monitoring wells in the Camp Oliver Landfill will be constructed using the information provided by Fort Stewart, and included within the Phase I RFI report (Phase I).

12) A surface water flow map will be included in the Phase I RFI report.

4.2.5.2 Soil Boring and Monitor-Well Installation Plan

Geraghty and Miller will install two ground-water monitoring wells (to replace CO-M1 and CO-M4). The monitoring wells will be installed by drilling with a rig (hollow-stem auger method). Proposed well placement is shown in Figure 4.7. The monitoring wells will be installed with a 10 foot screen to a depth of 5-8 feet into the saturated zone of the surficial sand aquifer in accordance with the Field Sampling Approach (Section 6.0). Well protection around each well will be installed to include concrete pads, protective casing, locking well covers, and protective posts at the corners of the well pads. The existing upgradient well will be abandoned in accordance with the Field Sampling Approach, Section 6.0.

4.2.5.3 Field Sampling Plan

In accordance with the GA EPD's recommendations, the four wells will be sampled one time and samples will be submitted for analyses of VOCs by EPA Method 8240, pesticides and PCBs by EPA Method 8080, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, pH by EPA Methods 9040/9045, and specific conductance by EPA Method 9050. One upgradient and one downgradient surface water sample will be collected and analyzed for the same constituents as the 4 monitoring wells. If further drainage ditches are identified, than an additional upgradient and downgradient surface water sample for each drainage ditch will be collected and analyzed. Field measurements for specific conductivity and pH will be recorded at each well. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Additional sampling, if needed, will be proposed for the Phase II investigation.

4.3 The Tac-X Landfill (FST-003)

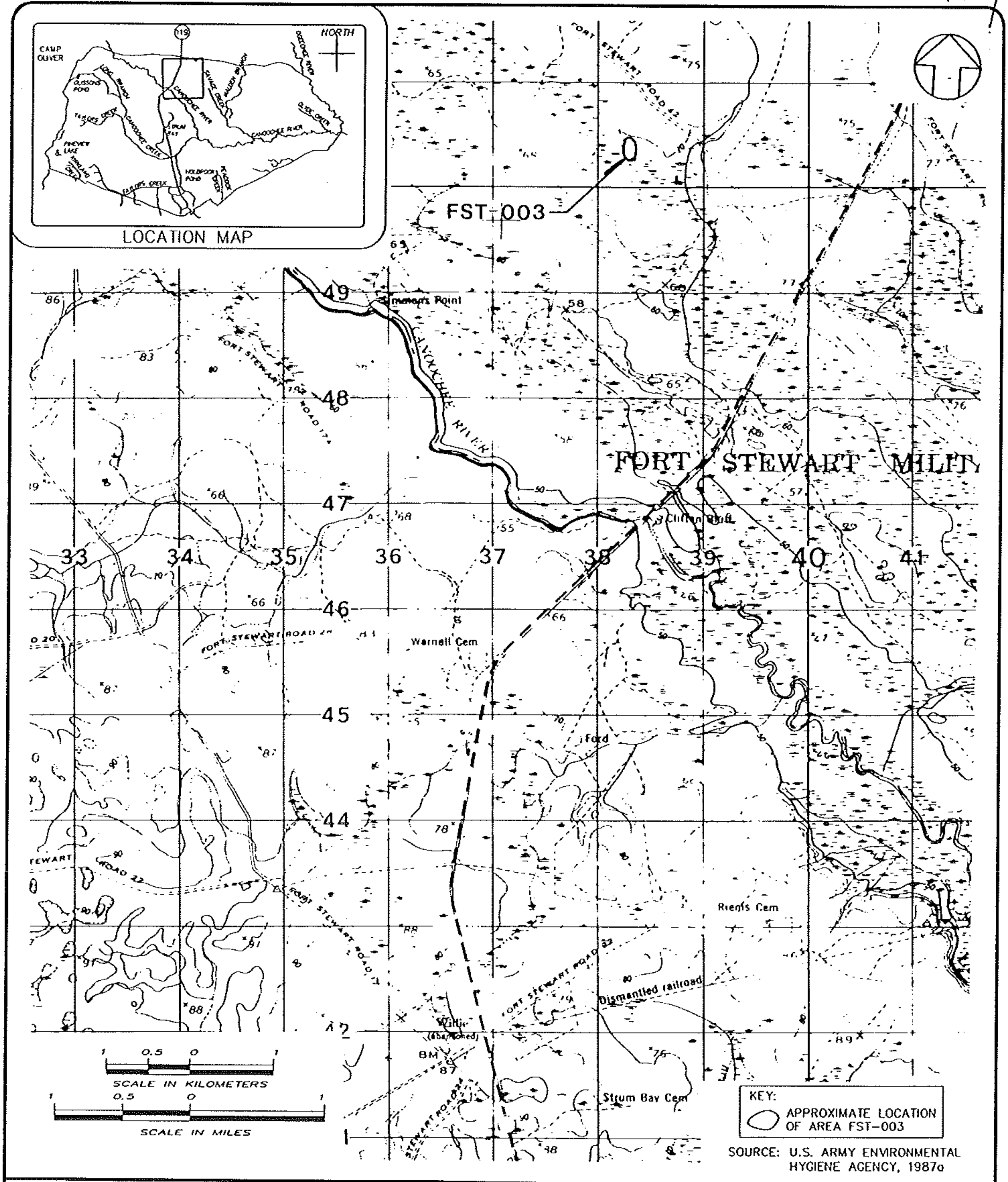
4.3.1 Site Description and History

The Tac-X Landfill (FST-003) is located about 1 1/4 miles south of the installation's northern boundary and 3 1/2 miles south-southwest of the city of Pembroke (Figure 4.9). The 5-acre site lies one mile southeast of Tac-X (Noncommissioned Office Academy) helicopter training area off of Fort Stewart Highway 42. Dimensions of the old trench are 20 feet wide by 400 feet long by 5 to 6 feet deep (U.S. Army Environmental Hygiene Agency 1988). According to the U.S. Army Environmental Hygiene Agency report, general physical conditions at the site showed a trench-like depression where the dump once existed, some aged refuse protruding from the soil at the bottom of the depression, grass, water and mud on the bottom of the depression, while grass, trees, and bushes covered the entire area. The site is essentially flat (less than 7 feet relief) and slopes from north to south.

From the 1960s to 1979, the area used open pit burning and trench fill for disposal of garbage from troop training activities, and from nearby residents. In 1979, the landfill was officially closed. The trench fill method was still used from 1979 to 1982 for disposal of general refuse from ground maintenance activities.

4.3.2 Previous Investigations

Two previous reports were published regarding this site: (1) 1982 RCRA Final Engineering Report by Environmental Science and Engineering, and (2) 1983 Installation Assessment of Headquarters by Environmental Science and Engineering. One of these reports was a result of an investigation conducted in 1982 and one was a result of an investigation conducted



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
TAC-X – LANDFILL LOCATION MAP FST-003
FORT STEWART *GEORGIA*

FIGURE
4.9

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January 17-21, 1983, respectively. The investigations are referenced in the 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency (USAEH), the 1987 Evaluation of Solid Waste Management Units by the U.S. Army Environmental Hygiene Agency, and the 1989 RCRA Facility Assessment Report (RFA) by the EPD.

Two ground-water monitoring wells (TX-M1 and TX-M3) and two observation wells (Figure 4.10) were installed in June 1980 by the COE (Appendices 4.1 through 4.5). Ground water and surface-water samples were collected in June of 1980. During 1982, Environmental Science and Engineering drilled four soil borings (TX-B1 through TX-B4) to a depth of 50 feet, with one boring (TX-B5) drilled to a depth of 100 feet (see Figure 4.10). The purpose of these borings was to gather geotechnical information including soil descriptions and aquifer parameters. Subsequently in 1983, Environmental Science and Engineering prepared the Installation Assessment Report. The purpose of this report was to determine the existence of toxic or hazardous materials and related contamination at Fort Stewart and Hunter AAF.

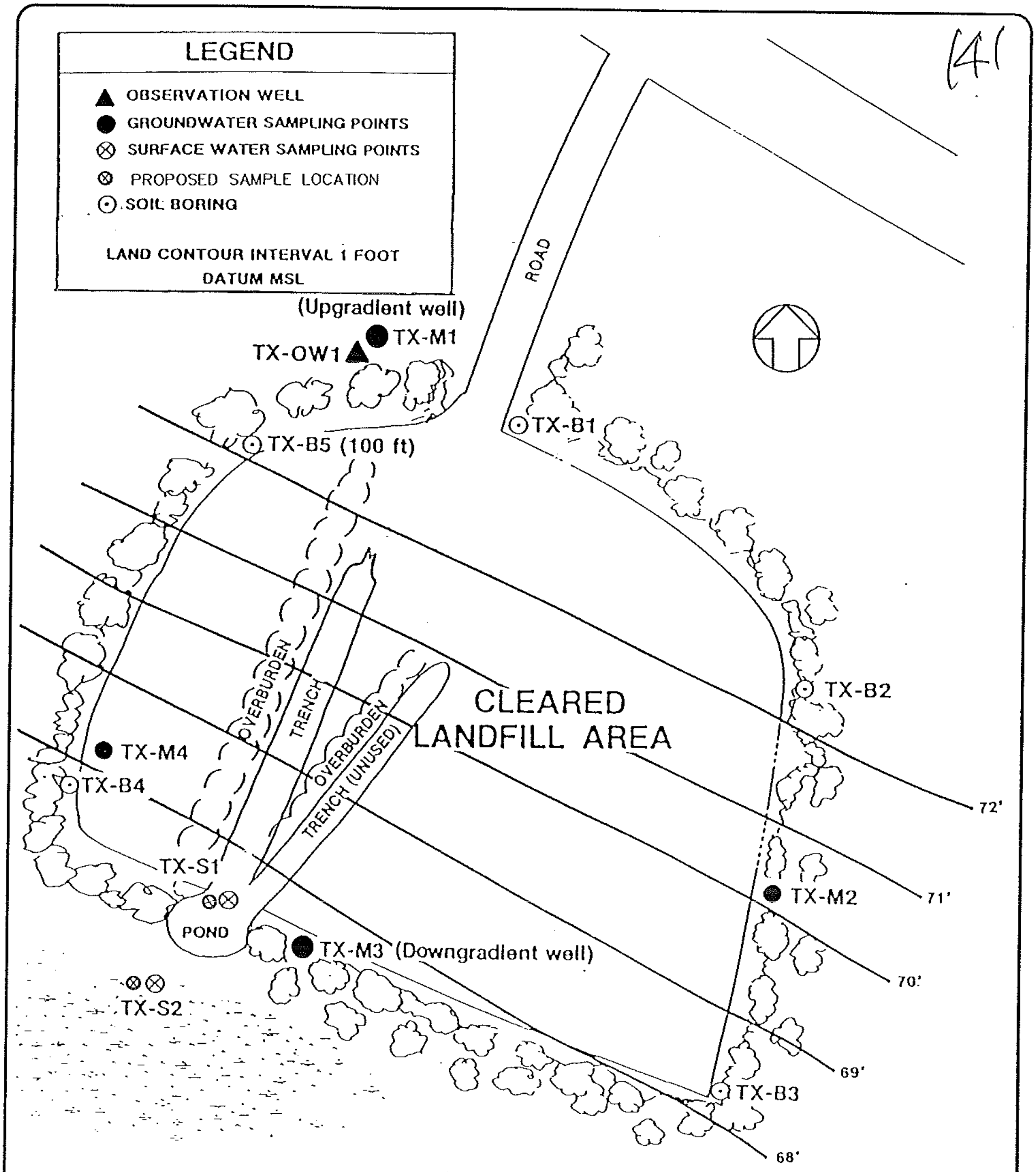
4.3.3 Waste Characterization

The waste characterization of the Tac-X Landfill from the 1960s to 1979, includes residential waste, food cans, brush, plastic, and cardboard boxes. From 1979 to 1982, the wastes included grass clippings, tree branches, root stumps, and chunks of asphalt and concrete.

4.3.4 Potential for Releases/Known Releases

4.3.4.1 Ground Water

Two monitoring wells were sampled at the landfill in June 1980 by the COE. The results from that analyses are provided in Appendices 4.6 through 4.13. The analytical results indicated that only one parameter exceeded drinking water standards set by the National Interim Primary Drinking Water Regulations. Iron had been reported as present in concentrations that range from 0.613 ppm to 10.2 ppm which are above the federal level of 0.3 ppm. The 1982 Environmental Science and Engineering report indicated that the sources for the high iron concentrations are the natural soils and the presence of iron waste products in the landfill.



Source: Environmental Science and Engineering 1983

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RCRA FACILITY INVESTIGATION
TAC–X – TOPOGRAPHY, MONITOR WELL, & SOIL BORING MAP FST–003
FORT STEWART
GEORGIA

FIGURE
4.10

H-3

The topography of the site is shown in Figure 4.10. A potentiometric map was prepared for the site in 1982 by Environmental Science and Engineering (Figure 4.11). Ground water flows from the north-northeast to south-southwest, as indicated on this map.

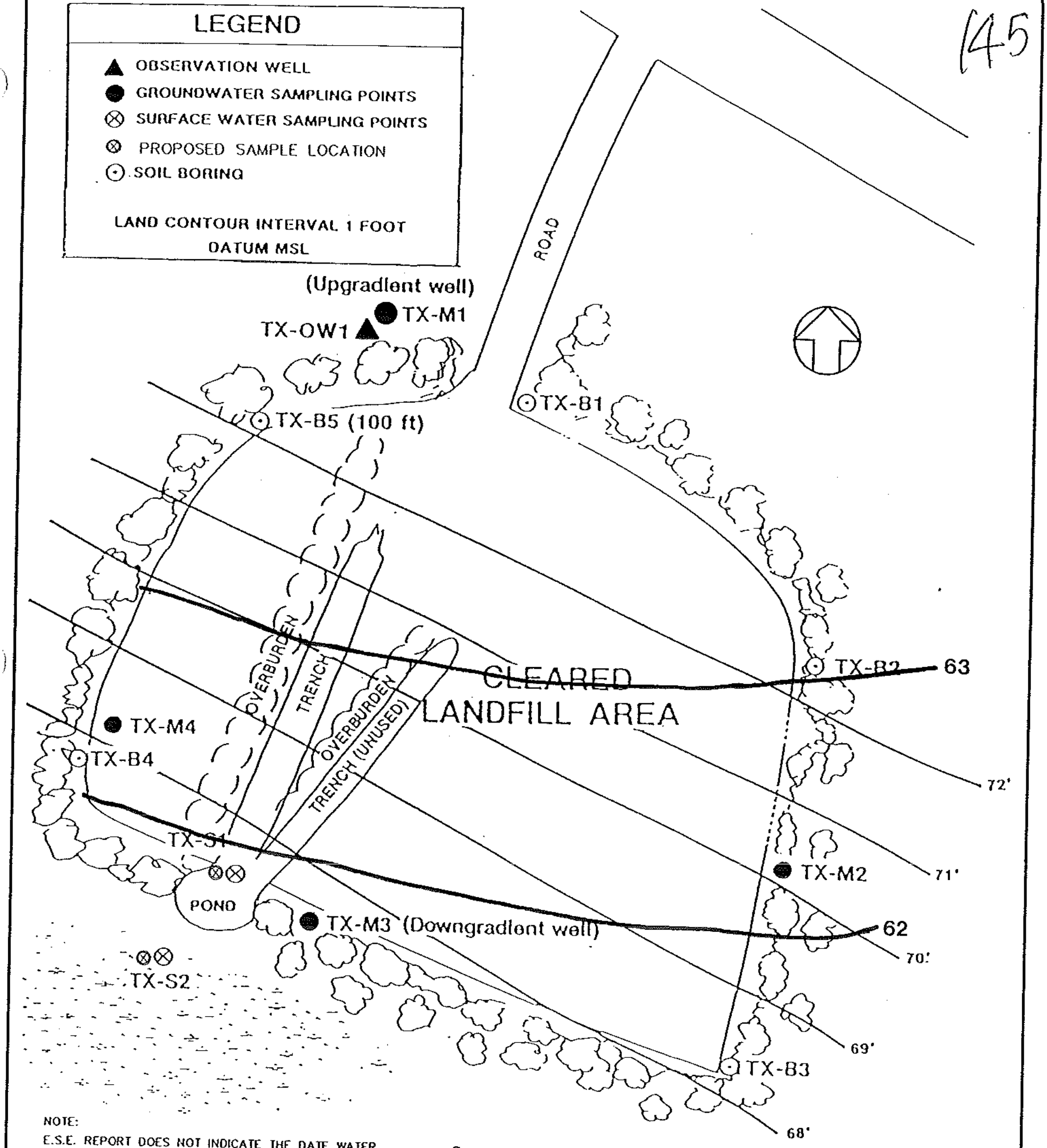
Information collected at the Tac-X Landfill has indicated that there has been no releases to the uppermost aquifer at the site. However, because of the close proximity of the water table to the base of the landfill, the potential for a release to ground water is high.

4.3.4.2 Soil

Four soil borings (TX-B1 through TX-B4) were drilled to a depth of 50 feet, with one boring (TX-B5) drilled to 100 feet during the 1982 Environmental Science and Engineering investigation (see Figure 4.10). According to the 1982 survey, the following was noted: (1) Subsurface sediments encountered were predominantly fine grained to coarse grained sands and sand-silt mixture. A gravel pocket was encountered at 20 feet in Well TX-M2. (2) Although the gravel is capable of transmitting ground water at a high rate, the low permeability sand-silt soils surrounding it severely restrict the movement of ground water. (3) The permeability of the soils below the solid waste cell is very low, ranging from 10^{-7} to 10^{-8} cm/sec. (4) Soil pH was generally above 5.0, which creates conditions conducive to heavy metal precipitation. Information provided indicated that leachate was observed trickling from the landfill. During a recent site visit by COE personnel, no leachate was observed. Based on the past investigations, the potential for impact by leachate to soil beneath the landfill is considered high, although the potential for impact to soils adjacent to the landfill is low.

4.3.4.3 Surface Water

Two surface-water sampling locations (TX-S1 and TX-S2) were sampled in the 1982 Environmental Science and Engineering investigation (see Figure 4.10). The results from the analyses of the 1982 survey are provided in Appendices 4.6 through 4.13. Chemical data from the site indicated that the surface water in the area is not being significantly degraded by the past operation of the Tac-X Landfill. Although iron concentrations in the surface water near the landfill were reported high (0.613 to 10.2 ppm), concentrations near background values for iron were reported a short distance from the landfill. Therefore, the potential for releases to surface water is low.



NOTE:
E.S.E. REPORT DOES NOT INDICATE THE DATE WATER LEVEL MEASUREMENTS WERE TAKEN.

Source: Environmental Science and Engineering 1983

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RCRA FACILITY INVESTIGATION
TAC-X - POTENTIOMETRIC MAP FST-003
FORT STEWART
GEORGIA

FIGURE
4.11

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4.3.5 Proposed Work and Sample Analyses

4.3.5.1 General

The following work is proposed for the Phase I investigation at the TAC-X Landfill (FST-003):

1) Four wells were constructed here in 1980 (TX-M1, TX-M2, TX-M3, and TX-M4). These appear to be in good condition.

2) Existing topographic and potentiometric maps are submitted as Figures 4.10 and 4.11.

3) Surface and ground-water analyses already performed are submitted in Appendices 4.6 through 4.13.

4) The existing well construction information will be submitted in the Phase I RFI report.

5) Submit analysis of leachate, if found. If this is not possible, a suitable substitute sample of leachate (if possible) or of soil or surface water will be analyzed for pH, specific conductance, VOCs, RCRA metals, pesticides, and PCBs.

6) The general ground-water flow direction at the site will be determined. The rate of flow will be determined in Phase II, if necessary.

7) The existing wells will be sampled per GA EPD recommendations for pH, specific conductance, VOCs, RCRA metals, pesticides and PCBs.

8) Well protection for the existing wells will be installed to include protective casing, locking well covers, and protective posts at the concrete well pads.

9) One representative north-south and one east-west cross section of the 4 existing wells in the Tac-X Landfill will be submitted in the Phase I RFI report.

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10) A brief description of the present site conditions will be provided.

11) Soil permeability tests are included in Appendix 4.12. The soil permeability will be investigated further, if necessary.

12) One upgradient and one downgradient surface water sample will be collected from Otter Hole Branch Pond and analyzed according to GA EPD recommendations for pH, specific conductivity, VOC, RCRA metals, pesticides, and PCBs.

13) A surface water flow map will be included in the Phase I RFI report.

4.3.5.2 Field Sampling Plan

In accordance with the GA EPD's recommendations, leachate from the landfill will be sampled one time and analyzed for pH by EPA Methods 9040/9045, specific conductance by EPA Method 9050, VOCs by EPA Method 8240. RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and pesticides and PCBs by EPA Method 8080. A duplication/split analyses will be run on the samples collected. Field measurements for specific conductivity and pH will be recorded for each sample.

The existing four wells will be sampled and analyzed for pH by EPA Method 9040/9045, specific conductance by EPA Method 9050, VOCs by EPA Method 8240, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and pesticides and PCBs by EPA Method 8080. One trip blank will be submitted for QA/QC analysis. One upgradient and one downgradient surface water sample will be collected and analyzed for the same constituents as the four monitoring wells. If further drainage ditches are identified, than an additional upgradient and downgradient surface water sample for each drainage ditch will be collected and analyzed. Field measurements for specific conductivity and pH will be recorded for each sample. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Additional wells, if needed, will be proposed in the Phase II Investigation.

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4.4 The Burn Pits (FST-004A to FST-004G)

4.4.1 Site Description and History

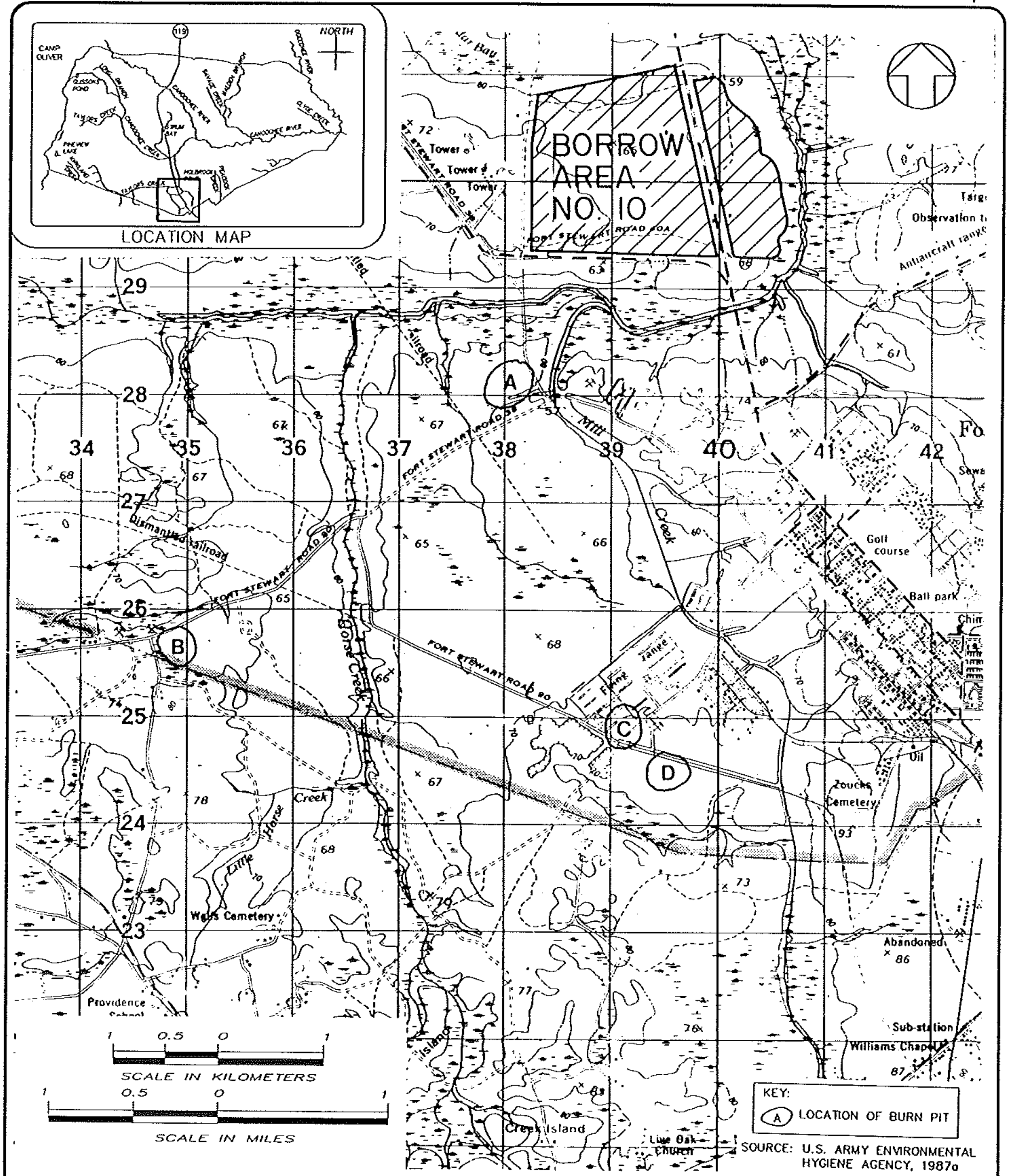
Seven separate burn pits are located around the cantonment area as shown in Figures 4.12 (Burn Pits A, B, C, and D) and 4.13 (Burn Pits E, F, and G). Six were used (Burn Pits A, B, C, D, E, and F) and are subject to the RFI. Burn Pit G was cleared but was never used. The six burn pits used, presumably have been in existence since the beginning of Fort Stewart operations and have been used at various times to burn combustible solid waste (i.e. construction debris, tree limbs, etc.). The sites differ in location and size. A topographic map is provided on the six sites that were used.

Burn Pit A (10± acres) is located approximately 1200 feet southwest of Fort Stewart, Route 38 from the junction of Fort Stewart 40 and Fort Stewart 38 (Figure 4.14). Burn Pit B (3± acres) is located approximately 200 feet northeast on Fort Stewart 90 from the junction of Fort Stewart 90 and the cutoff to State Route 196 (Figure 4.15). Burn Pit C (7± acres) is located approximately 300 feet west on Fort Stewart 90 from the junction of 15th Street and Fort Stewart 90 (Figure 4.16). Burn Pit D (10± acres) is located approximately 500 feet west on Fort Stewart 90 from the junction of Fort Stewart 90 and 6th Street (Figure 4.17). Burn Pit E (1± acre) is located approximately 800 feet east of Fort Stewart 144 from the junction of Fort Stewart 144 and Fort Stewart 50 (Figure 4.18). Burn Pit F (3± acres) is located approximately 3400 feet south on Fort Stewart 51 from the junction of Fort Stewart 51 and State Route 144 (Figure 4.19). Burn Pit G (never utilized) is located near the junction of Fort Stewart 51 and US 82.

Currently, five of the burn pits are inactive and have not been used for some time (Burn Pits B, C, D, E and, F). The actual time of operation is undetermined. Burn Pit A was observed being used during the initial site visit (November 1, 1990).

4.4.2 Previous Investigations

No previous investigations have been conducted at Fort Stewart that characterize the nature of the burn pits or any releases to the environment that may have occurred. However, two previous reports describing the SWMUs at Fort Stewart (U.S. Army Environmental Hygiene



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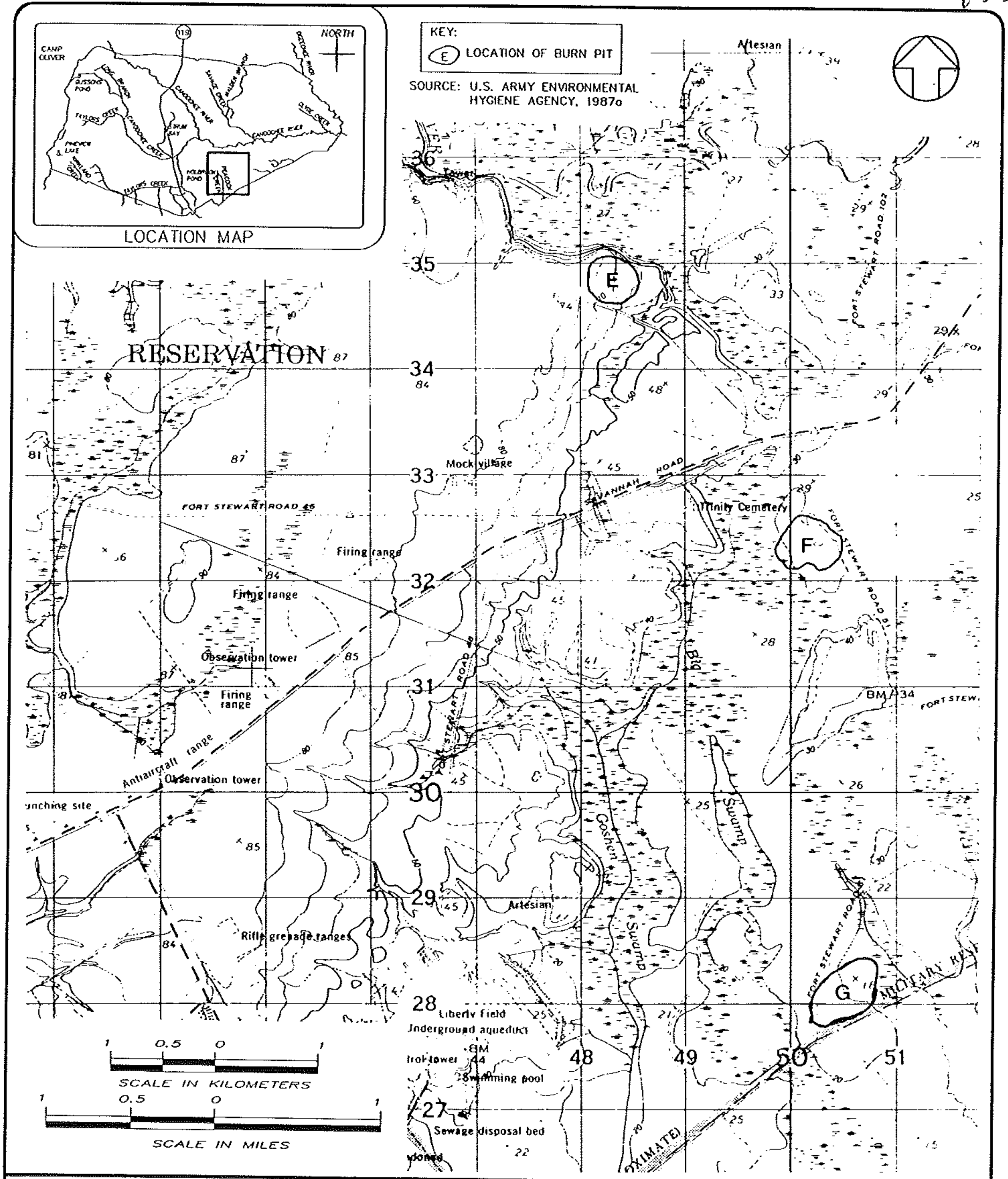
RCRA FACILITY INVESTIGATION
BURN PITS A–D LOCATION MAP FST–004 A–D
FORT STEWART *GEORGIA*

FIGURE
4.12



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RCRA FACILITY INVESTIGATION
BURN PITS E–G LOCATION MAP FST-004 E–G
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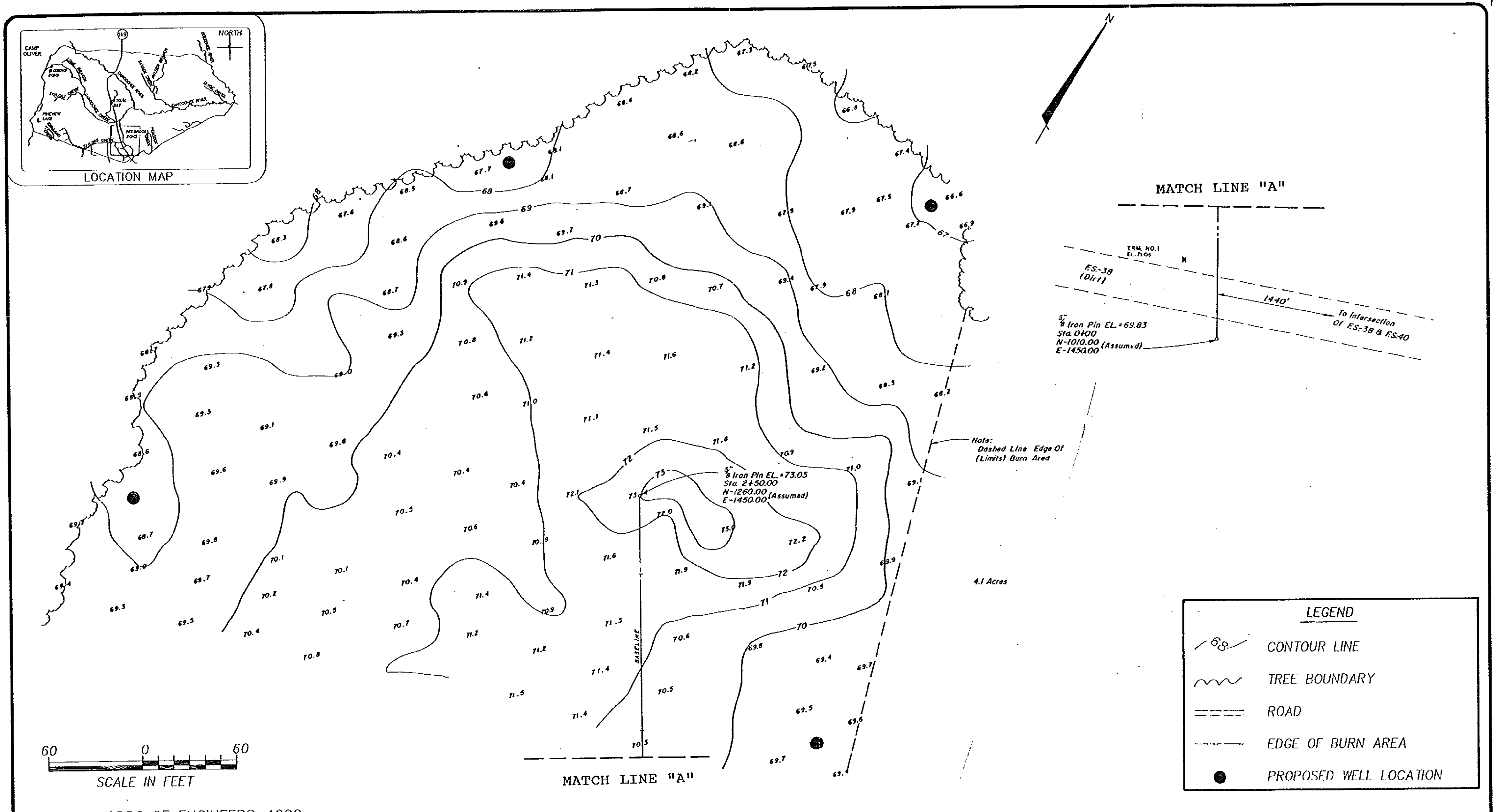
FIGURE
4.13



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RCRA FACILITY INVESTIGATION
BURN PIT A TOPOGRAPHIC MAP FST-004 A

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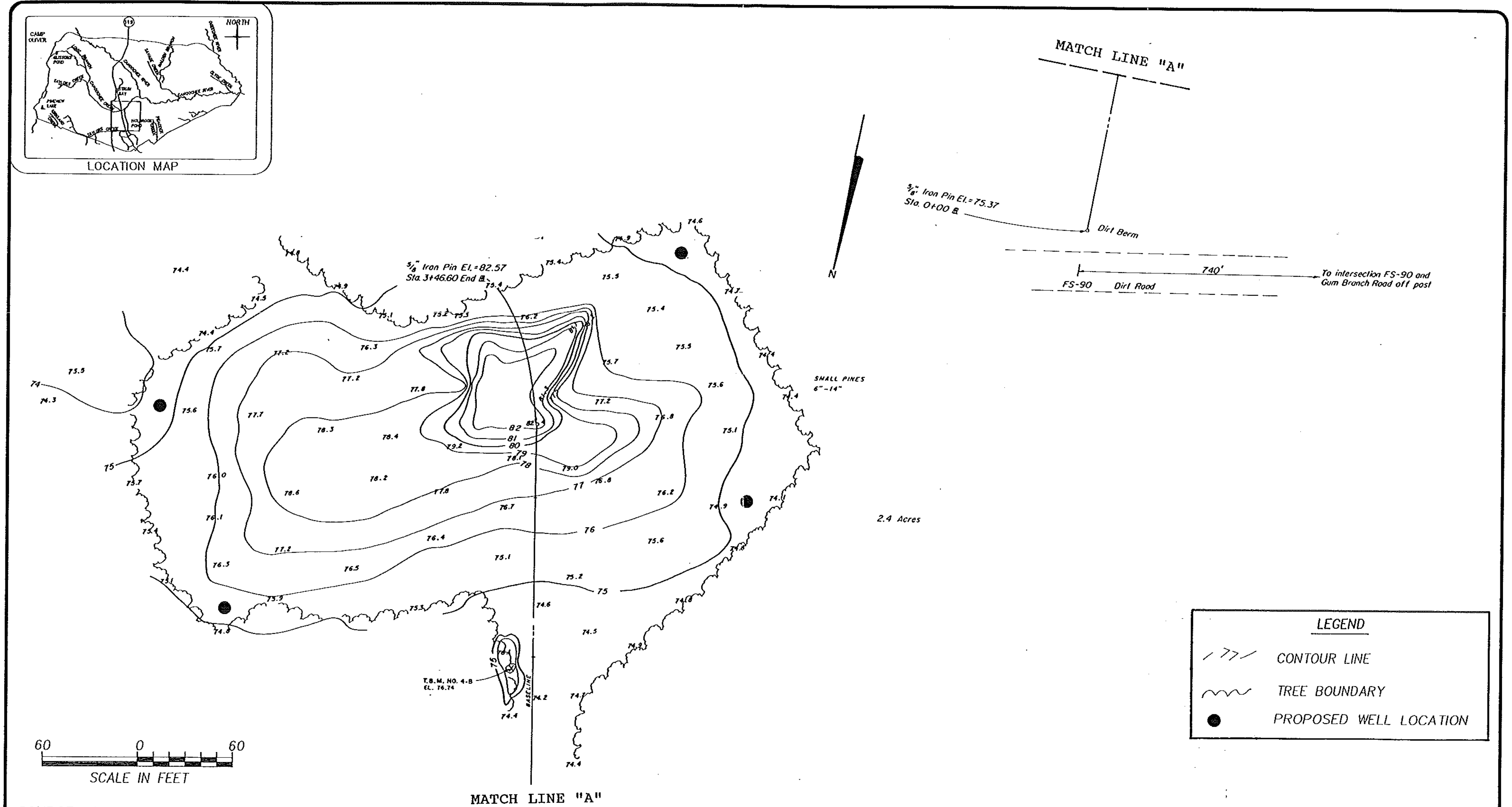
FIGURE
4.14



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BURN PIT B TOPOGRAPHIC MAP FST-004 B

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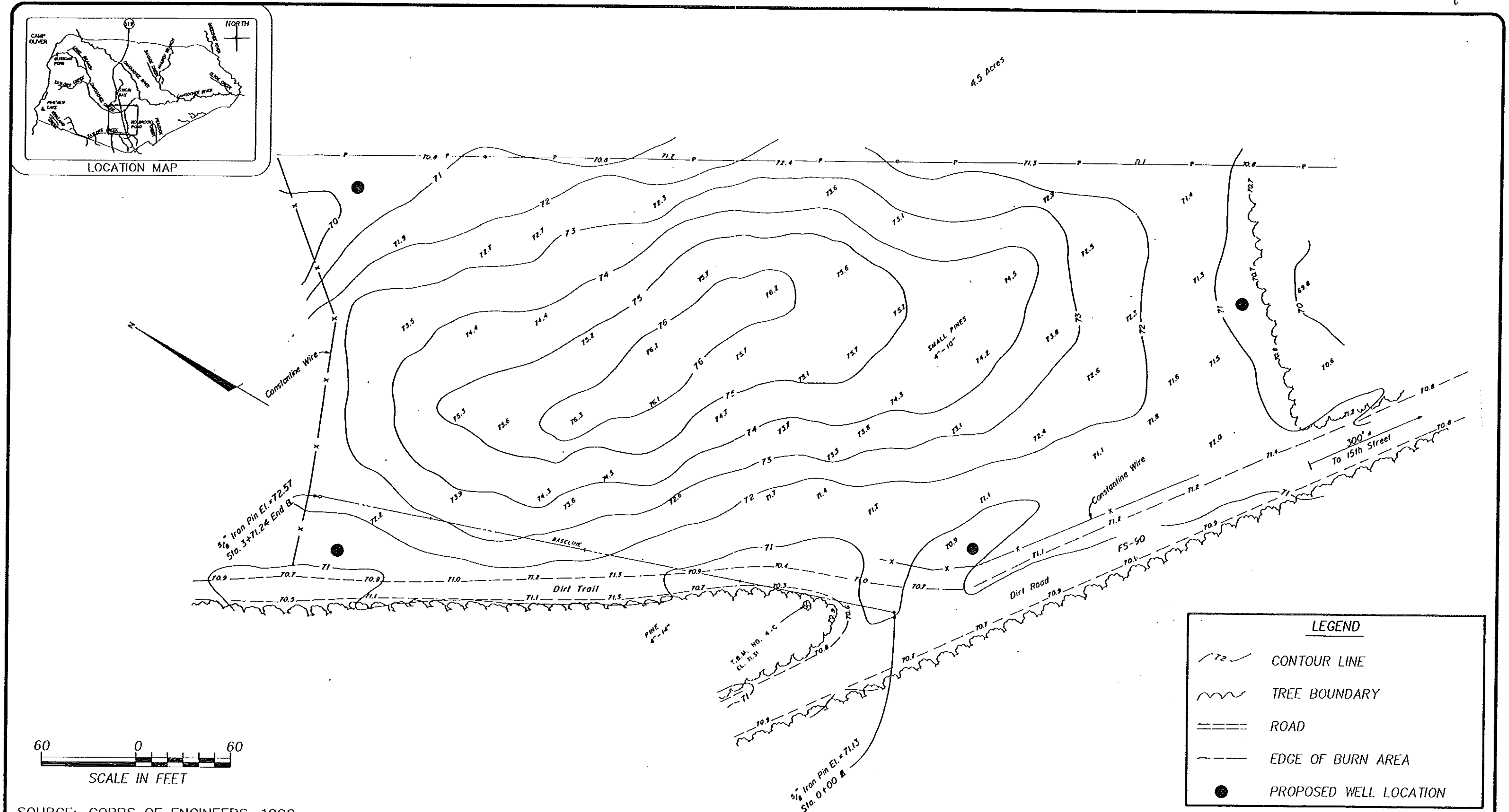
GEORGIA

FIGURE
4.15



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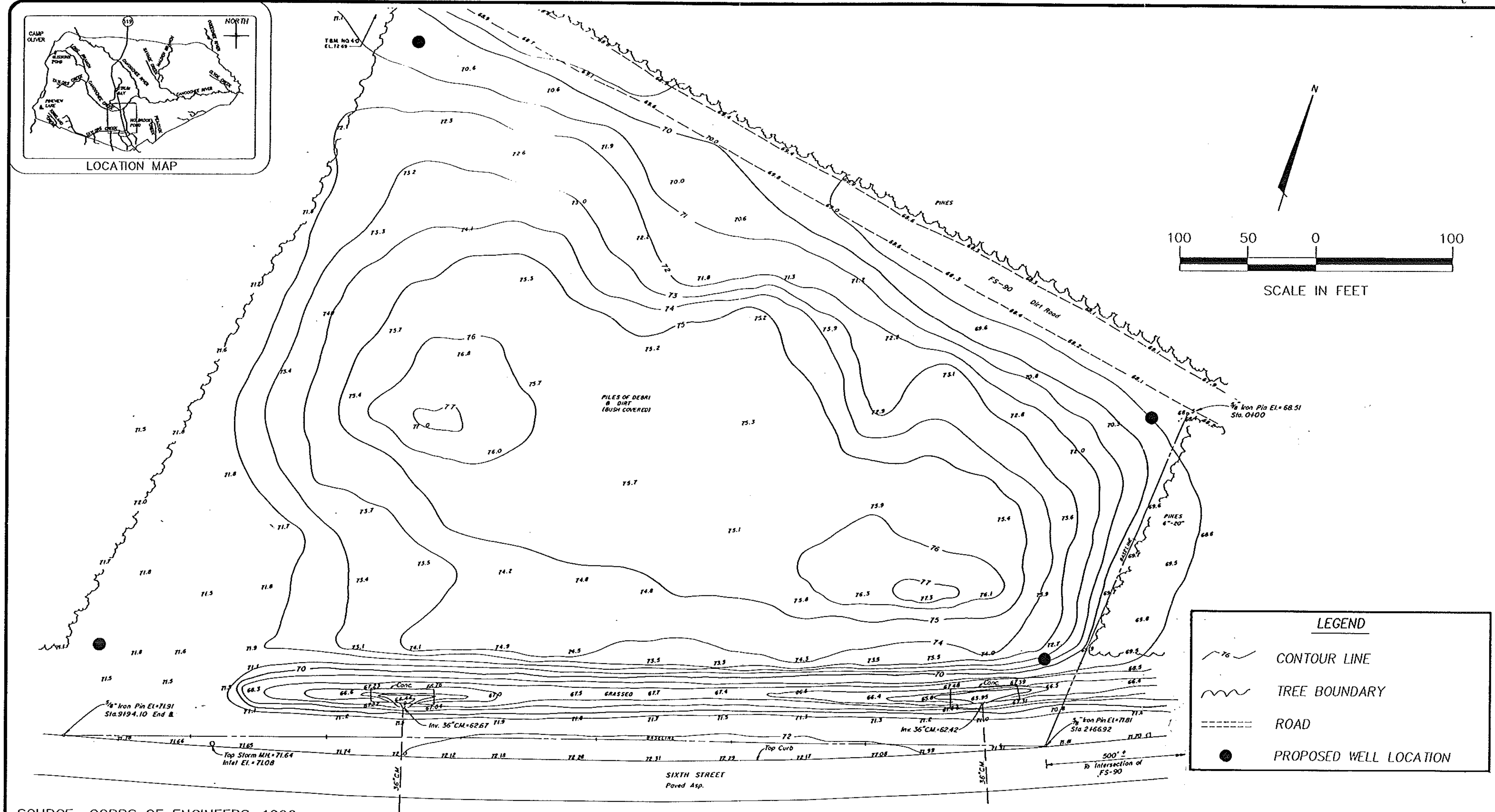
RCRA FACILITY INVESTIGATION
BURN PIT C TOPOGRAPHIC MAP FST-004 C

GEORGIA

FIGURE
4.16



SOURCE: CORPS OF ENGINEERS, 1990

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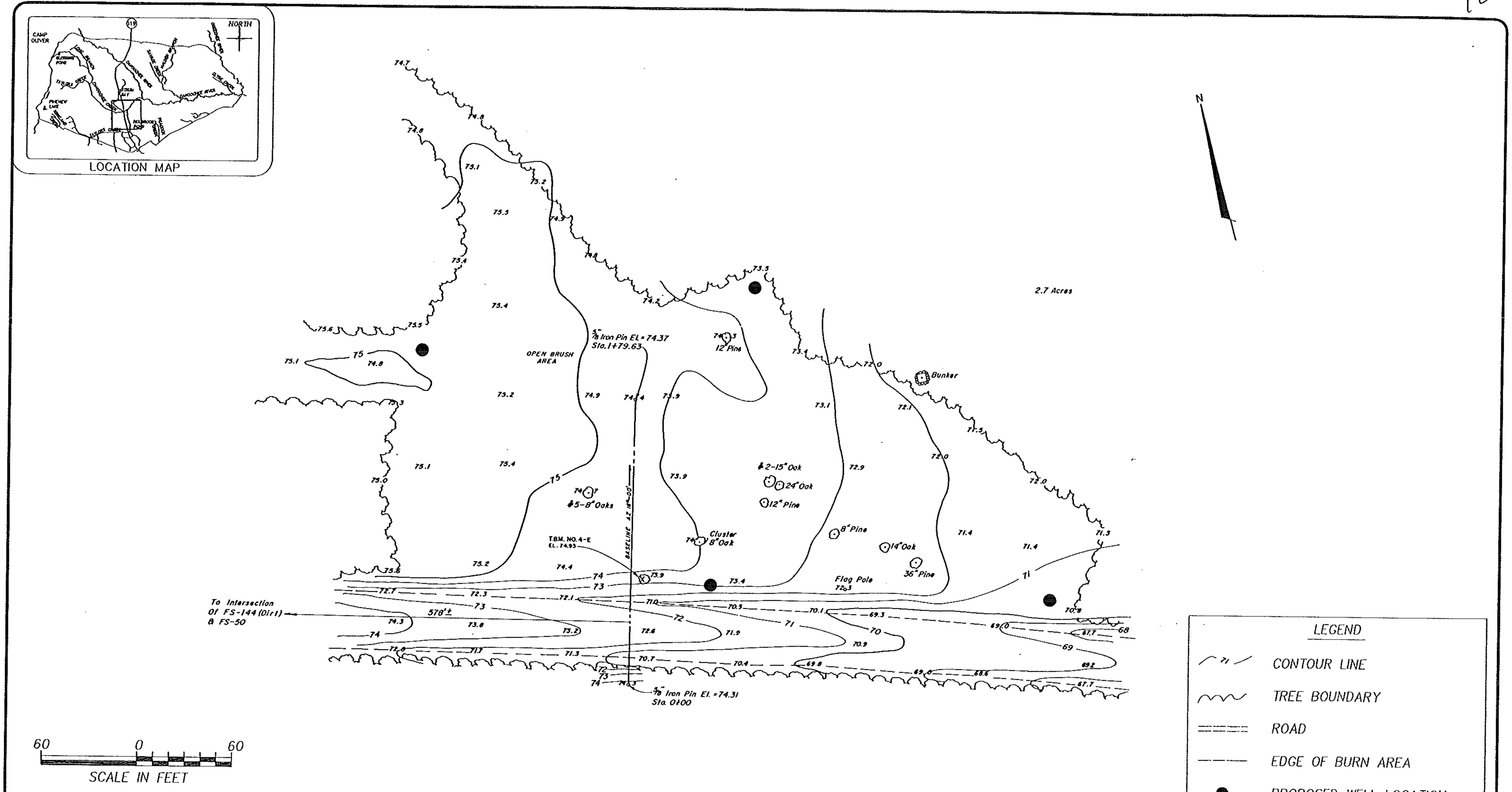
RCRA FACILITY INVESTIGATION
BURN PIT D TOPOGRAPHIC MAP FST-004 D

FORT STEWART

GEORGIA

FIGURE
4.17



SOURCE: CORPS OF ENGINEERS, 1990

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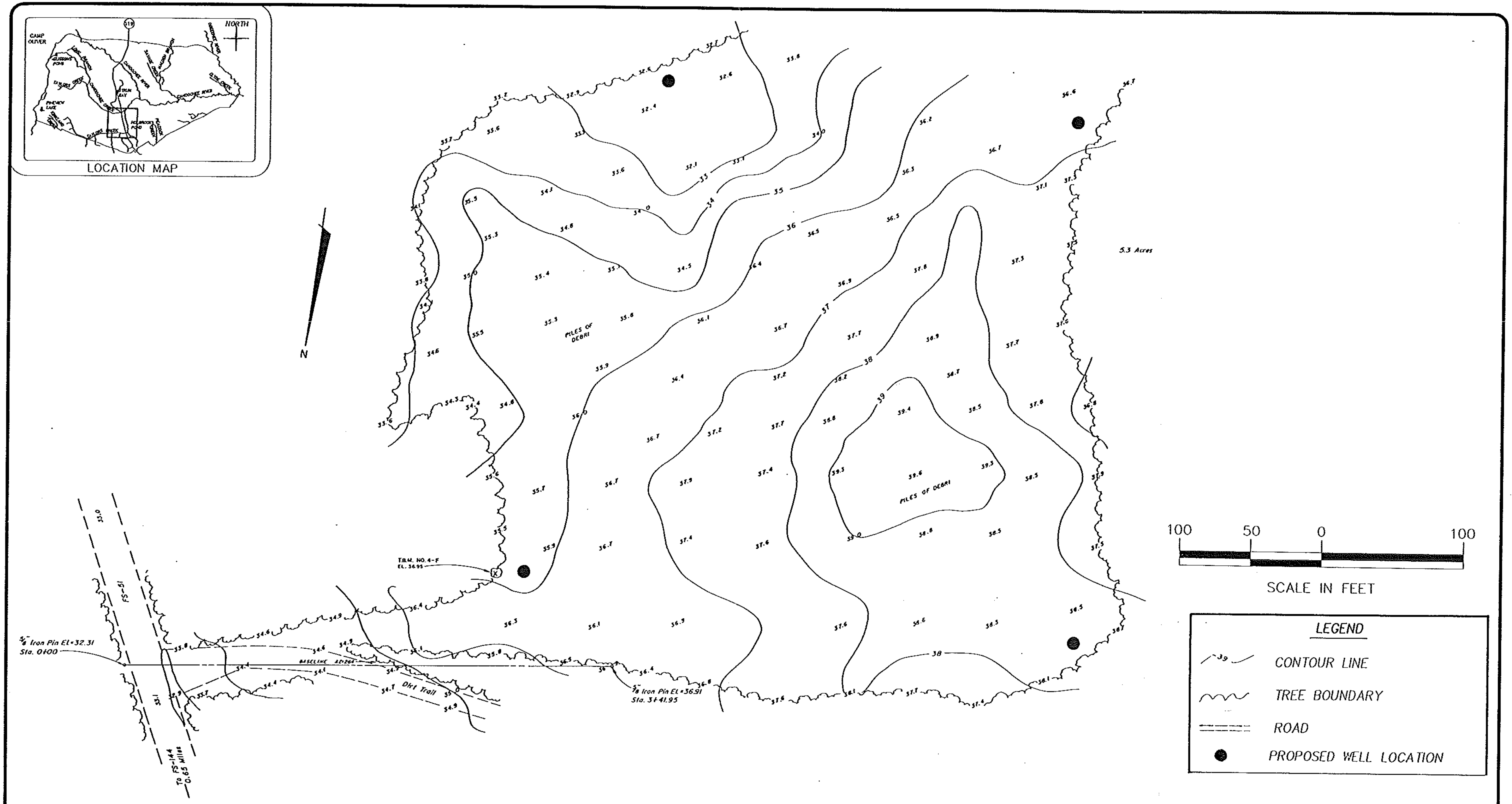
RCRA FACILITY INVESTIGATION
BURN PIT E TOPOGRAPHIC MAP FST-004 E

GEORGIA

FIGURE
4.18



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RCRA FACILITY INVESTIGATION
BURN PIT F TOPOGRAPHIC MAP FST-004 F

GEORGIA

FIGURE
4.19

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Agency 1988 and U.S. Army Environmental Hygiene Agency 1987) did mention the burn pits. No detailed investigations were conducted or mentioned in those reports.

4.4.3 Waste Characterization

The waste characterization of Burn Pits A through F include scrap lumber, timber cuttings, dumping construction and demolition waste, ashes, concrete trunks, and dirt from excavations. Personal communication with employees of Fort Stewart (pers. comm. Tommy Houston 1990) indicated that no fuels or solvents were used as ignition sources at these burn pits.

4.4.4 Potential for Releases/Known Releases

The RFA report indicated that no evidence of a release to the environment was apparent. However, it was also mentioned that if contaminants were present, the likely migration pathway would be to ground water. No ground-water monitoring wells have been installed at these sites and no past sampling has been conducted to characterize and verify releases to the environment.

4.4.5 Proposed Work and Sample Analyses

4.4.5.1 General

The following work is proposed for the Phase I investigation at Burn Pits FST-004A through FST-004G:

1) A minimum ground-water detection system is needed at six of the sites. Four wells will be installed at each site and sampled according to GA EPD recommendations. The samples will be analyzed for pH, specific conductance, VOCs, and RCRA metals.

2) A topographic survey was done in August 1990 by the COE at the six sites. Boring locations and other required information will be added to the maps and will be submitted in the Phase I RFI report.

3) One round of water-level data will be collected and used to determine ground-water flow direction. A potentiometric map of each site will be constructed. The rate of ground-water flow will be determined by tests in the Phase II investigation, if necessary.

4) Site FST-004G was cleared but never used as a burning area. It presently is grown over with small trees, brush, small palmettos, and grass. A detailed description of this site and the fact that it was never used will be prepared and submitted in the Phase I RFI report.

4.4.5.2 Soil Boring and Monitor-Well Installation Plan

Geraghty and Miller will install four ground-water monitoring wells at each burn pit (FST-004A through FST-004F) for a total of 24 wells. The hollow-stem auger method will be utilized to install the wells. Proposed well placement is shown in Figures 4.14-4.19. The monitoring wells will be installed with a 10 foot screen to a depth of 5-8 feet into the saturated zone of the surficial sand aquifer in accordance with the Field Sampling Approach (Section 6.0). Well protection around each well will be installed to include concrete pads, protective casing, locking well covers, and protective posts at the corners of the well pads. The existing upgradient well will be abandoned in accordance with the Field Sampling Approach, Section 6.0.

4.4.5.3 Field Sampling Plan

In accordance with the GA EPD's recommendations, the 24 wells will be sampled once and the samples will be submitted for analyses of VOCs by EPA Method 8240, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, pH by EPA Methods 9040/9045, and specific conductance by EPA Method 9050. One extra sample will be collected for lab duplication/split analysis. One equipment blank and two trip blanks will be submitted for QA/QC analysis. Field measurements for specific conductivity and pH will be recorded for each sample set in the field. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). The Phase I Report will include recommendations for the Phase II Investigation, if any.

4.5 The EOD Area (FST-009)

4.5.1 Site Description and History

EOD Area FST-009 is located 11 miles north of the cantonment area and 1 mile east of Georgia Highway 119 (Figure 4.20) in designated area B-12 (Figure 4.21) on the Fort Stewart Military Installation Map. EOD Area FST-009 was operated from 1979 to 1983 where open detonation of unexploded ordnance took place. There are three blast craters occupying a total area of approximately 2 acres. As indicated in the initial RFA (U.S. Army Environmental Hygiene Agency 1988), the craters in the ground contained no solid waste, other than small bits of shrapnel and no evidence of ashes or charred ground from the explosions.

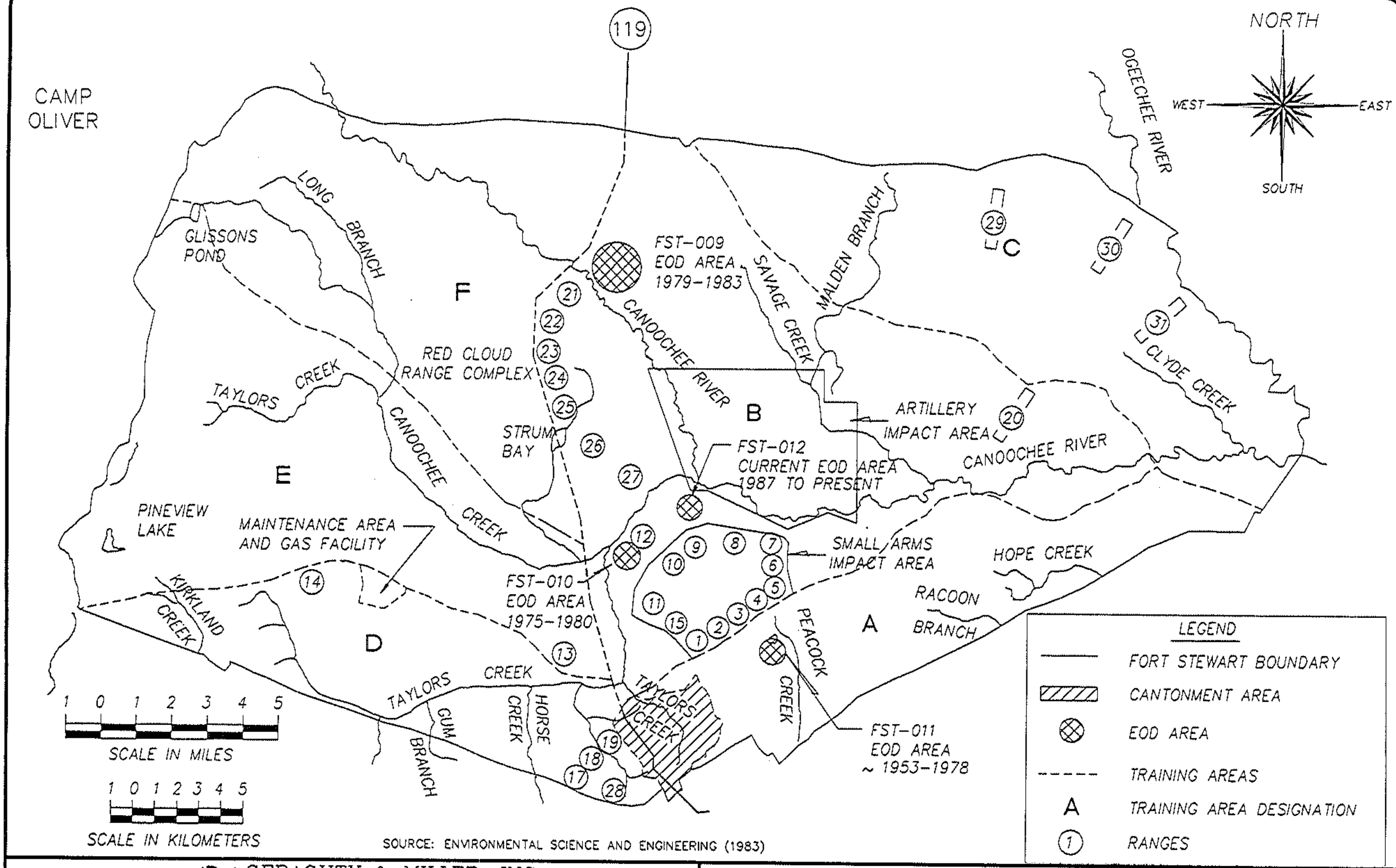
4.5.2 Previous Investigations

EOD Area FST-009 was previously investigated as part of the initial RFA by U.S. Army Environmental Hygiene Agency in April 1987. The results from that investigation were referenced in two subsequent documents: 1) the 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency, and 2) Evaluation of Solid Waste Management Units by the U.S. Army Environmental Hygiene Agency.

Soil sampling conducted by U.S. Army Environmental Hygiene Agency during the 1987 study was performed at EOD Area FST-009 (Figure 4.22). As indicated in the initial RFA (U.S. Army Environmental Hygiene Agency, 1988), laboratory analyses (Appendix 4.16) on the soil indicated no significant soil contamination.

4.5.3 Waste Characterization

The waste characterization of the EOD Area FST-009 as indicated in the initial RFA (USEAH 1988) includes excess artillery powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant, and regular and smoke grenades. According to EOD personnel, there are no records or information indicating any disposal of CB agents, acids, solvents, or other hazardous or toxic substances in the EOD area (Environmental Science and Engineering 1983).



SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING (1983)

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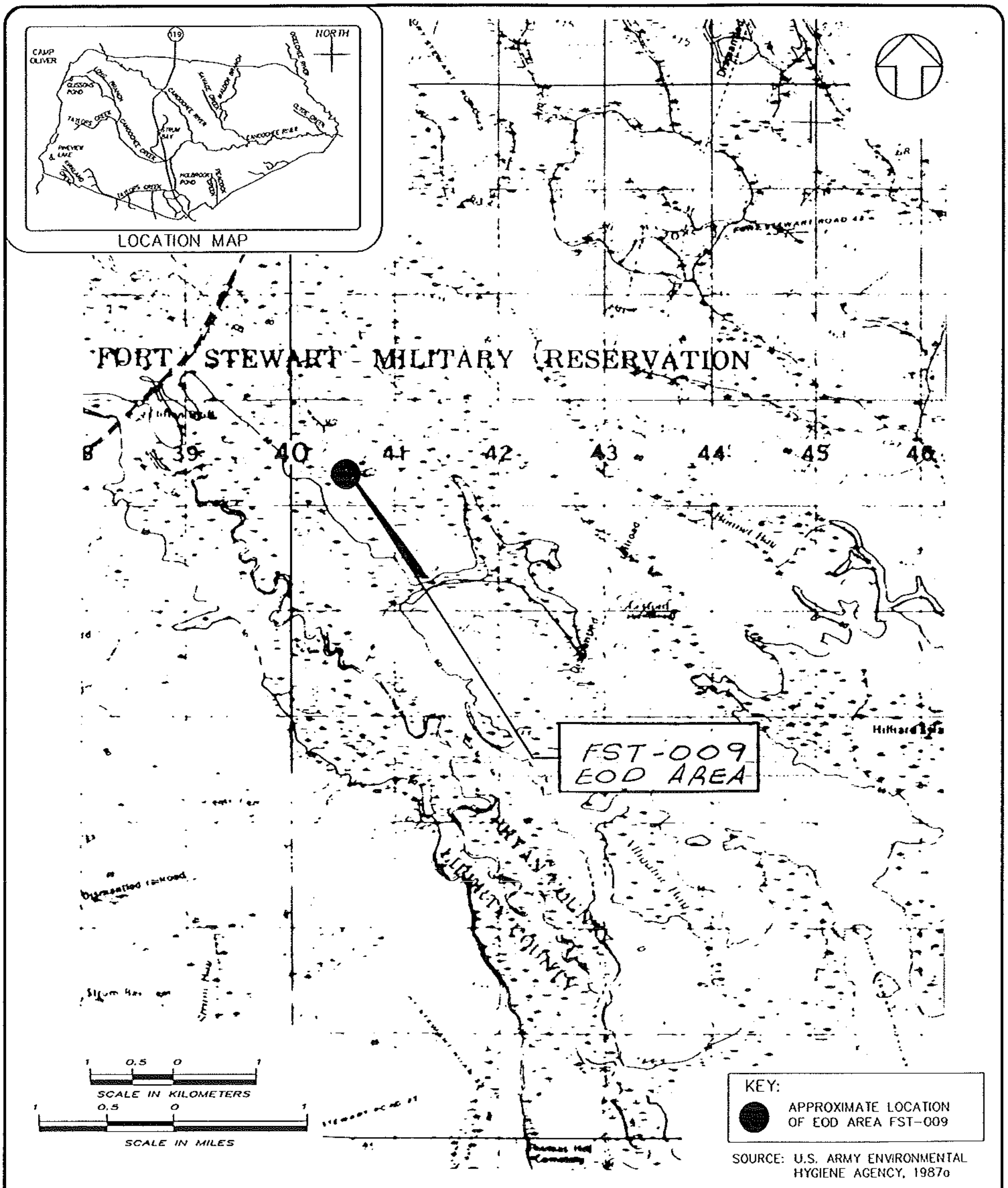
RCRA FACILITY INVESTIGATION
EOD LOCATION MAP FST-009 THROUGH FST-012

FORT STEWART

GEORGIA

FIGURE
4.20



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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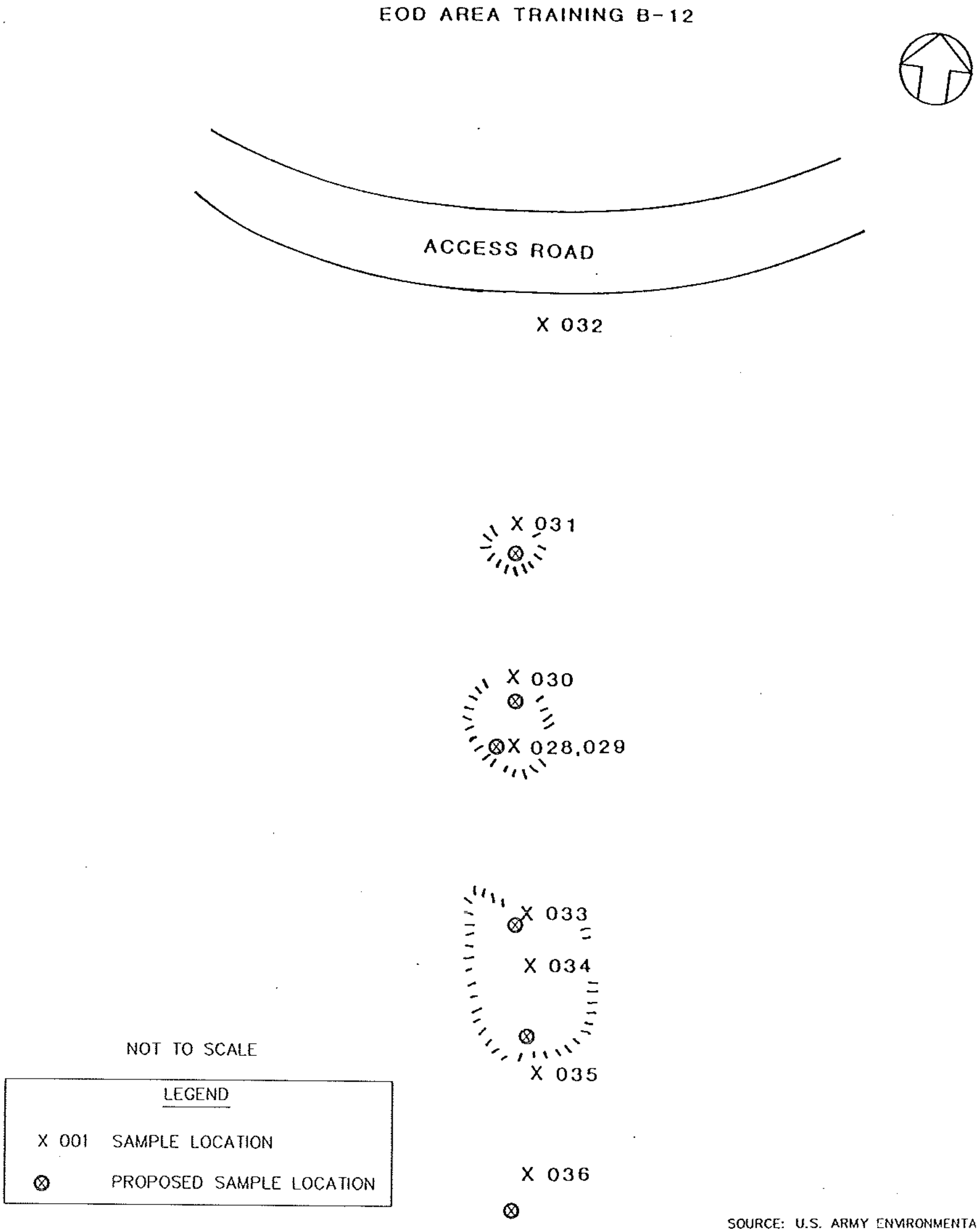
RCRA FACILITY INVESTIGATION
EOD AREA LOCATION MAP FST-009
FORT STEWART *GEORGIA*

FIGURE
4.21



SOURCE: U.S. ARMY ENVIRONMENTAL
HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
EOD AREA SAMPLE LOCATION MAP FST-009
FORT STEWART *GEORGIA*

FIGURE
4.22

4.5.4 Potential for Releases/Known Releases

During the U.S. Army Environmental Hygiene Agency 1987 soils survey, sampling crews conducted a transect across EOD Area FST-009 collecting 10 samples at 40-foot intervals, each oriented to intersect as many craters as possible. The crew limited soil sampling to the uppermost 1 inch of soil due to the safety precautions associated with unexploded ordnance. The samples were analyzed for metals using total digestion procedure (total metals) and the Toxicity Extraction Procedure (EP Tox).

Metals analysis from the 1987 United States Army Environmental Hygiene Agency survey of the samples collected at EOD Area FST-009 are presented below (Appendix 4.16). As indicated in that report, the analysis for total metals showed the existence of various levels of arsenic (3.91 to 12.9 ppm), barium (5.33 to 11.5 ppm), mercury (0.368 to 0.429 ppm), and lead (30.1 to 116.0 ppm) in all of the samples. These metals were also found in the background samples in approximately the same concentration. The conclusion drawn were that these metals may be indigenous to the soils of this area. Other metals reported in those samples were selenium to 0.259 ppm (1 of 10 samples), total chromium ranging from 4.55 to 4.78 ppm (3 of 109 samples), and cadmium ranging from 1.84 to 25.4 ppm (8 of 10 samples). The report went on to say that the analysis for EP Tox metals failed to reveal the existence of any of these compounds above the detection limit of the analysis. The conclusion of the investigation reported that although the metals were present, the compounds are not leachable as defined by the EP Tox, and as a result, are not mobile in the soil posing no risk to human health or the environment.

4.5.5 Proposed Work and Sample Analyses

4.5.5.1 General

The following work is proposed for the Phase I investigation at EOD Area (FST-009):

1) Soil sample data from April 1987 is submitted in Appendix 4.16.

2) A map will be prepared showing locations and depth of the samples.

3) Soil samples will be collected in the approximate location of the blast craters and analyzed according to GA EPD recommendations for pH, specific conductance, RCRA metals, and explosive residue.

4) The need for ground-water monitoring wells will be determined from data collected during the Phase I investigation and may be recommended for Phase II.

4.5.5.2 Field Sampling Plan

Surface soils in the blast craters will be sampled at five locations in EOD area FST-009 and analyzed for pH by EPA Methods 9040/9045, specific conductance by EPA Method 9050, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and explosive residue by EPA Method 8350. One additional background sample will be collected and analyzed for the same parameters. One equipment blank will be submitted for QA/QC analysis. One extra sample will be collected for lab duplication/split analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). The need for ground-water monitoring or additional sampling will be proposed and completed during Phase II.

4.6 The EOD Area (FST- 010)

4.6.1 Site Description and History

EOD Area FST-010 is located 4 miles north of the cantonment area and 1 mile east of Georgia Highway 119 (see Figure 4.20) in designated Area B-8 (Figure 4.23) on the Fort Stewart Installation Map. EOD Area FST-010 was operated from 1975 to 1980 where open detonation of unexploded ordnance took place. There is one trench with a total area of 2 acres. As indicated in the initial RFA (U.S. Army Environmental Hygiene Agency 1988), the craters in the ground contained no solid waste, other than small bits of shrapnel, and no evidence of ashes or charred ground from the explosions.

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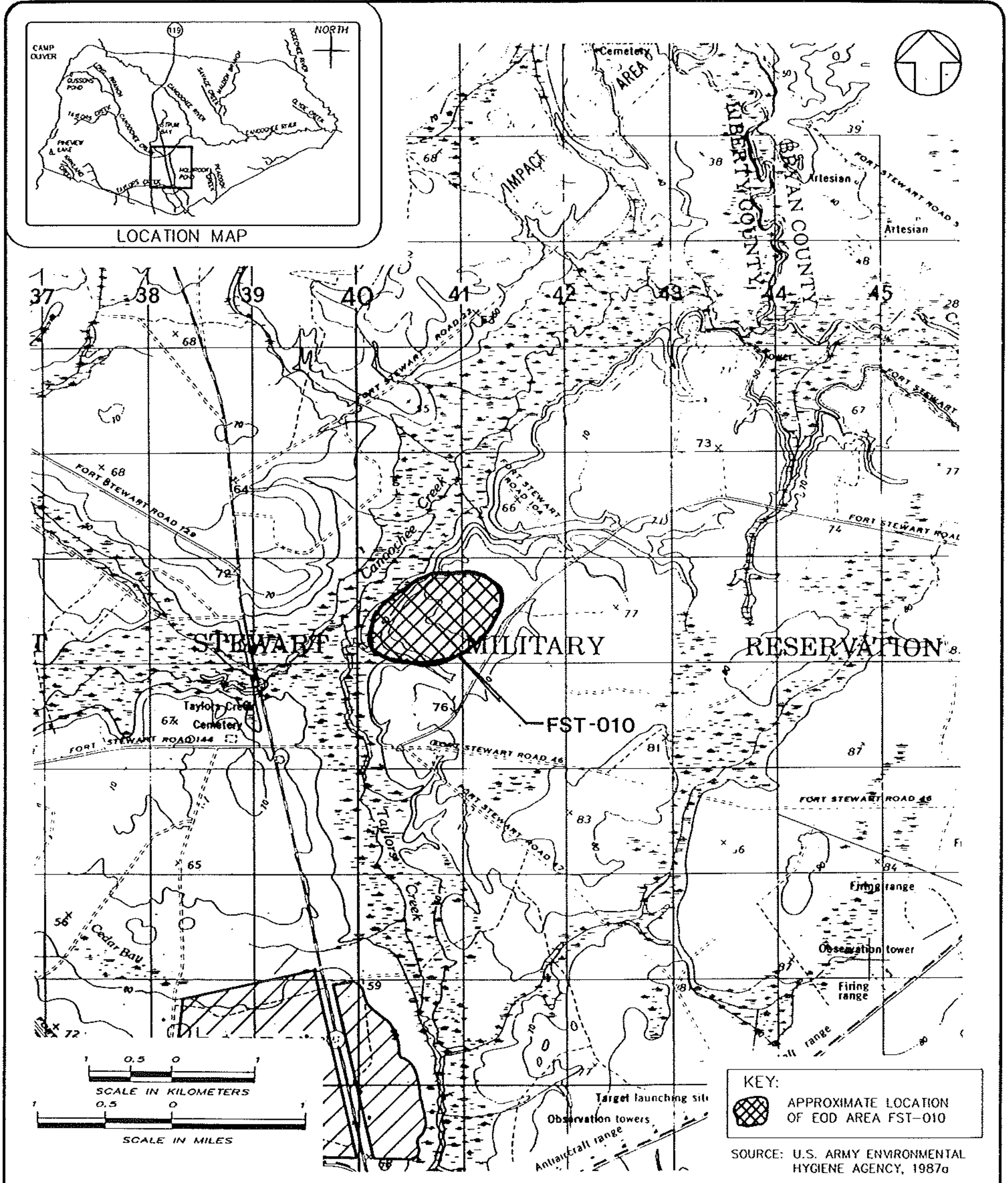

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
EOD AREA LOCATION MAP FST-010

FORT STEWART *GEORGIA*

FIGURE
4.23

4.6.2 Previous Investigations

EOD Area FST-010 was previously investigated as part of the initial RFA by U.S. Army Environmental Hygiene Agency in April 1987. The results from that investigation were referenced in two subsequent documents: 1) the 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency, and 2) Evaluation of Solid Waste Management Units by the U.S. Army Environmental Hygiene Agency.

Soil sampling conducted by U.S. Army Environmental Hygiene Agency during the 1987 study was performed at EOD Area FST-010 (Figure 4.24). As indicated in the initial RFA (U.S. Army Environmental Hygiene Agency, 1988), laboratory analyses (Appendix 4.16) on the soil indicated no significant soil contamination.

4.6.3 Waste Characterization

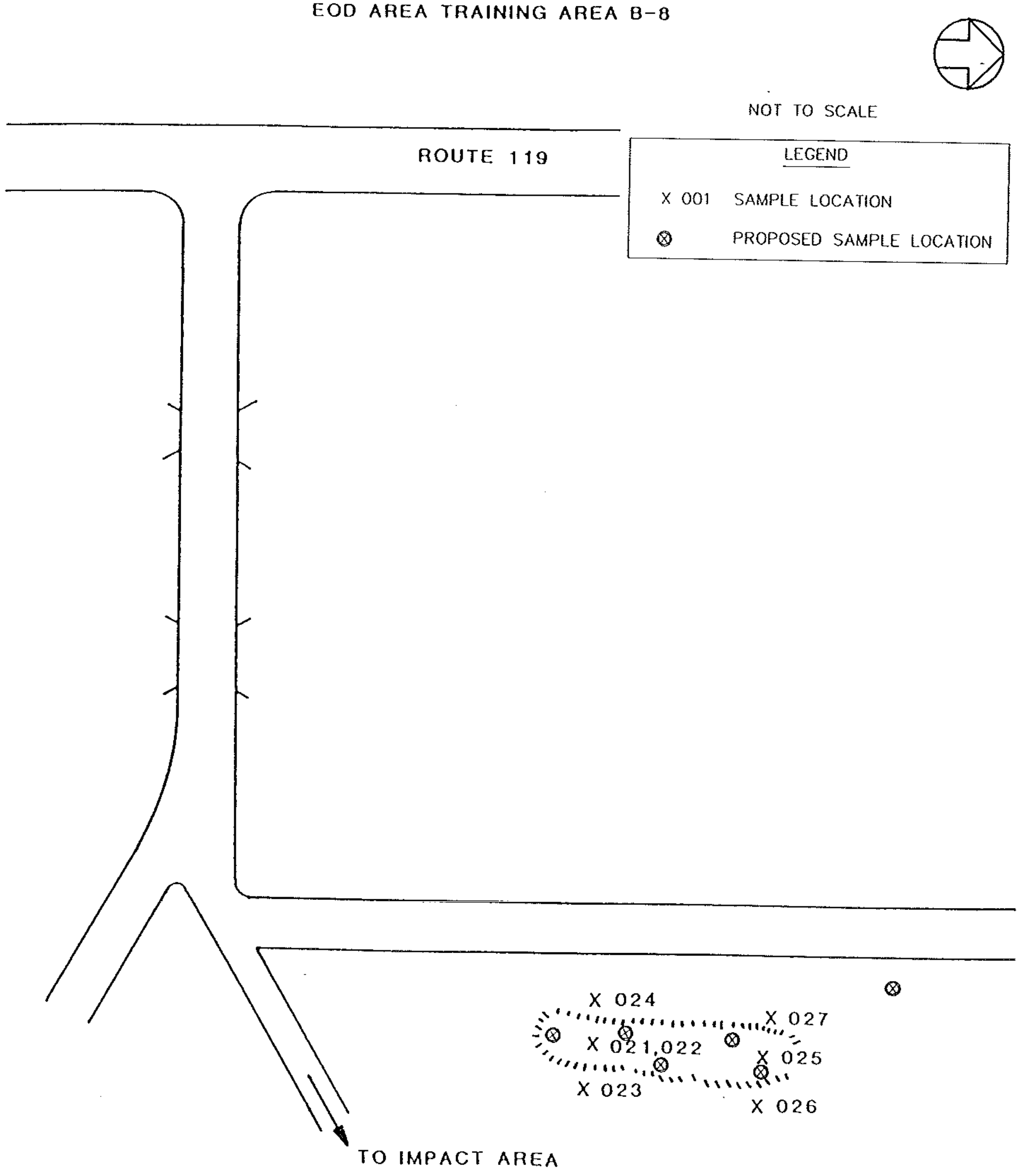
The waste characterization of the EOD areas as indicated in the initial RFA (USEAH 1988) includes excess artillery powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant, and regular and smoke grenades. According to EOD personnel, there are no records or information indicating any disposal of CB agents, acids, solvents, or other hazardous or toxic substances in the EOD area (Environmental Science and Engineering 1983).

4.6.4 Potential for Releases/Known Releases

During the U.S. Army Environmental Hygiene Agency 1987 soils survey, sampling crews conducted a transect across EOD Area FST-010 collecting 10 samples at 40-foot intervals, each oriented to intersect as many craters as possible. The crew limited soil sampling to the uppermost 1 inch of soil due to the safety precautions associated with unexploded ordnance. The samples were analyzed for metals using total digestion procedure (total metals) and the EP Tox.

Metals analysis from the 1987 U.S. Army Environmental Hygiene Agency survey of the samples collected at EOD Area FST-010 are presented below (Appendix 4.16). As written in that report, the analysis for total metals showed the existence of various levels of arsenic (1.98 to 9.91 ppm), barium (9.72 to 50.6 ppm), mercury (0.394 to 0.400 ppm), and lead (97.8 to 3281.0 ppm)

EOD AREA TRAINING AREA B-8



Source: U.S. Army Environmental Hygiene Agency, 1988

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RCRA FACILITY INVESTIGATION
EOD AREA SAMPLE LOCATION MAP FST-010
FORT STEWART *GEORGIA*

FIGURE
4.24

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in all of the samples. These metals were also found in the background samples in approximately the same concentration. Only, the lead data revealed results which were significantly higher than the concentration in the background samples. The report also indicated that, other metals found in these samples were selenium to 0.257 ppm (1 of 9 samples), total chromium ranging from 9.00 to 10.4 ppm (2 of 9 samples), and cadmium ranging from 1.98 to 26.0 ppm (3 of 9 samples). The analysis for EP Tox metals failed to reveal the existence of any of these compounds above the detection limit of the analysis. The conclusions drawn were that although the compounds existed in the soil, they were not leachable as defined by the EP Tox. The report indicated that the compounds were not mobile in the soil and did not pose a risk to human health or the environment.

4.6.5 Proposed Work and Sample Analyses

4.6.5.1 General

The following work is proposed for the Phase I investigation at EOD Area (FST-010):

1) The soil sample data from April 1987 is submitted in Appendix 4.14.

2) A map will be prepared showing locations and depth of the samples.

3) Soil samples will be collected in the approximate location of the blast craters and analyzed according to GA EPD recommendations for pH, specific conductance, RCRA metals, and explosive residue.

4) The need for ground-water monitoring wells will be determined from data collected during the Phase I investigation and may be recommended for Phase II.

4.6.5.2 Field Sampling Plan

Surface soils in the blast craters will be sampled at five locations in EOD area FST-010 and analyzed for pH by EPA Methods 9040/9045, specific conductance by EPA Method 9050, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and explosive residue by EPA Method 8350. One additional background sample will be collected and analyzed for the same parameters. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). The need for ground-water monitoring or additional sampling will be proposed and completed during Phase II.

4.7 EOD Area (FST-011)

4.7.1 Site Description and History

EOD Area FST-011 is located 3 miles northeast of the cantonment area, about 2 miles south of Georgia Highway 144 and 1 mile northeast of Wright Army Airfield (see Figure 4.20) in designated Area A-16 on the Fort Stewart Military Installation Map (Figure 4.25). EOD Area FST-011 was operated from 1953 to 1975 where open detonation of unexploded ordnance took place. There are numerous blast craters spread out over nearly 10 acres. As indicated in the initial RFA it is difficult to distinguish this site from the surrounding forest since it has become overgrown with trees and bushes.

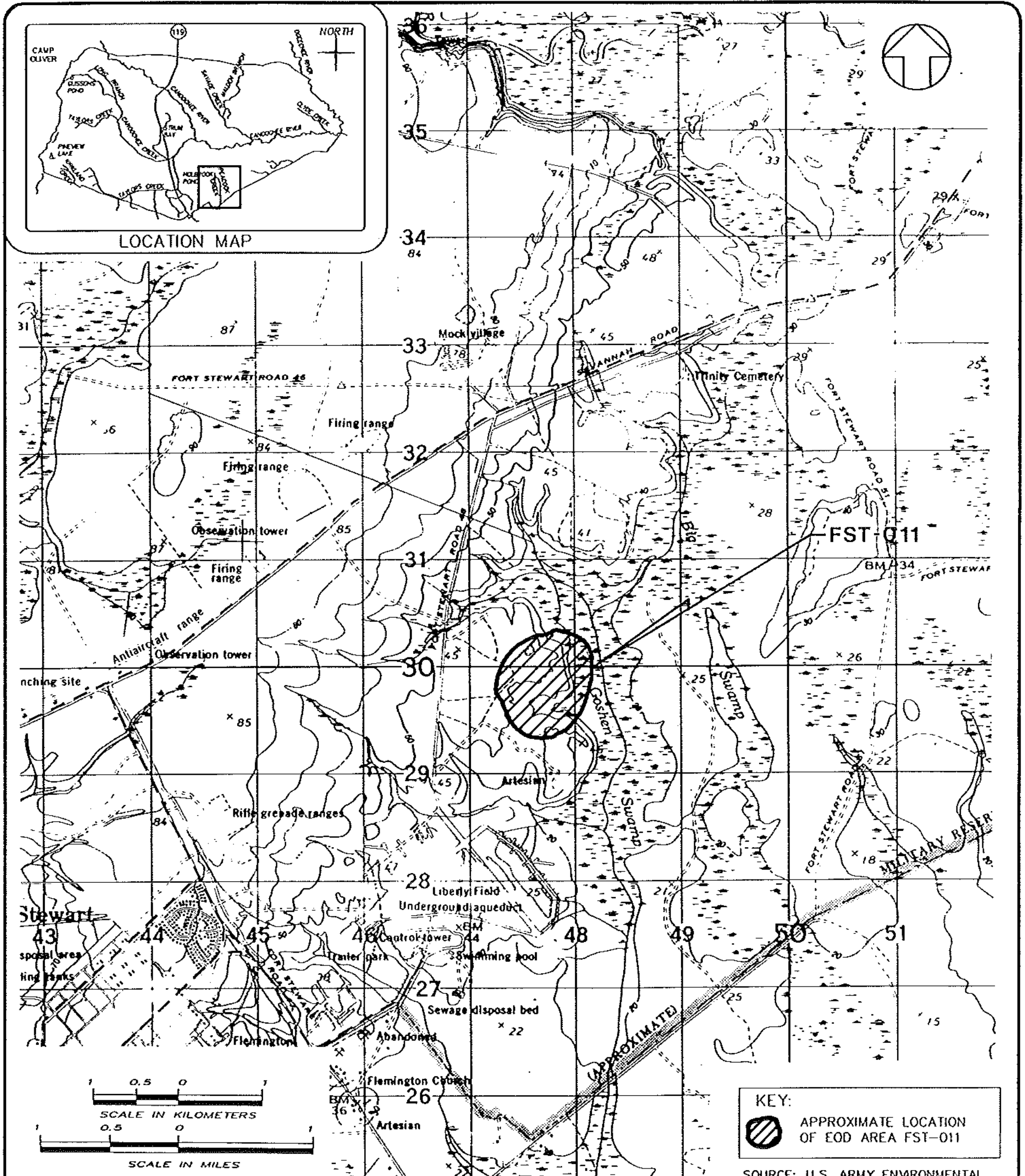
4.7.2 Previous Investigations

EOD Area FST-011 was previously investigated as part of the initial RFA by U.S. Army Environmental Hygiene Agency in April 1987. The results from that investigation were referenced in two subsequent documents: 1) the 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency, and 2) Evaluation of Solid Waste Management Units by the U.S. Army Environmental Hygiene Agency.

Soil sampling conducted by U.S. Army Environmental Hygiene Agency during the 1987 study was performed at EOD Area FST-011 (Figure 4.26). As indicated in the initial RFA (U.S. Army Environmental Hygiene Agency, 1988), laboratory analyses (Appendix 4.16) on the soil indicated no significant soil contamination.

4.7.3 Waste Characterization

The waste characterization of the EOD areas as indicated in the initial RFA (USEAH 1988) includes excess artillery powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant, and regular and smoke grenades. According to EOD personnel, there are no records or information indicating any disposal of CB



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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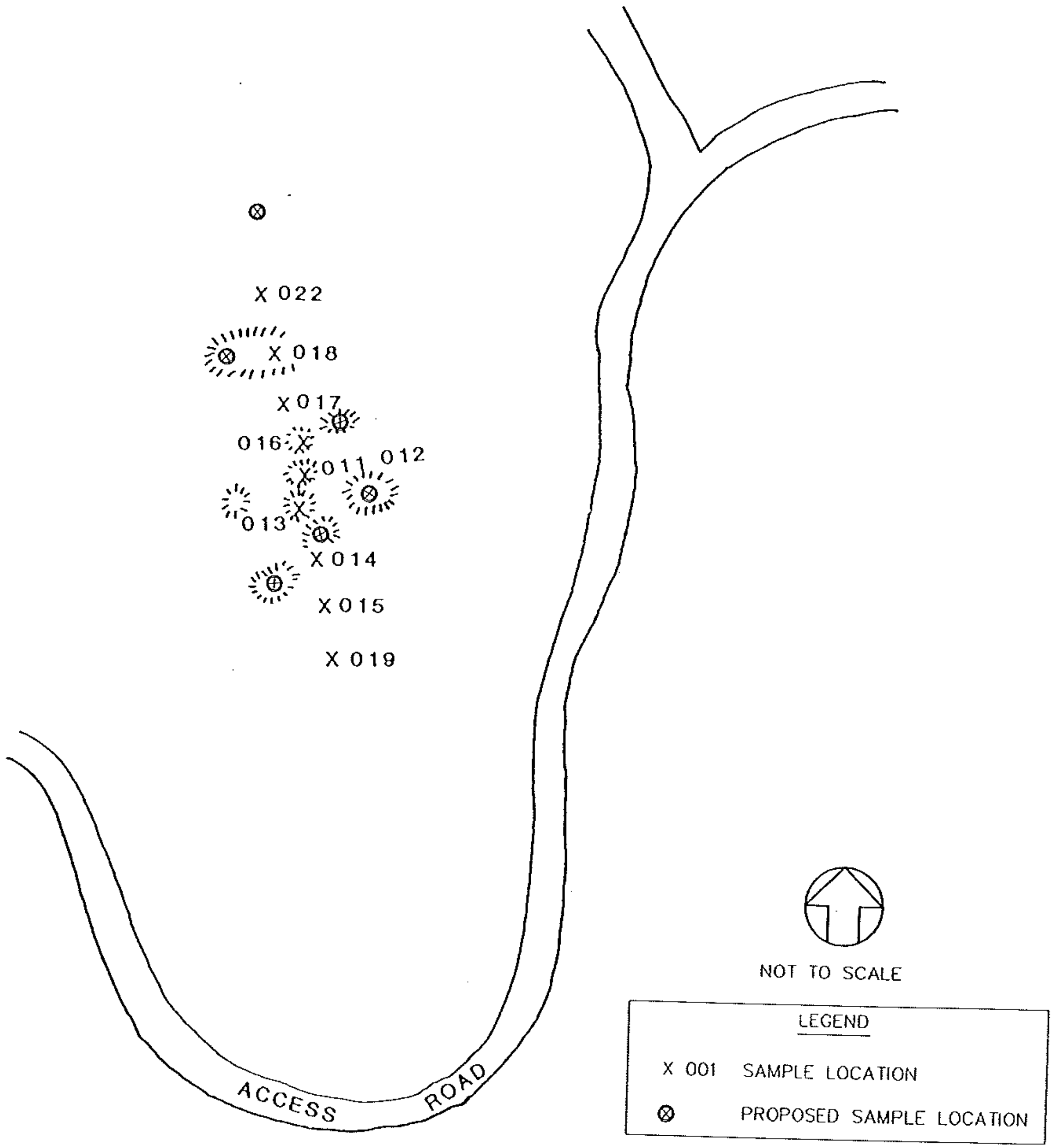
RCRA FACILITY INVESTIGATION
EOD AREA LOCATION MAP FST-011

FORT STEWART *GEORGIA*

FIGURE
4.25

EOD AREA TRAINING AREA A-16



Source: U.S. Army Environmental Hygiene Agency, 1988

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RCRA FACILITY INVESTIGATION
EOD AREA SAMPLE LOCATION MAP FST-011
FORT STEWART *GEORGIA*

FIGURE
4.26

agents, acids, solvents, or other hazardous or toxic substances in the EOD area (Environmental Science and Engineering 1983).

4.7.4 Potential for Releases/Known Releases

During the U.S. Army Environmental Hygiene Agency 1987 soils survey, sampling crews conducted a transect across EOD Area FST-011 collecting 10 samples at 40-foot intervals, each oriented to intersect as many craters as possible. The crew limited soil sampling to the uppermost 1 inch of soil due to the safety precautions associated with unexploded ordnance. The samples were analyzed for metals using total digestion procedure (total metals) and the EP TOX.

Metals analysis from the 1987 U.S. Army Environmental Hygiene Agency Survey of the samples collected at EOD Area FST-011 are presented below (Appendix 4.16). As written in that report, the analysis for total metals showed the existence of various levels of arsenic (1.98 to 21.4 ppm), barium (2.78 to 8.17 ppm), mercury (0.395 to 0.414 ppm), and lead (35.8 to 432.0 ppm) in all of the samples. These metals were also found in the background samples in approximately the same concentration. The report indicated that two samples collected from this area contained levels of total lead (432 ppm and 191 ppm) which significantly exceeded the lead concentrations in the background samples.

Other metals found in these samples were selenium to 0.787 ppm (1 of 9 samples), total chromium ranging from 3.69 to 4.35 ppm (3 of 9 samples), and cadmium ranging from 1.98 to 518.0 ppm (8 of 9 samples). The analysis for EP Tox metals failed to reveal the existence of any of these metals above the detection limit of the analysis, except for one sample. Sample 30 from the berm of the main crater (central crater) contained 0.43 milligrams per liter (mg/L) cadmium. This result is less than the 1.0 mg/L RCRA criteria for hazardous waste as outlined by 40 CFR 261.24. Therefore, these results failed to show that this area contains hazardous wastes (HWs) as defined by 40 CFR 261.24. The conclusions of the report were that although the metals exist in the soil, they are not leachable as defined by EP Tox. Thus, the report indicated that these metals were not mobile in the soil and did not pose a risk to human health or the environment.

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4.7.5 Proposed Work and Sample Analyses

4.7.5.1 General

The following work is proposed for the Phase I investigation:

1) The soil sample data from April 1987 is submitted in Appendix 4.14.

2) A map will be prepared showing locations and depth of the samples.

3) Soil samples will be collected in the approximate location of the blast craters and analyzed according to GA EPD recommendations for pH, specific conductance, RCRA metals, and explosive residue.

4) The need for ground-water monitoring wells will be determined from data collected during the Phase I investigation and may be recommended for Phase II.

4.7.5.2 Field Sampling Plan

Surface soils in the blast craters will be sampled at five locations in EOD area FST-011 and analyzed for pH by EPA Methods 9040/9045, specific conductance by EPA Method 9050, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and explosive residue by EPA Method 8350. One additional background sample will be collected and analyzed for the same parameters. One extra sample set and equipment blank for explosive residue will be collected for lab duplication/split analysis and QA/QC. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). The need for ground-water monitoring or additional sampling will be proposed and completed during Phase II.

4.8 The Current EOD Area (FST-012)

4.8.1 Site Description and History

The current EOD Area (FST-012) is located between the Artillery Impact Area and the Small Arms Impact Area south of the Canoochee River (see Figure 4.20) in the designated EOD area between B-9 and B-3, approximately 6 miles north of the cantonment area (Figure 4.27). The current EOD Area (FST-012) has been in operation from 1987 to the present. Disposal of unexploded ordnance is completed by thermal treatment methods. This area consists of blast craters occupying a total of approximately 3 acres.

4.8.2 Previous Investigations

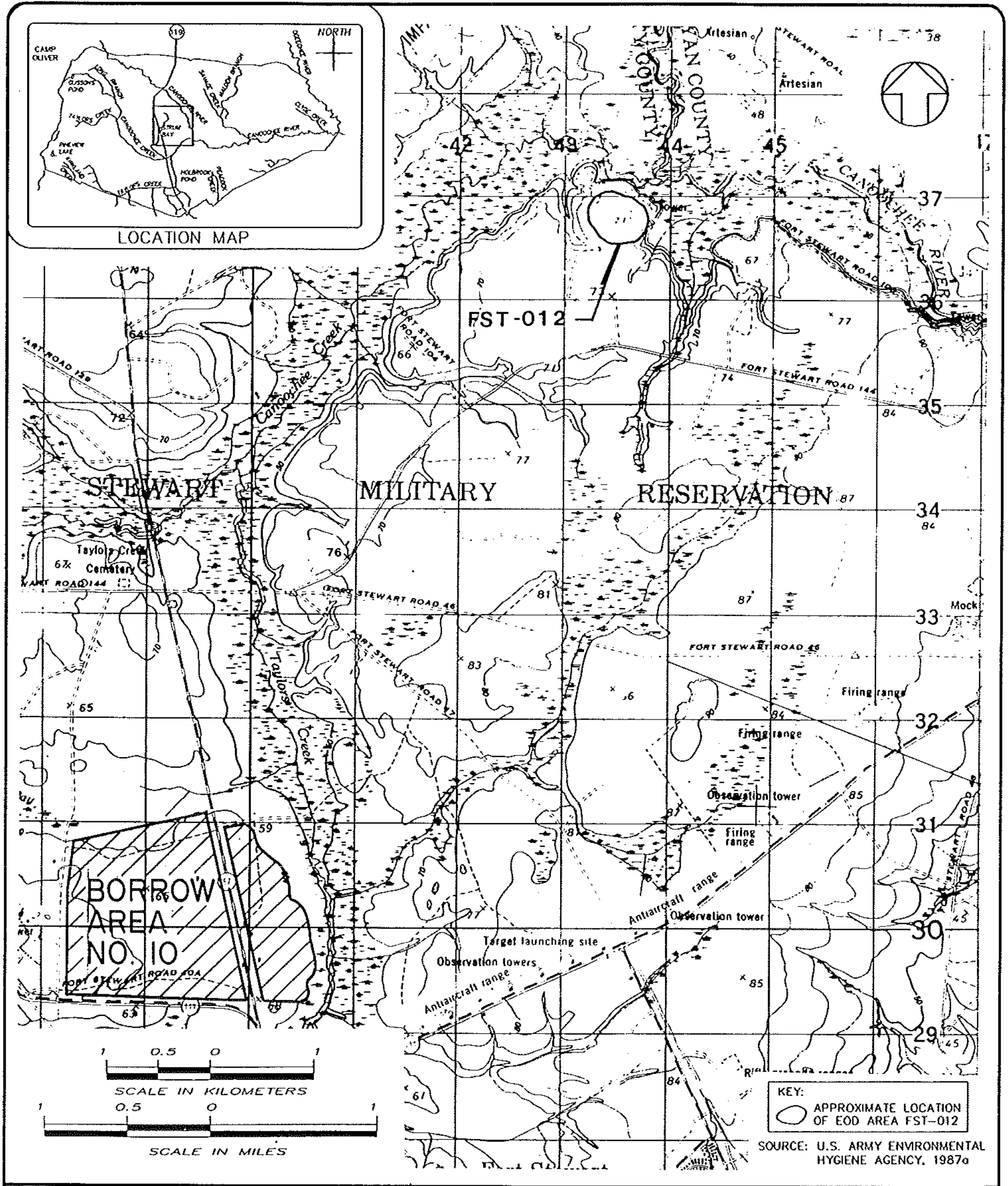
None of the past soil investigation included the current EOD Area (FST-012). Consequently, no information is available for this unit.

4.8.3 Waste Characterization

The waste characterization of the EOD areas as indicated in the initial RFA (USEAH 1988) includes excess artillery powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant, and regular and smoke grenades. More recent wastes found in the current EOD area, include unserviceable light antitank weapons (LAWs), dragons, and 2.75-inch rocket motors (U.S. Army Environmental Hygiene Agency 1987, U.S. Army Environmental Hygiene Agency 1988). According to EOD personnel, there are no records or information indicating any disposal of CB agents, acids, solvents, or other hazardous or toxic substances in the EOD area (Environmental Science and Engineering 1983).

4.8.4 Potential for Releases/Known Releases

None of the past soil investigations included the current EOD Area (FST-012). Consequently, no information is available to characterize the waste material at this unit. The potential for release would be similar to the other areas. No releases have been documented.



KEY:
APPROXIMATE LOCATION OF EOD AREA FST-012

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
CURRENT EOD AREA LOCATION MAP FST-012
FORT STEWART *GEORGIA*

FIGURE
4.27

4.8.5 Proposed Work and Sample Analyses

4.8.5.1 General

The following work is proposed for the Phase I investigation at the current EOD Area (FST-012).

1) The blast area craters will be sampled according to GA EPD recommendations for pH, specific conductance, RCRA metals, and explosive residue.

2) A map showing sampling locations and depths will be prepared and submitted.

3) Soil samples will be collected in the approximate location of the blast craters (Figures 4.27A) and analyzed according to GA EPD recommendations for pH, specific conductance, RCRA metals, and explosive residue.

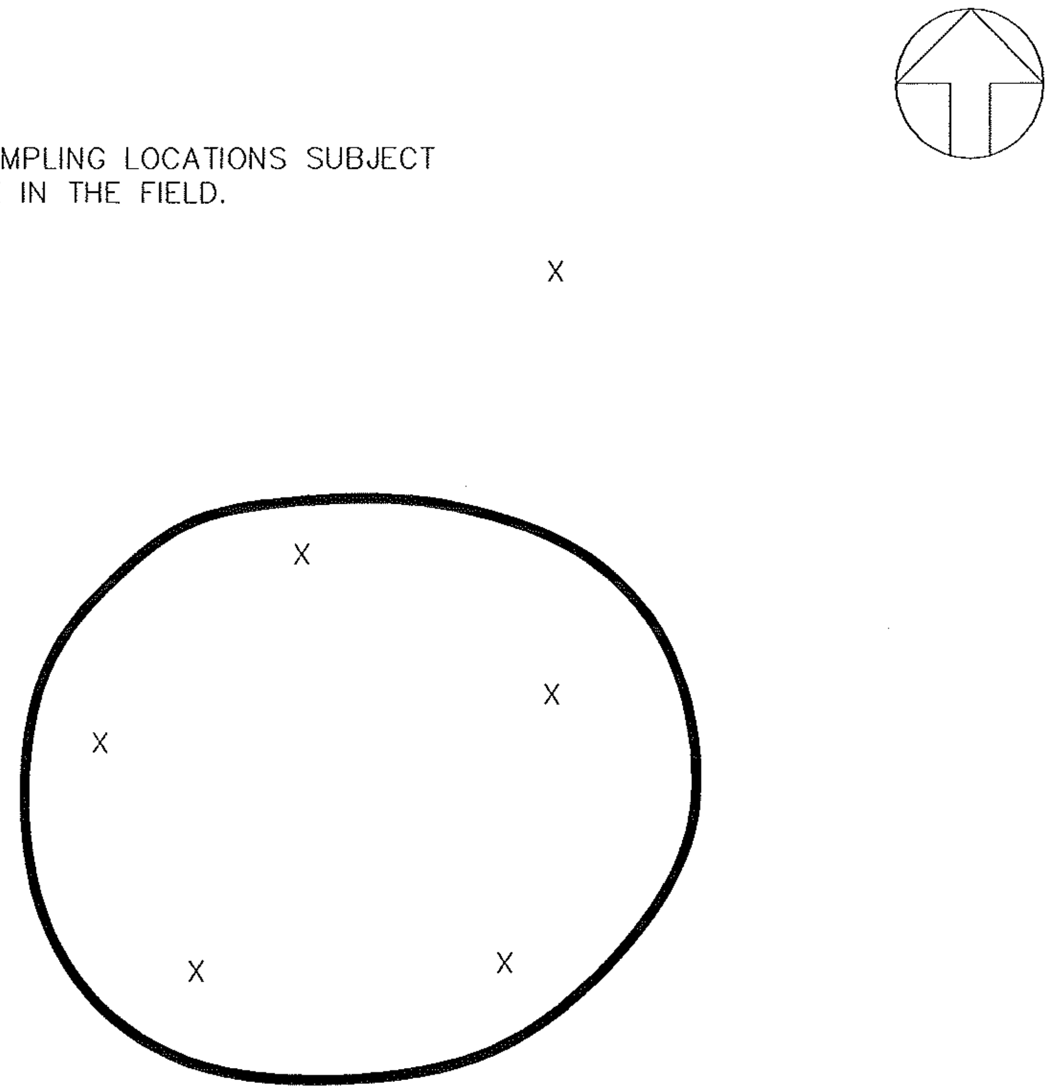
4) The need for ground-water monitoring wells will be determined from data collected during the Phase I investigation and may be recommended for Phase II.

4.8.5.2 Field Sampling Plan

Surface soils in the blast craters will be sampled at five sample locations in the current EOD area FST-012 and analyzed for pH by EPA Methods 9040/9045, specific conductance by EPA Method 9050, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and explosive residue by EPA Method 8350. One additional background sample will be collected and analyzed for the same parameters. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). The need for ground-water monitoring or additional sampling will be proposed and completed during Phase II.

NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT TO CHANGE IN THE FIELD.



KEY

◯ BLAST CRATER

X PROPOSED SAMPLE LOCATION

NOT TO SCALE

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RCRA FACILITY INVESTIGATION
CURRENT EOD AREA SAMPLE LOCATION MAP FST-012
FORT STEWART *GEORGIA*

FIGURE
4.27A

4.9 The Old Fire Training Pit (FST-014)

4.9.1 Site Description and History

The old fire training pit (FST-014) is located on the southwest boundary of the cantonment area across road FTS 90 from Zouck's Cemetery, behind the current facility engineering storage yard (Figure 4.28). During the 1940s to the 1950s, crash response crews used this area for fire fighting training exercises, burning waste oil and petroleum contaminated with water as fuel (USAEH, 1987). The site has been recently used for storage of leaves and pine needles collected from the cantonment area. During March 24 to 31, 1987, the northwest portion of the old fire training pit was actively burning or smoldering due to either spontaneous combustion or being set on fire. Currently, the site is an open grass field as seen on the November 1, 1990 site visit by Geraghty & Miller.

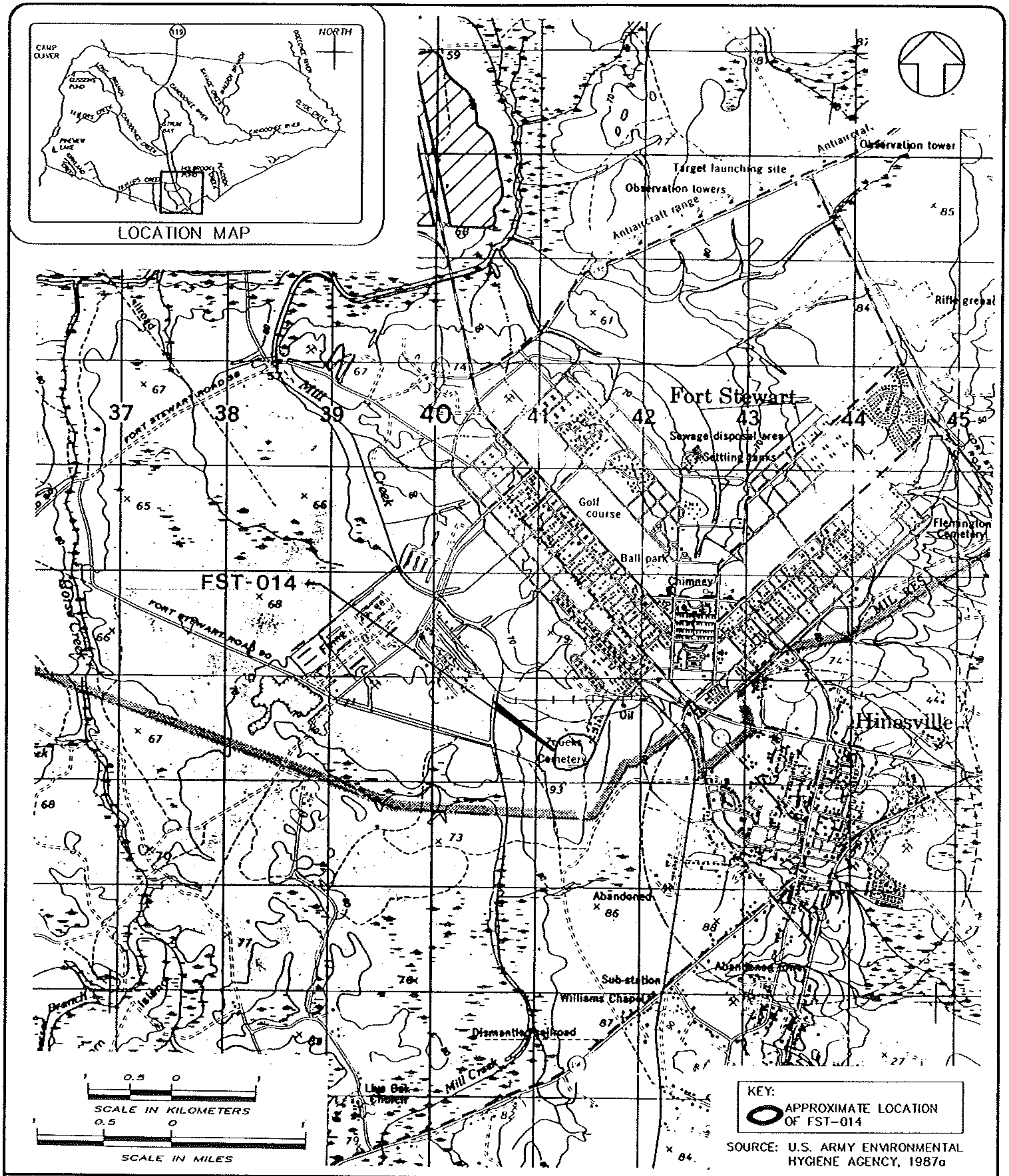
4.9.2 Previous Investigations

A previous investigation was completed in March 1987, Hazardous Waste Study No. 37-26-0127-88 Investigation of Soil Contamination by U.S. Army Environmental Hygiene Agency. The work was referenced in two subsequent reports: 1) 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency, and 2) 1987 Evaluation of Solid Waste Management Units No. 37-26-1382-88 by the U.S. Army Environmental Hygiene Agency.

Four boreholes (BH5 to BH8) were drilled to 5-foot depths by the U.S. Army Environmental Hygiene Agency (Figure 4.29) to obtain soil samples. Eleven samples were collected from these four boreholes and submitted for analyses. The results from these analyses are presented in Appendix 4.14 and soil boring logs in Appendix 4.15.

4.9.3 Waste Characterization

The fire training area was used by the crash response crews for training exercises. Fires were ignited with waste oil and petroleum contaminated with water as fuel. The waste characterization of the old fire training pit includes waste oil, solvents, and waste fuels contaminated with water.



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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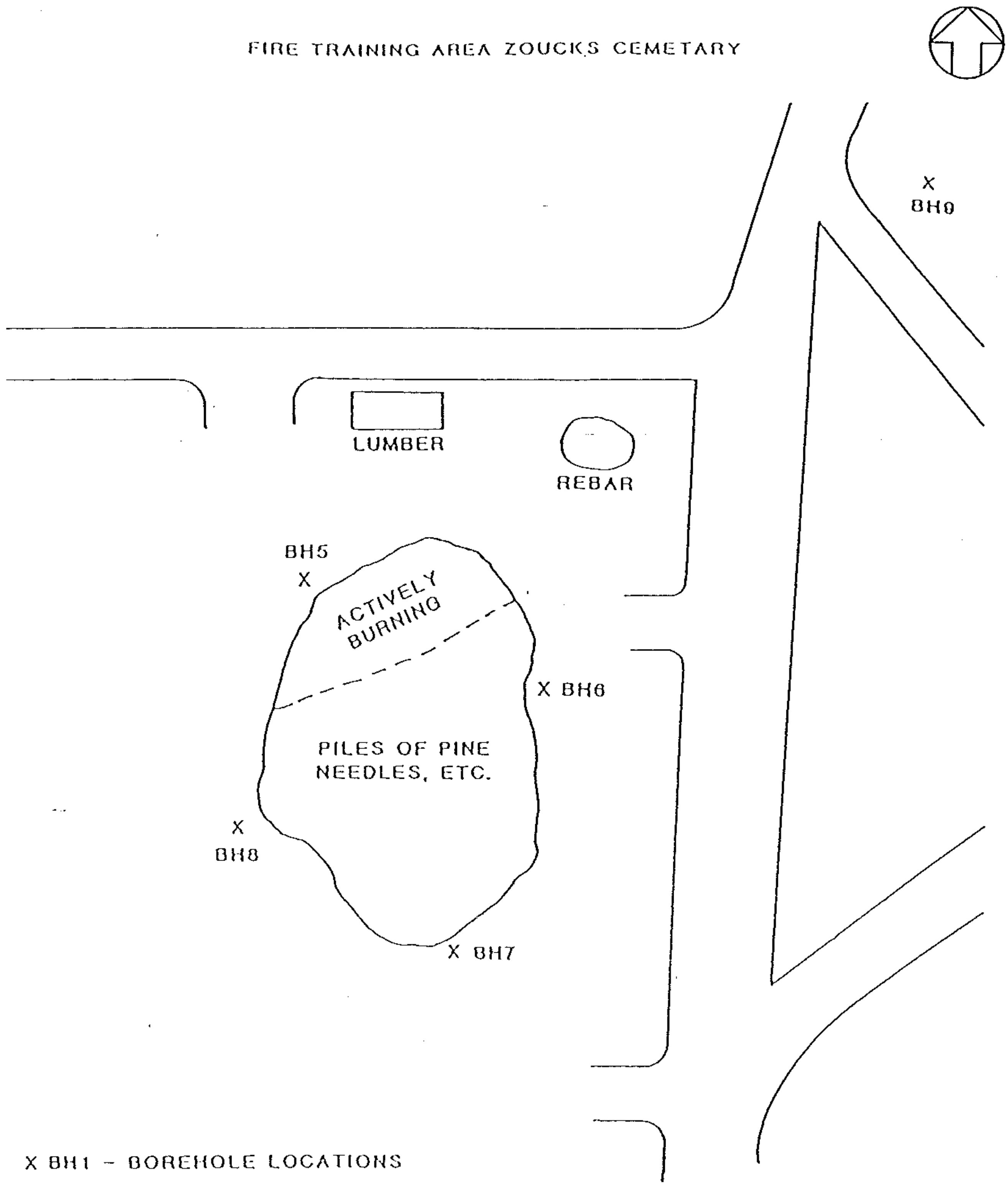
RCRA FACILITY INVESTIGATION
OLD FIRE TRAINING PIT LOCATION MAP FST-014
FORT STEWART *GEORGIA*

FIGURE
4.28

FIRE TRAINING AREA ZOUCKS CEMETARY



X BH1 - BOREHOLE LOCATIONS

(from 1987 investigation)
not to scale

Source: U.S. Army Environmental Hygiene Agency, 1988

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RCRA FACILITY INVESTIGATION
OLD FIRE TRAINING BOREHOLE LOCATION MAP FST-014
FORT STEWART *GEORGIA*

FIGURE
4.29

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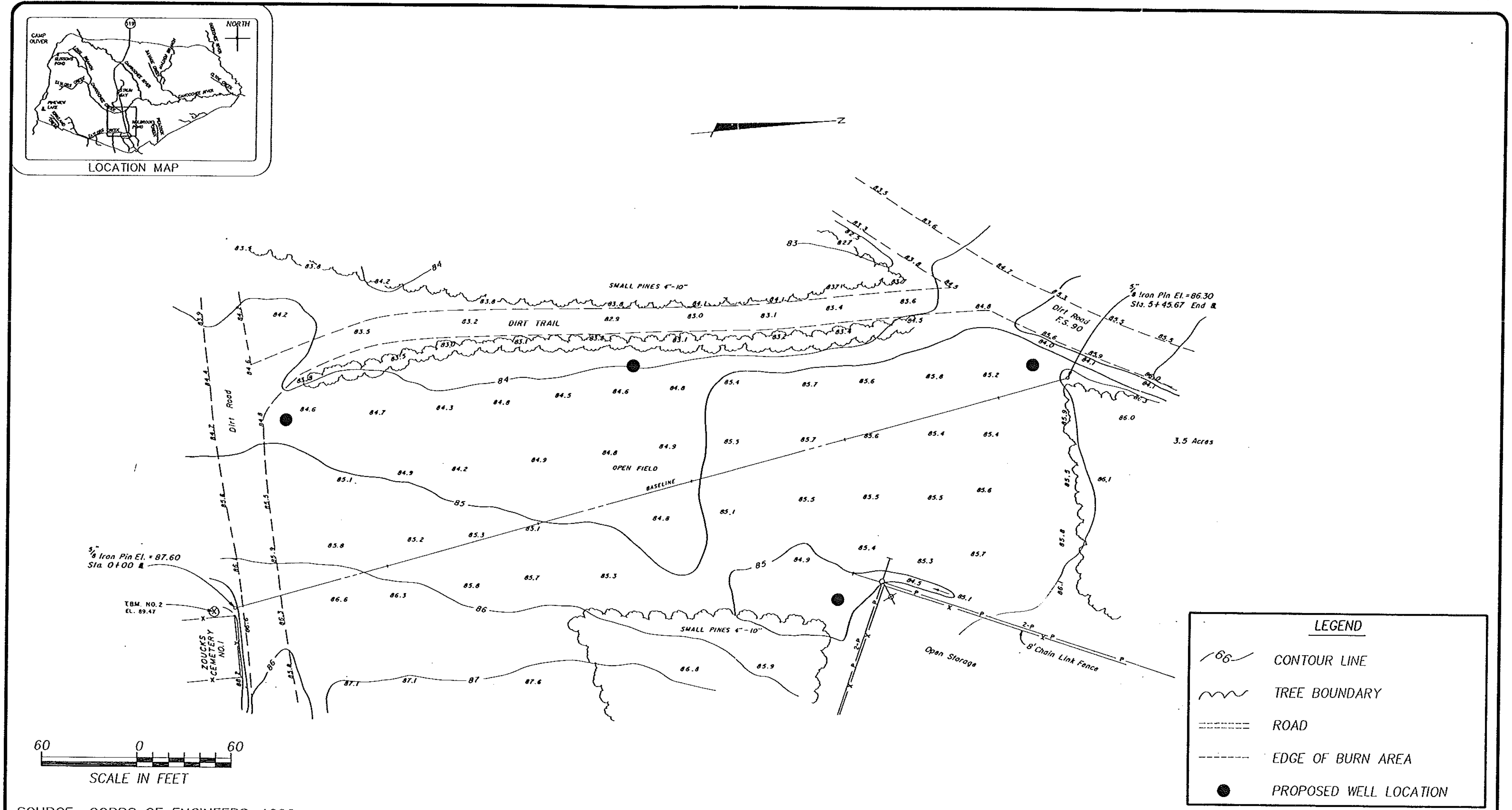
4.9.4 Potential for Releases/Known Releases

During the 1987 U.S. Army Environmental Hygiene Agency survey, 13 soil samples (including quality control) were collected from four boreholes and from the burn residue in the pit. The soil samples were submitted for analyses of metals using the total digestion procedures (total metals) and EP Tox. Additional samples were submitted for analyses of volatile organics (EPA Method 8240) and base-neutral extractable organics (EPA Method 8270). The complete analytical results by U.S. Army Environmental Hygiene Agency of the soil samples are included in Appendix 4.14.

The results of sample analyses indicated no significant contamination. A sample of the burn residue contained 505 ppm total lead, 25.7 ppm of total cadmium, and 5.9 ppm of total chromium. The lead concentration in this sample significantly exceeded the lead concentration of any of the background samples. Three soil samples contained levels of cadmium and chromium ranging from 1.95 to 4.99 ppm, and 7.17 to 11.9 ppm, respectively. However, the results as determined by the EP Tox test for lead, cadmium, and chromium plus the other metals revealed that none of the metals were above detection limits (Letter, U.S. Army Environmental Hygiene Agency, November 18, 1987). The results of the organic analysis indicated that no volatile organics or acid and base-neutral extractable organics were detected from samples collected in this area.

The soils in the area consist of fine sands and sandy soils which are well drained and exhibit an extremely low pH. Ground-water flow and hence migration pathways are inferred to follow the topography of the area (Figure 4.30), from south to north. The potential for migration of the fuels or waste oil to the shallow aquifer is high. The past investigations have not characterized the impact to the ground water.



SOURCE: CORPS OF ENGINEERS, 1990

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RCRA FACILITY INVESTIGATION
OLD FIRE TRAINING AREA TOPOGRAPHIC MAP FST-014

FORT STEWART

GEORGIA

FIGURE
4.30

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4.9.5 Proposed Work and Sample Analyses

4.9.5.1 General

The following work is proposed for the Phase I investigation at the Old Fire Training Pit (FST-014):

1) A topographic survey was done in August 1990 by the COE. Well locations will be shown on the topographic map. This map will be submitted in the Phase I RFI report.

2) Four ground-water monitoring wells will be constructed at this site which meet all COE and GA EPD recommendations. One soil sample will be collected from each monitoring well boring and analyzed for pH, VOCs, total petroleum hydrocarbons (TPH), and RCRA metals.

3) The four new monitoring wells will be sampled and analyzed according to GA EPD recommendations for pH, VOCs, TPH, and RCRA metals.

4) One representative north-south and one east-west cross section of the four monitoring wells in the Old Fire Training Pit will be submitted in the final RFI report (Phase I).

5) One round of water-level data will be collected and used to determine ground-water flow direction. A potentiometric map of the site will be prepared and submitted. Ground-water flow rate will be determined in the Phase II investigation.

6) Soil sample data from April 1987 is submitted for GA EPD review in Appendix 4.14.

4.9.5.2 Soil Boring and Monitor-Well Installation Plan

Four ground-water monitoring wells (one upgradient and three downgradient), will be installed. These monitoring wells will be installed by drilling with a rig (hollow-stem auger

223

method). Proposed well placement is shown in Figure 4.30. The monitoring wells will be installed with a 10 foot screen to a depth of 5-8 feet into the saturated zone of the surficial sand aquifer in accordance with the Field Sampling Approach (Section 6.0). Well protection around each well will be installed to include concrete pads, protective casing, locking well covers, and protective posts at the corners of the well pads.

4.9.5.3 Field Sampling Plan

In accordance with GA EPD's recommendations, the four wells will be sampled once and analyzed for VOCs by EPA Method 8240, pH by EPA Methods 9040/9045, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and TPH by EPA Method 8015. One equipment blank and one trip blank will be submitted for QA/QC analysis. One sample set will be submitted for lab duplication/split and rinsate analyses. Field measurements for specific conductivity and pH will be recorded for each well.

Soil samples will be collected every 2 feet during drilling, to the depth of the well. Soil samples will be collected from the ground surface to the water table. Each sample will be screened in the field with an organic vapor analyzer with a flame ionization detector (OVA-FID). The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the sample above the water table will be retained for testing.

The soil sample will be analyzed in accordance with GA EPDs recommendations for VOCs by EPA Method 8240, pH by EPA Methods 9040/9045, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, and TPH by EPA Method 8015. One extra sample set of soil and ground water will be submitted for lab duplication/split analyses. One equipment blank will be submitted for QA/QC analysis, and one trip blank for soil and ground water. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Additional wells, if needed, will be proposed in the Phase II investigation.

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4.10 DRMO Hazardous Waste Storage Area (FST-017)

4.10.1 Site Description and History

The DRMO Hazardous Waste Storage Area (FST-017) is located in the cantonment area on the west side of Building 1152 (Figure 4.31A). The storage area dimensions were 25 feet wide by 50 feet long. According to the Environmental Program Review (U.S. Army Environmental Hygiene Agency,1988), the storage area was neat, with most containers of waste in over pack containers and no evidence of any leaks or spills on the asphalt surface.

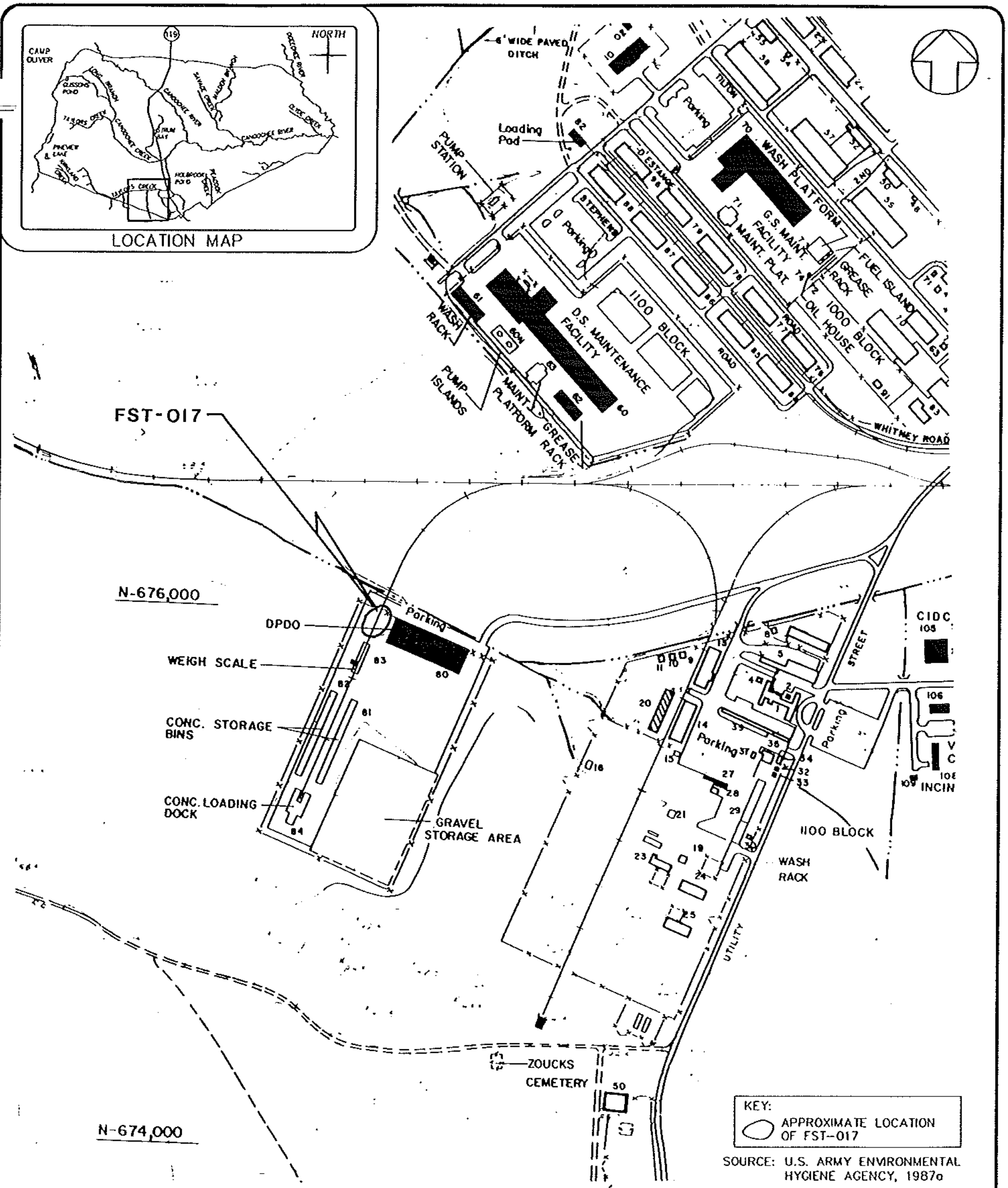
This area stored hazardous waste from 1985 until 1988. Hazardous waste is no longer stored at this site. The U.S. Army Environmental Hygiene Agency report noted that some previous labelling and packaging of hazardous waste has not conformed to all federal and DOT regulations (40 CFR 262.30, 40 CFR 262.32, 40 CFR 262.31, and 40 CFR 172). Also, sometimes the original manifest was prepared incorrectly.

4.10.2 Previous Investigations

No investigations have been conducted at the Hazardous Waste Storage Area (FST-017) to evaluate releases to the environment. Two reports on SWMUs at Fort Stewart generated as part of the initial RFA, mentioned the DRMO Hazardous Waste Storage Area: 1) 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency, and 2) 1987 Evaluation of Solid Waste Management Units No. 37-26-1382-88 by the U.S. Army Environmental Hygiene Agency.

4.10.3 Waste Characterization

The waste characterization for the DRMO hazardous waste storage area includes lead-acid batteries which are palletized and covered, leaking drums of hazardous materials in over-pack containers, spill cleanup residue in over-pack containers, and drums of excess hazardous materials.



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
DRMO HAZARDOUS WASTE STORAGE AREA LOCATION MAP FST-017
FORT STEWART GEORGIA

FIGURE
4.31A

229

4.10.4 Potential for Releases/Known Releases

Ground-water flow migration pathways are inferred to follow the topography (Figure 4.31B) from the northeast to southwest. No evidence of release is apparent according to documentation available. However, as indicated in the initial RFA report (No. 37-26-1382-88) the potential for a release to be carried to surrounding surface waters in an adjacent ditch is moderate.

4.10.5 Proposed Work and Sample Analyses

4.10.5.1 General

The following work is proposed for the Phase I investigation at the DRMO Hazardous Waste Storage Area (FST-017):

1) Soil samples shall be collected upgradient and downgradient of the former storage area.

2) Hazardous waste is no longer stored at this site, therefore a description of the current site conditions will be submitted in the Phase I RFI report.

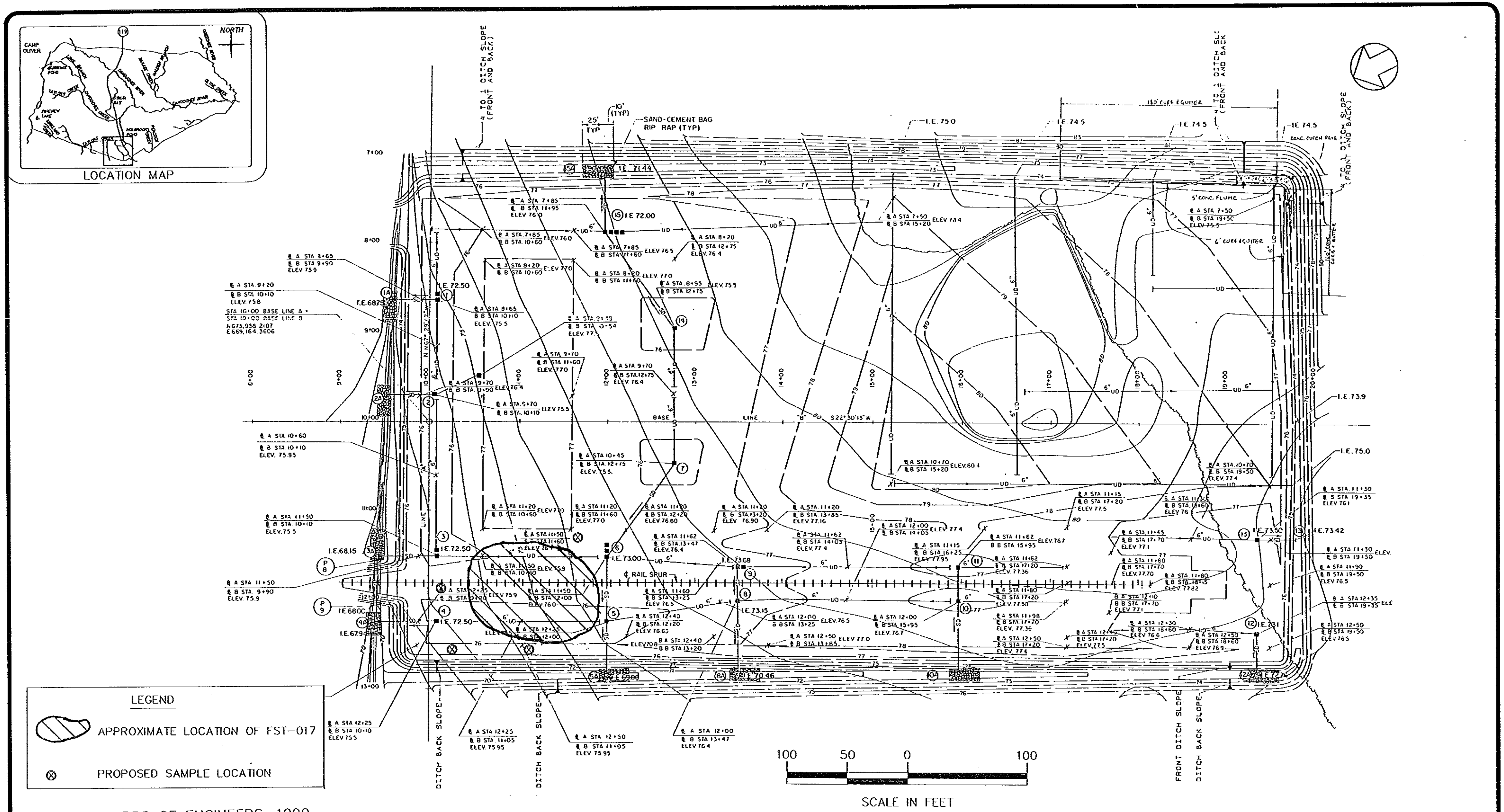
3) As-built drawings with topography of the site are available and are submitted as Figure 4.31B.

4.10.5.2 Soil Boring and Monitor-Well Installation Plan

Four soil borings will be collected on the downgradient side of the former storage area. These soil borings will be installed using the hand-auger method. The soil borings will be installed to a depth of 2 feet into the saturated zone of the surficial sand aquifer in accordance with the Field Sampling Approach (Section 6.0).

4.10.5.3 Field Sampling Plan

Soil samples will be collected from every hand auger bucket during installation of the boring. Soil samples will be collected from the ground surface to the water table. Each sample



SOURCE: CORPS OF ENGINEERS, 1990

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RCRA FACILITY INVESTIGATION
DRMO SITE MAP FST-017

FORT STEWART

GEORGIA

FIGURE
4.31B

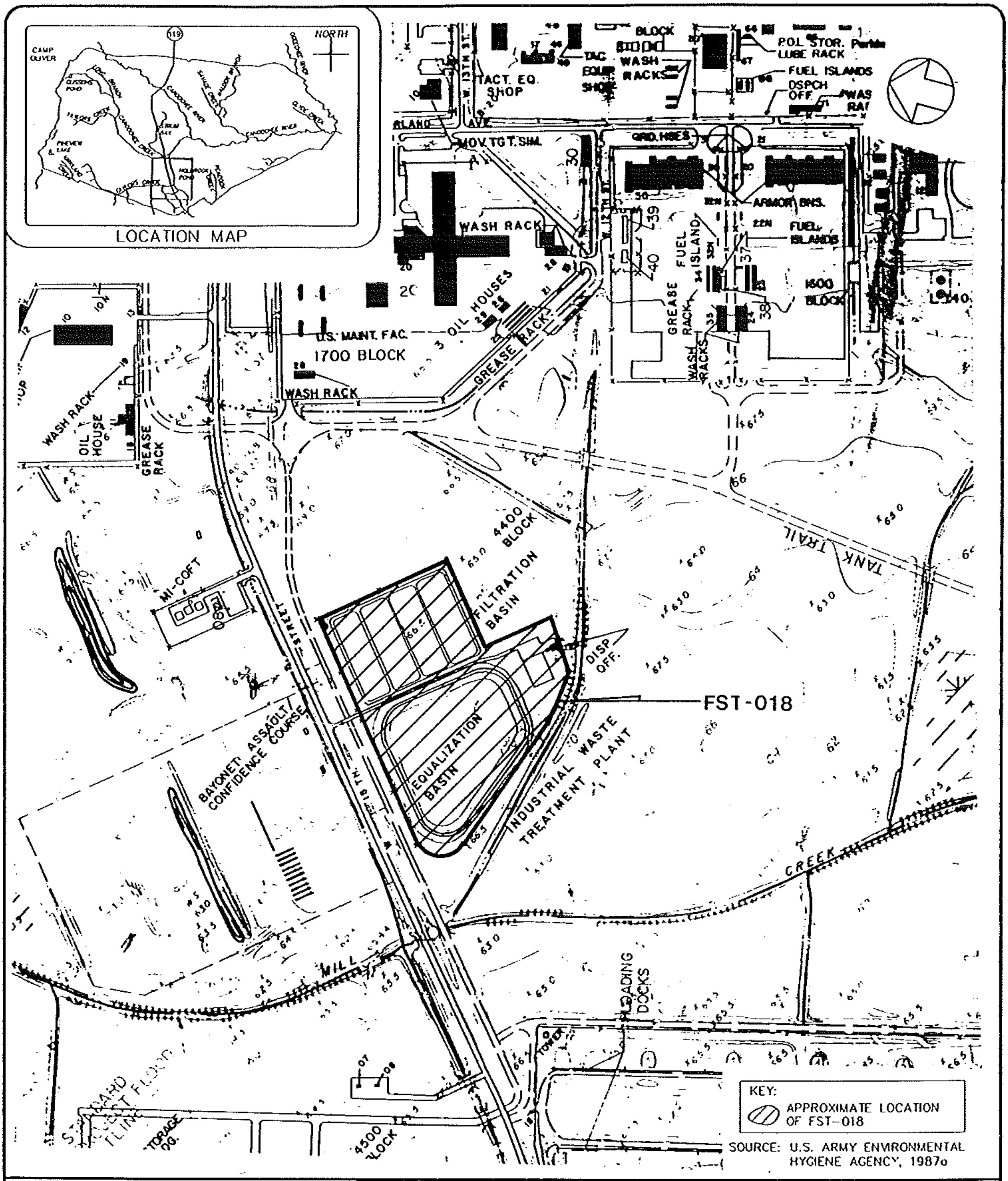
will be screened with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the sample above the water table will be retained for testing. In accordance with the GA EPD's recommendations, sample analysis will include VOCs by EPA Method 8240 and all TCLP constituents. One extra TCLP sample set will be submitted for matrix analysis. One trip blank will be submitted for QA/QC analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). If a minimum groundwater detection system is warranted; this will be proposed in the Phase I RFI Report.

4.11 The Industrial Wastewater Treatment Plant (FST-018)

4.11.1 Site Description and History

The Industrial Wastewater Treatment Plan (IWTP) (FST-018) is located on the western portion of the cantonment area west of Building 4420 (Figure 4.32). The IWTP has been in operation since 1981. It consists of a pump station, bar screens, an 18-inch Parshall flume, three 25 foot x 100 foot sedimentation and oil separation basins with slotted pipe oil skimmers, a 5 million gallon (MG) flow equalization basin, four 107 foot x 328 foot sand filters, and a final 12-inch Parshall flume for measuring IWTP effluent flow (Figure 4.33). A small building adjacent to the influent structure contains lab and storage space. A schematic of the IWTP and plant design specifications are shown in Figure 4.34.

Wastewater dewatering from wash racks, grease racks, and maintenance areas flow from a lift station to three sedimentation basins, which have oil skimming systems. Solids settle in the sedimentation basins. Basins are drained when sufficient amount of solids have accumulated in the process of dewatering the sludge. The sludge that accumulates in the sludge holding tanks is periodically removed to the sewage treatment plant where it is pumped into the aerobic digester for treatment and dewatering. There is a 4000-gallon underground waste oil tank at this site that overflowed in 1989. The oil in the 4000-gallon storage tank is pumped out every one to two weeks to a tank truck and transferred to a 10,000-gallon storage tank. No previous history of the tank is known. This tank is not part of FST-025.



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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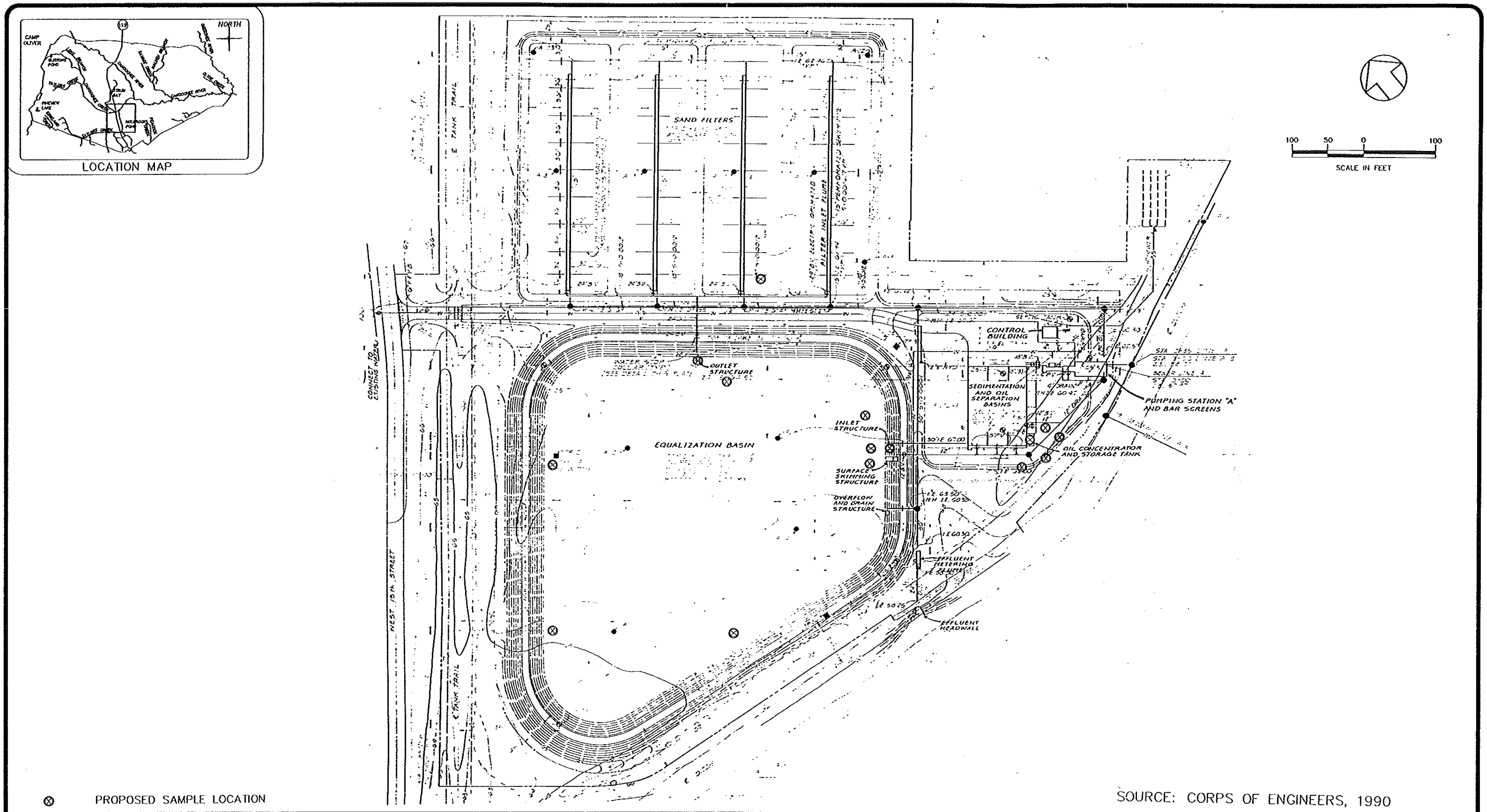
RCRA FACILITY INVESTIGATION
INDUSTRIAL WASTEWATER TREATMENT PLANT LOCATION MAP FST-018
FORT STEWART *GEORGIA*

FIGURE
4.32



SOURCE: CORPS OF ENGINEERS, 1990

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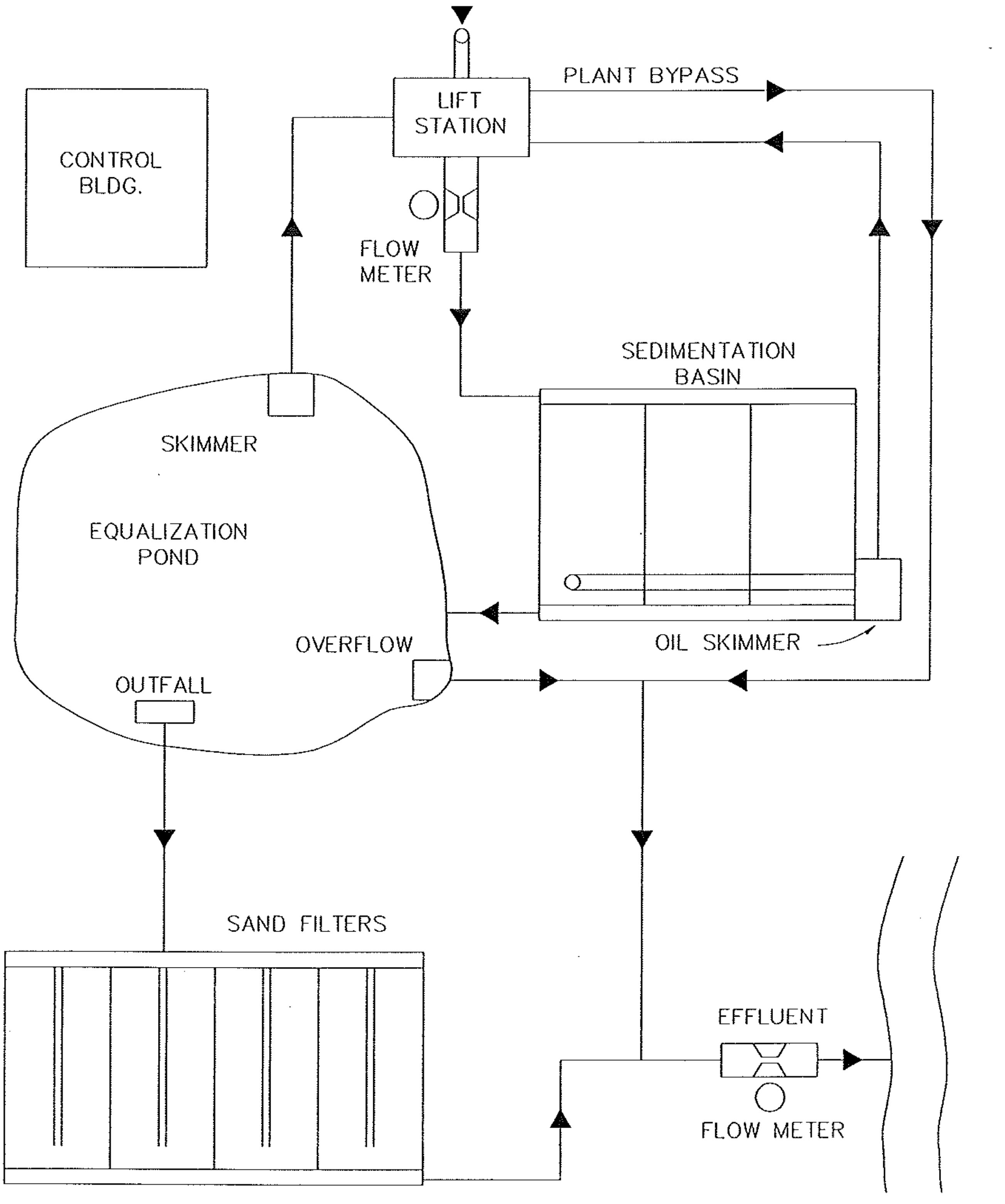
RCRA FACILITY INVESTIGATION
INDUSTRIAL WASTEWATER TREATMENT PLANT SITE PLAN LOCATION MAP FST-018

FORT STEWART *GEORGIA*

FIGURE
4.33



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987b

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RCRA FACILITY INVESTIGATION
INDUSTRIAL W.W.T.P. DESIGN AND FLOW SCHEMATIC FST-018
FORT STEWART *GEORGIA*

FIGURE
4.34

4.11.2 Previous Investigations

Three previous investigations were conducted at this site: 1) 1983 Environmental Science and Engineering Installation Assessment of Headquarters, 2) 1985 Wastewater Quality Engineering Consultation No. 32-62-0130-86 by United States Army Environmental Hygiene Agency, and 3) 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency. The first two reports are referenced in the initial RFA, U.S. Army Environmental Hygiene Agency 1987 Evaluation of Solid Waste Management Units, No. 37-26-1382-88. The industrial wastewater also includes the discharge from the Central Energy Wood Fired Boiler stack scrubber. This is predominantly carbon, ash, and by products of combustion.

4.11.3 Waste Characterization

Wastewater from the wash racks, grease racks, and maintenance areas is the waste introduced to the treatment plant. A general characterization of the IWTP Sludge Tanks includes oily sludge, methylene chloride degreaser and crankcase oil.

An analysis of the sludge samples was completed during the 1985 U.S. Army Environmental Hygiene Agency survey to determine if the sludge or wastewater would be classified as hazardous wastes. The analyses were performed for flashpoint (ignitable waste), PCB content, EP Toxicity Metals and Oily Waste Extraction Procedure. The results of those analyses from 1985 U.S. Army Environmental Hygiene Agency are provided in Appendices 4.16 through 4.22.

The results of the analysis reported the flashpoint of all samples was greater than 140°F; therefore, the wastes were not considered ignitable. In all cases, the PCB concentrations were less than the detectable limit of 7.0 ppm. The metals concentrations determined by the extraction procedures (Methods 1310 and 1330) were well below the maximum concentration at which the waste is characterized hazardous by EP toxicity. Only cadmium was found above detectable limits. A cadmium concentration of 0.14 mg/L was found in the sludge samples which is well below the maximum concentration of 1.0 mg/L.

Samples of the wastewater and sludge from the 1985 United States Army Environmental Hygiene Agency study were also analyzed for total metals. Analysis of the samples was performed by the U.S. Army Environmental Hygiene Agency following the maximum concentration of contaminants for characteristic of EP Toxicity (Table 1, 40 CFR 261.24). Results from these analyses are found in Appendices 4.16 through 4.22. United States Army Environmental Hygiene Agency defined a level of concern as 100 times the maximum concentrations of the EP Toxicity Test. Although all the metals concentrations were well below the level of concern, there were concentrations significantly above the level of detection for chromium and cadmium in the wastewater, and of barium, chromium, cadmium, and lead in the sludge. These concentrations of metals indicate that materials containing these metals are entering the IWTP system.

Sampling for priority pollutants organics was performed in 1985 using USEPA sampling procedures. However, no trip blanks were analyzed. Due to interference by the high hydrocarbon content of the wastewater and sludge samples, the detection limits were elevated 10 to 100 times above the normal detection limits for analyses of the base/neutral extractable organics, the acid extractables, and the pesticides/PCBs. Because of this, these analyses provide very little meaningful information.

The analytical results from 1985 U.S. Army Environmental Hygiene Agency study for volatile organics show that significant concentrations of 1,1,1, trichloroethane; (i.e., 160-340 ug/g) were present in the wastewater and sludge. Those concentrations indicated that 1,1,1, trichloroethane (which is used as a degreasing solvent) was present in the IWTP system.

4.11.4 Potential for Releases/Known Releases

Since the IWTP is not designed to handle 1,1,1, trichloroethane; the potential for release by way of treated wastewater to the surface water is high. The potential for release to the ground water and soil as indicated in the initial RFA is low. Ground-water flow and hence migration pathways are inferred to follow the topography.

The waste oil tank on the IWTP site has not been previously investigated. In 1989, the underground waste oil tank overflowed (due to a design fault in the skimmer), therefore, potential for release to the soil is high near the tank.

4.11.5 Proposed Work and Sample Analyses

4.11.5.1 General

The following work is proposed for the Phase I investigation at the Industrial Wastewater Treatment Plant (FST-018):

1) The sampling and analysis conducted in 1985 is included in Appendices 4.16 through 4.22.

2) The sludge will be resampled and tested for the presence of 1,1,1-trichloroethane, and other VOCs by EPA Method 8240, all TCLP constituents, pH by EPA Methods 9040 and 9045, specific conductance by EPA Method 9050, and pesticides and PCBs by EPA Method 8080.

3) A detailed description of the sludge tanks and the rest of the site will be submitted to GA EPD.

4) There is also an underground waste oil tank located near the sludge tank that overflowed in 1989. Soil samples will be taken next to the tank, on the downgradient side, to a depth equal to the bottom of the tank. The samples will be analyzed according to GA EPD recommendations for VOCs (EPA Method 8240), TPH (EPA Method 8015), specific conductance by EPA Method 9050, and RCRA metals (EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740).

5) The equalization basin influent and effluent wastewater will be sampled per GA EPD recommendations for VOCs, pH, RCRA metals, pesticides, and PCBs.

6) Three water and three sediment samples will be collected near the influent pipe of the equalization basin. Water and sediment samples will be collected at four separate locations around the equalization basin. Sediment from the equalization basin will be sampled according to GA EPD recommendations for RCRA metals, VOCs, pH, pesticides, and PCBs. Water samples will be analyzed for RCRA metals, VOCs, pH, pesticides and PCBs.

7) The sludge and/or sediment from the sand filters will be sampled per GA EPD recommendations for all TCLP constituents, VOCs, pH, pesticides, and PCBs.

4.11.5.2 Soil Borings Installation Plan

In accordance with GA EPD's recommendations, four soil borings will be taken next to the tank, on the downgradient side. Soil borings will be installed using the hand-auger method. The soil borings will be installed to a depth of the tank in accordance with the Field Sampling Approach (Section 6.0). OVA-PID or OVA-FID readings will be taken at two-foot intervals. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0).

4.11.5.3 Field Sampling Plan

Soil samples will be collected from every hand auger bucket during installation of the boring. Soil samples will be collected from the ground surface to the water table. Each sample will be screened in the field with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the first sample above the water table will be retained for testing. The soil sample will be analyzed for RCRA metals (Methods 6010 + 7470/7471 + 7060 + 7421 + 7740), VOCs (Method 8240), and TPH (EPA Method 8015).

The sludge will be resampled and tested. The sludge will be analyzed for all TCLP constituents, VOCs (EPA Method 8240), pH (EPA Methods 9040/9045), and pesticides and PCBs (EPA Method 8080). One extra TCLP sample will be submitted for matrix analysis. One equipment blank will be submitted for QA/QC analysis. One extra sample set will be submitted for lab duplication/split analyses resulting in three samples to be analyzed.

One equalization basin influent and effluent wastewater sample will be collected and analyzed for VOCs by EPA Method 8240, pH by EPA Method 9040/9045, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, pesticides and PCBs by EPA Method 8080.

One equipment blank will be submitted for QA/QC analysis. One extra sample set will be submitted for lab duplication/split analyses.

Three water and three sediment samples from near the influent pipe of the equalization basin and four water and four sediment samples from select areas within the equalization basin will be collected. The water will be analyzed for RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740, VOCs by EPA Method 8240, pH by EPA Method 9040/9045 and pesticides and PCBs by EPA Methods 8080. The sediment will be collected and analyzed for VOCs by EPA Method 8240, all TCLP constituents, pH by EPA Methods 9040/9045 and pesticides and PCBs by EPA Method 8080. One sludge/sediment sample will be collected from the sand filters and analyzed for all TCLP constituents, VOCs by EPA Method 8240, pH by EPA Method 9040/9045, and pesticides and PCBs by EPA Method 8080. One extra TCLP sample will be submitted for matrix analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). If needed, a minimum groundwater detection system will be proposed in the Phase I RFI Report.

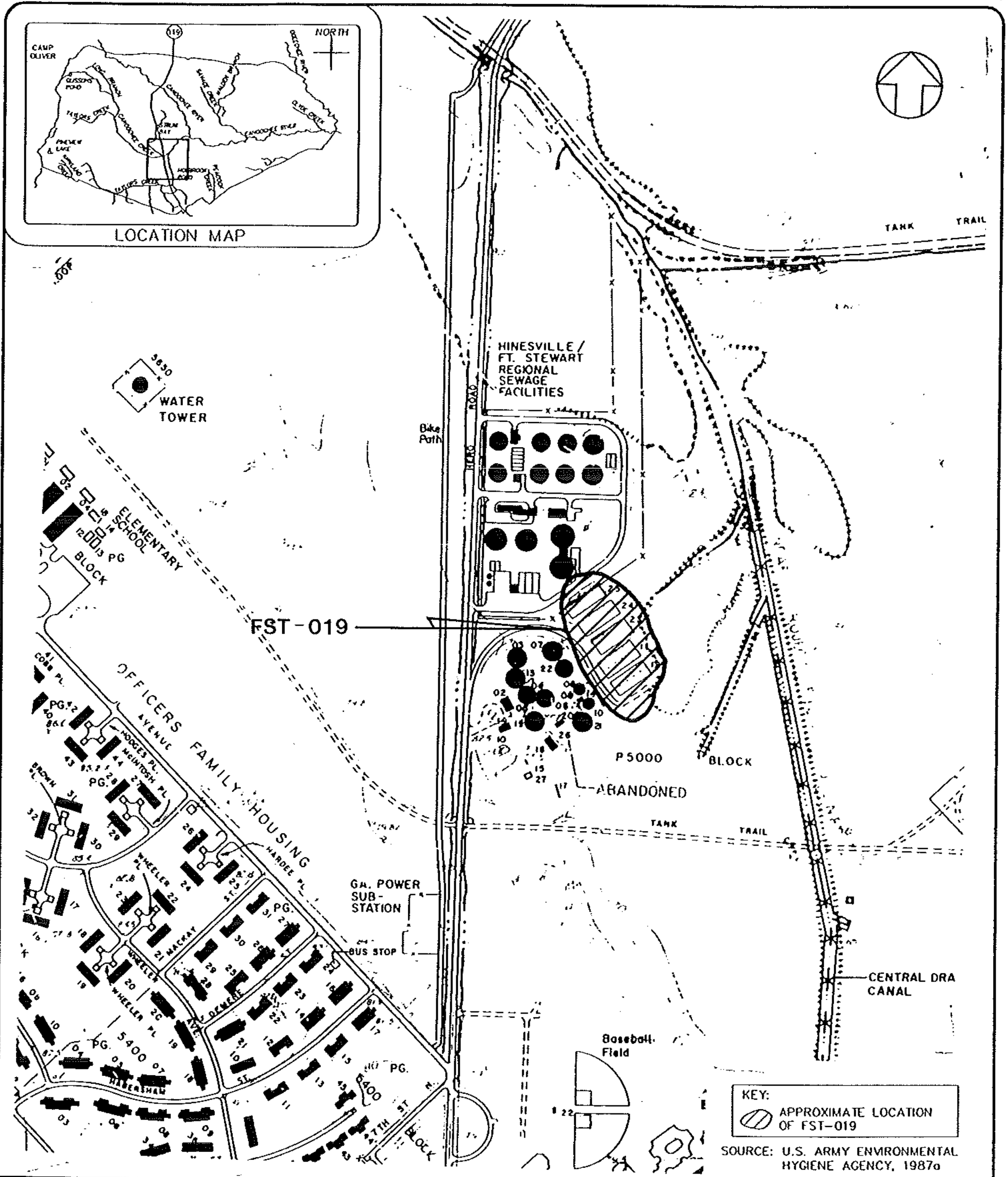
4.12 The Old Sludge Drying Beds (FST-019)

4.12.1 Site Description and History

The old sludge drying beds are located in the north central portion of the cantonment area in the P5000 block next to the old sewage treatment plant (Figure 4.35). Sludge from the domestic wastewater treatment plant was dewatered at this site from the 1960s to 1985. The old sludge drying beds were closed before a formal closure was required. According to Mr. Thomas Houston (personal communication 1990), these beds were removed and backfilled in 1989. The area currently has a good grass cover.

4.12.2 Previous Investigations

No previous investigations have been conducted at the old sludge drying beds. They are included as a SWMU in the 1987 initial RFA, U.S. Army Environmental Hygiene Agency Evaluation of Solid Waste Management Units publication No. 37-26-1382-88.



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
OLD SLUDGE DRYING BEDS LOCATION MAP FST-019
FORT STEWART *GEORGIA*

FIGURE
4.35

4.12.3 Waste Characterization

The waste characterization of the old sludge drying beds includes sludge from the domestic wastewater treatment plant incorporated in a sand media. There is a potential for some contaminants to concentrate in the media but no analysis is available that characterizes the waste.

4.12.4 Potential for Releases/Known Releases

No past sampling of soil or ground water has been conducted at this site to evaluate a release. The potential for release as evaluated in the initial RFA, was low.

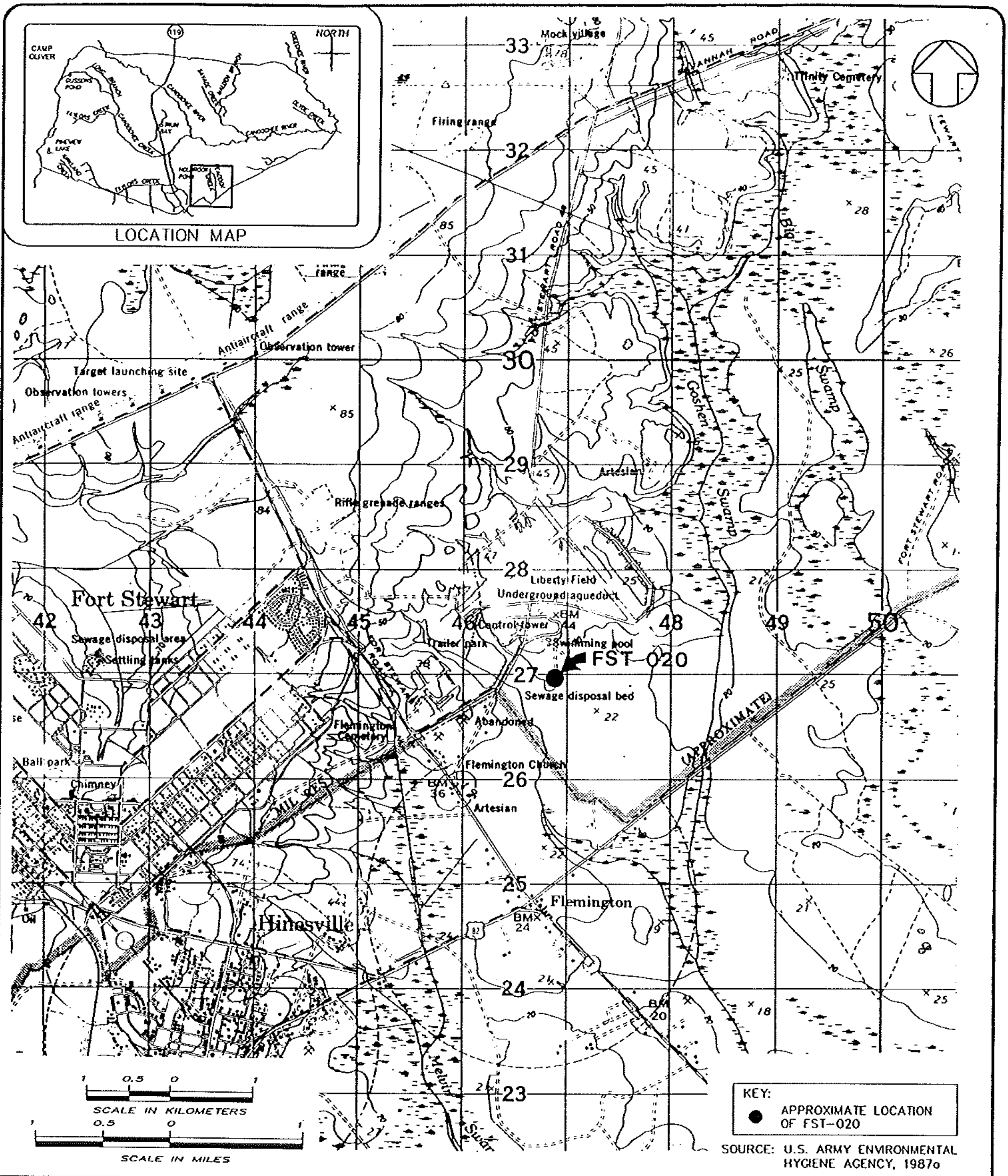
4.12.5 Proposed Work and Sample Analyses

No previous investigations have been conducted at the old sludge drying beds. To facilitate an evaluation of this site, a description of the current site conditions and the abandonment procedures followed during closure will be submitted to the state for review. Recommendations for Phase II work will be included in the Phase I RFI Report.

4.13 The Wright Air Field Sewage Disposal Beds (Land Spray Application and Lagoon - FST-020).

4.13.1 Site Description and History

The Wright Air Field sewage disposal bed land spray application and lagoon is located east of the cantonment area, one-half mile south of Wright Army Airfield (Figure 4.36). According to 1989 Georgia Department of Natural Resources report, the lagoon and land application system has been active for forty years (1950s to present). Approximately 3000 gallons per day of wastewater is discharged to a series of two, lined, biological, oxidation lagoons followed by a spray irrigation field. The primary lagoon was aerated with a floating aerator (U.S. Army Environmental Hygiene Agency 1988). The estimated capacity of the plant is 24,500 gpd. The facility operates under an NPDES permit which requires monitoring of seven monitoring wells on a routine basis.



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987o

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RCRA FACILITY INVESTIGATION
WRIGHT AIR FIELD SEWAGE DISPOSAL BEDS LOCATION MAP FST-020
FORT STEWART
GEORGIA

FIGURE
4.36

4.13.2 Previous Investigations

Two previous investigations were conducted at Fort Stewart which included an evaluation of this site: 1) 1988 Environmental Program Review No. 32-24-7038-89 by the U.S. Army Environmental Hygiene Agency and, 2) 1983 Installation Assessment of Headquarters by Environmental Science and Engineering. Two additional reports were prepared which referenced these investigations: 1) 1987 Evaluation of Solid Waste Management Units by U.S. Army Environmental Hygiene Agency, No. 37-26-1382-88 and, 2) 1989 Environmental Priorities Initiative Preliminary Assessment of Fort Stewart by Georgia Department of Natural Resources.

Effluent monitoring has been conducted on a monthly basis at the Wright Air Field Sewage Disposal Beds. The land application permit summary is listed in Table 4.4. Drilling logs (Appendix 4.25) provided by the COE (1979) record the boring of four holes (CS-3, A-21, A-22, A-23) in May 1976 and seven holes (OW-1 through OW-7) in April 1979 (Figure 4.37). No other information was provided with these drilling logs. Wells were installed in Borings OW-1 through OW-7.

4.13.3 Waste Characterization

The waste characterization of the Wright Airfield Sewage Beds is treated domestic wastewater.

4.13.4 Potential for Releases/Known Releases

No evidence of release is known or has been documented. The potential for release of wastewater treatment effluent to the surface water exists. The potential for release to soil or ground water is low because of the solids handling practices.

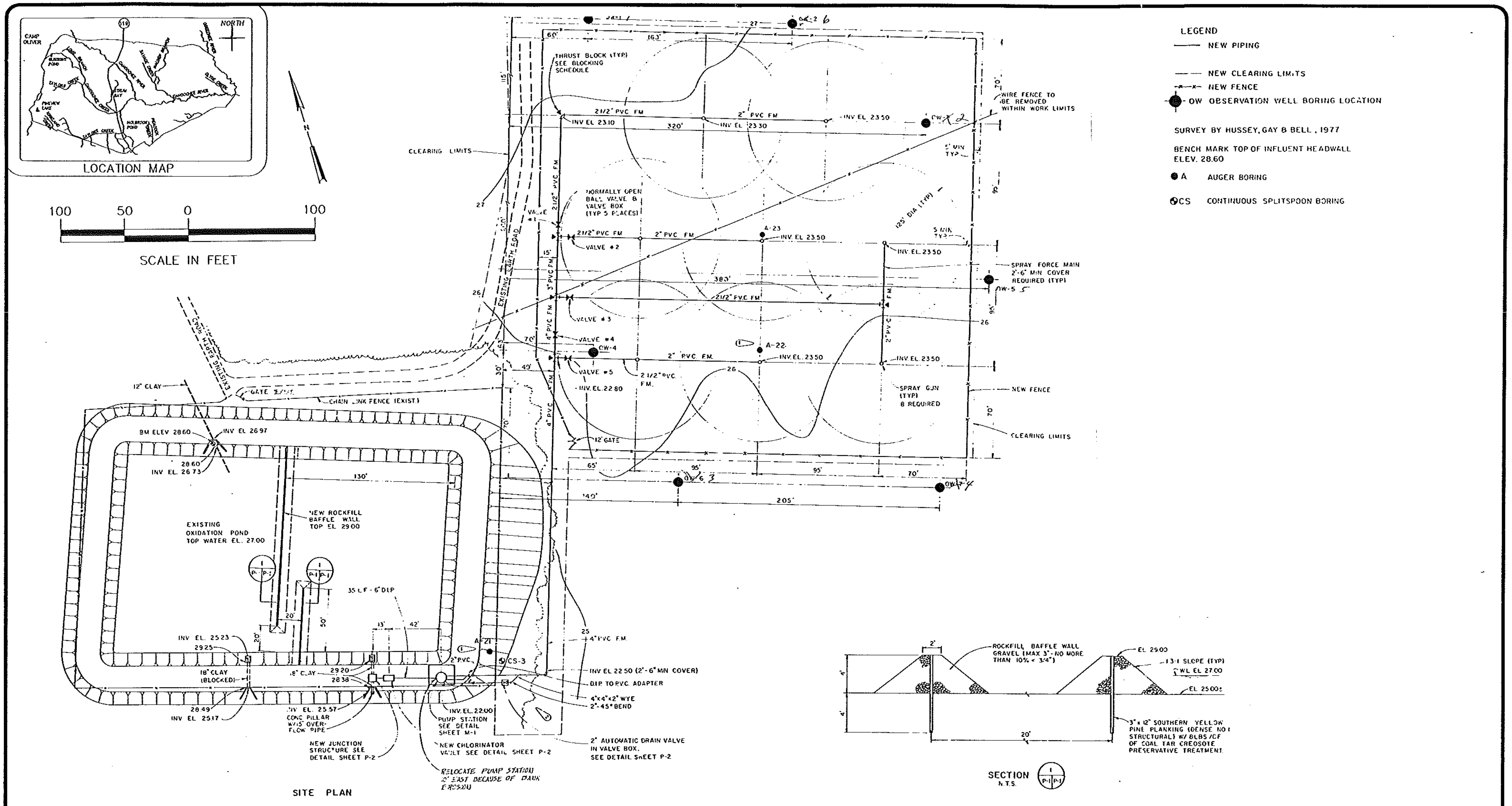
Table 4.4 NPDES Permit Effluent Limitations*, Sewage Treatment Plant (FST-020).

Parameter†	8/14/75 through 6/30/77		7/1/77 through 8/14/80	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
Flow (MGD)	5.0		5.0	
BOD	30	45	6	9
Suspended Solids	30	45	30	45
Fecal Coliform Bacteria (total coliforms per 100 ml)	200	400	200	400
pH (units)	6.0-9.0		6.0-9.0	
Chlorine Residual	>0.5		>0.5	
Ammonia-Nitrogen	--	--	1.0	1.5
Dissolved Oxygen	--	--	6.0	--

Note: All values reported as mg/l except as noted.

* Based on NPDES permit No. CA0004308 effluent limitations.
† MGD = million gallons per day.
BOD = biochemical oxygen demand.
ml = milliliters.

Source: Environmental Science and Engineering 1983



SOURCE: CORPS OF ENGINEERS, 1990

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SAVANNAH, GEORGIA

RCRA FACILITY INVESTIGATION
WRIGHT AIR FIELD SEWAGE DISPOSAL BEDS SITE MAP FST-020

FORT STEWART

GEORGIA

FIGURE
4.37

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4.13.5 Proposed Work and Sample Analyses

4.13.5.1 General

The following work is proposed for the Phase I Investigation at the Wright Air Field Sewage Disposal Beds:

1) FST-020 is a permitted NPDES facility that requires routine sampling of seven monitoring wells. The well construction logs for these wells are included in Appendix 4.23.

2) The current conditions of the site and the status of the NPDES permit will be described in the Phase I Report. Ground-water sampling parameters and sample collection frequency outlined in the NPDES permit will be investigated and included into the final plan, if available.

3) All existing ground-water data for the monitoring well system will be investigated and submitted in the final plan, if available.

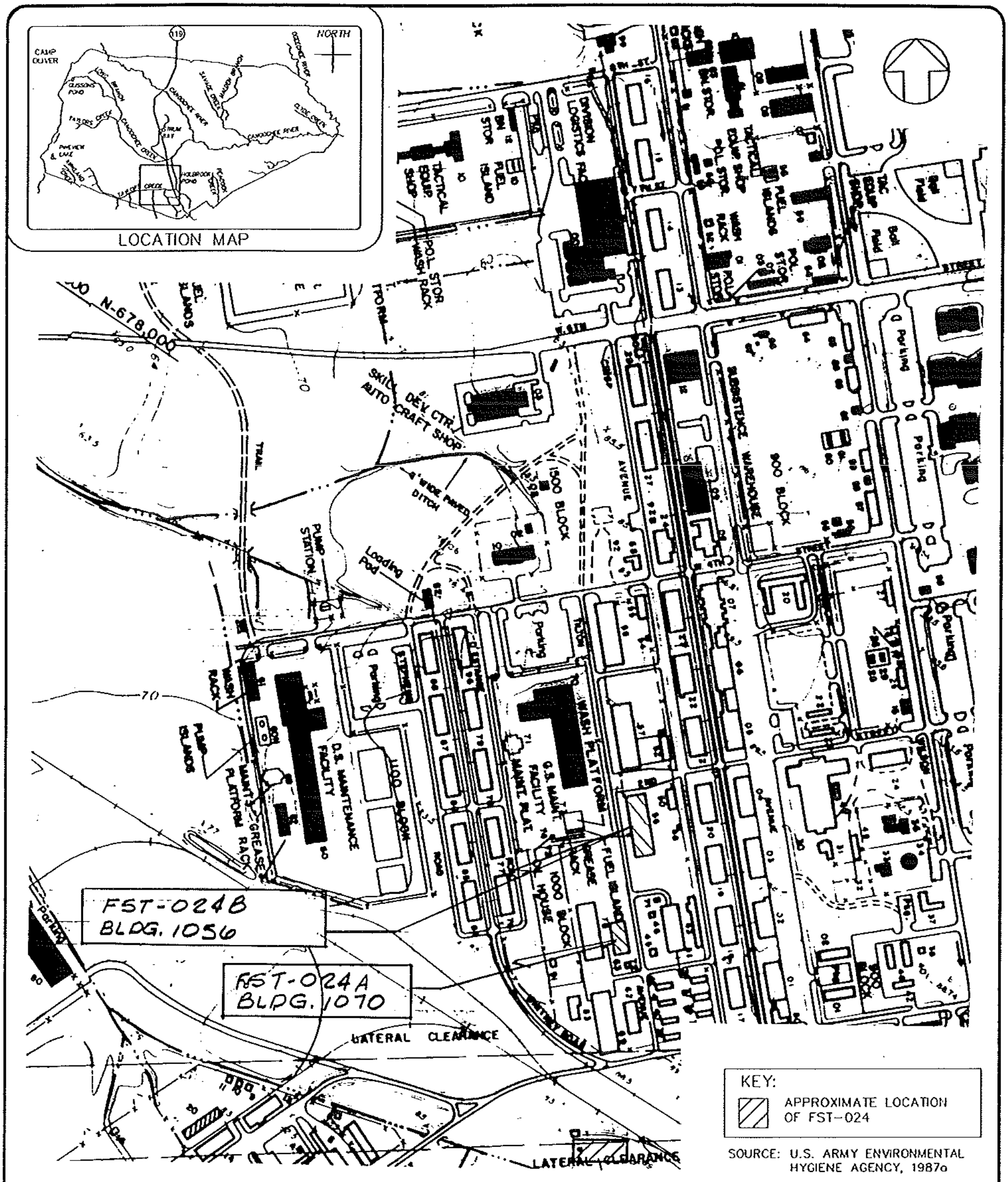
4) An investigation into the loading rate for priority pollutants on the spray field will be conducted. If the information is available, it will be submitted in the Phase I RFI report.

5) An expanded summary of the two previous investigations will be included in the Phase I RFI report, if more information is available.

4.14 The Radiator Shop (FST-024)

4.14.1 Site Description and History

The (new) radiator shop (FST-024A) is located inside building 1070 in the southern portion of the cantonment area (Figure 4.38). The old radiator shop is located inside building 1056 (FST-024B) in the southern portion of the cantonment area. The work area for the new radiator shop is approximately 20 feet x 20 feet. The new shop has been in operation since 1980.



KEY:

▨ APPROXIMATE LOCATION OF FST-024

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
RADIATOR SHOP FST-024A AND FST-024B

FORT STEWART *GEORGIA*

FIGURE
4.38

Radiators are repaired by descaling the radiator and soaking it in an aqueous solution of sodium hydroxide. The next step is to encapsulate this caustic waste solution by mixing it with concrete and sodium silicate and disposing it in the landfill. The radiator is then leak tested using a fluorescein dye and painted in a wet curtain spray paint booth. According to the COE (1990), encapsulating is not performed any longer.

4.14.2 Previous Investigations

Two previous investigations conducted at Fort Stewart mentioned this site: 1) 1983 Installation Assessment of Headquarters (Environmental Science and Engineering), and, 2) 1987 Evaluation of Solid Waste Management Units No. 37-26-1382-88 (U.S. Army Environmental Hygiene Agency). No previous sampling was completed at this site.

4.14.3 Waste Characterization

Waste generated at the radiator shop is related to the maintenance and cleaning of radiators. The waste characterization includes caustic waste cleaning solution, sodium hydroxide, water-based fluorescein dye solution, and spent recirculation water from the wet curtain spray paint booth.

4.14.4 Potential for Releases/Known Releases

According to the Environmental Science & Engineering report (1983), wastes were discharged to a drain field located adjacent to Building 1070 from 1980 to late 1981 from the new radiator shop (FST-024A). The Environmental Science & Engineering report estimated that only about one pound of lead was discharged to the drain field during this two-year period. According to the Environmental Science & Engineering report (1983), wet curtain recirculation wastewater discharge is routed to the IWTP. Since late 1981, the caustic waste cleaning solution has been handled as a hazardous waste.

The fluorescein dye solution and paint booth recirculation water, which is non-hazardous, has been conveyed onto the ground outside Building 1070 near the drainfield, via a pipeline (Environmental Science and Engineering 1983). The initial RFA indicated that the exposure potential from a release at this unit is low.

The paint booth is located in building 1056 (FST-024B). The floor drain in Building 1056 is not relevant to the radiator shop in Building 1070. The drain in building 1056 has been connected with the industrial wastewater pipe (located across the road), for disposal at the IWTP. Therefore, discharge is no longer routed to the ditch. The ditch near building 1056 is not associated with the radiator shop in building 1070.

4.14.5 Proposed Work and Sample Analyses

4.14.5.1 General

The following work is proposed for the Phase I investigation at the Waste Oil Tanks (FST-025):

1) One sample of the "sludge" shall be collected and analyzed according to GA EPD recommendations for all TCLP constituents, VOCs, and pH (Figure 4.38A).

2) Sediment samples will be collected from the former drain field adjacent to building 1070 (Figure 4.38A) and analyzed according to GA EPD recommendations for all TCLP constituents.

3) DEH installed a pipe under the road that connects the drain pipe in building 1056 to the industrial pipe located across the road. If drawings are available of this improvement, they will be submitted in the Phase I RFI report.

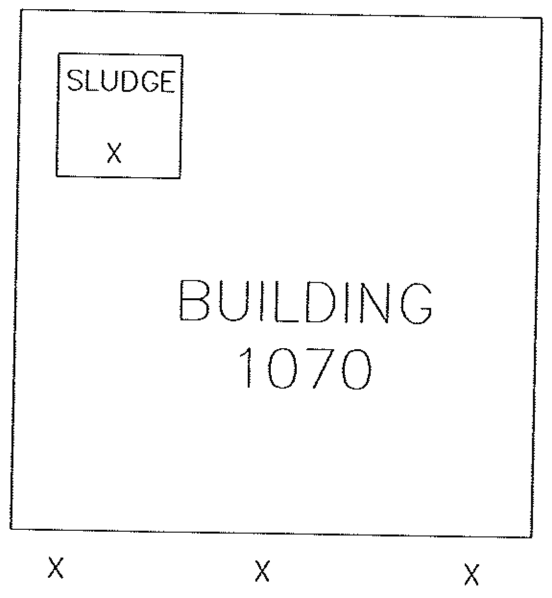
4) A description of the current site conditions and DEH plans will be submitted to the state for review.

5) The ditch will not be sampled because the drain no longer discharges to the ditch.

6) The date the encapsulating practice ceased will be investigated and included in the Phase I RFI report, if available.

NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT TO CHANGE IN THE FIELD.



NOT TO SCALE

KEY

X PROPOSED SAMPLE LOCATION

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RCRA FACILITY INVESTIGATION
RADIATOR SHOP SAMPLING LOCATION FST-024
FORT STEWART
GEORGIA

FIGURE
4.38A

7) A detailed description of the descaling process and drainage schematics for the paint booth will be provided in the Phase I RFI report, if available.

4.14.5.2 Field Sampling Plan

The radiator "sludge" will be sampled once and analyzed for all TCLP constituents, VOCs by EPA Method 8240, and pH by EPA Methods 9040/9045, in accordance with GA EPD's recommendations. One extra TCLP sample of the sludge will be collected for matrix analysis.

Three sediment samples will be collected from the former drain field. Sediment samples will be collected from the ground surface to the water table. Each sample will be screened with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the first sample above the water table will be retained for testing.

The three sediment samples will be analyzed for all TCLP constituents. One extra TCLP sediment sample will be submitted for matrix analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0).

The GA EPD recommendations included testing the encapsulating concrete and sampling the ditch near the former discharge area. However, since the encapsulating procedure is no longer in operation and the drain now discharges into the IWTP, sampling will not be performed.

4.15 The 86 Waste Oil Tanks (FST-025)

4.15.1 Site Description and History

Eighty-six waste oil tanks are located at various areas within the cantonment area as shown in Plate 3 and as listed in Table 4.5. The waste oil tanks for the most part are situated in motor pools and have been in operation over a time period from 1950 to the present. Most of the tanks are underground and are constructed of concrete, fiberglass, or steel. However, some of the tanks are aboveground with a containment wall around them. The capacity of the storage tanks varies from 150 to 11,000 gallons.

Table 4.5 Master List of Waste Oil Tanks (FST-025).

Tank No.	Building No.	Capacity (gallons)	Construction Material	Installation Date	Ground Cover
1	1841	1000	Fiberglass	1982	Concrete
4	1840	2500	Fiberglass	1982	Concrete
4A	1840	1000	Steel	1982	Dirt w/ Cement Pad
7	1820	11000	Steel	1980	Concrete
8	1828	4000	Concrete	1982	Concrete
9	1828	4000	Concrete	1982	Concrete
10	1820	500	Steel	1980	Concrete
13	1810	2500	Steel	1982	Concrete
14	1811	500	STeel	1982	Concrete
17	1720	2000	Fiberglass	1981	Concrete
18	1720	2000	Fiberglass	1981	Concrete
19	1720	2000	Fiberglass	1981	Concrete
20	1720	2000	Fiberglass	1981	Concrete
21	1720	2000	Fiberglass	1981	Concrete
22	1720	2000	Fiberglass	1981	Concrete
23	1720	2000	Fiberglass	1981	Concrete
24	1720	2000	Fiberglass	1981	Concrete
25	1720	4000	Concrete	1981	Concrete
26	1720	4000	Concrete	1981	Concrete
27	1720	4000	Concrete	1981	Concrete
28	1720	4000	Concrete	1981	Concrete
28A	1720/22	1000	Fiberglass	1981	Concrete
28B	1720	2000	Fiberglass	1987	Concrete
29	1633	1000	Steel	1982	Concrete
38	1510/13	1000	Steel	1983	Concrete
39	1510	4000	Concrete	1983	Concrete
40	1510	4000	Concrete	1983	Concrete
42	1542	1000	Fiberglass	1983	Concrete
45	1172	500	Steel	1983	Concrete
46	1170	4000	Concrete	1981	Concrete
47	1170	4000	Concrete	1981	Concrete
56	1056	2000	Steel	1960	Concrete
59	1160	4000	Concrete	1983	Concrete
60	1160	4000	Concrete	1983	Concrete
61	1164	500	Fiberglass	1983	Concrete
64	1128	1000	Steel	1950	Concrete
64A	1130	500	Steel	1970	Dirt with concrete
67	967	1000	Steel	1969	Dirt with Cement Pad
70	955	1000	Concrete	1969	Dirt with Cement Pad
71	1203	1000	Fiberglass	1980	Concrete
71A	1260	1000	Concrete	1984	Concrete

Table 4.5 Master List of Waste Oil Tanks (FST-025).

Tank No.	Building No.	Capacity (gallons)	Construction Material	Installation Date	Ground Cover
74	1280	2500	Fiberglass	1983	Probable Concrete
75	1809	1000	Fiberglass	1985	Concrete
76	1223	1000	Fiberglass	1981	Concrete
79	1224	1000	Fiberglass	1981	Concrete
82	1266	1000	Steel	1981	Concrete
83	1286	4000	Concrete	1981	Concrete
84	1285	4000	Concrete	1981	Concrete
85	1284	4000	Concrete	1981	Concrete
86	1283	4000	Concrete	1981	Concrete
89	1247	1000	Fiberglass	1981	Concrete
92	1331	1000	Fiberglass	1981	Concrete
93	1330	2500	Fiberglass	1981	Concrete
94	1320/234	1000	Fiberglass	1988	Concrete
94A	1320 (2)(4)	1000	Fiberglass	1988	Dirt
94B	1339B	1000	Fiberglass	1988	Concrete
94C	1339A	1000	Fiberglass	1988	Concrete
100	1340/43F	1000	Steel	1093	Concrete
100A	1349	1000	Fiberglass	1988	Dirt/ no pad
100B	1350	1000	Fiberglass	1988	Dirt/no pad
201A	260	1000	Fiberglass	1985	Probable Concrete
201B	260	1000	Fiberglass	1985	Probable Concrete
207	232	500	Steel	1985	Concrete
207A	230	2500	Fiberglass	1985	Concrete
210	272	1000	Steel	1985	Probable Concrete
214	1503	550	Fiberglass	1988	Dirt
215	1503	500	Fiberglass	1988	Dirt
216	4502	1000	Fiberglass	1985	Probable Concrete
217	4502	1000	Fiberglass	1985	Probable Concrete
218	4502	1000	Fiberglass	1985	Probable Concrete
219	4502	1000	Fiberglass	1985	Probable Concrete
220	4502	5000	Fiberglass	1985	Probable Concrete
224	4528	1000	Fiberglass	1985	Probable Concrete
225	4529	1000	Fiberglass	1985	Probable Concrete
228	4577	1000	Fiberglass	1985	Probable Concrete
229	4577	1000	Fiberglass	1985	Probable Concrete
230	4577	1000	Fiberglass	1985	Probable Concrete
231	4577	1000	Fiberglass	1986	Probable Concrete

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Table 4.5 Master List of Waste Oil Tanks (FST-025).

Tank No.	Building No.	Capacity (gallons)	Construction Material	Installation Date	Ground Cover
232	4577	5000	Fiberglass	1986	Probable Concrete
236	4578	2500	Fiberglass	1987	Probable Concrete
237	4578	2500	Fiberglass	1987	Probable Concrete
238	4586	1000	Steel	1987	Probable Concrete
241	241	2000	Fiberglass	1985	Probable Concrete
242	241	1000	Fiberglass	1985	Probable Concrete
243	241	1000	Fiberglass	1985	Probable Concrete
244	241	1000	Fiberglass	1985	Probable Concrete

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RCRA FACILITY INVESTIGATION

LOCATION OF WASTE OIL TANKS (FST-025)

FORT STEWART GEORGIA

SIZE	INVITATION NO.	FILE NO.	PLATE
F	DACA-21-90-0079		3

SCALE: 1" = 500'

SHEET

4.15.2 Previous Investigations

Fort Stewart has conducted several investigations over the past few years to inventory all underground storage tanks (USTs) and to perform tank, and associated pipeline tightness tests. The waste oil tanks were included in these investigations.

The results of these investigations have been referenced in several reports: 1) 1987 Evaluation of Solid Waste Management Units No. 37-26-1382-88. (U.S. Army Environmental Hygiene Agency), 2) 1988 Underground Tank and Pipeline Test Certification Report by Tracer Research Corporation for DEH Environmental Office, and 3) 1988 Environmental Program Review (U.S. Army Environmental Hygiene Agency). The waste oil was determined to be non-hazardous and to meet specifications in 40 CFR 266.40 from the past test results that the Fort Stewart Environmental Office has scheduled (U.S. Army Environmental Hygiene Agency, 1987).

4.15.3 Waste Characteristics

The product disposed of in the waste oil tanks is waste product associated with maintenance in the motor pools. A characterization of the product in the waste oil tanks would include a mixture of waste oil, non-hazardous used standard type II solvent, used antifreeze, and used hydraulic fluid. According to the initial RFA developed by U.S. Army Environmental Hygiene Agency (1987), past test results of waste oil at Fort Stewart meets the specifications in 40 CFR 266.40.

4.15.4 Potential for Releases/Known Releases

Evidence of releases from the waste oil tanks have not been documented. However, the potential for a release to the environment is high in the event of tank failure. If a UST leaked, the waste oil could migrate to the shallow aquifer and subsurface soils. Surface water, ground water, or soils would be threatened if an aboveground tank leaked and the secondary containment failed.

4.15.5 Proposed Work and Sample Analyses

4.15.5.1 General

The following work is proposed for the Phase I investigation for the Waste Oil Tanks (FST-025):

1) Most recent information from Fort Stewart indicates that there are approximately 86 underground waste oil tanks on the installation. A list of tanks with building numbers is provided as Table 4.5. After the "walk-over" investigation, Table 4.5 will be updated to include questionable data.

2) A map that clearly shows all waste oil tanks at Fort Stewart has been constructed. The full size map (Plate 3) will be updated to show which tanks are aboveground.

3) Each tank will be given a "walk-over" investigation. The purpose will be to verify location and to note any signs of contamination. The following information shall be provided for each tank: type of tank, ground cover at tank, building number, number on tank, if any. The condition of the concrete will be checked.

4) Soil samples will be collected to the depth of the water table or 5 feet below the bottom of the tank at USTs not entirely covered by concrete, or at USTs with concrete that is cracked or in poor condition. If the tank bottom is within the water table, a ground-water sample will be collected and analyzed. During the soil sampling, the orientation of these tanks will be determined.

5) Soil sampling at aboveground tanks will be done during Phase II, if needed.

6) Samples shall be tested according to GA EPD recommendations for RCRA metals, pH, and TPH.

7) Tank tightness tests (Tracer method) will be performed on USTs entirely covered by concrete in good condition during the Phase I field investigation. During the tightness tests, the orientation of these tanks will be determined.

4.15.5.2 Soil Boring and Monitor-Well Installation Plan

The orientation of the USTs (that soil samples will be collected from) will be determined by carefully by boring by hand auger to find the edge of the tank. Once the edge of the tank is identified, the test borings may be initiated. The soil borings will be installed to a depth to the water table or 5 feet below the bottom of the tank (if possible with a hand auger) at eleven underground waste oil tanks. Soil samples will be collected from every hand auger bucket during installation of the boring. Soil samples will be collected from the ground surface to the water table. Each sample will be screened with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the first sample above the water table will be retained for testing.

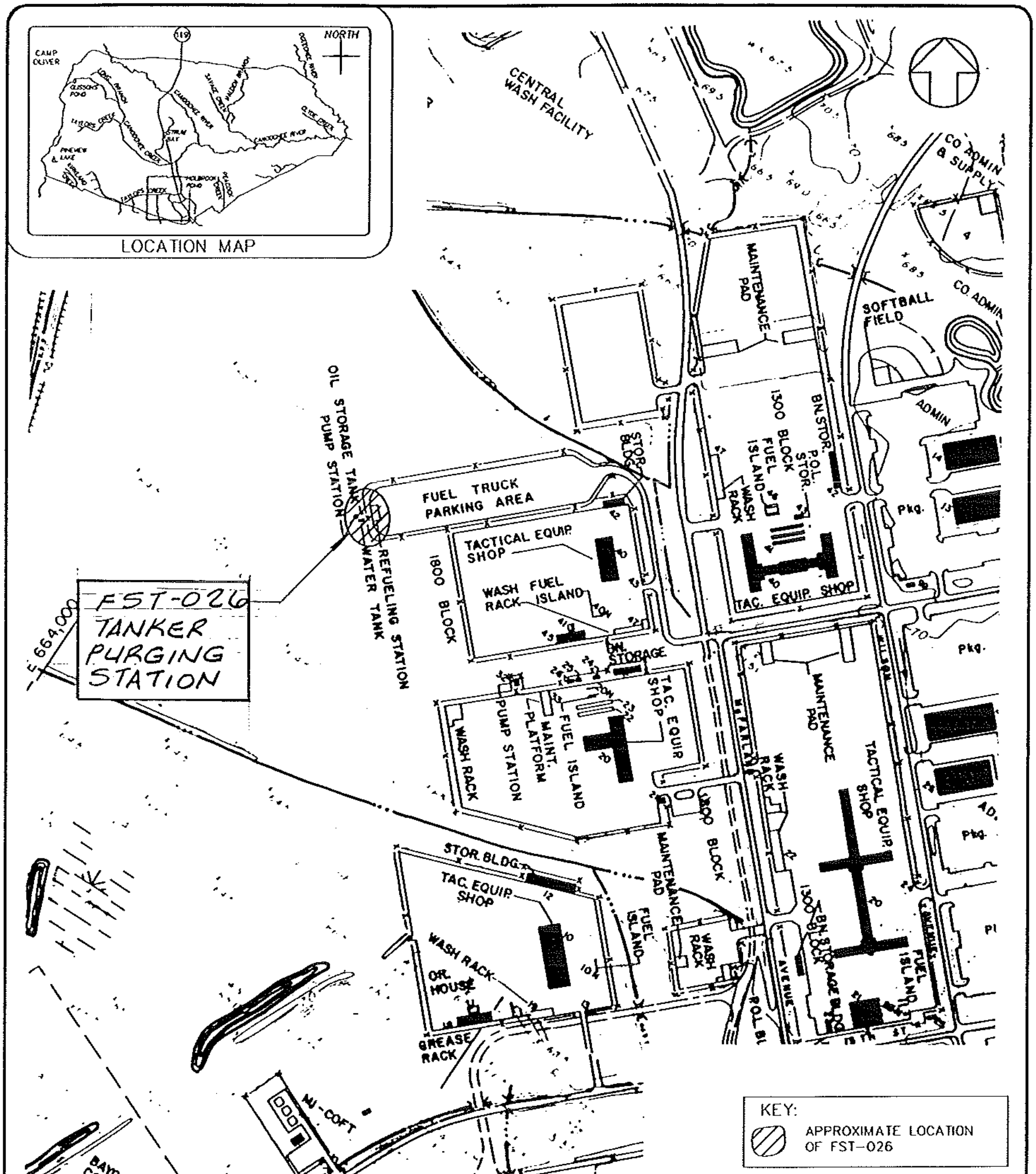
4.15.5.3 Field Sampling Plan

Eleven tank sites have a dirt cover over the USTs. Therefore, the eleven tank areas to collect soil and possibly ground-water samples are: 4A, 56, 64, 64A, 67, 70, 94A, 100A, 100B, 214, and 215. One soil sample will be collected at each tank and analyzed for pH by EPA Methods 9040/9045, TPH by EPA Method 8015, and all TCLP constituents. One extra duplication/split sample set will be collected. One equipment blank will be submitted for QA/QC analysis. One extra TCLP sample will be submitted for matrix analysis. If ground water is encountered prior to reaching the bottom of a UST, then a ground-water sample for that UST will be submitted and analyzed for VOCs by EPA Method 8240, TPH by EPA Method 8015, RCRA metals by EPA Methods 6010 + 7470/7471 + 7060 + 7421 + 7740 and pH by EPA Methods 9040/9045. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Recommendations for any further sampling or monitoring wells will be included in the Phase I Report.

4.16 The 724th Tanker Purging Station (FST-026)

4.16.1 Site Description and History

The 724th Tanker Purging Station is located on the western portion of the cantonment area near the fuel truck parking lot (Figure 4.39). The Purging Station is an area where tanker trailers that carry JP-4 Jet Fuel, #2 Fuel Oil and Mogas are routinely cleaned. This area consists of an



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
724 th. TANKER PURGING STATION FST-026
FORT STEWART *GEORGIA*

FIGURE
4.39

underground waste oil tank and an aboveground storage tank that receive water liquid after phase separation.

4.16.2 Previous Investigations

No previous investigations have been conducted in this area. The only report that briefly mentions the 724th Purging Station is 1989 GA EPD RFA Report entitled "Environmental Priorities Initiative Preliminary Assessment of Fort Stewart, Georgia.

4.16.3 Waste Characterization

The waste characterization for the 724th Tanker Purging Station includes waste liquids from the purging of the tanker trailer. These waste liquids contain assorted petroleum hydrocarbons to include JP-4, #2 Fuel Oil and Mogas.

4.16.4 Potential for Releases/Known Releases

No releases have been reported or documented from this area. However, the potential for spillage, and hence release to the soils around the tanks is high, and the release from the underground tank through failure of the tank is high.

4.16.5 Proposed Work and Sample Analyses

4.16.5.1 General

The following work is proposed for the Phase I investigation at the 724th Tanker Purging Station (FST-026):

1) Soil samples will be collected and analyzed according to GA EPD recommendations and results submitted for review. The samples will be collected on the upgradient and downgradient side of the purging area. Samples will be collected from the ground surface to a depth equal to approximately 1 foot into the saturated zone.

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2) An investigation will be performed to determine if tank integrity tests have been performed. If the tests are available, they will be included in the Phase I RFI report.

3) The waste oil UST is associated with FST-025.

4) The need for ground-water monitoring wells will be determined from data collected during the Phase I investigation and may be recommended for Phase II.

4.16.5.2 Soil Boring and Monitor-Well Installation Plan

Four soil borings (one upgradient and three downgradient) will be installed. Four sets of soil samples will be collected from the ground surface to the water table. Soil samples will be collected from every hand auger bucket during installation of the boring. Each sample will be screened in the field with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the first sample above the water table will be retained for testing. The soil borings will be installed by using the hand-auger method in accordance with the Field Sampling Approach (Section 6.0).

4.16.5.3 Field Sampling Plan

The soil samples will be submitted for analysis of TPH by EPA Method 8015, VOCs by EPA Method 8240, all TCLP constituents, and pH by EPA Methods 9040/9045. An additional sample set will be included for duplication/splits. One equipment blank and one trip blank will be submitted for QA/QC analysis. One extra TCLP sample will be submitted for matrix analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Recommendations for any further sampling or monitoring wells will be included in the Phase I Report.

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4.17 The Motor Pools (include wash racks, grease racks, and steam racks - FST-027).

4.17.1 Site Description and History

The motor pools and their associations, located throughout the cantonment area, are shown on Plate 4 and listed in Table 4.6. Wash racks, steam racks, grease racks, and oil/water separators are found at most motor pools. Many of the USTs (FST-025) are also located at the motor pools. The specific times of operations of these motor pools are unknown but assumed to be from the 1950's to the present.

4.17.2 Previous Investigations

Two previous investigations conducted at Fort Stewart mentioned the motor pool wash racks: 1) 1983 Installation Assessment of Headquarters (Environmental Science and Engineering) and 2) 1989 Environmental Priorities Initiative and Preliminary Assessment of Fort Stewart, Georgia (Georgia Department of Natural Resources).

4.17.3 Waste Characterization

The waste characterization for the motor pools includes waste oil, antifreeze, petroleum products, and possibly solvents.

4.17.4 Potential for Release/Known Releases

Wash racks and oil/water separators were installed in the mid-1970s. In consequence, the separator effluent lines were directed to the storm drainage system. Prior to the installation of the separators, the wash rack wastewater was discharged untreated to the storm drainage system. As of 1980, all but 20 separators were connected to the sanitary sewer. The remaining 20 were affiliated with the Georgia Army National Guard (GARNG), and discharge under the NPDES Permit No. GA0027685.

By the summer of 1982, all but three of the wash rack separators were connected to the new Industrial Wastewater Treatment Plant (IWTP). These three wash racks, located in the DIO and DEH maintenance areas, are monitored closely. During the 1983 onsite investigation, the

Table 4.6 Motor Pool Locations (FST-027)

Abbreviation	*Explanation*	*Location*
1/2 ADA	1st Battalion 2nd Air Defense Artillery	1300
1/5 ADA	1st Battalion 5th Air Defense Artillery	1300
1/41ST ART	1st Battalion 41st Artillery	1200
1/64 ARMOR	1st Battalion 64th Armor	1600
1ST INF BG	1st Infantry Brigade	1200
2/7TH INF	2nd Battalion 7th Infantry	1200
2/4 CAV	2nd Squadron 4th Calvary	1400
3/41ST ART	3rd Battalion 41st Artillery	1800
3/7TH INF	3rd Battalion 7th Infantry	1200
3/15TH INF	3rd Battalion 15th Infantry	1200
3/69 ARMOR	3rd Battalion 69th Armor	1600
4/64 ARMOR	4th Battalion 64th Armor	1400
24TH ID	Headquarters Company 24th Infantry Division	200
24TH MP	24th Military Police Company	200
24TH SPT	24th Support Battalion	4500
87TH MAINT	87th Maintenance Battalion	200
92ND ENG	92nd Engineer Battalion (Combat Heavy)	4500
124TH MI	124th Military Intellegence Battalion	200
224TH SPT BN	224th Support Battalion	4500
632 MAINT	632 Maintenance Company	1100
724 SPT	724th Support Battalion	1700/1800
DEB	Division Engineer Brigade	1300
DEH	Directorate of Engineering and Housing	1100
DISCOM	Division Support Command	4500
DIVARTY	Division Artillery, 24th Infantry Division	1800
DOL MAINT	Directorate of Logistics Maintenance Divison	1000
DOL/24TH MP	Directorate of Logistics and 24th Military Police Company	200
GA National Guard	Georgia National Guard	9100-10300
GANG MATES	Georgia National Guard Mobilization and Equipment Training Site	10500

Note: See Plate 4 for locations.

NOTE:
SEE TABLE 4.6 FOR
LIST OF ABBREVIATIONS.

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RCRA FACILITY INVESTIGATION

LOCATION OF MOTOR POOLS (FST-027)

FORT STEWART GEORGIA

SIZE	INVITATION NO.	FILE NO.	PLATE
F	DACA-21-90-0079		4
SCALE: 1' = 500'		SHEET	

effluent pipe from the oil/water separator for the wash rack near Building 1060 was broken. Consequently, wastewater exited through a hole in the side of the pipe and entered an open drainage ditch, rather than flowing through the pipe to the IWTP. Since this report, the pipe has been fixed. The potential for release to soils at all motor pools is high.

4.17.5 Proposed Work And Sample Analyses

4.17.5.1 General

The following work is proposed for the Phase I investigation for the Motor Pools (FST-027):

1) A complete inventory and description of the conditions at each motor pool will be prepared for submittal of the State's review. Plate 4 will be updated to show names and boundaries of each motor pool.

2) A location map (with specific motor pool and effluent line discharges identified) will be prepared for each motor pool for the Phase I RFI report.

3) Process schematics drawings for the three separators not hooked up to the industrial wastewater treatment plant will be provided in the Phase I RFI report, if available.

4) Soil samples will be collected from the drainage ditch near building 1060, where wastewater from the broken separator effluent line was discharging.

4.17.5.2 Soil Boring and Monitoring Well Installation Plan

One upgradient and two downgradient soil samples will be collected from the drainage ditch where wastewater from the broken separator effluent line was discharging. The samples will be collected to a depth of one foot below ground surface. Soil samples will be collected from every hand auger bucket during installation of the boring. Each sample will be screened in the field with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the last sample will be retained for testing. The borings will be installed in accordance with the Field Sampling Approach (Section 6.0).

4.17.5.3 Field Sampling Plan

In accordance with GA EPD's recommendations, the soil sample collected from each boring will be submitted for analyses of VOCs by EPA Method 8240, all TCLP constituents, TPH by EPA Method 8015, and pH by EPA Methods 9040/9045. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0).

4.18 The 724th Battery Shop (FST-028)

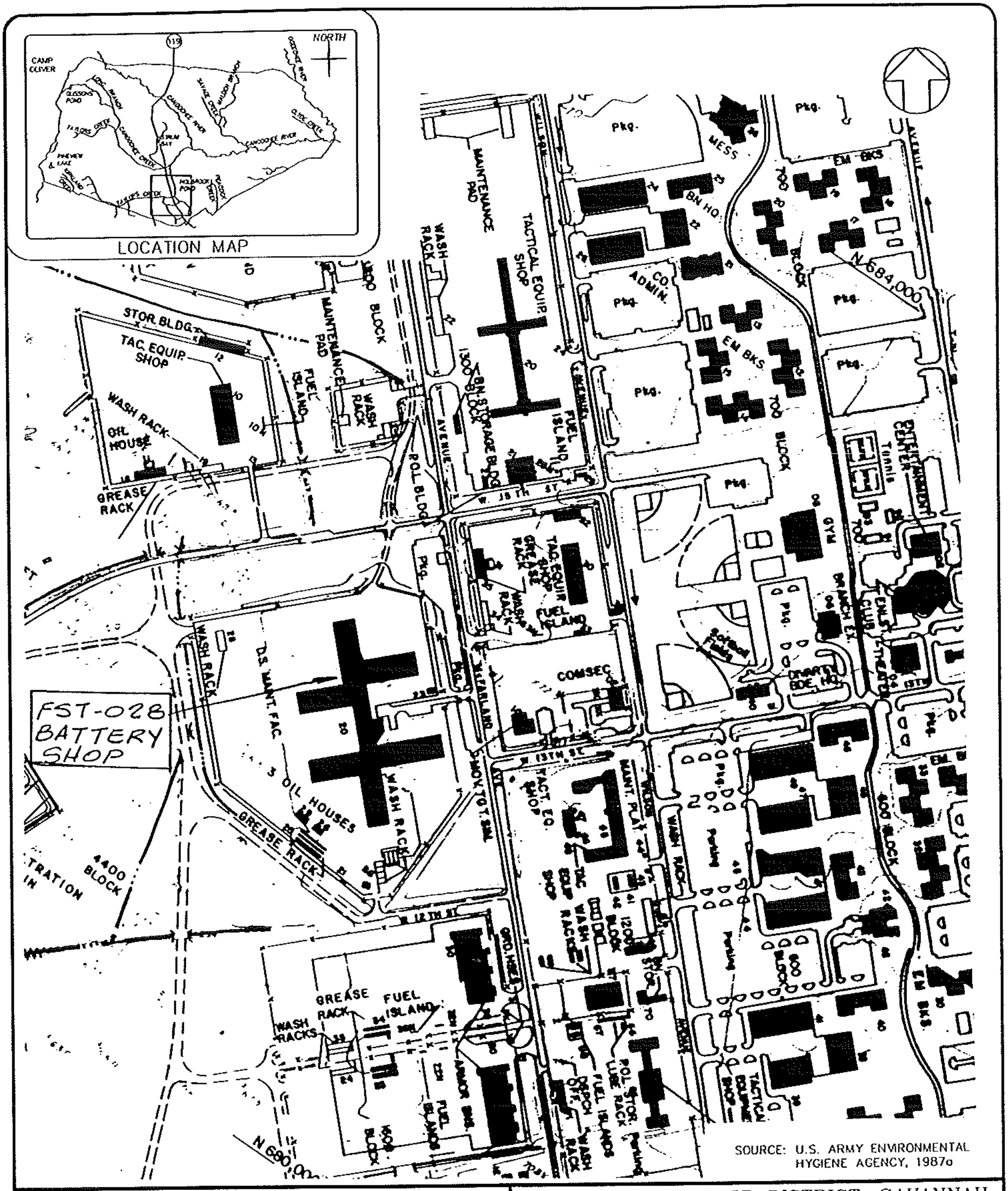
4.18.1 Site Description and History

The 724th battery shop is located on the western portion of the cantonment area, northeast of the IWTP, behind building 1720 (Figure 4.40). To the best of our knowledge, this facility is an open air cage where batteries are filled, charged, and neutralized. The storage area for spent lead-acid batteries is on concrete. A leachate trail was noted across the parking lot to bare soil (Georgia Department of Natural Resources 1989). Recently the building has been enlarged and the concrete foundation repaired.

Prior to 1981, spent batteries were drained prior to being transported to the DPDO storage yard. Approximately 200 to 400 liters per week of acid was drained from the batteries into a lead-lined vat. Attempts to neutralize the acid by adding soda ash to the vat were unsuccessful (Environmental Science and Engineering 1983). This "neutralized" solution was then discharged into the storm drain system. Currently spent batteries are transferred without draining to the DPDO storage yard prior to sale to salvage contractors. Repairs were made to this system in 1990 and the old limestone rock used to neutralize the acid was disposed of as a hazardous waste.

4.18.2 Previous Investigations

The previous investigations concerning this site were mentioned in three previous reports: 1) 1983 Installation Assessment of Headquarters (Environmental Science and Engineering), 2) 1989 RCRA Facility Assessment Report (Georgia Department of Natural Resources), and 3) 1988 Environmental Program Review No. 32-24-7038-89 (U.S. Army Environmental Hygiene Agency).



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
BATTERY SHOP LOCATION MAP FST-028
FORT STEWART *GEORGIA*

FIGURE 4.40

The Battery Shop has had two rounds of sampling completed at this location in 1989. One round was taken at the request of GA EPD at the edge of the motor pool (1 sample, 1 background). Additionally, the limestone rock used to neutralize the acid was tested prior to disposal as a hazardous waste. A sample was taken for Hazardous Waste characterization, and the results showed approximately 3600 ppm Lead by EP Toxicity Method.

4.18.3 Waste Characterization

The battery shop is an area where batteries are serviced and charged. The waste generated includes sulfuric acid from batteries and "neutralized" (soda ash) battery solutions that are associated with maintenance.

4.18.4 Potential for Releases/Known Releases

Prior to 1981, batteries were drained prior to sale to salvaging contractors. Evidence of spillage by deterioration of the concrete in the parking lot downgradient of the facility (U.S. Army Environmental Hygiene Agency 1988), and a dissolved portion of the concrete with a leachate trail across the parking lot to bare soil is evident at the battery shop (Georgia Department of Natural Resources 1989). It is estimated that about 2 pounds of lead was discharged per year when the hazardous neutralized battery acid was discharged to the storm drainage system prior to 1981 (Environmental Science and Engineering 1983). The potential for release to the soil and possibly the ground water is high.

4.18.5 Proposed Work and Sample Analyses

4.18.5.1 General

The following work is proposed for the Phase I Investigation for the Battery Shop (FST-028):

1) A complete description on the current site conditions will be prepared and submitted for review as part of the Phase I investigation.

2) The results of the 1989 soil sample analysis are included in Appendix 4.26.

3) Four soil samples (one upgradient of the battery shop and three at the areas described as having been screened) will be collected and analyzed for all TCLP constituents, TPH, and pH. The samples will be collected as close to the designated areas as possible (Figure 4.40A). It is possible that new buildings or pavement may cover these areas.

4) The need for ground-water monitoring wells will be determined from data collected during the Phase I investigation and may be recommended for Phase II.

4.18.5.2 Soil Boring Installation Plan

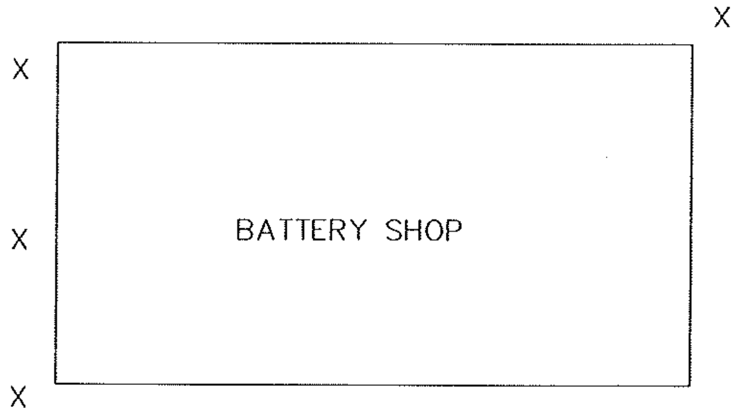
One soil sample will be collected upgradient of the battery shop in addition to one soil sample at each of the three areas described as having been screened. All soil samples will be installed to a depth of one foot into the water table. Soil samples will be collected from every hand auger bucket during installation of the boring. Soil samples will be collected from the ground surface to the water table. Each sample will be screened in the field with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the first sample above the water table will be retained for testing. The borings will be installed in accordance with the Field Sampling Approach (Section 6.0).

4.18.5.3 Field Sampling Plan

In accordance with GA EPD's recommendations, the soil sample collected from each boring will be submitted for analyses of all TCLP constituents, TPH by EPA Method 8015 and pH by EPA Methods 9040/9045. One extra TCLP sample will be submitted for matrix analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0).

NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT
TO CHANGE IN THE FIELD.



KEY

X PROPOSED SAMPLE LOCATION

NOT TO SCALE

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RCRA FACILITY INVESTIGATION
BATTERY SHOP SAMPLING LOCATIONS FST-028
FORT STEWART *GEORGIA*

FIGURE
4.40A

4.19 The Evans Army Heliport POL Storage Facility (FST-029)

4.19.1 Site Description and History

The Evans Army Heliport POL Storage Facility is located approximately five miles northeast of the cantonment area, at the junction of State Road 144 and Fort Stewart 54 near the Evans Army Heliport. This area consists of two above-ground 250,000-gallon diesel tanks surrounded by a 5-foot high earth dike (covered by an asphalt layer) (Figure 4.41). The facility has been in operation at least since 1967 (COE 1967).

4.19.2 Previous Investigations

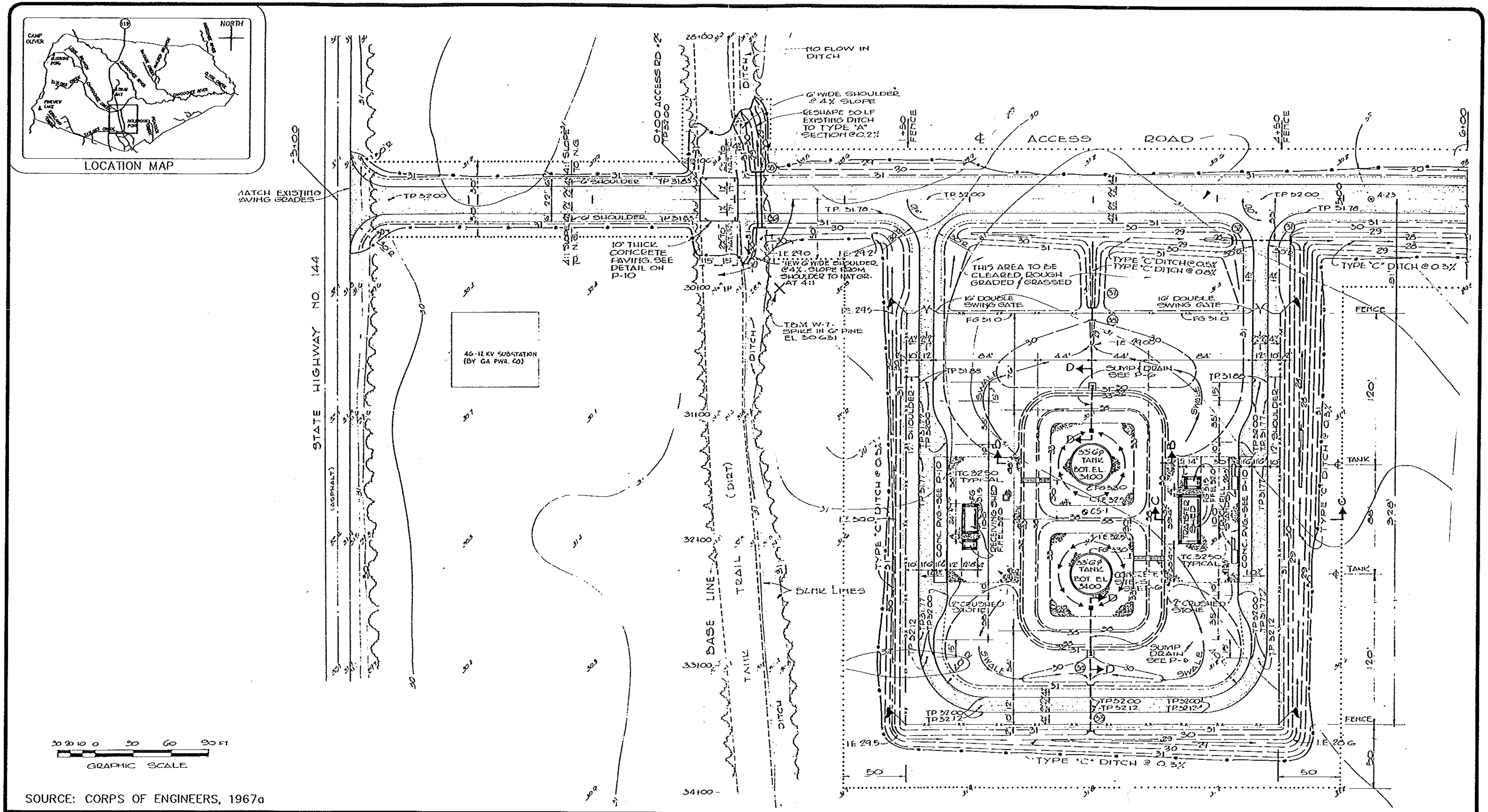
Investigations at this site were mentioned in two previous reports: 1) 1983 Installation Assessment Report (Environmental Science and Engineering), and 2) 1989 GA EPD RFA report, Environmental Priorities Initiative Preliminary Assessment of Fort Stewart, Georgia (Georgia Department of Natural Resources).

4.19.3 Waste Characterization

The waste at the Evans Army POL Storage Facility are related to the two diesel tanks. The waste characterization for this unit includes diesel fuel.

4.19.4 Potential for Release/Known Releases

According to 1983 Environmental Science and Engineering, the valves on the drain lines from the enclosed berm are normally closed and are screened whenever rainwater accumulates inside the enclosed area. If no contamination is visible, then the drain lines are opened, allowing the water to drain into the sewer or drainage ditch. No spills greater than 1000 gallons have been reported (Environmental Science and Engineering 1983). Routine drips at all four loading areas have resulted in stained soil (Georgia Department of Natural Resources 1989). Potential for release to the soil from within the concrete berm is low while potential for release to soil outside the berm from spills is high.



SOURCE: CORPS OF ENGINEERS, 1967a

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RCRA FACILITY INVESTIGATION
GRADING, DRAINAGE, AND PAVING POL FACILITY FST-029

FORT STEWART

GEORGIA

FIGURE
4.41

4.19.5 Proposed Work and Sample Analyses

4.19.5.1 General

The following work is proposed for the Phase I investigation for the Evans Army Heliport POL Storage Facility (FST-029):

1) This site has two 250,000-gallon diesel tanks (aboveground) that are enclosed in a berm approximately 5 feet high. Soil samples will be collected from inside the berm and outside the berm (Figure 4.41A).

2) Samples will also be collected at the off-loading areas and the on-loading points.

3) An investigation into all known spill events, their locations and quantities released will be performed and a list provided of the available information.

4.19.5.2 Soil Boring and Monitor-Well Installation Plan

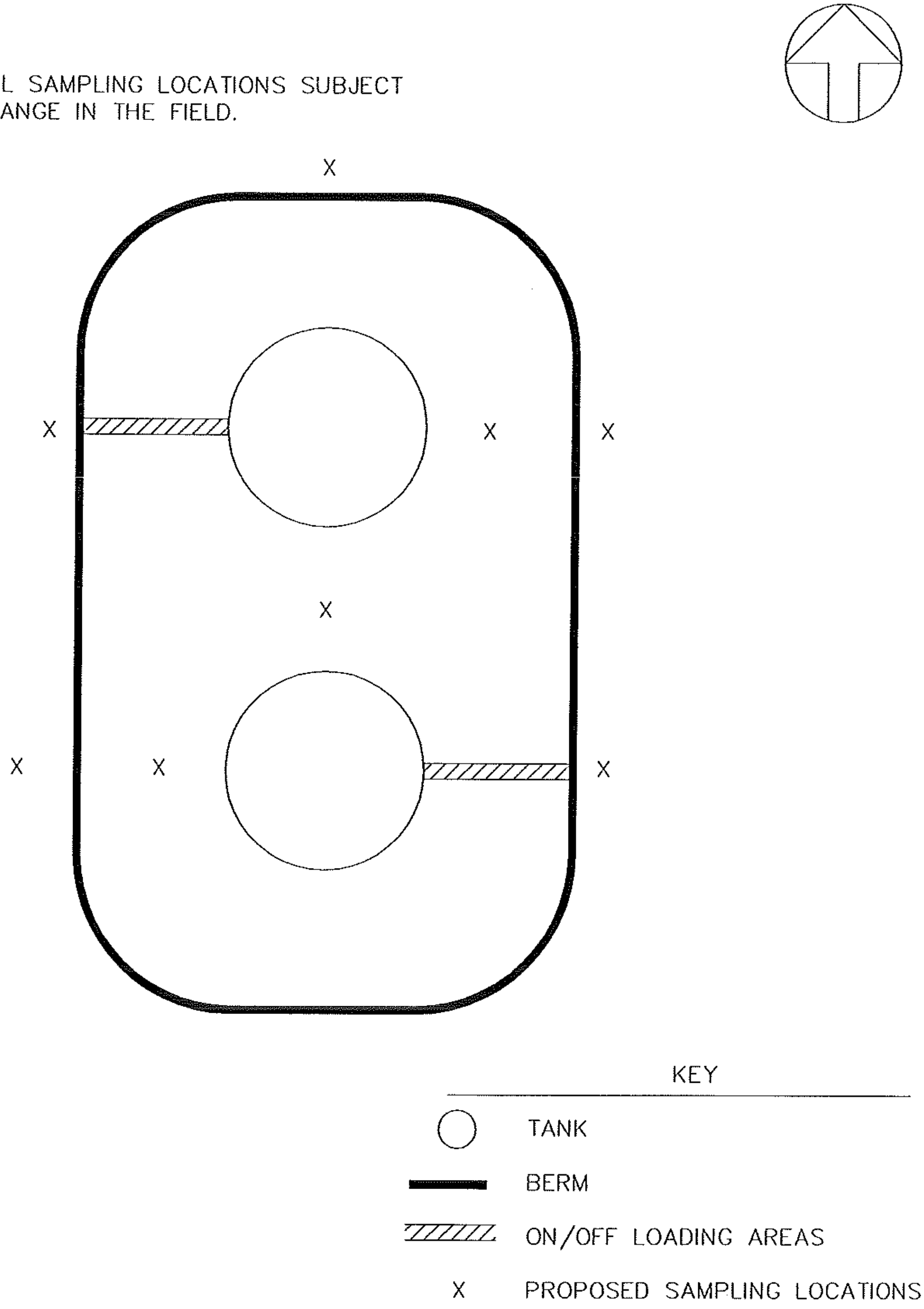
Three soil sample sets inside and three sample sets outside the berm will be taken. Two additional soil samples will be collected at the off-loading and on-loading areas. Soil samples will be collected from every hand auger bucket during installation of the boring. Soil samples will be collected from the ground surface to the water table. Each sample will be screened in the field with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the first sample above the water table will be retained for testing. These soil borings will be installed by using hand-auger methods. The borings will be installed to a depth of 2-3 feet into the saturated zone of the surficial sand aquifer in accordance with the Field Sampling Approach (Section 6.0).

4.19.5.3 Field Sampling Plan

In accordance with the GA EPD's recommendations, the six soil samples collected from inside and outside the berm will be submitted for analysis of VOCs by EPA Method 8240, TPH by EPA Method 8015, and all TCLP constituents. The two soil samples to be collected from the off and on-loading areas will be analyzed as stated above. One extra TCLP sample set will be

NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT
TO CHANGE IN THE FIELD.



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EVANS ARMY HELIPORT POL STORAGE FACILITY SAMPLING LOCATIONS FST-029
FORT STEWART
GEORGIA

FIGURE
4.41A

collected for matrix analyses at the laboratory. One trip blank will be submitted for analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0).

4.20 The Recirculating Wash Impoundment "Birdbath" (FST-030).

4.20.1 Site Description

The Recirculating Wash Impoundment or "Birdbath" is located on the western edge of the cantonment area off State Route 144 (Figure 4.42). Wastewater from the vehicle washing facility is received in this concrete lined impoundment. Sludge (grease and sand) is removed and disposed of in the on-site landfill approximately every six months.

4.20.2 Previous Investigations

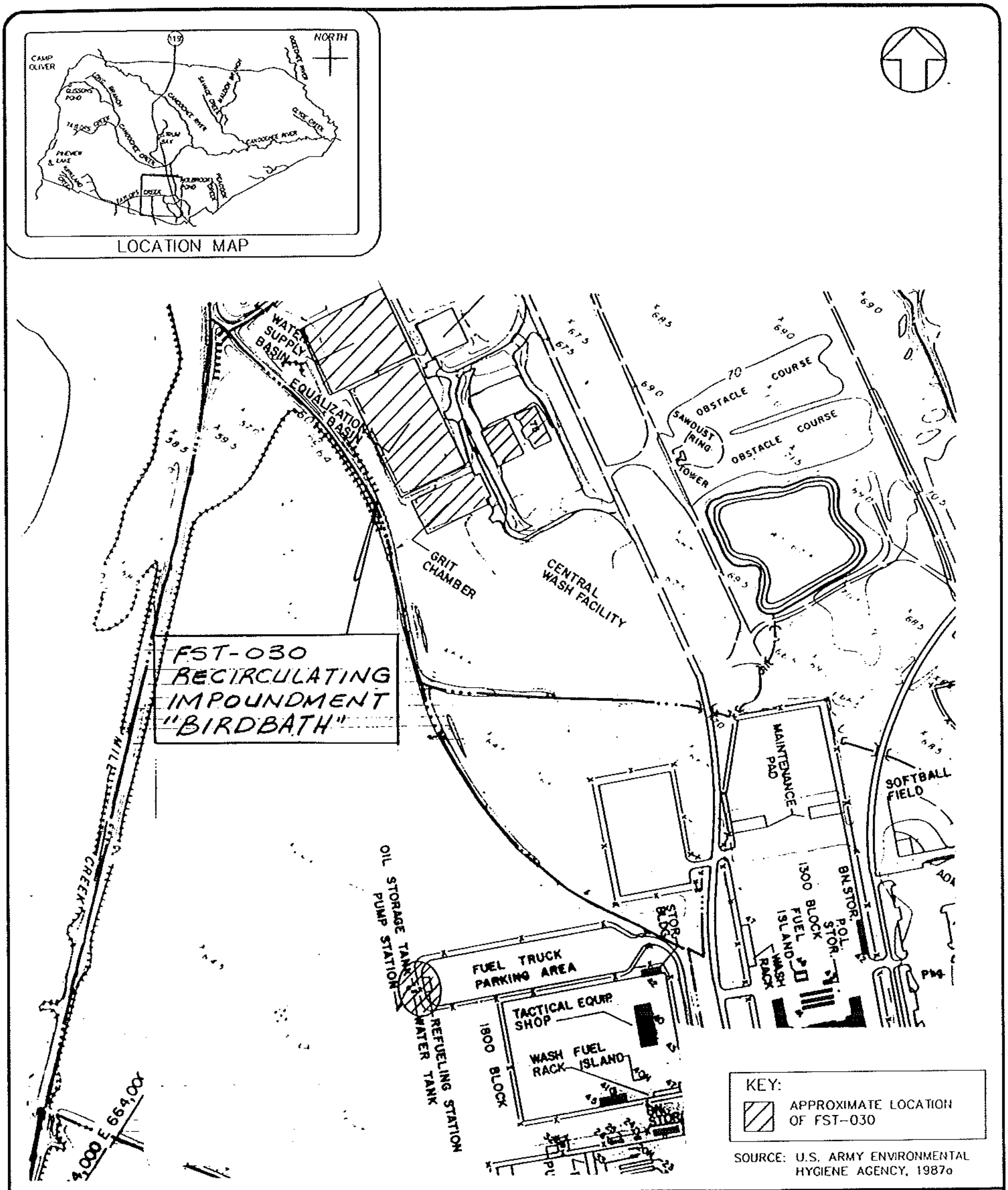
No previous investigations of this site have been performed. The site was mentioned and briefly described in the 1989 GA EPD RFA Report.

4.20.3 Waste Characterization

Grease and oil is generated in the wash waters during the cleaning of equipment in the "Birdbath". The wastewater is run through a sand filter. The waste characterization includes grease, sludge, and probably waste oil, non-hazardous used standard type II solvent, and used hydraulic fluid.

4.20.4 Potential for Release/Known Releases

No information is available that documents a release of waste to the environment. The "Birdbath" is reported to be a closed system so that the potential for a release to the surrounding soil or ground water is low.



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
RECIRCULATING IMPOUNDMENT "BIRD BATH" FST-030
FORT STEWART *GEORGIA*

FIGURE
4.42

325

4.20.5 Proposed Work and Sample Analyses

4.20.5.1 General

The following work is proposed for the Phase I investigation for the Recirculating Wash Impoundment (FST-030):

1) A sample of the sludge will be taken from both sludge holding impoundments (Figure 4.42A).

2) A description of the site will be prepared and provided to the state for review.

4.20.5.2 Field Sampling Plan

One sample set will be taken of the sludge from each of the two sludge holding impoundments. The samples will be submitted for analysis of VOCs by EPA Method 8240, all TCLP constituents, TPH by EPA Method 8015 and pH by EPA Methods 9040/9045. Two extra TCLP sample sets will be submitted for matrix and duplication/split analysis at the laboratory. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Recommendations for any further sampling or monitoring wells will be included in the Phase I RFI Report.

4.21 The DEH Asphalt Tanks (FST-031)

4.21.1 Site Description and History

The DEH Asphalt tanks are located in the south cantonment area near Utility Street and the railroad tracks (Figure 4.43). Three 20,000-gallon above-ground tanks surrounded by an earthen berm are found at this site. There is also a much smaller tank nearby that is also above ground. The tanks held cut-back asphalt for use on the base. The time of operation for these tanks is unknown.

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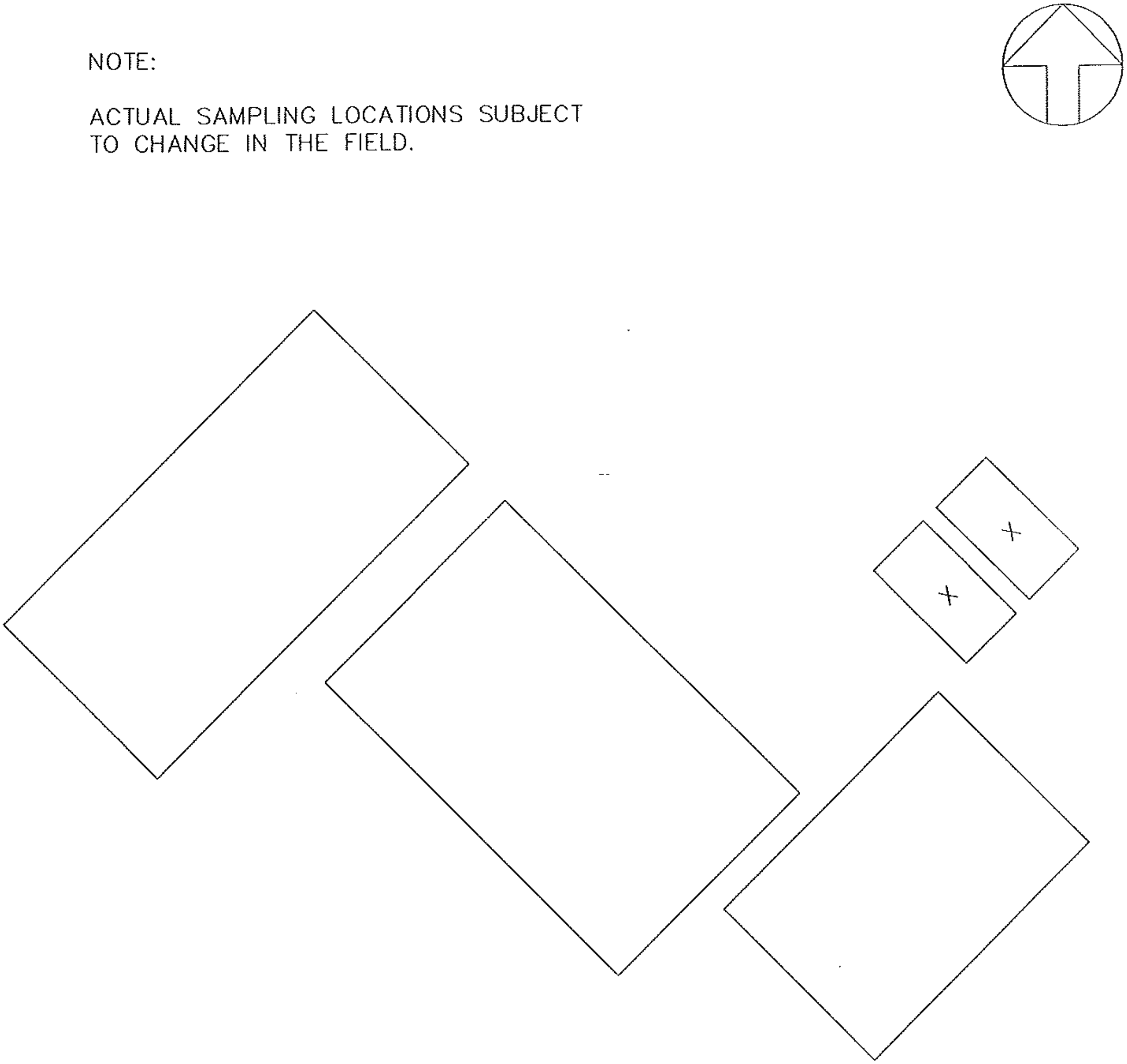
NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT TO CHANGE IN THE FIELD.



KEY

X PROPOSED SAMPLE LOCATIONS

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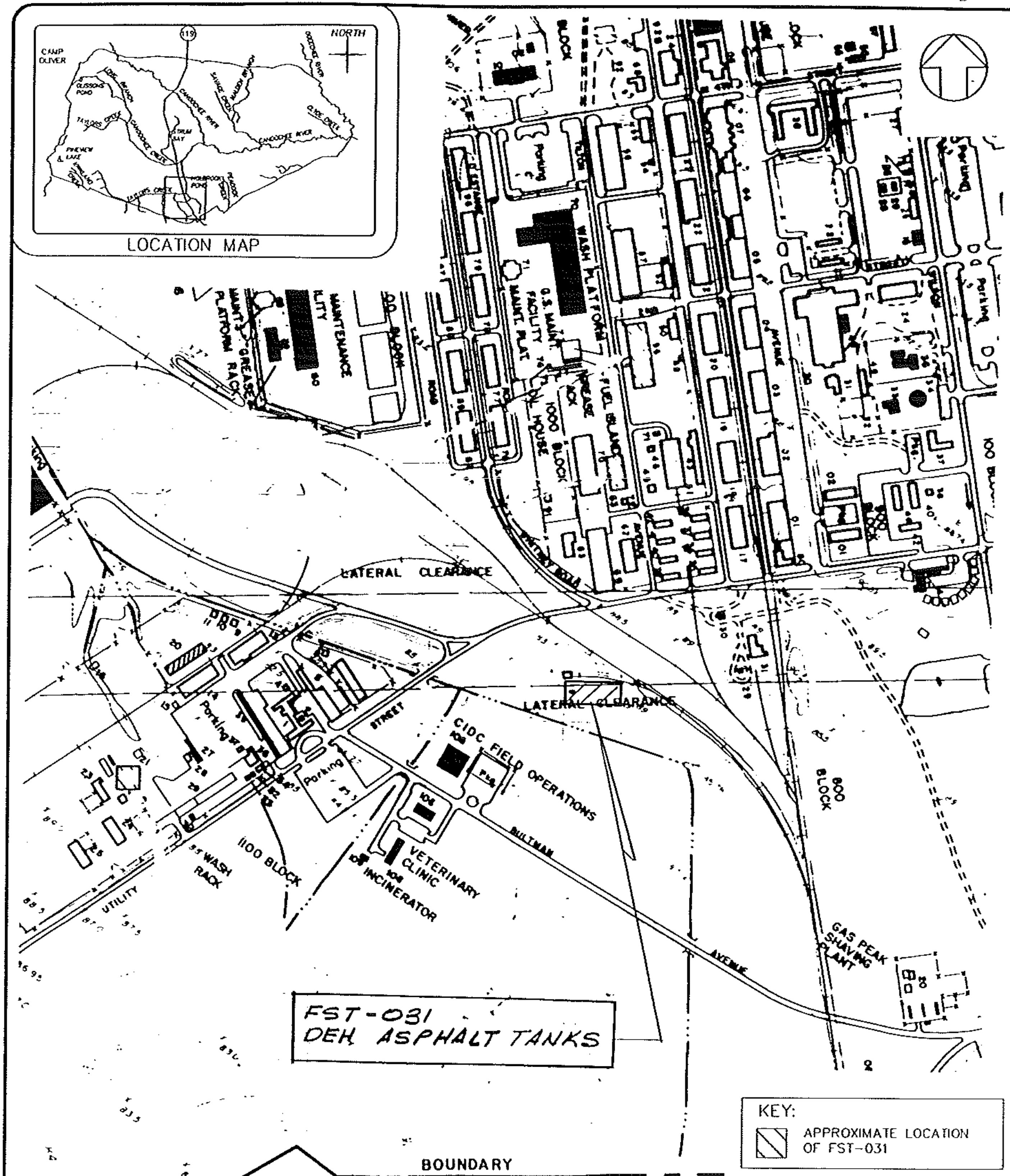
RCRA FACILITY INVESTIGATION
RECIRCULATING IMPOUNDMENT "BIRD BATH" SAMPLING LOCATIONS FST-030
FORT STEWART *GEORGIA*

FIGURE
4.42A



SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
LOCATION OF DEH ASPHALT TANKS FST-031
FORT STEWART *GEORGIA*

FIGURE
4.43

4.21.2 Previous Investigations

No previous investigations have been conducted at this site. The tanks were briefly described in the 1989, GA EPD RFA report, Environmental Priorities Initiative Preliminary Assessment of Fort Stewart, Georgia.

4.21.3 Waste Characterization

The only material stored at this site is asphalt. Therefore, the waste characterization for the DEH asphalt tanks includes asphalt and its associated by-products.

4.21.4 Potential for Releases/Known Releases

No releases are known or have been documented. The potential for release to the soils surrounding the tanks outside the berm are low. The potential for release through spillage to the soils inside the berm is high.

4.21.5 Proposed Work and Sample Analyses

4.21.5.1 General

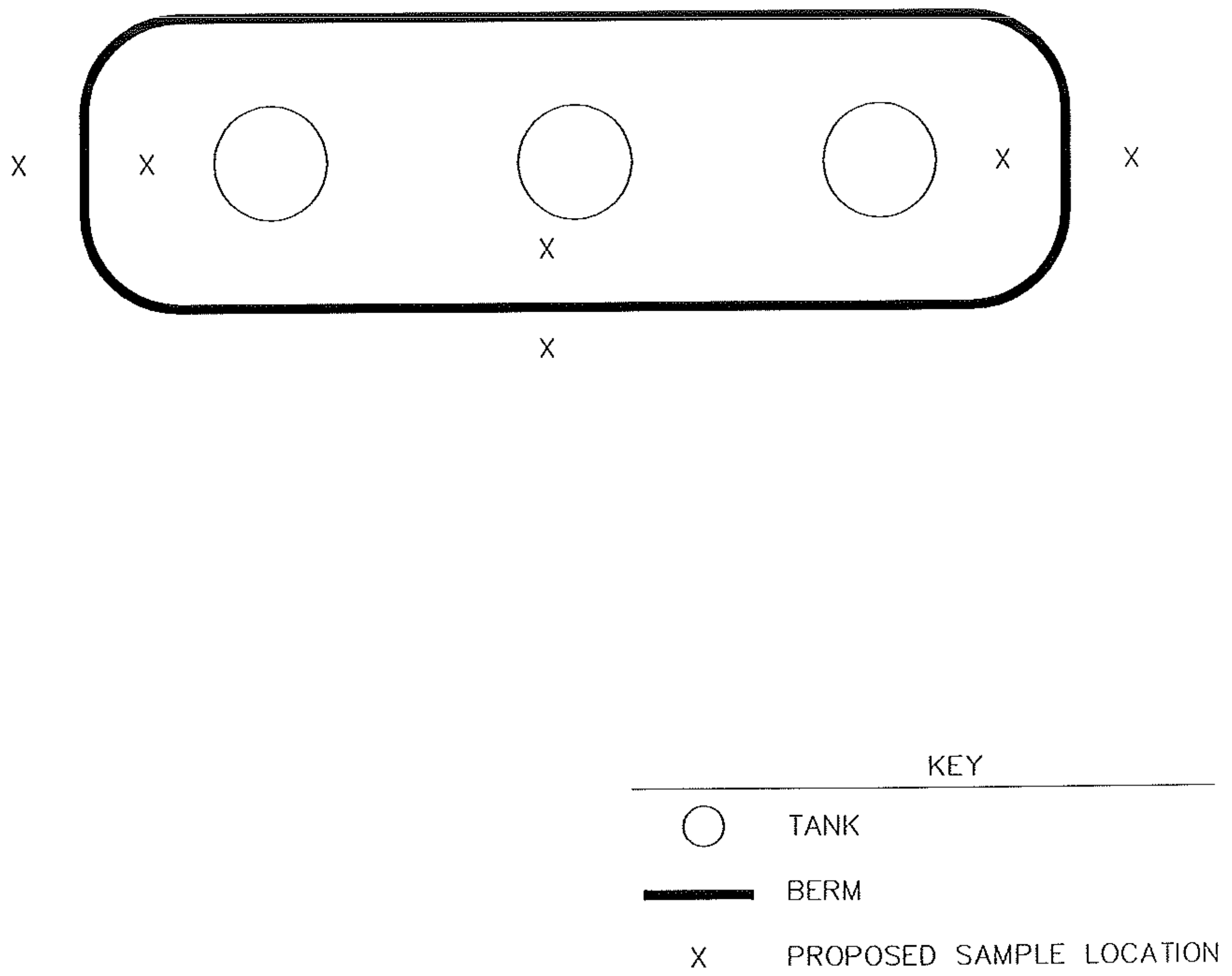
The following work is proposed for the Phase I investigation for the DEH Asphalt Tanks (FST-031):

1) Soil samples will be taken inside the berm and outside the berm (Figure 4.43A).

2) A description of the site will be prepared and provided to the state for review.

NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT
TO CHANGE IN THE FIELD.



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RCRA FACILITY INVESTIGATION
DEH ASPHALT TANKS SAMPLING LOCATIONS FST-031
FORT STEWART *GEORGIA*

FIGURE
4.43A

4.21.5.2 Soil Boring and Monitor-Well Installation Plan

Three soil sample sets will be collected near the tank inside the berm and three soil sample sets will be collected outside the berm. All samples will be collected from within the upper 1 foot of soil. All soil samples will be screened with an OVA-FID or OVA-PID. These soil samples will be collected using hand-auger methods in accordance with the Field Sampling Approach (Section 6.0) and the QAPP (Attachment A).

4.21.5.3 Field Sampling Plan

The six soil samples will be submitted for analysis of VOCs by EPA Method 8240, TPH by Method 8015 and pH by EPA Methods 9040/9045. One trip blank will be submitted for analysis. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Recommendations for any further sampling or monitoring wells will be included in the Phase I RFI Report.

4.22 The Supply Diesel Tank (FST-032)

4.22.1 Site Description and History

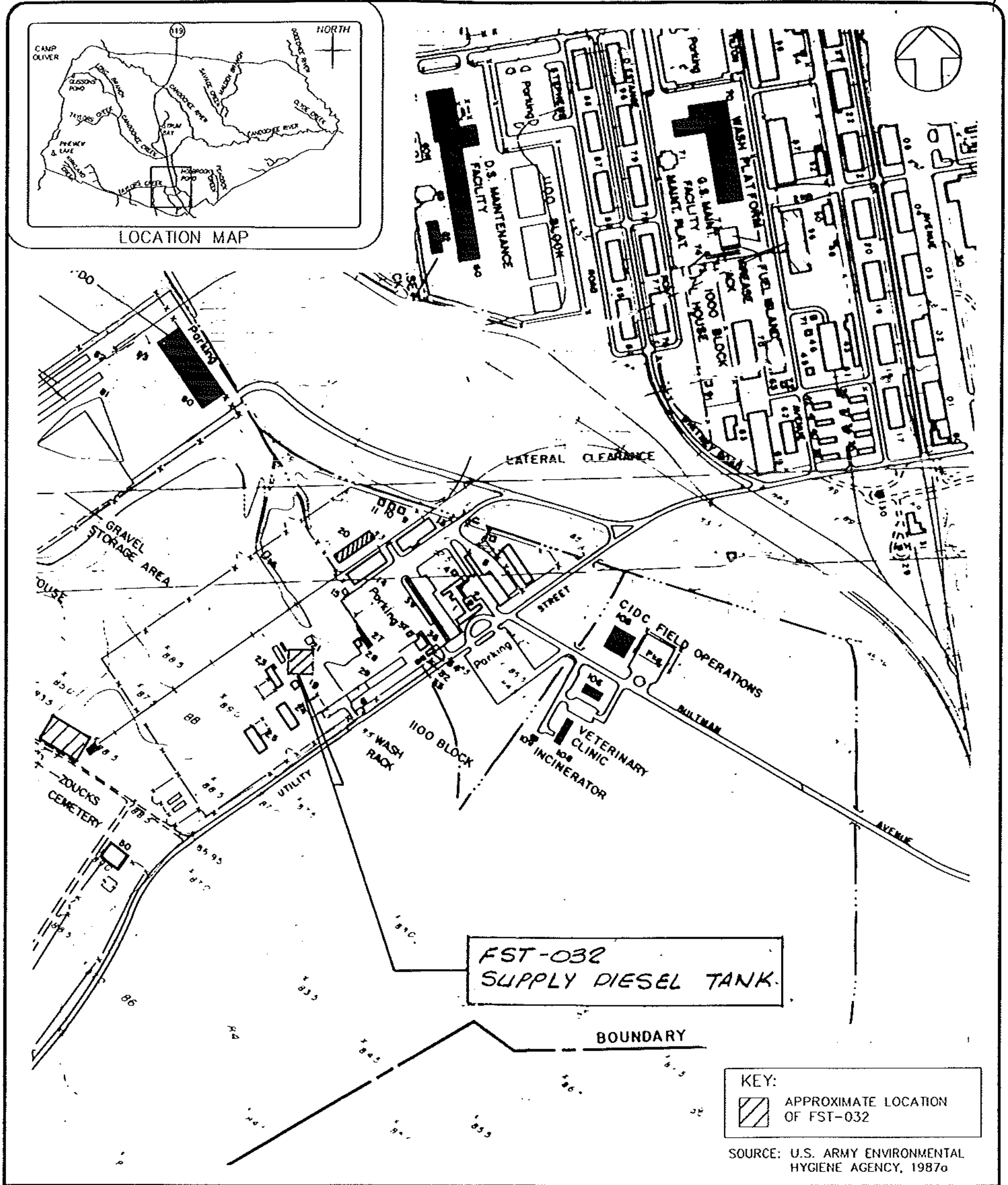
The supply diesel tank is located on the south side of the cantonment area, between buildings 1123 and 1121 (Figure 4.44). There is one above-ground tank at this site which is enclosed in a berm. The period of time that this tank has been in operation is unknown.

4.22.2 Previous Investigations

No previous investigations have been conducted at this site. The tank was mentioned and briefly described in the 1989 GA EPD RFA report.

4.22.3 Waste Characterization

Diesel fuel is the only product stored in this tank. Therefore, the waste characterization of the supply diesel tanks includes diesel constituents.



KEY:

▨ APPROXIMATE LOCATION OF FST-032

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987a

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RCRA FACILITY INVESTIGATION
LOCATION OF SUPPLY DIESEL TANK FST-032
FORT STEWART *GEORGIA*

FIGURE
4.44

339

4.22.4 Potential for Releases/Known Releases

No releases is known or has been documented. The potential for release to the soil outside the berm is low while potential for release through spillage to soil inside the berm is high.

4.22.5 Proposed Work and Sample Analyses

4.22.5.1 General

The following work is proposed for the Phase I investigation:

1) Soil samples will be collected next to the tank inside and outside of the berm (Figure 4.44A).

2) A description of the current site conditions will be submitted to the state.

4.22.5.2 Soil Boring and Monitor-Well Installation Plan

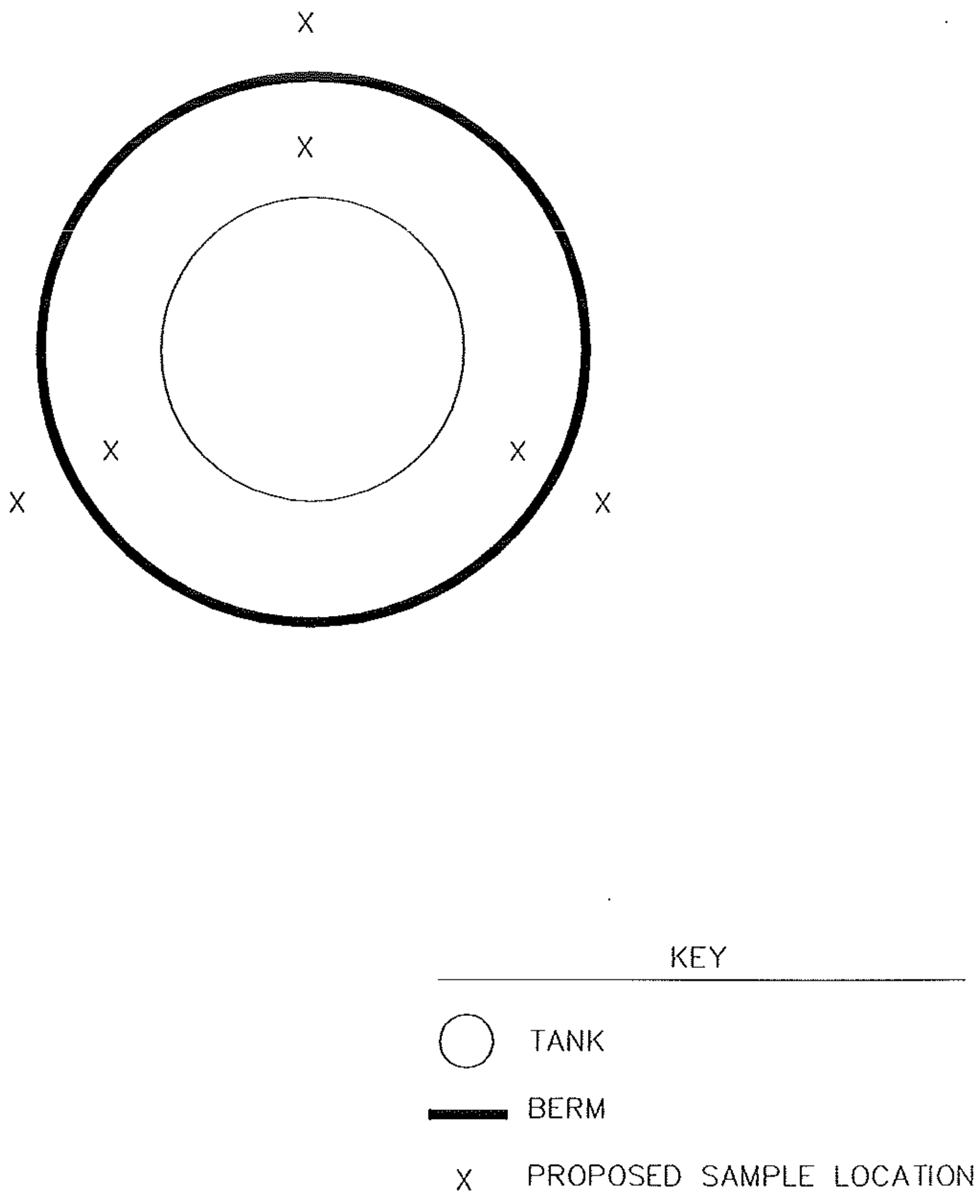
Three soil sample sets next to the tank inside the berm and three soil sample sets outside the berm will be collected. All soil samples will be collected from the upper 1 foot of soil. Soil samples will be collected from every hand auger bucket during installation of the boring. Each sample will be screened in the field with an OVA-FID. The one sample that yields the highest reading or appears contaminated will be retained for analysis. If none of the samples appear to be contaminated, the last sample collected will be retained for testing. We propose to install these soil borings by using hand-auger methods in accordance with the Field Sampling Approach (Section 6.0).

4.22.5.3 Field Sampling Plan

The samples will be submitted for analysis of VOCs by EPA Method 8240 and TPH by EPA Method 8015. Refer to Table 6.1 for sampling summary. Field sampling will follow procedures found in the QAPP (Attachment A) and the Field Sampling Approach (Section 6.0). Recommendations for any further sampling or monitoring wells will be included in the Phase I RFI Report.

NOTE:

ACTUAL SAMPLING LOCATIONS SUBJECT
TO CHANGE IN THE FIELD.



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RCRA FACILITY INVESTIGATION
SUPPLY DIESEL TANK SAMPLING LOCATIONS FST-032
FORT STEWART *GEORGIA*

FIGURE
4.44A

343

5.0 QUALITY ASSURANCE PROJECT PLAN

To ensure the quality of the field and laboratory data produced during the implementation of the RFI, a Generic Quality Assurance Program Plan (QAPP) has been prepared. The QAPP has been prepared according to the guidelines set forth by the U.S. Environmental Protection Agency (EPA) in "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans", (QAMS-005/80), EPA. The QAPP has been structured as a generic document to provide general guidance to the field and laboratory personnel concerning methodologies for sampling and analysis of environmental media, proper record keeping protocols, data quality objectives, and procedures for data review. The detailed plan is included at Attachment A.

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6.0 FIELD SAMPLING APPROACH

6.1 Waste Characterization

Waste characterization involves collecting data that describe the physical and chemical aspects of waste materials and the matrix in which they are contained. These data are valuable for identifying indicator parameters, possible migration pathways, and monitoring procedures, as well as determining the nature and scope of corrective measures which may be applied. Several ground water, surface water, soil, and sludge samples will be submitted for analyses (Table 6.1).

Waste characterization may be implemented whenever it is necessary to identify the types of waste disposed at a SWMU. In contrast, waste characterization may be limited when the SWMU of concern is no longer active and the waste cannot be sampled. Additional waste characterization, not outlined in this work plan, will be identified in Phase II, if necessary.

Waste Characterization will describe methods that may be used to (1) collect data through review of available information, (2) collection of additional information, and (3) characterize the physical and chemical properties of the materials.

6.1.1 Review of Existing Data and Records

Identification of the types and constituents of waste materials will be made, where possible, through the examination of the references from the SOW. These records may include the following:

- waste characterization data used for permit applications,
- past state or sampling analyses,
- records of disposal practices and operating procedures, referenced in documents listed in the SOW,
- reports on environmental assessments, referenced in documents listed in the SOW,
- information concerning age and period of operation of facility, referenced in documents listed in the SOW, and
- information from past or present employees.

Table 6.1 Work Plan Laboratory Analytical Breakdown, Fort Stewart.

Location	Matrix	Parameter	EPA Analysis Method	No. of Field # Samples	No. of Dups/ Samples	No. of Rinsate Samples	No. of TCLP Matrix	No. of Trip Blanks	Total AE Samples
FST-001*	GW/SW	pH, spc	various	8	1	1			10
FST-001	GW/SW	VOCs	8240	8	1	1		1	11
FST-001	GW/SW	RCRA metals	various	8	1	1			10
FST-001	GW/SW	pest/PCBs	8080	8	1	1			10
FST-001	GW/SW	RA-228/6	900	8	1	1			10
FST-002*	GW/SW	pH, spc	various	6					6
FST-002	GW/SW	RCRA metals	6010	6					6
FST-002	GW/SW	VOCs	8240	6					6
FST-002	GW/SW	pest/PCBs	8080	6					6
FST-003*	GW/SW	pH, spc	various	6					6
FST-003	GW/SW	VOCs	8240	6				1	7
FST-003	GW/SW	RCRA metals	various	6					6
FST-003	GW/SW	pest/PCBs	8080	6					6
FST-003	leachate	pH, spc	various	1	1	1			3
FST-003	leachate	VOCs	8240	1	1	1			3
FST-003	leachate	RCRA metals	various	1	1	1			3
FST-003	leachate	pest/PCBs	8080	1	1	1			3
FST-004 A	GW	VOCs	8240	4	1	1		1	7
FST-004 A	GW	RCRA metals	various	4	1	1			6
FST-004 A	GW	pH, spc	various	4	1	1			6
FST-004 B	GW	VOCs	8240	4					4
FST-004 B	GW	RCRA metals	various	4					4
FST-004 B	GW	pH, spc	various	4					4
FST-004 C	GW	VOCs	8240	4					4
FST-004 C	GW	RCRA metals	various	4					4
FST-004 C	GW	pH, spc	various	4					4
FST-004D	GW	VOCs	8240	4				1	5
FST-004D	GW	RCRA metals	various	4					4
FST-004D	GW	pH, spc	various	4					4
FST-004 E	GW	VOCs	8240	4					4
FST-004 E	GW	RCRA metals	various	4					4
FST-004 E	GW	pH, spc	various	4					4
FST-004 F	GW	VOCs	8240	4					4
FST-004 F	GW	RCRA metals	various	4					4
FST-004 F	GW	pH, spc	various	4					4
FST-004 G				0					0
FST-009	Soil	RCRA metals	various	6	1	1			8
FST-009	Soil	pH, spc	various	6	1	1			8
FST-009	Soil	Explsv Resd	8350	6	1	1			8
FST-010	Soil	RCRA metals	various	6					6
FST-010	Soil	pH, spc	various	6					6
FST-010	Soil	Explsv Resd	8350	6					6

Table 6.1 Work Plan Laboratory Analytical Breakdown, Fort Stewart.

Location	Matrix	Parameter	EPA Analysis Method	No. of Field # Samples	No. of Dups/ Samples	No. of Rinsate Samples	No. of TCLP Matrix	No. of Trip Blanks	Total AE Samples
FST-011	Soil	RCRA metals	various	6					6
FST-011	Soil	pH, spc	various	6					6
FST-011	Soil	Explsv Resd	8350	6	1	1			8
FST-012	Soil	RCRA metals	various	6					6
FST-012	Soil	pH, spc	various	6					6
FST-012	Soil	Explsv Resd	8350	6					6
FST-014	GW	VOCs	8240	4	1	1		1	7
FST-014	GW	pH	various	4	1	1			6
FST-014	GW	RCRA metals	various	4	1	1			6
FST-014	GW	TPH	8015	4	1	1			6
FST-014	Soil	VOCs	8240	4	1	1		1	7
FST-014	Soil	pH	various	4	1	1			6
FST-014	Soil	RCRA metals	various	4	1	1			6
FST-014	Soil	TPH	8015	4	1	1			6
FST-017	Soil	VOC	8240	4				1	5
FST-017	Soil	all TCLP	various	4			1		5
FST-018	Sludge	VOCs	8240	1	1	1			3
FST-018	Sludge	all TCLP	various	1	1	1	1		4
FST-018	Sludge	pH/spc	various	1	1	1			3
FST-018	Sludge	pest/PCBs	8080	1	1	1			3
FST-018	Sldg/Sed	VOCs	8240	1					1
FST-018	Sldg/Sed	all TCLP	various	1			1		2
FST-018	Sldg/Sed	pH	various	1					1
FST-018	Sldg/Sed	pest/PCBs	8080	1					1
FST-018	Soil	VOCs	8240	4					4
FST-018	Soil	RCRA metals	various	4					4
FST-018	Soil	TPH	8015	4					4
FST-018	WW	RCRA metals	various	2					2
FST-018	WW	VOCs	8240	2				1	3
FST-018	WW	pH/spc	various	2	1	1			4
FST-018	WW	pest/PCBs	8080	2	1	1			4
FST-018	Sed	VOCs	8240	7	1	1		1	10
FST-018	Sed	all TCLP	various	7	1	1	1		10
FST-018	Sed	pH	various	7	1	1			9
FST-018	Sed	pest/PCBs	8080	7	1	1			9
FST-018	SW	RCRA metals	various	7					7
FST-018	SW	VOCs	8240	7					7
FST-018	SW	pH	various	7					7
FST-018	SW	pest/PCBs	8080	7					7
FST-019				0					0
FST-020				0					0
FST-024	Sludge	TCLP all	various	1			1		2
FST-024	Sludge	VOCs	8240	1					1
FST-024	Sludge	pH	various	1					1
FST-024	Sed	TCLP all	various	3			1		4

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Table 6.1 Work Plan Laboratory Analytical Breakdown, Fort Stewart.

Location	Matrix	Parameter	EPA Analysis Method	No. of Field # Samples	No. of Dups/ Samples	No. of Rinsate Samples	No. of TCLP Matrix	No. of Trip Blanks	Total AE Samples
FST-025**	Soil	TCLP all	various	11	1	1	1		14
FST-025	Soil	pH	various	11	1	1			13
FST-025	Soil	TPH	8015	11	1	1			13
FST-025	GW	RCRA metals	various	11	1	1	1		14
FST-025	GW	pH	various	11					11
FST-025	GW	TPH	8015	11					11
FST-025	GW	VOCs	8240	11				2	13
FST-026	Soil	VOCs	8240	4	1	1		1	7
FST-026	Soil	TCLP all	various	4	1	1	1		7
FST-026	Soil	TPH	8015	4	1	1			6
FST-026	Soil	pH	various	4					4
FST-027	Sed	VOCs	8240	3					3
FST-027	Sed	all TCLP	various	3			1		4
FST-027	Sed	pH	various	3					3
FST-027	Sed	TPH	8015	3					3
FST-028	Soil	TCLP all	various	4			1		5
FST-028	Soil	TPH	8015	4					4
FST-028	Soil	pH	various	4					4
FST-029	Soil	VOCs	8240	8				1	9
FST-029	Soil	TCLP all	various	8			1		9
FST-029	Soil	TPH	8015	8					8
FST-030	Sludge	VOCs	8240	2					2
FST-030	Sludge	all TCLP	various	2			1		3
FST-030	Sludge	TPH	8015	2	1	1			4
FST-030	Sludge	pH	various	2					2
FST-031	Soil	VOCs	8240	6				1	7
FST-031	Soil	TPH	8015	6					6
FST-031	Soil	pH	various	6					6
FST-032	Soil	VOCs	8240	6					6
FST-032	Soil	TPH	8015	6					6
				545	42	42	13	14	656

* Note: More surface water samples may be required if surface drains into a ditch(es) prior to Mill Creek.

** 75 tanks will be tightness tested.

Note: RCRA metals EPA Methods are 6010 + 7470/7471 + 7060 + 7421 + 7740.

Note: pH EPA Methods are 9040/ 9045.

Note: Specific conductivity EPA Method is 9050.

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6.1.2 Site Inspection

A site inspection will be made to generally define existing conditions. Information gained from the site inspection may include, but will not be limited to the following:

- integrity of waste containment,
- location and size of areas of concern,
- location of drainage features and possible conduits for migration,
- locations of discharge points,
- level of site security, and
- facility sketch map of all areas of concern.

6.1.3 Collection of Additional Information

In some cases, adequate characterization of wastes will be made by evaluating existing records or data on operating procedures. When verifiable information on wastes at a site are not available, but required to be investigated in the Scope of Work, additional data collection activities will be required.

6.2 Soil and Sediment Investigation

The objective of the soil and sediment investigation is to provide a framework for site-specific identification of the nature and extent of soil and sediment contamination at the facility. The potential for inter-media transfer of releases from soil and sediment to other media is significant. Contaminated soil and sediment can be major sources of contamination to ground water, air, subsurface gas, and surface water.

The work involved in the investigation will be to review existing data and conduct field studies that will help define the nature and magnitude of the existing contamination. The information included in this plan are excerpts from the Interim Final RCRA Facility Investigation Guidance Manual, EPA, May 1989.

6.2.1 Sampling

The extent and location of sampling required for waste characterization will depend on professional judgement concerning the need for additional information. The extent of information gathered during the review of available data and site inspection, as well as the complexity of the site and environmental media, will play roles in determining the extent and locations of sampling.

The sampling methods utilized will be appropriate for the type of material and item being sampled. Waste materials may include solids, sludges, and liquids; items may include drums, sludge drying beds, and surface impoundments. Details of sampling procedures are described in the Quality Assurance Project Plan (Attachment A).

Analytical parameters will be chosen based on extent of available information. Analyzing for broad indicator parameters such as total organic halogens or pH may be useful when there is little or no knowledge of what materials may be present. Whenever possible, analyses for specific constituents of concern will be conducted. Analyses may be conducted by a laboratory or in the field, when appropriate.

Appropriate sample collection and preservation techniques are specified in the QAPP (Attachment A). Specific measures must be taken to store and preserve samples to minimize their degradation. The sampling techniques described below are commonly used with a minimum of soil disturbance. Soil sampling methods will commonly vary with the depth of interest. Surficial sampling in the upper 6 inches of soil can usually be accomplished with simple tools, including shovels, spatulas, soil punches, and ring samplers. Constituents that have moved further downward in the soil profile often require tools such as tube samplers and augers. Manually operated tools are commonly useful to about 8 feet in depth, depending on the soil type. Below this depth, hydraulically or mechanically driven equipment generally is needed.

6.2.2 Chemical Analyses

Soil samples may be collected for laboratory chemical analyses. The methodology for preparation of samples and analytical techniques are described in the QAPP (Attachment A).

Field analyses may be conducted on soil samples, including determination of volatile organic vapors using either an OVA or a photoionizer such as an HNu or Photovac instrument. The OVA uses a flame ionization detector to measure organic vapors. Organic material that burns in a hydrogen flame can be detected. The OVA is most sensitive to aliphatic and aromatic hydrocarbons. It is less sensitive to alcohols, ketones, and aldehydes. The instrument's sensitivity decreases with increasing chlorine substitution to various hydrocarbons. The OVA is only moderately sensitive to many volatile organic halocarbons and is relatively insensitive to trihalomethanes and carbon tetrachloride. The ambient (background) reading will be subtracted from the field measurement of the sample. The sample will also be screened with a carbon filter probe which isolates the amount of methane the sample registers. The methane value will be subtracted from the unfiltered value where hydrocarbons may be detected producing a resultant value.

The HNu and Photovac uses a photoionization technique to detect selected organic vapors in the sampled air stream. These instruments primarily respond to organic compounds containing double or triple bonds such as alkenes (ethene, propene, etc.), chlorinated alkenes (trichloroethene, tetrachloroethene, various dichloroethenes), aromatic hydrocarbons (benzene, xylene, toluene), as well as many ketones and aldehydes.

6.3 Hydrogeologic Investigation

The objective of the hydrogeologic investigation is to provide an outline for conducting the necessary investigations to (1) determine the nature of the subsurface geology and aquifer characteristics at the facility, and (2) determine the presence or absence of releases.

Based on the review of existing data and reports and the results of field reconnaissance activities, a Phase I field investigation program will be undertaken to obtain site-specific information on the hydrogeology, including lithology, stratigraphy, structure, presence of aquifer(s) and confining unit(s), aquifer characteristics, physical and chemical characteristics of the formation, water levels, recharge/discharge, water quality, and ground-water use.

6.3.1 Drilling

Hollow-stem auger drilling involves the use of hollow auger flights to drill a borehole. The method is rapid and extremely effective in most unconsolidated, but cohesive sediments. The major advantage to this method is that fluids are not introduced to the hole. Also, it is the ideal method for drilling to obtain undisturbed samples for geotechnical and chemical analyses. The best method for collecting a soil sample using auger drilling is by driving a split spoon through the center of the auger flight. Maximum penetration using hollow stem auger is generally 75 to 100 feet below land surface.

6.3.2 Formation Sampling

Formation sampling provides a means to examine the physical and mineralogical properties of the geologic media. Methods of formation sampling include drilling or augering soil borings and excavating test pits; and sampling using split-spoons, augers, and Shelby tubes or collecting grab samples. Samples may be described and field analyzed or sent to a laboratory for geotechnical or chemical analyses. Appropriate sample collection and preservation techniques are specified in the QAPP (Attachment A).

6.3.3 Monitoring Wells

The purpose of monitoring wells will be to supplement existing wells in defining ground-water flow rates and direction, aquifer characteristics, and to assist in determining if releases are present. Monitoring wells will be installed in the unconsolidated surficial sediments. All drilling development and sampling equipment will be decontaminated in accordance with the QAPP (Attachment A).

Boreholes for installation of surficial monitoring wells will be of sufficient diameter to permit a minimum of 2 inches of annular space when the well is installed. The surficial monitoring wells will be completed at varying depths depending on the lithology encountered; depths of surficial wells will be approximately 30 feet and less. Split-spoon samples will be collected continuously to 10 feet below land surface (bls) and at 5-foot intervals thereafter to the total depth of the well. Soil samples for grain-size distribution and moisture content will be collected with the split-spoon samplers.

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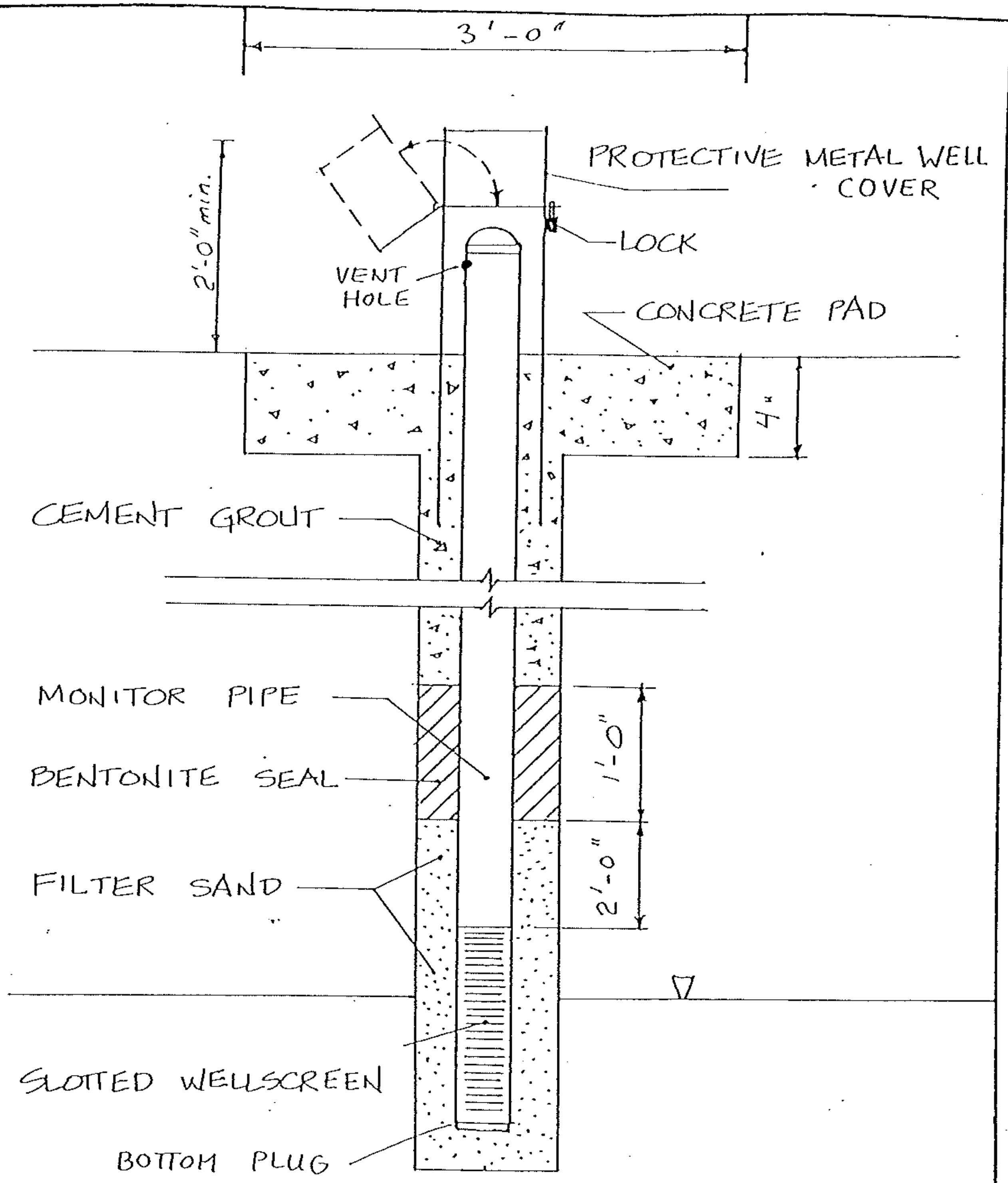
The physical characteristics of the samples obtained will be described in detail on lithologic logs using the United Soil Classification System. Soil samples will be classified based on the results of geotechnical laboratory analyses. A detailed well construction log will be prepared for each well.

The surficial monitoring wells will be constructed using 5 feet or more of new, 2-inch-diameter, factory-slotted or continuous wrap, polyvinyl chloride (PVC) well screen with Schedule 40, threaded, flush joint, PVC casing extending to 3 feet above land surface. The PVC casings will conform to the requirements of ASTM-D 1785 and will carry the seal of the National Sanitation Foundation. Each well will be fitted with a vented PVC cap and protection as outlined in the field sampling plans for each SWMU.

The screen length, screen size, and screened interval of the well will be selected so that the completed monitoring well yields quantities of water and samples that are representative of the selected zone of interest. Consideration will be given to the effects of precipitation at Fort Stewart which causes great fluxation of the water-table surface. The screen length will be 10 feet to insure that the water table remains within the screened interval at all times.

The annular space between the borehole and screen (approximately sized for the selected well screen) will be filled with uniformly graded silica sand from the bottom of the hole to approximately 2 feet above the top of the well screen using the tremie method. The tremie method incorporates the use of a drop pipe placed in the annular space of the well through which sand can be placed at the desired depth.

A bentonite seal with minimum thickness of 1 foot will be placed above the filter pack in each well to prevent downward migration of cement grout (Figure 6.1). The seal, consisting of tamped bentonite pellets or bentonite slurry also will be installed by the tremie method. The remaining annular space above the bentonite will be sealed by pressure grouting with cement grout to land surface. The cement grout will consist of a mixture of Portland Type I cement (ASTM-C 150) and water in the proportion not to exceed seven gallons of clean water per bag of cement (94 pounds). Additionally, 5 to 10 percent by weight of bentonite powder will be added to the grout to prevent shrinking and to control the heat of hydration during grouting, which can cause the casing to warp.



JOB SHEET TITLE	TYPICAL MONITOR WELL	REFERENCED DRAWING NO. REFERENCED SHEET NO.	SKETCH SK-- – 1 OF 1
		CONTRACT NO. DACA21-90-C-0079 MODIFICATION NO.	DATE 10-30-90
BASE	(NOT TO SCALE)	INVITATION NO. ADDED BY AMENDMENT NO.	OSGR TFN

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FIGURE 6.1 PROPOSED MONITOR WELL CONSTRUCTION

Boreholes will be drilled as near to plumb and true as possible to assist in proper casing alignment, sand pack, and cement seal. Precautions will be used during the drilling and well construction to prevent the entry of foreign material into the well. The well casing will extent to 2 to 3 feet above grade and will be surrounded by a large diameter steel casing set into a concrete pad. The steel casing will have a lockable cap. The concrete pad will be a minimum of 3 feet by 3 feet wide and 4 inches thick, sloped away from the well.

After the completion of each monitoring well, but no sooner than 48 hours after grouting is completed, well development will be conducted. The wells will be developed by alternately swabbing (with a surge block) and pumping or bailing. No acids, dispersing agents, or explosives will be used in the well. Development will continue until pH, conductivity, and turbidity have stabilized. If the well yield is too low to permit continuous pumping or bailing, the well will be alternatively swabbed, pumped, or bailed dry, and allowed to recharge at least five well volumes.

6.3.4 Ground-water Sampling

6.3.4.1 Well Survey

Elevations at sites within one-half mile of the cantonment area will be surveyed to a common datum point. Elevations at sites greater than one-half mile distance from the cantonment area will be surveyed to a temporarily established bench mark.

6.3.4.2 Water-Level Measurements

The static water-level will be measured prior to purging and sampling the ground water. The static water level will be determined to the nearest 0.01 foot. An electronic water-level indicator (M-scope) or chalked steel tape will be used for the water-level measurement. Duplicate measurements will be recorded for each well and referenced to the survey point (top of well casing). Devices used to measure ground-water levels shall be calibrated to 0.01 feet per 10-foot length. Before each use, these devices shall be prepared according to the manufacturer's instructions (if appropriate) and checked for obvious damage. These devices shall be decontaminated after each use as described in Appendix A. Calibration and maintenance data shall be recorded in a logbook.

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6.3.4.3 Purging the Well

After a water-level measurement has been taken, the monitoring well will be purged to remove the standing water. Purging can be accomplished by pumping or bailing. If pumping used, the end of the intake tube will be positioned just below the static water level. The intake is then lowered as the water level drops so that the water in the well casing is completely and efficiently removed. The intake tube will be removed from the well before suction has been discontinued. Bailing the well is acceptable. However, if a bailer is employed, extreme care will be taken in lowering the bailer into the well to avoid "surging" the water in the casing. Three to five volumes of water will be evacuated from each well so that a representative sample of formation water is collected.

6.3.4.4 Field Measurements

After purging the well, a water sample will be collected to obtain measurements of pH, temperature, and conductivity. Before obtaining these measurements, the field instrumentation must be properly calibrated in accordance with the QAPP (Attachment A).

6.3.4.5 Sample Collection

After obtaining the field measurements, the monitoring well will be sampled for the parameters of interest. Geraghty & Miller will obtain samples for organic analyses with a bottom-filling Teflon^{TM} bailer. Sampling for dissolved metals involves mounting an in-line 0.45μ membrane filter to a filter stand and connecting the stand to the outlet of the peristaltic pump.

Samples of the ground water present in the screened interval will be collected by lowering the pump intake or Teflon^{TM} bailer, as appropriate, to a depth below land surface (bls) that is approximately equal to the depth to the center of the well screen. This procedure will be initiated so that the sample collected is representative of ground water at the depth of the screened interval.

Sample containers, preservation techniques, and shipping procedures are specified in the QAPP (Attachment A). Decontamination procedures for the pumping and sampling equipment also are detailed in Attachment A.

7.0 HEALTH AND SAFETY PLAN

This Health and Safety Plan (HASP) has been prepared by Geraghty & Miller, Inc. to be used during the RCRA Facility Investigation at Fort Stewart. The Resume of Negotiation Proceedings indicated that all drilling, sampling, and other field activities will be performed in Level D protection. Therefore, this plan is designed for Level D protection only. In the event that conditions at a site necessitate a higher measure of personnel protection, work will stop at that site and the COE Project Manager will be notified. Work conducted under higher levels of protection will be handled under contract modifications. The elements of this Level D HASP are described in detail in Attachment B.

8.0 REFERENCES

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APPENDIX 1.0

LIST OF ACRONYMS AND ABBREVIATIONS

APPENDIX 1.0

List of Acronyms and Abbreviations

ACOE	Army Corps of Engineers
Ag	Silver
As	Arsenic
ASTM	American Standards for Testing and Materials
Ba	Barium
BH	Borehole
BTEX	Benzene, toluene, ethyl benzene, xylene
Cd	Cadmium
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
Cr	Chromium
DEH	Directorate of Engineering and Housing
DFAE	Directorate of Facilities Engineering
DIO	Directorate of Industrial Operations
DOT	Department of Transportation
DPDO	Defense Property Disposal Office
DRMO	Defense Reutilization and Marketing Office
EOD	Explosive Ordnance Disposal
EP TOX	Toxicity Extraction Procedure
EPD	Environmental Protection Division
GARNG	Georgia Army National Guard
GDNR	Georgia Department of Natural Resources
Hg	Mercury
HNu	Photoionization detector
HW	Hazardous waste
IWTP	Industrial Waste Treatment Plant
LAW	Light antitank weapon
MG	Million gallons
MSL	Mean sea level
MW	Monitor well
OVA	Organic Vapor Analyzer
Pb	Lead
POL	Petroleum, oils, and lubricants

APPENDIX 1.0

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List of Acronyms and Abbreviations

POW	Prisoner of War
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
Se	Selenium
SOW	Scope of Work
SWMU	Solid Waste Management Unit
TCLP	Toxic Characteristics Leachate Procedure
TOC	Total organic carbon
TOX	Total organic halogens
TPH	Total petroleum hydrocarbons
TRC	Tracer Resource Corporation
USAR	U.S. Army Reserve
USCS	U.S. Conservation Survey
UST	Underground storage tank
VOA	Volatile organic aromatics

APPENDIX 2.1

CHARACTERISTICS OF WELLS AT FORT STEWART

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY 1988

APPENDIX 2.1 CHARACTERISTICS OF WELLS AT FORT STEWART, GEORGIA

Well No.	Location	Casing Diameter (Inches)	Depth of Casing/Well (Feet)	Pump Types	Main Pump Rating (GPM)	Motor (HP)	Water Storage Facilities Type	Water Storage Capacity (Gallons)	Appurtenances and Notes
1	Bldg. P00939, 1st St. and Wilson Ave, Main Post	14	451/816	10" vertical Turbine, Jacuzzi Booster	1750	125	---	---	A,B,C,D,E,F,G
2	Bldg. P00456, Herd Road, Main Post	12	470/808	10" vertical Turbine, Jacuzzi Booster	1400	125	---	---	A,B,C,D,E,F,H
3	Bldg. 1345, 15th St. and Wilson Ave. Main Post	12	436/750	10" vertical Turbine, Peabody Booster	1400	125	---	---	A,B,C,D,E,F,H
4	Bldg. T09961, 12th St. and Bultman Ave. Main Post	12	464/802	10" vertical Turbine, Jacuzzi Booster	1400	125	---	---	A,B,C,D,E,F,H
5	Bldg. T07731, E. Lowe Circle, Wright AAF	10	374/472	8" Peabody Vertical, Turbine, Aurora Booster	500	50	Pressure	8,000	A,D,E,F,H
6	Bldg. T07732, W. Lowe Circle Wright AAF	10	393/500	8" Vertical Turbine, Jacuzzi Booster	500	50	---	---	A,B,D,E
7	T16009, Taylors Creek	10	360/468	8" Vertical Turbine, Jacuzzi Booster	500	50	Pressure	8,000	B,C,E,H
8	Bldg. T15003, Camp Oliver	8	451/706	6" Vertical Turbine, Aurora Booster	400	30	Pressure	12,000	A,B,C,D,E,H
9	Bldg. S19222 TAC-X	6	403/560	4" Vertical Turbine	175	10	Pressure	5,000	B,C,D,E,H,I
10	T 19107 Evans Army Heliport	6	404/600	4" Vertical Turbine, Jacuzzi Booster	135	10	Elevated	150,000	B,C,D,E,H,I
--	P17006 Ammunition Supply Point	4	---/500	3" Vertical Turbine, Jacuzzi Booster	75	5	Pressure	600	A,C,E
--	Bldg. P08330, Skeetrange Holbrook Pond	3 and 4	---/605	Submersible at 80' depth	80	3	Pressure	315	J,K
--	Bldg. P08331 Campground Holbrook Pond	3 and 4	---/605	Submersible at 80' depth	80	3	Pressure	315	J,K

A. Totalizer and recording flow meter
B. Water level gauges
C. Automatic control system
D. Platform for chlorine tanks
E. Wallace and Tiernan V-notch clorinator, model V-75
F. Wallace and Tieman fluoridation pump, model A747
G. Standby gas engine
H. Standby diesel engine
I. Pump timer
J. Wallace and Tiernan 94 series solution metering pump, hypochlorinator
K. No flow meter, no pump timer

Source: U. S. Army Environmental Hygiene Agency 1988

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APPENDIX 2.2

CHARACTERISTICS OF POTABLE WELLS AT THE MAIN CANTONMENT AREA

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY 1988

APPENDIX 2.2 . CHARACTERISTICS OF POTABLE WELLS AT THE MAIN CANTONMENT AREA

Well	Diameter Inches	Depth Feet	Casing Depth Feet	Flow (GPM)*	Standby Power Flow (GPM)
1	14	816	451	1,750	950
2	12	508	393	1,400	1,400
3	12	750	436	1,400	1,400
4	12	805	439	1,400	1,400
11	16	779	560	1,000	1,000

*GPM = Gallons per minute

No well characteristics such as diameter, well depth and casing setting are presented for the outlying wells in reference 2, except for the well's rated pump rates (Table D-4).

TABLE D-4. PUMP RATED FLOW IN THE OUTLYING POTABLE WELLS

Well	Area	Total Rated Flow Capacity	Standby Power
5	Wright Army Airfield	500 GPM	Yes
6	Wright Army Airfield	500 GPM	No
7	Taylors Creek	500 GPM	Yes
8	Camp Oliver	400 GPM	Yes
9	TAC-X	175 GPM	Yes
10	Evans Basefield	190 GPM	Yes
-	Ammunition Supply Point	75 GPM	No
-	Holbrook Pond (Skeet Range)	80 GPM	No
-	Holbrook Pond (Campground)	80 GPM	No

Source: U. S. Army Environmental Hygiene Agency 1988

APPENDIX 4.1

RESULTS OF SOIL BORING PROGRAM
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1981

APPENDIX 4.1 Results of Soil Boring Program
FST-001, FST-002, FST-003

Soil Boring	Depth (ft)	Samples		Date Completed
		Split Spoon	Shelby	
TAC-X Site				
TX-B1	50	11	--	1/16/80
TX-B2	50	11	--	1/17/80
TX-B3	50	11	--	1/17/80
TX-B4	50	11	--	1/17/80
TX-B5	100	21	--	1/18/80
Camp Oliver Site				
CO-B1	100	21	--	1/23/80
CO-B2	50	11	--	1/21/80
CO-B3	50	11	--	1/21/80
CO-B4	50	11	--	1/22/80
CO-B5	50	11	--	1/22/80
South Central Site				
SC-B1	100	20	1	2/8/80
SC-B2	50	11	--	1/24/80
SC-B3	50	11	--	1/24/80
SC-B4	50	11	--	1/25/80
SC-B5	50	10	1	2/6/80
SC-B6	50	11	--	1/30/80
SC-B7	50	11	--	1/30/80
SC-B8	50	11	--	1/30/80
SC-B9	50	11	--	1/25/80
SC-B10	50	11	--	2/1/80
SC-B11	50	10	1	2/5/80
SC-B12	50	10	1	2/5/80
SC-B13	50	11	--	2/6/80
SC-B14	50	11	--	2/4/80
SC-B15	100	21	--	2/11/80
SC-B16	50	10	1	2/1/80

Source: ESE, 1981.

APPENDIX 4.2

RESULTS OF WELL DRILLING PROGRAM
FST-001, FST-002, FST-003

SOURCE: ESE, 1981

APPENDIX 4.2 Results of Well Drilling Program FST-001, FST-002, FST-003

Date	Depth	Yield	Date Completed
TAX-C Site			
TX-M1	46.5	7	1/24/80
TX-M2	26.0	10	2/4/80
TX-M3	45.5	4	2/8/80
TX-M4	49.5	3	1/30/80
TX-OW1	47.0	10	4/12/80
Camp Oliver Site			
CO-M1	36.0	0.5	2/13/80
CO-M2	45.5	*	2/17/80
CO-M3	25.5	3	2/21/80
CO-M4	46.0	*	2/25/80
South Central Site			
SC-M1	25.0	3	2/29/80
SC-M2	21.5	2	3/4/80
SC-M3	25.5	2	3/10/80
SC-M4	21.5	2	3/15/80
SC-M5	33.5	7	3/19/80
SC-M6	27.5	3	3/24/80
SC-OW1	50.0	*	4/15/80
SC-OW2	50.0	*	4/17/80
SC-OW3	31.0	*	4/19/80
SC-OW4	31.0	*	4/22/80
SC-OW5	30.0	*	4/25/80
SC-OW6	40.0	*	4/27/80
SC-OW7	35.0	*	4/29/80

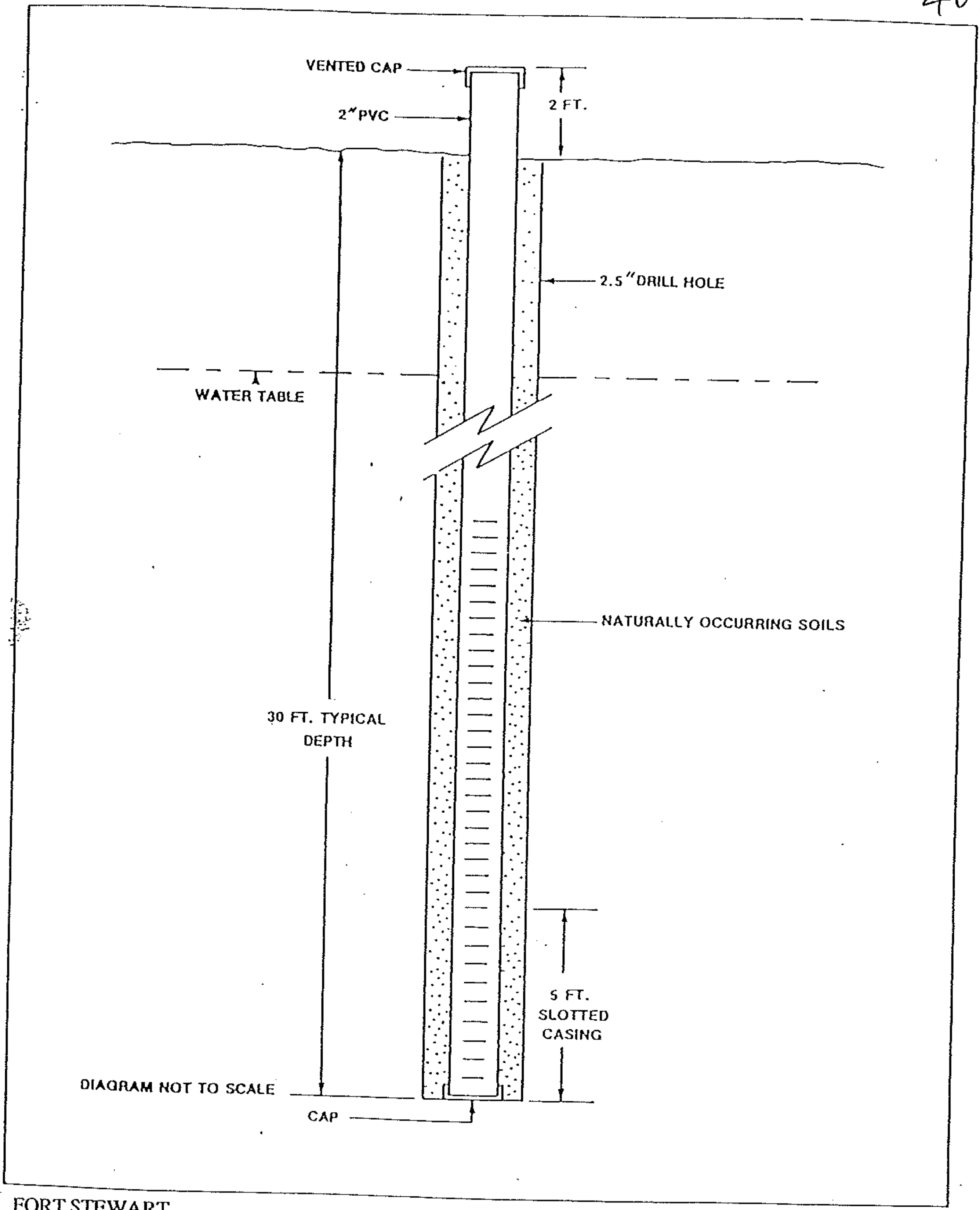
* Not Measured

Source: ESE, 1981.

APPENDIX 4.3

TYPICAL OBSERVATION WELL INSTALLATION

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY 1988



FORT STEWART

TYPICAL OBSERVATION WELL INSTALLATION (1980 Wells)

Source: U. S. Army Environmental Hygiene Agency 1988

APPENDIX 4.4

DRILLING LOGS, LITHOLOGIC COMPLETION
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1982

Hole No. TX-B1

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 of 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station) N 761020.89 E 659616.81

3. DRILLING AGENCY Pittsburgh Testing Laboratories

4. HOLE NO. (As shown on drawing title and file number) TX-B1

5. NAME OF DRILLER Robert Prophet

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 50'

10. SIZE AND TYPE OF BIT Split spoon 1½" ID, Bit size 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 11 UNDISTURBED

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER 3.08' ATOB

16. DATE HOLE STARTED 1/16/80 COMPLETED 1/16/80

17. ELEVATION TOP OF HOLE 72.9'

18. TOTAL CORE RECOVERY FOR BORING

19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP 2.5Y 7/2 light grey, slightly silty fine sand, poorly sorted 2.0'		1	very loose, dry blows/ft pushed
	5		SP-SM 2.5Y 5/6 light olive brown slightly clayey silty fine sand, poorly sorted 7.0'		2	very firm, moist 30
	10		SM 5 YR 5/2, reddish grey slightly clayey, silty very fine sand		3	very stiff, moist 22
			coarse sand			
			grey clay 14.5'			
	15		SP 10 YR 6/2 light brownish grey, slightly silty fine sand, poorly sorted 18.0'		4	firm, wet 17
	20		SP-SM 5 YR 6/8, reddish yellow, silty medium to coarse sand 21.0'		5	very loose, wet 2
	25		SP 5Y 5/2 olive grey, slightly silty fine - medium sand (27.5')		6	dense, wet 18
	30		SC 5Y 6/2, light olive grey slightly clayey, silty fine sand		7	stiff, moist 11

FST-003

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 72.9'	Hole No. TX-B1
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(32.5')			
	35		SM 2.5 Y 6/2 light brownish grey, slightly silty medium to coarse sand		8	Dense, wet 15
	40		SM 2.5 Y 6/2 light brownish grey, slightly silty medium to coarse sand		9	loose, wet 14
	45		SM 5 Y 6/2 light olive grey, slightly silty medium to coarse sand		10	loose, wet 13
	50		SM 2.5 Y 7/2 light grey slightly silty medium to coarse sand		11	loose, wet 32

Source: Environmental Science and Engineering 1982

Hole No. TX-B2

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT: Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station): N. 760796.31 E. 659829.35

3. DRILLING AGENCY: Pittsburgh Testing Laboratories

4. HOLE NO. (As shown on drawing title and file number): TX-B2

5. NAME OF DRILLER: Robert Prophet

6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK: 0'

9. TOTAL DEPTH OF HOLE: 50'

10. SIZE AND TYPE OF BIT: S.S. 1½" ID, Bit 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL

12. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD2

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11 : UNDISTURBED

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER: 3.08' ATOB

16. DATE HOLE: STARTED 1/17/80 : COMPLETED 1/17/80

17. ELEVATION TOP OF HOLE: 72.1'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR: Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/ft
		○	SP 2.5 Y 6/2 light brownish grey fine to medium sand 2.25'		1	loose, moist	pushed
	5	○○	SP-SM 10 YR 5/1, 10 YR 6/6 10 R 5/8 mixed red grey, brownish yellow slightly clayey silty sand, fine to medium		2	very stiff, moist	17
	10	○○	SP-SM 10 YR 5/6 yellowish brown, very slightly clayey silty fine to medium sand 12.5'		3	very firm, moist	26
	15	○	SP 10 YR 6/3 pale brown medium to coarse sand, poorly sorted		4	very firm, moist	29
	20	●	SP 10 YR 6/8 brownish yellow slightly silty medium to coarse sand, poorly sorted 21.0'		5	firm, moist	15
	25	●●	SP-SM 7.5 YR 6/6, reddish yellow clayey, silty medium to coarse sand 28.0'		6	soft, moist	2
	30	●	SP 7.5 YR 7/6 reddish yellow slightly silty medium to coarse sand, poorly sorted 32.5'		7	loose, moist	6

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 72.1'	Hole No. TX-82
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			32.5'				
			34.0'				
	35		SP-SM 10 YR 6/3 pale brown, very slightly clayey, silty medium sand (37.5')		8	firm, moist	12
	40		SP 10 YR 6/1 grey, medium to coarse sand poorly sorted		9	firm, moist	14
	45		SP 10 YR 6/4 light yellowish brown, slightly clayey medium to coarse sand, poorly sorted		10	slight loss of drilling fluid	11
	50		SP 10 YR 6/2 light brownish grey slightly clayey silty medium to coarse sand, poorly sorted		11	firm, moist	17

Source: Environmental Science and Engineering 1982

Hole No. TX-B3

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DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies

LOCATION (Coordinates or Station) N. 760412.14 E. 659667.31

2. DRILLING AGENCY Pittsburgh Testing Laboratories

3. HOLE NO. (As shown on drawing title and file number) TX-B3

4. NAME OF DRILLER Robert Prophet

5. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 30'

10. SIZE AND TYPE OF BIT S.S. 1½" ID. Bit 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED 11 : UNDISTURBED

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER 2.92' ATOB

16. DATE HOLE : STARTED 1/17/80 : COMPLETED 1/17/80

17. ELEVATION TOP OF HOLE 68.5'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/ft.
			SP 2.5Y 6/4 light yellowish brown, slightly silty fine sand poorly sorted		1	loose, dry	pushed
	5		SP 7.5 YR 5/8 strong brown medium to coarse sand, poorly sorted		2	Dense, moist	13
	10		SP 10 YR 7/6 yellow silty fine to medium sand poorly sorted 10.75'		3	Dense, moist	31
	15		SP-SM 7.5 YR 7/8 reddish yellow , very slightly clayey silty medium to coarse sand with slight amount of gravel 14.5'		4	Firm, wet	22
	20		SM 5 YR 7/6 reddish yellow silty fine to medium sand		5	very soft, wet	1
	25		SM 7.5 YR 7/6 reddish yellow very slightly silty fine to medium sand, poorly sorted, with chuncks of grey clay in wash.		6	Firm, moist	16
	30		SM 10 YR 7/8 yellow slightly silty fine to medium sand poorly sorted (32.5')		7	Very loose, moist	4

FST-003

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 68.5'	Hole No. TX-B3
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM (32.5')			
	35		~~SM-SC~~ 10 YR 5/2 greyish brown clayey silty medium to coarse sand, poorly sorted (37.5')		8	Firm, moist 12
	40		SP-SM 2.5 Y 5/2 greyish brown slightly clayey, silty medium to coarse sand, poorly sorted		9	Firm, moist 12
	45		SP-SM 2.5 Y 5/2 greyish brown silty medium to coarse sand poorly sorted (47.5')		10	Loose, moist 6
	50		SM 10 YR 6/1 grey slightly silty medium to coarse sand		11	Loose, moist 20

FST-003

Source: Environmental Science and Engineering 1982

Hole No. TX-84

417

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies	10. SIZE AND TYPE OF BIT S.S. 1½" ID, Bit 3 7/8"
2. LOCATION (Coordinates or Station) N. 760717.38 E. 659264.50	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY Pittsburgh Testing Laboratories	12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
4. HOLE NO. (As shown on drawing title and file number) TX-84	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED
5. NAME OF DRILLER Robert Prophet	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.	15. ELEVATION GROUND WATER 2.17' ATOB
	16. DATE HOLE: STARTED 1/17/80; COMPLETED 1/17/80
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE 67.5'
8. DEPTH DRILLED INTO ROCK 0'	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 50'	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/ft. pushed
			SP 10 YR 5/11 grey slightly silty fine sand, poorly sorted		1	Loose, moist	
	5		SP 10 YR 5/2 greyish brown very slightly silty fine to medium sand poorly sorted (7.5')		2	Firm, moist	12
	10		SP-SM 10 YR 5/2 greyish brown very slightly clayey silty fine to medium sand (12.5')		3	Firm, moist	15
	15		SP 10 YR 6/3 pale brown slightly silty fine to medium sand, poorly sorted		4	very firm, moist	28
	20		SP 10 YR 4/4 dark yellowish brown very slightly silty medium sand, with very slight amount of organics 22.5'		5	loose, moist	6
	25		SM ~~SC-SM~~ 10 YR 4/3 brown very slightly silty, clayey fine sand 28.75'		6	very stiff, moist	20
	30		SM 10 YR 4/2 dark greyish brown, slightly silty fine to medium sand 32.5'		7	very firm, moist	24

FST-003

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 67.5'	Hole No. TX-B4
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	30		SM2.5 Y 6/2 light brownish grey slightly silty fine to medium sand (37.5')		8	very firm, moist 21
	40		SP-SM 2.5 Y 6/2 light brownish grey very slightly clayey, silty fine sand (42.5')		9	firm, moist 25
	45		SP 2.5 Y 6/2 light brownish grey very slightly silty fine sand		10	dense, moist 29
	50		SP 2.5 Y 6/2 light brownish grey very slightly clayey fine to medium sand		11	dense, moist 54

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

Hole No. TX-B5

421

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 3 SHEETS

1. PROJECT Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station) N. 761028.11 E. 659291.50

3. DRILLING AGENCY Pittsburgh Testing Laboratories

4. HOLE NO. (As shown on drawing title and file number) TX-B5

5. NAME OF DRILLER Robert Prophet

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 100'

10. SIZE AND TYPE OF BIT S.S. 1½" ID, Bit 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL Acker A02

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 21 UNDISTURBED

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER 3.50' ATOB

16. DATE HOLE STARTED 1/18/80 COMPLETED 1/18/80

17. ELEVATION TOP OF HOLE 72.4'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			SP 2.5 Y 6/2 light brownish grey slightly silty fine sand with organics poorly sorted 1.5'		1	loose, moist	Blows/ft pushed
	5		SM-SP 2.5 Y 6/4 light yellowish brown very slightly clayey silty fine sand, poorly sorted		2	loose, moist	6
	10		SM-SP 5 YR 5/1 grey, very slightly clayey silty medium to coarse sand, poorly sorted coarse sand and gravel (12.5')		3	very firm, moist	29
	15		SP 10 YR 6/2 light brownish grey slightly silty medium sand, poorly sorted		4	dense, wet	33
	20		SP 5 Y 4/1 dark grey silty fine sand with slight amount of organics. 23.0'		5	soft, wet	2
	25		SC 5 Y 5/1 grey, slightly silty clayey silty fine sand 26.25'		6	very stiff, moist	19
	30		SM 5 Y 5/1 grey slightly silty medium to coarse sand, poorly sorted 32.5'		7	very firm, moist	25

FST-003

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 72.4'

Hole No. TX-B5

PROJECT: Fort Stewart RCRA Studies

INSTALLATION: Fort Stewart, GA

SHEET 2 OF 3 SHEETS

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SP 5 Y 5/2 olive grey, very slightly clayey medium to coarse sand, poorly sorted		8	very firm, moist 20
	40		SP 5 Y 5/1 grey very slightly clayey medium to coarse sand, poorly sorted		9	very firm, moist 22
			(42.5')			
	45		SM 10 YR 6/2 light brownish grey slightly silty medium to coarse sand, poorly sorted		10	dense, wet 34
	50		SM 10 YR 5/1 grey very slightly silty medium to coarse sand with slight amount of gravel poorly sorted		11	very dense, wet 56
	55		SM 5 Y 6/1 grey slightly silty medium to coarse sand with slight amount of gravel poorly sorted		12	very dense, wet 50/0.75'
	60		SM 10 YR 5/1 grey slightly silty medium to coarse sand with slight amount of gravel increasing in size		13	very dense, wet 50/0.83' beginning to lose drilling fluid
	65		SM 2.5 Y 6/4 light yellowish brown slightly silty coarse sand with slight amount of gravel		14	very dense, wet 50/0.50' continued loss or drilling fluid
	70		SM 2.5 Y 5/2 greyish brown slightly silty micaceous fine sand, poorly sorted 72.5'		15	50/0.67' hard, moist difficult drilling

Source: Environmental Science and Engineering 1982

425

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 72.4'	Hole No. TX-85
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			72.5'			
	75		SP 2.5 Y 5/2 greyish brown very slightly silty micaceous		16	very hard, moist 50 difficult drilling
	80		SP 2.5 Y 6/2 light greyish brown very slightly silty, micaceous medium to coarse sand		17	very hard, moist 50/0.92' difficult drilling
	85		SP 5 Y 6/1 grey slightly silty micaceous fine sand		18	hard, wet 50/0.92' difficult drilling
	90		SP 5 Y 5/2 olive grey slightly silty micaceous fine sand		19	hard, wet 50/0.92' difficult drilling
	95		SP 5 Y 4/1 dark grey slightly silty micaceous fine sand		20	hard, wet 50/0.79 difficult drilling
	100		SP 5 Y 5/3 olive, slightly silty micaceous fine sand		21	hard, wet difficult drilling 50/0.83

FST-003

Source: Environmental Science and Engineering 1982

Hole No. CO-B1

427

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 3 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N. 754448.76 E. 608748.37
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) CO-B1
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 100'
10. SIZE AND TYPE OF BIT split-spoon 1⅜" ID, bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 21 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 11.75' @ 24 hrs
16. DATE HOLE STARTED 1/23/80 COMPLETED 1/23/80
17. ELEVATION TOP OF HOLE 143.9'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH 0 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP 7.5 YR 5/6 strong brown slightly silty, slightly clayey, poorly sorted fine sand 2.75'		1	Blows/ft. Pushed
	5		SM 2.5 YR 4/6 red clayey silty medium to coarse sand (7.5)		2	stiff, moist 11
	10		SM-SP 5 YR 6/8 reddish yellow, slightly clayey, silty, fine to medium sand (12.5')		3	very stiff, wet 20
	15		SC 5Y 8/2, 5 YR 7/6 mixed white, reddish yellow slightly silty, clayey fine sand, sand component increases at 17'		4	very stiff, moist 17
	20		SC 10 YR 6/6 brownish yellow silty, clayey fine sand		5	stiff, wet 9
	25		SC 5 YR 6/4 light reddish brown slightly silty, clayey sand 27.0'		6	stiff, moist 11
	30		SP-SM 2.5Y 7/2 light grey clayey silty poorly sorted fine sand		7	medium density, moist 6

FST-002

Source: Environmental Science and Engineering 1982

429

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 143.9'	Hole No. CO-B1
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SP-SM 10 YR 8/4 very pale brown slightly clayey, silty poorly sorted fine sand		8	stiff, medium moist 10
	40		SP-SM 7.5 6/4 pale red clayey, silty fine sand		9	stiff, moist 9
			42.0			
	45		SC-SM 5Y 7/4, 10 YR 7/6 mixed pale yellow, yellow clayey, silty fine sand (mixed)		10	very stiff, moist 17
	50		SC-SM 5Y 6/4 pale olive clayey, silty, course sand		11	very stiff, moist 29
			54.5'			
	55		SP-SM 2.5Y 7/4 pale yellow silty clayey medium sand, sand poorly sorted		12	very dense, moist - cemented 50/0.42'
	60		SP-SM 2.5 7/4 pale yellow very slightly clayey silty fine to medium poorly sorted sand		13	very dense, moist 50/0.83'
	65		SP-SM 10 YR 7/4 very pale brown very slightly clayey silty medium to coarse poorly sorted sand		14	very dense, moist 50/0.58'
	70		SP-SM 2.5Y 8/2 white clayey, silty, fine to medium sand		15	hard, moist 50/0.75'
			(72.5')			

FST-002

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 143.9' | Hole No. CO-B1

PROJECT Fort Stewart RCRA Studies | INSTALLATION Fort Stewart, GA | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(72.5')			431
	75		SM 10 YR 7/3 very pale brown clayey silty medium sand 78.5'		16	hard, moist 50/0.71'
	80		SP-SM 10 YR 7/2 light grey clayey silty medium sand		17	hard, moist cemented 50/0.54'
	85		SP-SM 10 YR 8/1 white clayey silty fine sand alternating layers some cemented some not		18	dense, moist 64/0.5'
	90		SP-SM 5Y 8/1 white clayey, fine sand - silty fine sand (mixed) 94.25'		19	dense, moist 37
	95		CH blue-lavender; no Munsell soil equivalent silty clay 97.25'		20	very stiff, moist 22
	100		SP 10 YR 7/6 yellow silty fine to medium poorly graded sand		21	very dense, moist 50/0.79'

FST-002

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

Hole No. CO-82

433

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, CA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station) N. 754747.28 E. 608893.43

3. DRILLING AGENCY Pittsburgh Testing Laboratories

4. HOLE NO. (As shown on drawing title and file number) CO-82

5. NAME OF DRILLER Robert Prophet

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 30'

10. SIZE AND TYPE OF BIT split spoon 1½" I.D., bit size 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 11 UNDISTURBED

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER 4.17' @ 24 hrs.

16. DATE HOLE STARTED 1/21/80 COMPLETED 1/21/80

17. ELEVATION TOP OF HOLE 134.5'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			SP-SM 10 YR 5/4 yellowish brown very slightly clayey, silty fine sand with very slight amounts of coarse sand		1	soft, dry	Blows/ft Pushed
	5		SP-SM 10 YR 7/8 yellow clayey, silty fine to medium sand with gravel		2	soft, moist	3
	10		SP-SM 2.5 YR 6/8 light red very slightly clayey silty fine to medium sand with very slight amounts of gravel		3	hard, moist	37
	15		SP-SM 5 YR 6/8 reddish yellow, silty medium sand with gravel 18.0'		4	very stiff, moist	24
	20		SM 7.5 YR 7/8 reddish yellow silty coarse sand poorly sorted, with slight amount of gravel		5	firm, wet some fluid loss at 20 - 21'	11
	25		SM 10R 6/6 light red slightly clayey silty fine sand		6	loose, moist	10
	30		SM 10R 6/8 light red slightly silty medium to coarse sand with gravel (32.5')		7	firm, wet beginning to loose drilling fluid at 28'	14

FST-002

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 134.5' | Hole No. CO-B2

PROJECT Fort Stewart RCRA Studies | INSTALLATION Fort Stewart, GA | SHEET 2 OF 2 SHEETS

435

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(32.5')			
	35		SP 10R 6/6 light red medium to coarse sand with gravel		8	firm, wet 13 easy drilling continual loss of drilling fluids
	40		SP 10R 6/6 light red medium to coarse sand with gravel		9	firm, wet 15 losing drilling fluid
	45		SP 10 YR 7/8 yellow medium to coarse sand with gravel		10	firm, wet with 13 continual loss of fluid to 50'
	50		SP 2.5Y 7/8 yellow medium to coarse sand with gravel		11	firm, wet fluid loss 20

FST-002

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

Hole No. CO-B3

437

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
LOCATION (Coordinates or Station) N. 755236.12 E. 609181.53
2. DRILLING AGENCY Pittsburgh Testing Laboratories
3. HOLE NO. (As shown on drawing title and file number) CO-B3
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT Split spoon 1⅜" ID. Bit size 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 11 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 2.83' @ 24 hrs.
16. DATE HOLE STARTED 1-21-80 COMPLETED 1-21-80
17. ELEVATION TOP OF HOLE 123.4'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/ft.
			SP-SM 10 YR 6/6 brownish yellow silty fine to medium sand		1	very loose, dry	Pushed
	5		SP-SM 10 YR 6/6, 10 R 4/8 mixed brownish yellow, red. very slightly clayey, silty, fine to medium sand 8.0'		2	soft, moist	3
	10		SM 10 R 6/8 light red clayey, silty, very fine sand		3	stiff, moist	14
	15		SM 7.5 YR 7/4 pink clayey, silty very fine sand (17.5')		4	stiff, moist	14
	20		SP 7.5 YR 7/8 reddish yellow very slightly silty medium to coarse sand, poorly sorted 23.0'		5	firm, moist	12
	25		SM-SP 10 YR 8/6 yellow clayey, silty fine sand 29.0'		6	stiff, moist	6
	30		SP 10 YR 8/1 white, slightly silty fine sand, poorly sorted (32.5')		7	dense, moist	10

FST-002

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 123.4'	Hole No. CO-B3
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/Ft
	35		SM-SP 5 Y 8/2 pale yellow slightly clayey, silty medium to coarse sand		8	stiff, moist	10
	40		SM-SP 5 Y 7/2 light grey slightly clayey, silty, medium to coarse sand 44.0'		9	stiff, moist	31
	45		SM 5 Y 7/2 light grey silty very fine to fine sand		10	stiff, moist	8
	50		SM 10 YR 8/2 white, silty very fine to fine sand		11	stiff, moist	45

439

FST-002

Source: Environmental Science and Engineering 1982

Hole No. CO-B4

DRILLING LOG	DIVISION South Atlantic
INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS
1. PROJECT Fort Stewart RCRA Studies	10. SIZE AND TYPE OF BIT Split spoon 1 3/8" ID, bit size 3 7/8"
LOCATION (Coordinates or Station) N. 755140.67 E. 609482.36	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
2. DRILLING AGENCY Pittsburgh Testing Laboratories	12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
4. HOLE NO. (As shown on drawing title and file number) CO-B4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 ; UNDISTURBED
5. NAME OF DRILLER Robert Prophet	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4.08' @ 24 hrs.
	16. DATE HOLE: STARTED 1-22-80 ; COMPLETED 1-22-80
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE 123.4'
8. DEPTH DRILLED INTO ROCK 0'	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 50'	19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			SP-SM 10 YR 6/8 brownish yellow, slightly clayey, silty fine sand		1	firm, moist	Blows/ft Pushed
	5		SP-SM 7.5 YR 6/8 reddish yellow, slightly clayey, silty fine to medium sand with pebbles and gravel		2	stiff, moist	15
	10		SP-SM 7.5 YR 7/8 reddish yellow, clayey silty fine sand with gravel 14.0'		3	very stiff, moist	26
	15		SM 10 R 5/4 weak red, slightly clayey, silty fine sand		4	stiff, moist	12
	20		SM lavender-red no Munsell soil equivalent. Very slightly clayey, silty fine sand		5	stiff, moist	7
	25		SM 10 R 6/4 pale red, very slightly clayey, silty fine sand 27.0'		6	loose, moist	10
	30		SP-SM 5 Y 8/2 white, slightly clayey, silty fine sand, slightly micaceous 32.5'		7	stiff, moist gradual loss of drilling fluid	8

FST-002

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 123.4'	Hole No. CO-B4
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SP-SM 5 Y 8/2 white, very slightly clayey micaceous silty fine sand (37.5')		8	hard, moist difficult drilling 35
	40		SM 5 Y 7/2 light grey, micaceous silty fine sand 42.0'		9	hard, moist difficult drilling 43
	45		SP-SM 5 Y 8/1 white, silty fine - medium sand		10	stiff, wet difficult drilling 6
	50		SP-SM 7.5 YR 6/4 light brown slightly clayey, silty fine to medium sand		11	hard, moist 50/0.75' difficult drilling

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

Hole No. CO-B5

445

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT: Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station): N. 755140.67 E. 609482.36
3. DRILLING AGENCY: Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number): CO-B5
5. NAME OF DRILLER: Robert Prophet
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK: 0'
9. TOTAL DEPTH OF HOLE: 50'
10. SIZE AND TYPE OF BIT: Split spoon 1½" I.D. Bit size 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 3.33' @ 24 hours
16. DATE HOLE: STARTED 1-22-80 COMPLETED 1-22-80
17. ELEVATION TOP OF HOLE: 137.8'
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			SP-SM 7.5 YR 5/6 strong brown slightly clayey, silty fine to medium sand 2.0'		1	stiff, moist	Blows/ft pushed
	5		SM 2.5 YR 5/6 red, very slightly clayey, silty very fine sand (7.5')		2	very stiff, moist	21
	10		SP-SM 5 YR 6/8 reddish yellow clayey, silty medium to coarse sand (12.5')		3	hard, moist difficult drilling	31
	15		SC 5 YR 6/6 reddish yellow slightly clayey fine to medium sand, poorly sorted		4	hard, moist	17
	20		SC 7.5 YR 7/8 reddish yellow clayey fine to medium sand, poorly sorted (22.5')		5	stiff, wet	14
	25		SM 7.5 YR 7/8 reddish yellow slightly silty, medium to coarse sand with slight amount of gravel		6	firm, wet	17
	30		SM. 2.5 YR 6/8 light red slightly silty medium to coarse sand 32.5'		7	loose, moist	10

FST-002

Source: Environmental Science and Engineering 1982

447

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 137.8'

Hole No. CO-B5

PROJECT: Fort Stewart RCRA Studies

INSTALLATION: Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			32.5'				
	35		SM 2.5 YR 6/8 light red, slightly silty medium to coarse sand with slight amount of gravel		8	loose, moist	11
	40		SM 10 Y 8/8 yellow, silty medium to coarse sand with slight amount of gravel		9	firm, moist beginning to loose drilling fluid	13
	45		SM 2.5 Y 8/8 yellow, silty medium to coarse sand with gravel		10	firm, moist	16
	50		SM 5 YR 8/2 pinkish white silty medium to coarse sand with gravel		11	firm, moist with continual loss of drilling fluid to 50 feet	20

FST-002

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

Hole No. SC-81

449

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET
OF 3 SHEETS

1. PROJECT: Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station): N. 687157.80 E. 660530.34

3. DRILLING AGENCY: Pittsburgh Testing Laboratories

4. HOLE NO. (As shown on drawing title and file number): SC-81

5. NAME OF DRILLER: Robert Prophet

6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK: 0'

9. TOTAL DEPTH OF HOLE: 100'

10. SIZE AND TYPE OF BIT: S.S. 1½" I.D., Bit 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL

12. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD2

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 19 : UNDISTURBED 1

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER: 10.75' @ 24 hrs.

16. DATE HOLE: STARTED 2/7/80 : COMPLETED 2/8/80

17. ELEVATION TOP OF HOLE: 59.9'

18. TOTAL CORE RECOVERY FOR BORING

19. SIGNATURE OF INSPECTOR: Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/ft
			SC 2.5 YR 5/6, 5 YR 7/2, 5 YR 6/1, mixed red, pinkish grey, grey clayey fine sand (2.5')		1	loose, moist	pushed
	5		SM10 YR 8/1 white, slightly silty fine sand, very slight amount of clay		2	loose, moist	7
	10		SM10 YR 8/2 white, slightly silty fine sand, very slight amount of clay		3	very loose, moist	2
	15		SM7.5 YR 8/2 white, silty fine sand, slight amount of clay (17.5')		4	very loose, moist	1
	20		SC 10 YR 7/8 yellow silty, clayey fine to medium sand, poorly sorted 22.75'		5	very loose, mosit	2
	25		SP 7.5 YR 6/6 reddish yellow, very slightly silty micaceous medium to coarse sand, slight amount of gravel		6	very loose, moist	3
	30		SP 2.5 Y 7/4 7.5 YR 7/8 mixed pale yellow, reddish yellow, very slightly silty micaceous fine sand (32.5')		7	loose, moist	50

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 59.9'	Hole No. SC-B1
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(32.5')			451
	35		SM 10 YR 7/2 light grey, silty fine sand 37.75'		8	shelby tube Pushed
	40		SP-SM 10 YR 6/1 grey, very slightly clayey, silty fine sand, partially cemented 41.5'		9	very hard, moist difficult drilling 52
	45		SM2.5 Y 5/1 grey, slightly silty micaceous fine to coarse sand poorly sorted (47.5')		10	very hard, moist difficult drilling 57
	50		SP-SM 5 Y 6/2 light olive grey very slightly clayey, silty micaceous fine sand 52.0'		11	hard, moist difficult drilling 39
	55		SM 5 Y 5/1 grey silty micaceous fine to medium sand (57.5')		12	hard, moist difficult drilling 53
	60		SP-SM 5 Y 6/1 grey, silty fine to medium sand		13	hard, moist difficult drilling 50/0.54'
	65		SP - SM 5 Y 6/1 grey, silty fine to medium sand, with slight amount of clay		14	very stiff, moist difficult drilling 29
	70		SP-SM 5 Y 6/1 grey, silty fine to medium sand, with slight amount of clay 72.5'		15	hard, moist difficult drilling 33

FST-001

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 59.9'	Hole No. SC-B1
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			72.5'			
	75		No sample, lost sampler in hole (77.5')		16	hard, difficult drilling 50/0.83
	80		SM 5 Y 6/2 Light olive grey, slightly silty, micaceous fine sand		17	hard, difficult drilling, loose zone below 80' 52
	85		SM 5 Y 6/1 grey, slightly silty fine sand, poorly sorted (87.5')		18	very hard, difficult drilling 50
	90		SP-SM 5 Y 6/1 grey, silty fine sand, poorly sorted (92.5').		19	hard, difficult drilling 50/0.75
	95		SM 5 Y 6/1 grey, slightly silty fine sand, poorly sorted		20	hard, difficult drilling 56
	100		SM 5 Y 5/1 grey, slightly silty fine sand, poorly sorted		21	hard, difficult drilling 77

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-B2

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N. 687548.84 E. 660942.85
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) SC-B2
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 11 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 0.75' ATOB
16. DATE HOLE STARTED 1/24/80 COMPLETED 1/24/80
17. ELEVATION TOP OF HOLE 64.4'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

455

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/ft
			SP 10 YR 2/1 black fine to medium sand with organics 1.5'		1	loose, moist	pushed
	5		SM 7.5 YR 7/2 pinkish grey silty fine sand, poorly sorted 5.0'		2	very firm, moist	26
	10		SM 10 YR 7/3 very pale brown, slightly silty fine to medium sand, poorly sorted		3	loose, moist	8
	15		SM 2.5 Y 7/4 pale yellow slightly silty fine to medium sand, poorly sorted, picking up clay at bottom (17.5')		4	firm, moist	9
	20		SP 10 YR 8/2 white, fine to medium sand, poorly sorted (22.5')		5	firm, moist	15
	25		SM - SC 10 YR 6/8 brownish yellow, clayey, silty fine to medium sand 25.0'		6	very loose, moist	Pushed
	30		SM 5 Y 6/1 grey, silty micaceous fine sand with slight amount of clay (32.5')		7	firm, moist	22

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 64.4'	Hole No. SC-B2
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(32.5')			
	35		SP-SM 5 Y 7/1 light grey clayey, silty micaceous fine sand 37.0'		8	hard, moist 50/0.58' difficult drilling
	40		SM 5 Y 7/1 light grey, slightly silty micaceous fine sand		9	hard, moist 50/0.38' difficult drilling
	45		SM5 Y 7/1 light grey, slightly silty micaceous fine sand (47.5')		10	hard, moist 50/0.81' difficult drilling
	50		SP - SM 5 Y 7/2 light grey very slightly clayey silty fine sand		11	hard, moist 50/0.73' difficult drilling

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-B3

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DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS
1. PROJECT Fort Stewart RCRA Studies		10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"	
2. LOCATION (Coordinates or Station) N. 687929.13 E. 661144.17		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY Pittsburgh Testing Laboratory		12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2	
4. HOLE NO. (As shown on drawing title and file number)	SC-B3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 11 UNDISTURBED
5. NAME OF DRILLER Robert Prophet		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.		15. ELEVATION GROUND WATER 8.58' ATOB	
		16. DATE HOLE	STARTED 1-24-80 COMPLETED 1-24-80
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 62.6'	
8. DEPTH DRILLED INTO ROCK 0'		18. TOTAL CORE RECOVERY FOR BORING	
9. TOTAL DEPTH OF HOLE 50'		19. SIGNATURE OF INSPECTOR Robert [illegible]	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			SP-SM 5 YR 6/6, 5 YR 7/1, mixed light grey reddish yellow silty fine to medium sand (2.5')		1	loose, moist	Blows/ft pushed
	5		SM 2.5 Y 7/6 yellow, slightly silty fine sand		2	loose, moist	29
	10		SM 2.5 Y 8/2 white, slightly silty fine sand		3	loose, moist	18
	15		SM 10 YR 7/3 very pale brown silty fine sand		4	firm, moist	21
	20		SM 10 YR 6/3 pale brown, silty fine to medium sand, poorly sorted (22.5')		5	firm, moist	3
	25		SP-SM 5 Y 8/2 white, very slightly clayey, silty fine sand (27.5')		6	firm, moist	54/0.5'
	30		SM 5 Y 6/2 light olive grey, slightly silty fine sand 32.5'		7	hard, compacted, moist, difficult drilling	38

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 62.6'	Hole No. SC-83
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

461

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SC 5 Y 6/1 grey, slightly silty, clayey fine sand (37.5')		8	hard, moist 29 difficult drilling
	40		SP-SM 5 Y 5/1 grey, very slightly clayey micaceous silty fine sand (42.5')		9	hard, moist 50/0.83' compacted, difficult drilling
	45		SC 5 Y 7/2 light grey, very slightly silty clayey micaceous fine to medium sand		10	dense, compacted 50/0.83' moist, difficult drilling
	50		SM ~~SC~~ 5 Y 6/1 grey, very slightly silty clayey micaceous fine to medium sand		11	dense, compacted, moist difficult drilling 39

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-84

463

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT: Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station): N. 688417.13 E. 661633.71
3. DRILLING AGENCY: Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number): SC-84
5. NAME OF DRILLER: Robert Prophet
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK: 0'
9. TOTAL DEPTH OF HOLE: 50'
10. SIZE AND TYPE OF BIT: S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD2
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 3.0' ATOB
16. DATE HOLE: STARTED 1-25-80 | COMPLETED 1-25-80
17. ELEVATION TOP OF HOLE: 55.2'
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP 10 YR 7/2 light grey, slightly silty fine to medium sand, poorly sorted		1	loose, moist Blows/ft pushed
	5		SP 10 YR 8/2 white, slightly silty fine to medium sand, poorly sorted 7.0'		2	firm, moist 14
	10		SM-SC 2.5 Y 7/2 light grey, reddish brown streaks clayey, silty fine sand 14.5'		3	stiff, moist 12
	15		SM 2.5 Y 7/2 light grey, very slightly clayey micaceous silty fine sand		4	soft, moist 8
	20		SM 5 Y 4/2 dark grey, very slightly clayey micaceous silty fine sand 22.5'		5	firm, moist 3
	25		SC 5 Y 4/1 dark grey, clayey micaceous fine sand, with very slight amount of silt		6	very soft, moist 1
	30		SC 5 Y 5/2 olive grey, clayey micaceous fine sand (32.5')		7	hard, cemented, moist 50/0.85

FST-001

Source: Environmental Science and Engineering 1982

APPENDIX 4.4

Hole No. SC-85

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N. 688276.58 E. 622041.66
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) SC-85
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 10 UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 1.83' ATOB
16. DATE HOLE STARTED 2-6-80 COMPLETED 2-6-80
17. ELEVATION TOP OF HOLE 51.7'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			SP 10 YR 5/2 greyish brown slightly silty fine sand, poorly sorted		1	loose, moist	Blows/ft pushed
	5		SP 10 YR 7/1 light grey, slightly silty fine sand, poorly sorted 7.75'		2	dense, moist foul odor present	31
	10		SC 2.5 Y 6/4; 2.5 Y 7/2 mixed light grey, light yellowish brown, very slightly silty clayey fine 12.5'		3	stiff, moist	15
	15		SM 10 YR 8/1; 5 Y 6/2, mixed white and light olive grey, silty fine sand (17.5')		4	shelby tube	Pushed
	20		SM-SC 5 Y 6/1 grey clayey silty fine sand 24.0'		5	soft, moist	4
	25		ML 5 Y 4/1 grey very slightly clayey very fine sandy silt 27.5'		6	very soft, moist	1
	30		SM 5 Y 5/2 olive grey slightly silty fine sand 32.5'		7	very stiff, moist	24

FST-001

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 51.7'	Hole No. SC-B5
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SM 5 Y 6/1 grey slightly silty fine sand		8	very stiff, moist 30
	40		SM 5 Y 5/2 olive grey slightly silty clayey fine sand 42.0'		9	hard, moist 42
	45		SP-SM 5 Y 5/2 olive grey silty micaceous medium to coarse sand 47.0'		10	hard, moist 51 difficult drilling
	50		SC-SM 5 Y 7/2 light grey clayey, silty fine to medium sand		11	hard, moist, 50/0.33 difficult drilling

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-B6

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DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N. 687382.17
3. DRILLING AGENCY Pittsburgh Testing Labortories
4. HOLE NO. (As shown on drawing title and file number) SC-B6
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT HS 1¾" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED 10 : UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 7.92' ATOB
16. DATE HOLE : STARTED 1-28-80 : COMPLETED 1-30-80
17. ELEVATION TOP OF HOLE 71.8'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-SM 10 YR 7/2, 10 YR 7/6 mixed yellow, light grey very slightly clayey silty fine sand		1	loose, moist blows/ft pushed
	5		SP-SM 2.5 Y 5/4, 10 YR 5/1, mixed grey; light olive brown, very slightly clayey silty fine sand, poorly sorted (7.5)		2	loose, moist pushed
	10		No sample taken, solid waste cell 12.0'		(3)	
	15		SP 2.5 Y 7/4 pale yellow, slightly silty fine sand		4	very firm, moist 24 foul odor
	20		SP 2.5 Y 7/4 pale yellow, slightly silty medium to coarse sand		5	firm, moist pushed foul odor
	25		SP 2.5 Y 7/2 light grey, slightly silty fine sand, poorly sorted 27.5'		6	very loose, moist 2 no odor
	30		SM 2.5 Y 8/2 white, very slightly clayey micaceous silty very fine sand 32.5'		7	hard, moist 7 difficult drilling

FST-001

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 11.8'

Hole No. SC-B6

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SM 2.5 Y 8/4 pale yellow very slightly clayey micaceous silty very fine sand 37.0'		8	hard, moist, difficult drilling 75/0.33'
	40		SC 5 Y 5/2 olive grey, very slightly silty clayey micaceous fine sand		9	hard, moist difficult drilling 49
	45		SC 5 Y 5/1 grey, very slightly silty clayey micaceous fine sand		10	hard, moist difficult drilling 36
	50		SC 5 Y 5/1 grey, very slightly silty clayey micaceous fine sand		11	hard, partially cemented, moist difficult drilling 37

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-87

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) Location uncertain-Land filled and leveled
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) SC-87
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 9 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 8.83' ATOB
16. DATE HOLE STARTED 1-30-80 COMPLETED 1-30-80
17. ELEVATION TOP OF HOLE unknown
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
					(1)	Blows/ft
	5		No samples solid waste cell		(2)	
			8.5'			
	10		SP 2.5 Y 7/2, 2.5 Y 7/4 mixed light grey, white, yellow slightly silty fine sand, poorly sorted		3	loose, moist 8
	15		SP 2.5 Y 8/4 pale yellow, slightly silty fine sand		4	very loose, moist 3
	20		SP 2.5 Y 8/2 white, slightly silty fine sand with very slight amount of clay		5	loose, moist 7
	25		SP 5 Y 8/1 white, very slightly silty fine sand		6	loose, moist 5
			28.0'			
	30		SP-SM 2.5 Y 7/1 pale yellow silty fine sand		7	loose, moist, 50/0.21' lower half of sample partially cemented
			(32.5')			

FST-001

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE Unknown

Hole No. SC-B7

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SC 5 Y 8/2 light grey, very slightly silty micaceous fine sand		8	hard, moist, difficult drilling 40
	40		SC 5 Y 5/1 grey, very slightly silty clayey micaceous fine sand		9	very stiff, moist difficult drilling 26
	45		SC 5 Y 7/2 grey, very slightly silty clayey micaceous fine sand		10	partially cemented moist, difficul drilling 50/0.83'
			48.0'			
	50		SC-SM 5 Y 7/1 light grey clayey silty fine to medium sand		11	partially cemented, moist, difficul drilling 50/0.21'

FST-001

Source: Environmental Science and Engineering 1982

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Hole No. SC-88

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N. 686743.34 E. 661289.31
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) SC-88
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 11 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 11.83' ATOB
16. DATE HOLE STARTED 1-30-80 COMPLETED 1-30-80
17. ELEVATION TOP OF HOLE 70.1'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	blows/ft pushed
			SM 10 YR 4/2, 2.5 Y 7/4 mixed dark greyish brown, pale yellow silty fine to medium sand		1	very loose, moist	
	5		SM 5 Y 5/2 olive grey, silty fine to medium sand, poorly sorted		2	very fine, moist	28
	10		SM 10 YR 7/6 yellow, silty fine to medium sand poorly sorted		3	firm, moist	15
	15		SM 5 Y 8/4 pale yellow, silty fine to medium sand poorly sorted		4	loose, moist	8
	20		SM 5 Y 8/4 pale yellow, silty fine to medium sand poorly sorted		5	loose, moist	5
	25		SM 2.5 Y 8/4 pale yellow slightly silty, clayey, micaceous fine sand, very poorly sorted (27.5')		6	very firm, difficult drilling	4
	30		SP 5 Y 5/1 grey very slightly silty micaceous fine to medium sand 32.5'		7	hard, partially cemented, difficult drilling	3

FST-001

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 70.1'	Hole No. SC-B8
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			32.5'				
	35		SC 7.5 YR 6/8 reddish yellow, very slightly silty, clayey micaceous medium to coarse sand		8	hard, partially cemented, moist, difficult drilling	44
	40		SC 10 YR 6/1 grey, silty medium to coarse sand, slightly clayey		9	hard, partially cemented moist, difficult drilling	45
	45		SC 5 Y 7/1 light grey, silty fine to medium sand, very slightly clayey		10	hard, moist, difficult drilling	28
			46.75'				
	50		SC-SM 5 Y 5/1 light grey very slightly clayey, silty fine sand		11	hard, moist difficult drilling	50/0.5'

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-B9

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DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT: Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station): N. 686343.38 E. 662077.47
3. DRILLING AGENCY: Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number): SC-B9
5. NAME OF DRILLER: Robert Prophet
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK: 0'
9. TOTAL DEPTH OF HOLE: 50'
10. SIZE AND TYPE OF BIT: S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD2
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11 : UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 8.75' ATOB
16. DATE HOLE: STARTED 1-25-80 : COMPLETED 1-25-80
17. ELEVATION TOP OF HOLE: 69.8'
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: Robert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP 10 YR 6/6 brownish yellow slightly silty fine sand, poorly sorted		1	very loose, dry Blows/ft oily pushed
	5		SP 2.5 Y 6/4 light yellowish brown, slightly silty fine sand, poorly sorted		2	loose, moist 9 oil present in mud pit
	10		SP 10 YR 2/2 very dark brown very slightly silty fine sand, poorly sorted		3	firm, moist 11 foul odor - oily
	15		SP 10 YR 2/1 black silty very fine sand, poorly sorted 18.0'		4	firm moist 21 no odor or oil present
	20		SM 10 YR 6/2 light brownish grey clayey silty fine sand		5	stiff, moist 14
	25		SM 10 YR 5/2 greyish brown silty fine sand 27.0'		6	stiff, moist 9
	30		SM-SP 10 YR 5/2 greyish brown, silty fine sand, poorly sorted [illegible]		7	very loose, moist 1

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 69.8'

Hole No. SC-89

PROJECT: Fort Stewart RCRA Studies

INSTALLATION: Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SG-SM 10 YR white, silty, clayey micaceous very fine sand (37.5')		8	hard, moist, oily 65
	40		SM 5 Y 6/3 pale olive, very slightly clayey silty micaceous fine sand		9	hard, moist, difficult drilling 44
	45		SM 5 Y 6/3 pale olive, very slightly clayey silty micaceous fine sand (47.5')		10	hard, partially cemented, moist difficult drilling 54
	50		SM-SC 5 Y 6/2 light olive grey very slightly clayey silty fine sand		11	hard, moist difficult drilling 54

FST-001

Source: Environmental Science and Engineering 1982

H-I-R-SC-810 485

DRILLING LOG | DIVISION South Atlantic | INSTALLATION Fort Stewart, GA | SHEET OF SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N. 686538.62 E. 662670.60
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) SC-810
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 11 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 7.83' ATOB
16. DATE HOLE STARTED 2-1-80 COMPLETED 2-1-80
17. ELEVATION TOP OF HOLE 68.6'
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR Robert Prophet

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP 2.5 Y 7/2 light grey, very slightly clayey silty fine sand, poorly sorted 3.0'		1	loose, moist Blows/ft pushed
	5		SM 10 YR 4/3 brown to dark brown, silty very fine sand		2	stiff, moist 9
	10		SM 10 YR 7/3 pale brown, silty fine to medium sand, poorly sorted		3	very firm, moist 25
	15		SM 10 YR 8/4 very pale brown, silty fine to medium sand 17.5'		4	firm, moist 23
	20		SC 10 YR 6/1 grey clayey fine to medium sand 21.5'		5	stiff, moist 5
	25		SP-SM 10 YR 6/2 light brownish very slightly clayey micaceous fine to coarse sand, poorly graded		6	very firm, moist difficult drilling 5
	30		SP-SM 5 Y 5/2 olive grey very slightly clayey, silty fine to coarse sand, poorly sorted 32.5'		7	very firm, moist difficult drilling 17

FST-001

Source: Environmental Science and Engineering 1982

487

Hole No. SC-311

DRILLING LOG

DIVISION: South Atlantic
INSTALLATION: Fort Stewart, GA
SHEET 1 OF 2 SHEETS
1. PROJECT: Fort Stewart RCRA Studies
10. SIZE AND TYPE OF BIT S. S. 1½" I.D. Bit 3 7/8"
2. LOCATION (Coordinates or Station): N. 687186.82 E. 662733.11
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: Pittsburgh Testing Laboratories
12. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD2
4. HOLE NO. (As shown on drawing title and file number): SC-B11
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 8 UNDISTURBED 1
5. NAME OF DRILLER: Robert Prophet
14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
15. ELEVATION GROUND WATER: 7.50' ATOB
16. DATE HOLE: STARTED 2-5-80 COMPLETED 2-5-80
7. THICKNESS OF OVERBURDEN
17. ELEVATION TOP OF HOLE: 70.26'
8. DEPTH DRILLED INTO ROCK: 0'
18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE: 50'
19. SIGNATURE OF INSPECTOR: Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
					(1)		Blows/ft
	5		No samples taken solid waste cell 7.0'		(2)		
	10		SM 10 YR 6/8 brownish yellow very slightly clayey fine to medium silty sand, poorly sorted		3	firm, moist	11
	15		SM 5 Y 7/4, 5 Y 8/2 mixed pale yellow and white, silty fine sand (17.5')		4	shelby tube	pushed
	20		SP-SM 10 YR 7/1 light grey very slightly clayey silty fine sand (22.5')		5	firm, moist	7
	25		SM 10 YR 7/2 light grey very slightly clayey silty fine to medium sand (27.5')		6	loose, moist	3
	30		SP-SM 10 YR 6/1 light grey silty micaceous fine to medium sand (32.5')		7	firm, moist	9

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 70.26'	Hole No. SC-811
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(32.5')			
	35		SM 2.5 YR 7/4 pale yellow slightly silty micaceous fine sand		8	hard, dry, cemented, difficult drilling 28/0.17'
	40		SM 5 Y 6/3 pale olive slightly silty micaceous fine sand		9	hard, dry, partially cemented difficult drilling 50/0.75'
	45		SM 5 Y 5/2 olive grey, very slightly clayey silty micaceous fine sand		10	hard, dry, partially cemented, difficult drilling 42
	50		SM 5 Y 5/1 grey, very slightly clayey silty fine sand		11	hard, dry, partially cemented, difficult drilling 50/0.92'

Source: Environmental Science and Engineering 1982

Hole No. SC-B12

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station) N. 687631.59 E. 662875.47

3. DRILLING AGENCY Pittsburgh Testing Laboratories

4. HOLE NO. (As shown on drawing title and file number) SC-B12

5. NAME OF DRILLER Robert Prophet

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 50'

10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 8 UNDISTURBED 1

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER 6.0' ATOB

16. DATE HOLE STARTED 2-5-80 COMPLETED 2-5-80

17. ELEVATION TOP OF HOLE 67.02'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	5		No samples taken solid waste cell 7.5'		(1) (2)	Blows/ft
	10		SM 10 YR 7/1 grey silty fine to medium sand, poorly sorted with very slight amount of clay (12.5')		3	firm, moist 20
	15		SP 10 YR 7/2 light grey slightly silty fine to medium sand (17.5')		4	stiff, moist 12
	20		SP-SM 2.5 Y 7/2, 10 R 8/1 mixed light grey and white silty fine sand		5	shelby tube pushed
	25		SP-SM 10 YR 7/1 light grey silty fine to medium sand poorly sorted (27.5')		6	loose, moist 9
	30		SP 10 YR 6/2 light brownish grey, slightly silty fine to coarse sand, very poorly sorted, with very slight amount of clay 32.5'		7	loose, moist 13

Source: Environmental Science and Engineering 1982

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DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 67.02'	Hole No. SC-B12
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SP 2.5 Y 6/2 light brownish grey, slightly silty fine sand		8	stiff, moist 11
	40		SP 10 YR 6/2 light brownish grey slightly silty fine sand		9	very stiff, moist 20
	45		SP 2.5 Y 5/2 greyish brown slightly clayey, slightly silty fine to medium sand		10	hard, moist 50/0.92' difficult drilling
	50		SP 2.5 Y 4/1 dark grey, silty fine to coarse sand, very poorly sorted		11	very stiff, moist 27 difficult drilling

Source: Environmental Science and Engineering 1982

Hole No. SC-813

495

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N 688197.28 E. 662979.40
3. DRILLING AGENCY Pittsburgh Testing Laboratories
4. HOLE NO. (As shown on drawing title and file number) SC-813
5. NAME OF DRILLER Robert Prophet
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT 5.5" HS I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9 : UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 6.83' ATOB
16. DATE HOLE: STARTED 2-6-80 : COMPLETED 2-6-80
17. ELEVATION TOP OF HOLE 55.3'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	blows/ft
			SP 10 YR 6/1 grey, very slightly silty fine sand 5.0'		1	loose, moist	pushed
	5				(2)		
			No samples taken solid waste cell				
	10		12.5'		(3)		
	15		SM 5 Y 8/4 pale yellow silty fine sand, poorly graded		4	very loose, moist foul odor present	2
	20		SM 2.5 YR 8/2 silty fine sand, poorly sorted (22.5')		5	loose, moist slight odor present	2
	25		SP 10 YR 7/3 very pale brown fine to medium sand poorly graded (27.5')		6	very loose, moist no odor	4
	30		SM 10 YR 6/1 grey silty medium to coarse sand, poorly graded 32.5'		7	loose, moist easy drilling	13

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 55.3' | Hole No. SC-B13

PROJECT Fort Stewart | INSTALLATION Fort Stewart, GA | SHEET 2 OF 2 SHEETS

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
			32.5'				
	35		SM 5 Y 7/2 grey silty micaceous fine sand		8	stiff, moist difficult drilling	13
	40		SM 5 Y 6/2 light olive grey very slightly clayey silty micaceous fine sand		9	hard, partially cemented, moist difficult drilling	53
	45		SM 5 Y 5/1 grey very slightly clayey silty micaceous fine sand		10	very stiff, moist difficult drilling	23
	50		SM 5 Y 5/2 dark grey slightly clayey, silty fine sand		11	very stiff, moist difficult drilling	38

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 61.20'

Hole No. SC-814

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		SM 10 YR 6/1 grey, very slightly clayey, silty fine to coarse sand with very slight amount of gravel, very poorly sorted		8	very loose, moist easy drilling 1
	40		SM 5 YR 7/2 light grey, silty fine to coarse sand with very slight amount of gravel, very poorly sorted		9	hard, moist difficult drilling 32
	45		SM 10 YR 5/1 grey silty fine to medium sand with gravel, poorly sorted		10	hard, moist difficult drilling 41
	50		SM 10 YR 7/2 light grey silty micaceous medium to coarse sand with slight amount of gravel		11	hard, moist difficult drilling 50/7"

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE Unknown	Hole No. SC-315
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 3 SHEETS

501

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(32.5')			
	35		SP 2.5 Y 7/6, 5 Y 6/1 mixed grey, yellow, silty fine sand, poorly sorted 37.5'		8	loose, moist 6
	40		SM 5 Y 5/1 grey, silty micaceous fine sand		9	soft, moist 4
	45		SM 5 Y 5/1 grey silty micaceous fine sand		10	very stiff, moist difficult drilling 19
	50		SM 5 Y 7/2 light grey slightly clayey, silty micaceous fine to medium sand		11	hard, partially cemented, moist difficult drilling 61
	55		SM 5 Y 5/2 olive grey slightly clayey, silty micaceous fine to medium sand with very slight amount of gravel		12	hard, partially cemented, moist difficult drilling 60
	60		SM 5 Y 7/1 light grey silty fine to medium sand, poorly sorted		13	firm, moist difficult drilling 34
	65		SM 5 Y 6/1 grey silty fine to medium sand with slight amount of coarse sand		14	very firm, moist 56
	70		SM 10 YR 6/1 grey silty medium to coarsesand with slight amount of gravel 72.5'		15	very firm, moist 48

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE unknown	Hole No. SC-B15
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 3 OF 3 SHEETS

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ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			72.5'			
	75		SP 2.5 Y 6/0 grey medium to coarse sand with slight amount of gravel		16	very firm, moist 24
	80		SP 2.5 Y 5/0 grey very slightly silty fine to medium sand with very slight amount of gravel		17	very firm, moist 30
			(82.5')			
	85		SM 2.5 Y 6/2 light brownish grey silty fine to medium sand, very slight amount of gravel		18	firm, moist 32
	90		SM 2.5 Y 5/2 greyish brown silty fine to medium sand		19	firm, moist 18
	95		SM 5 Y 5/1 grey silty fine to medium sand		20	firm, moist 36
	100		SM 5 Y 6/1 grey, silty fine to medium sand		21	firm, moist 41

FST-001

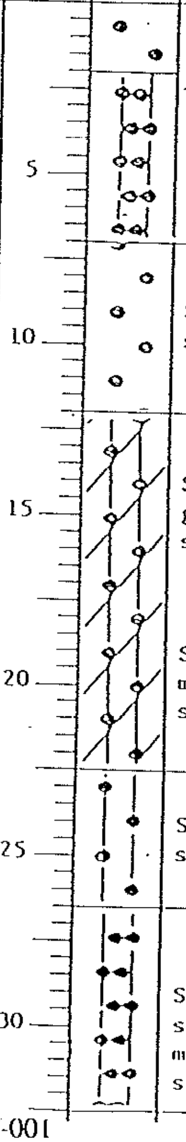
Source: Environmental Science and Engineering 1982

505

Hole No. SC-816

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
LOCATION (Coordinates or Station) N. 686806.71 E. 663435.00
2. DRILLING AGENCY Pittsburgh Testing Laboratories
3. HOLE NO. (As shown on drawing title and file number) SC-816
4. NAME OF DRILLER Robert Prophet
5. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT S.S. 1½" I.D., Bit 3 7/8"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL Acker AD2
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10 ; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 10.17' ATOB
16. DATE HOLE: STARTED 2-1-80 ; COMPLETED 2-1-80
17. ELEVATION TOP OF HOLE 66.34'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Greaves



ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	blows/ft
			SP 10 YR 4/2 dark greyish brown silty fine sand, poorly sorted 2.0'		1	loose, moist	pushed
	5		SP-SM 7.5 YR 4/2 dark brown silty fine sand 7.0'		2	loose, moist	6
	10		SP 7.5 YR 3/2 dark brown silty fine sand 12.0'		3	very stiff, moist	26
	15		SC-SM 5 Y 6/2 light olive grey clayey, silty fine sand		4	firm, moist	5
	20		SC-SM 2.5 Y 7/2, 5 Y 6/1 mixed light grey and grey silty, clayey fine sand (22.5')		5	shelby tube	pushed
	25		SM 5 Y 6/1 grey clayey, silty very fine sand 26.5'		6	stiff, moist	7
	30		SP-SM 5 YR 5/1 grey very slightly clayey, silty micaceous fine to medium sand (32.5')		7	stiff, moist difficult drilling	5

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 66.34' | Hole No. SC-B16

PROJECT Fort Stewart RCRA Studies | INSTALLATION Fort Stewart, GA | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM (32.5')			
	35		~~SC-SM~~ 5 Y 5/3 olive clayey silty micaceous fine sand 37.5'		8	hard, moist difficult drilling 53
	40		SP-SM 5 Y 5/1 grey very slightly clayey, silty micaceous fine sand (42.5')		9	hard, partially cemented, moist difficult drilling 50/0.33'
	45		SP 5 Y 5/3 olive very slightly silty micaceous fine sand (47.5')		10	hard, moist difficult drilling 34
	50		SC 5 Y 6/2 light olive grey very slightly silty, clayey micaceous fine sand, slight amount of coarse sand		11	hard, moist difficult drilling 50/0.42'

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

DRILLING LOGS, WELL COMPLETION
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1982

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APPENDIX 4.5

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT
Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station)
N761203.76 E659516.77

DRILLING AGENCY
Paul N. Clawson

HOLE NO. (As shown on drawing title and file number) TX-M1

3. NAME OF DRILLER
Paul N. Clawson

4. DIRECTION OF HOLE
☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 50'

10. SIZE AND TYPE OF BIT 9"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
MSL

12. MANUFACTURER'S DESIGNATION OF DRILL
STMCO

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED 0 | UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES –

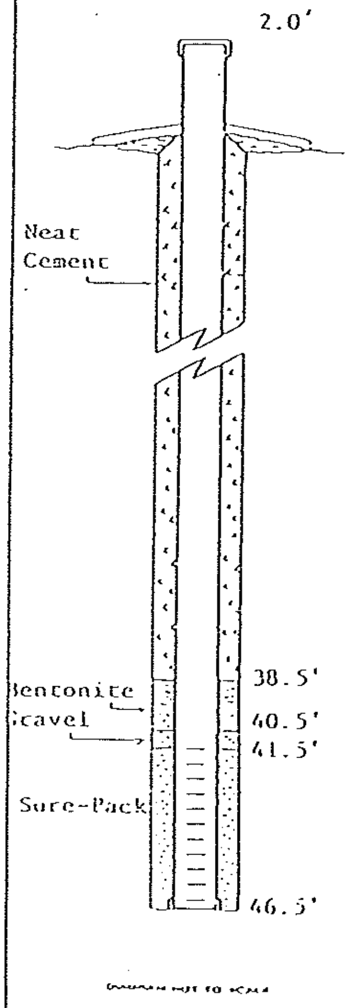
15. ELEVATION GROUND WATER 5.83' @ 24 hours

16. DATE HOLE | STARTED 1/22/80 | COMPLETED 1/24/80

17. ELEVATION TOP OF HOLE 76.47'

18. TOTAL CORE RECOVERY FOR BORING

19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Buff to grey-medium, slightly clayey sand, slight amount of plant fragments upper 2 ft. 5.0'			
	5 10		Grey to brown-silty clayey fine to medium sand, up to 15% clay 14.0'			
	15 20		Grey to brown-silty clayey fine to medium sand less clay (± 5%) than above 21.0'			
	25 30		Olive green sandy clay and clayey sand. Sand fine to very fine grain 30.0'			

Source: Environmental Science and Engineering 1982

RILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 76.47'

Hole No. TX-M1

SHEET 2 OF 2 SHEETS

ROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

ATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.0'			
	35		Grey - medium to coarse sand with up to 10% clay			
	40		41.0'			
	45		Grey to medium to coarse sand with up to 5% clay to 44 ft., up to 2% clay below 44 ft.			
	50					

FST-003

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. TX-M2

DRILLING LOG

DIVISION South Atlantic

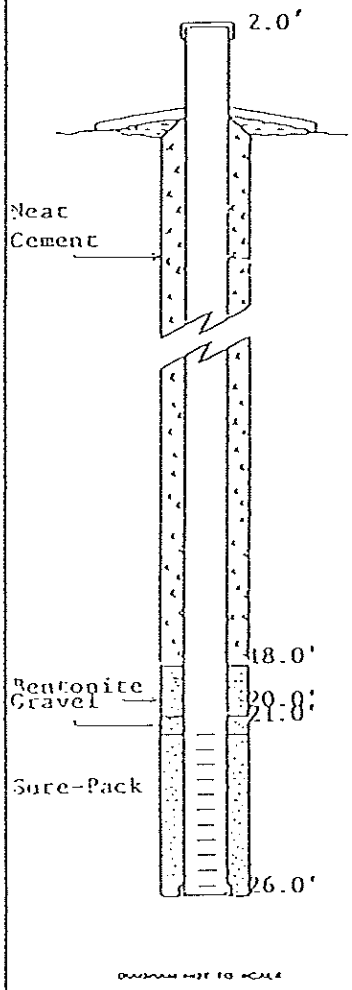
INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N760657.51 E659795.88

DRILLING AGENCY Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number) TX-M2 --
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 4.6' @ 24 hrs
16. DATE HOLE STARTED 1/31/80 COMPLETED 2/4/80
17. ELEVATION TOP OF HOLE 74.13'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Greene

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	5		Buff to grey - fine to medium clayey sand 5.0'			
	10		Buff to grey - medium to coarse clayey sand 11.0'			
	15 20		Orange - coarse sand occasional clayey beds up to 1 ft. thick 21.0'			
	25 30		Orange - clayey fine to medium sand 30.0'			

FST-003

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 74.13' | Hole No. TX-M2

PROJECT Fort Stewart RCRA Studies | INSTALLATION Fort Stewart, GA | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35		White, grey - green - from 29.5 ft. to 50 ft. interbedded fine and fine to medium sand with sandy clay. Bed thickness 1 ft. to 3 ft.; most boundaries gradational			
	40					
	45					
	50					

Source: Environmental Science and Engineering 1982

Hole No. TX-M3

519

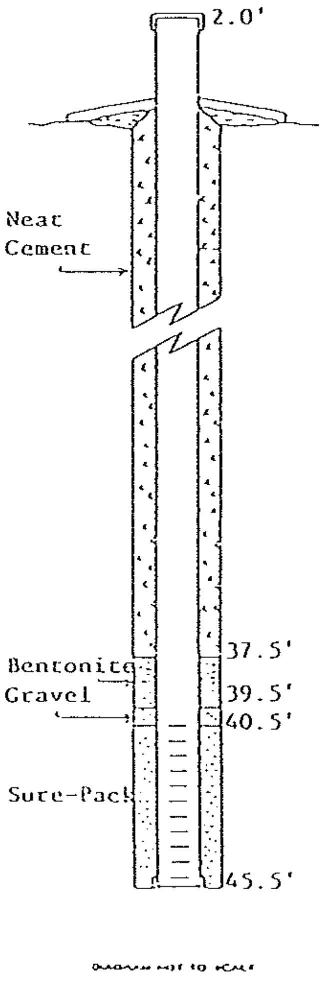
DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N760527.39 E659471.04
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) TX-M3
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 2.6' @ 24 hours
16. DATE HOLE STARTED 2/5/80 COMPLETED 2/8/80
17. ELEVATION TOP OF HOLE 71.12'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Brown - medium sand, color grades to light grey with orange stringers below 1.5 ft. 4.0'			
	5		White - clayey medium to coarse sand, bed of fine sand near 5 ft. 7.0'			
	10		Grey fine to medium sand 10.0'			
	15 20		Orange to slightly white coarse to medium sand, very slight amount of clay (5%), variable vertically 24.0'			
	25 30		White - sandy clay; sand fine grades downward to silty clay at 29 ft. 30.0'			

FST-003

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)
ELEVATION TOP OF HOLE 71.12'
Hole No. TX-M3
PROJECT Fort Stewart RCRA Studies
INSTALLATION Fort Stewart, GA
SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			33.0'			
	35		Grey-green - sandy clay sand fine grain 38.0'			
	40 45		Light grey - fine to medium slightly clayey sand occasional thin beds of fine sand 46.0'			
	50		Grey - green - fine to medium clayey sand			

Source: Environmental Science and Engineering 1982

Hole No. TX-M4

523

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT: Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station): N760717.38 E659264.50

DRILLING AGENCY: Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number): TX-M4

5. NAME OF DRILLER: Paul N. Clawson

6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK: 0'

9. TOTAL DEPTH OF HOLE: 50'

10. SIZE AND TYPE OF BIT: 9"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL

12. MANUFACTURER'S DESIGNATION OF DRILL: SIMCO

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0 UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

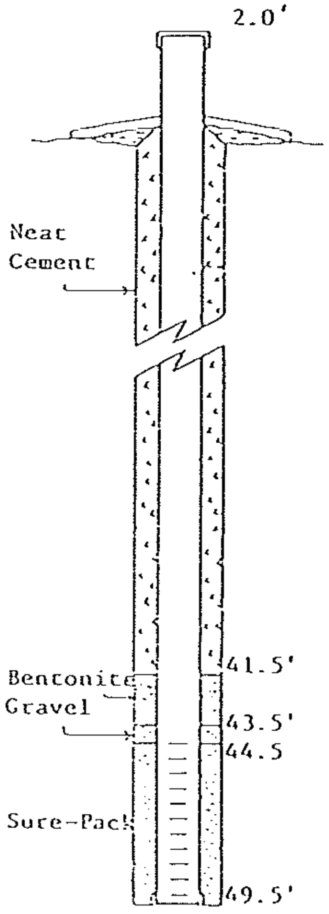
15. ELEVATION GROUND WATER: 2.2' @ 24 hrs.

16. DATE HOLE: STARTED 1/25/80 COMPLETED 1/30/80

17. ELEVATION TOP OF HOLE: 70.46'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR: Robert Gr

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			See soil boring log TX-B4			 DIAGRAM NOT TO SCALE

FST-003

Source: Environmental Science and Engineering 1982

Hole No. TX-OW1

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N761199.12 E659515.98
DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) TX-OW1
5. NAME OF DRILLER Paul N. Clayson
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT 2.5"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

525

12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE STARTED 4/10/80 COMPLETED 4/12/80
17. ELEVATION TOP OF HOLE 76.42'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	5		Dark Brown - Silty fine sand			easy drilling, loss of water till 10'
	10		10.0'			
	15		Tan/Orange - clayey fine to medium sandy clay ≈30%, slight amounts of coarse material 16.5'			
			Orange - fine sandy silt			easy drilling
	20		21.0'			
	25		Grey - fine sandy clay-clayey sand - hard muscovite present			difficult drilling, hard, compacted
	30		30.0'			

FST-003
APPENDIX 4.5

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 76.42'

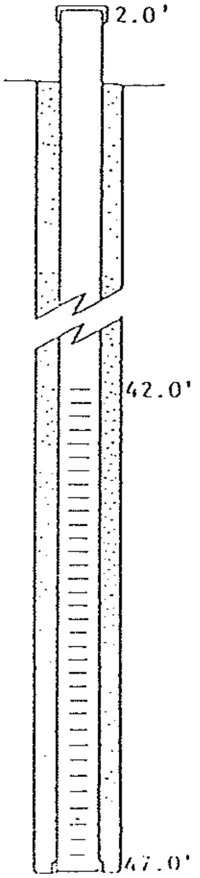
Hole No. TX-OW1

PROJECT: Fort Stewart RCRA Studies

INSTALLATION: Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35		36.5'			
	40		Light brown - clayey, fine sand - sand becoming coarser and clay diminishing in amounts to 47'			easy drilling, started losing drilling fluid
	45		46.5'			
			Light grey - medium to coarse sand with slight amounts of clay			loss of drilling fluid
	50					



Source: Environmental Science and Engineering 1982

Hole No. CO-M1

DRILLING LOG

DIVISION South Atlantic

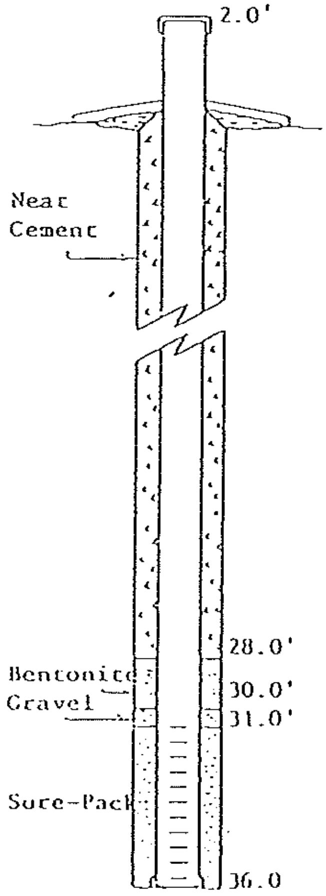
INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

529

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N754176.22 E608888.74
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) CO-M1
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 12.5 @ 24 hrs.
16. DATE HOLE STARTED 2/11/80 COMPLETED 2/13/80
17. ELEVATION TOP OF HOLE 151.27'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	5		Rusty Brown - Clayey fine to medium sand 9.0'			dry, tough, compacted, hard drilling
	10		Light Grey - coarse slightly clayey sand 13.0'			
	15 20		Purple - tough plastic clay. Below 15 ft. to 22 ft. with medium to coarse sand (10 to 30%) 24.0'			
	25		White - sandy clay, sand very fine 26.0'			
	30		White to rusty brown - sandy clay, sand very fine, makes up less than 30% of samples 30.0'			



Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 151.27'	Hole No. CO-M1
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA.	SHEET 2 of 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			33.0'			
	35		Light grey - clayey fine to medium sand 35.0'			
	40		Brown to pink - silty sandy clay. silt and extremely fine sand make up 40 to 60% of samples			
	45					
	50					

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. CO-M2 533

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station) N754755.01 E608897.65

3. DRILLING AGENCY Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number) CO-M2

5. NAME OF DRILLER Paul N. Clawson

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 50'

10. SIZE AND TYPE OF BIT 9"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

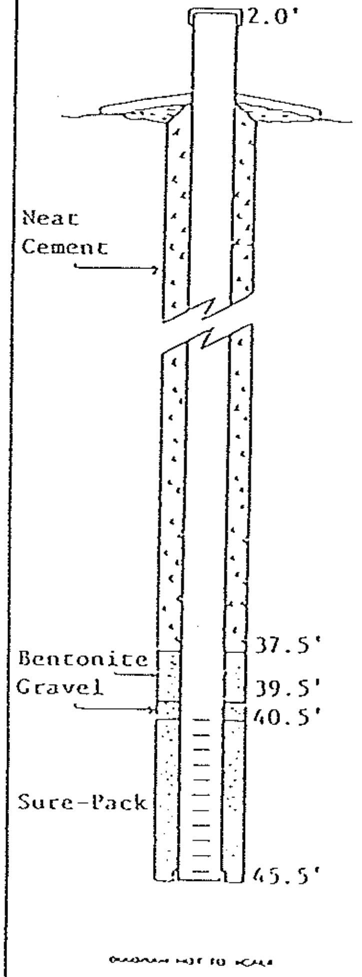
15. ELEVATION GROUND WATER

16. DATE HOLE STARTED 2/14/80 COMPLETED 2/17/80

17. ELEVATION TOP OF HOLE 136.97'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			See soil boring log CO-B2			

Source: Environmental Science and Engineering 1982

Hole No. CO-M3

535

DRILLING LOG

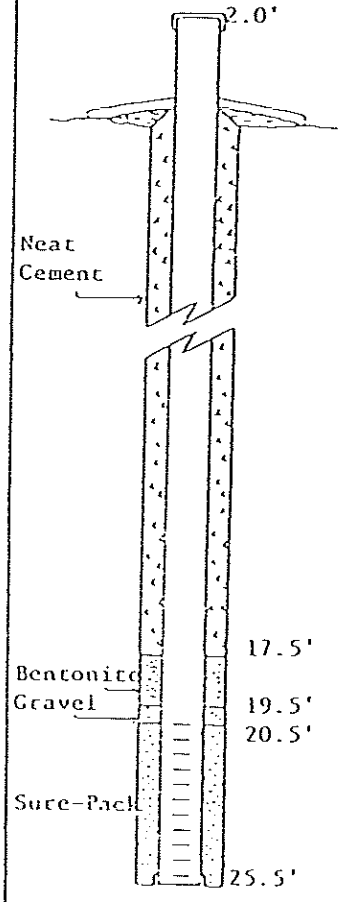
DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N755318.55 E609187.01
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) CO-M3
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 30'
10. SIZE AND TYPE OF BIT 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 3.25' @ 24 hrs.
16. DATE HOLE STARTED 2/18/80 COMPLETED 2/21/80
17. ELEVATION TOP OF HOLE 124.55'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Greaney

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	5		Brown - clayey fine to medium sand, 10 to 20% clay, color changed to grey-brown at 5 ft. 6.0'			
	10		Light grey - clayey fine sand, clay 20 to 30% 14.0'			
	15		Rust brown - clayey silty fine to medium sand 19.5'			
	20		Light grey silty, sandy clay top 2 ft. plastic 23.0'			
	25		Light grey-fine to coarse sand, clay less than 5% 26.0'			
	30		Light grey - clayey silty fine to coarse sand, 20 to 30% clay			



Source: Environmental Science and Engineering 1982

Hole No. CO-M4

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT: Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station): N755137.29 E609476.96

DRILLING AGENCY: Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number): CO-M4

5. NAME OF DRILLER: Paul N. Clawson

6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK: 0'

9. TOTAL DEPTH OF HOLE: 50'

10. SIZE AND TYPE OF BIT: 9"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL

12. MANUFACTURER'S DESIGNATION OF DRILL: SIMCO

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 0 · UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER: 4.1' @ 24 hrs.

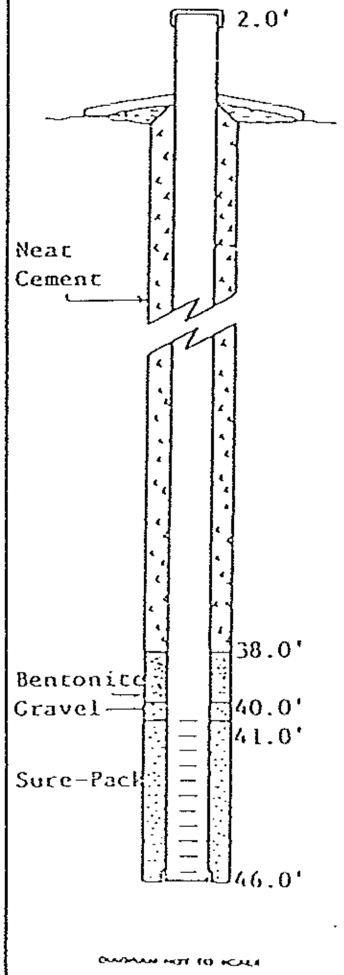
16. DATE HOLE: STARTED 2/22/80 COMPLETED 2/25/80

17. ELEVATION TOP OF HOLE: 125.89'

18. TOTAL CORE RECOVERY FOR BORING: %

19. SIGNATURE OF INSPECTOR: Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			See soil boring log CO-B4			



Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. SC M1 539

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station) N686890.30 E660515.96

DRILLING AGENCY Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number) SC-M1

5. NAME OF DRILLER Paul N. Clawson

6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 26.5'

10. SIZE AND TYPE OF BIT 9"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED 0 | UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER 6.9' @ 24 hrs.

16. DATE HOLE | STARTED 2/26/80 | COMPLETED 2/29/80

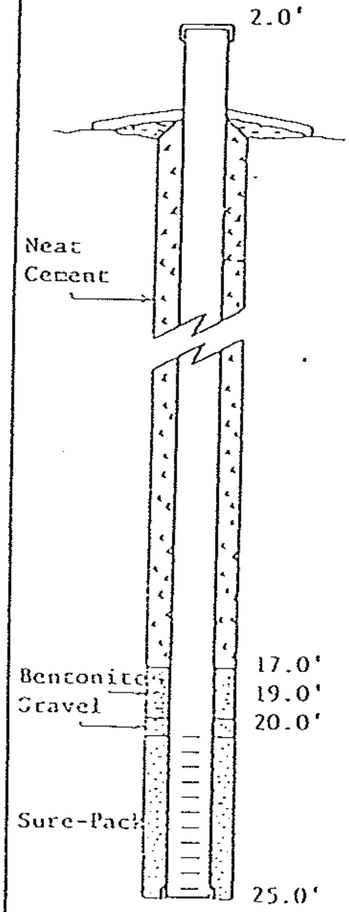
17. ELEVATION TOP OF HOLE 62.31'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Red Brown - very clayey sand, color changes to grey below 3', sand mostly medium, some fine 9.0'			
			Light grey - silty, sandy clay, orange-red streaks, thin but frequent 21.0'			
			Light grey - clayey medium sand, clay 5-10% 25.0'			
			Dark grey - very silty, sandy clay, extremely hard material			

Depth scale: 5, 10, 15, 20, 25, 30



Source: Environmental Science and Engineering 1982

Hole No. SC-M2

541

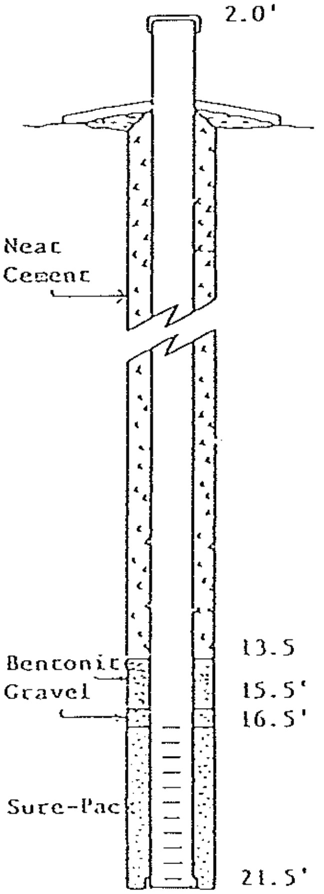
DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT: Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station): N687929.13 E661144.17
3. DRILLING AGENCY: Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number): SC-M2
5. NAME OF DRILLER: Paul N. Clawson
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK: 0'
9. TOTAL DEPTH OF HOLE: 26.5'
10. SIZE AND TYPE OF BIT: 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 6.1' @ 24 hrs.
16. DATE HOLE: STARTED 3/1/80 COMPLETED 3/4/80
17. ELEVATION TOP OF HOLE: 64.65'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			See soil boring log SC-B3			

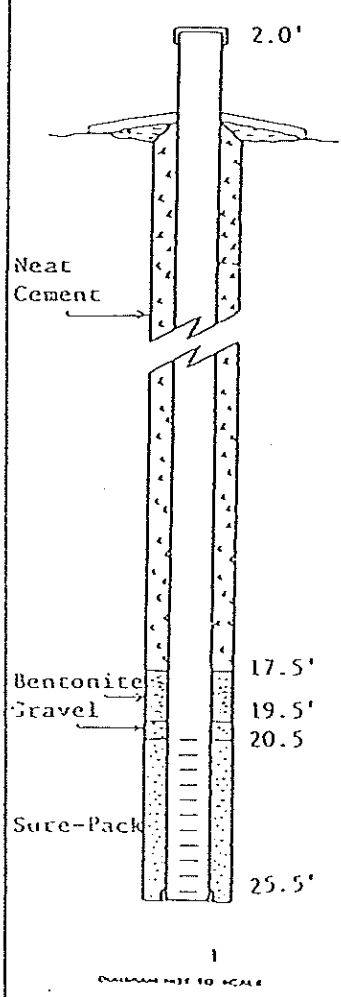
FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-M3

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA	SHEET 1 OF 1 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N688276.58 E622041.66
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) SC-M3
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 27.0'
10. SIZE AND TYPE OF BIT 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER Flowing well
16. DATE HOLE STARTED 3/6/80 COMPLETED 3/10/80
17. ELEVATION TOP OF HOLE 53.77'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			See soil boring log SC-85			

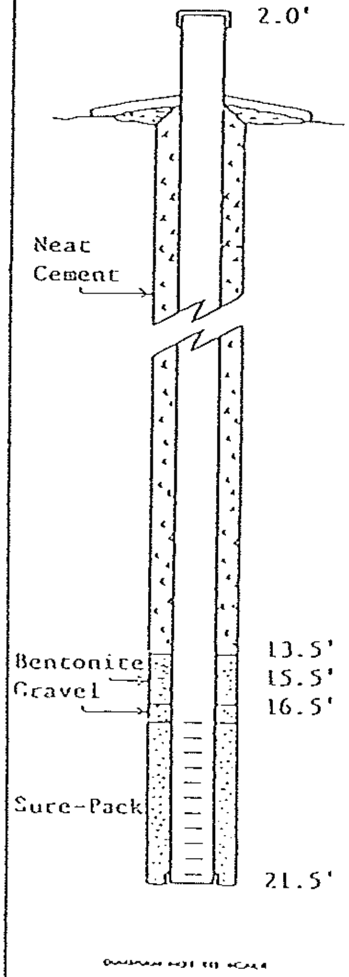
Source: Environmental Science and Engineering 1982

Hole No. SC-M4

545

DRILLING LOG	DIVISION South Atlantic
INSTALLATION Fort Stewart, GA	SHEET 1 OF 1 SHEETS
1. PROJECT Fort Stewart RCRA Studies	10. SIZE AND TYPE OF BIT 9"
2. LOCATION (Coordinates or Station) 688197.28 E662979.40	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY Paul N. Clawson	12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
4. HOLE NO. (As shown on drawing title and file number) SC-M4	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0, UNDISTURBED 0
5. NAME OF DRILLER Paul N. Clawson	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 40.5' @ 24 hrs.
	16. DATE HOLE: STARTED 3/11/80, COMPLETED 3/15/80
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE 57.85'
8. DEPTH DRILLED INTO ROCK 0'	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 23'	19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Buff - fine sand 1.5'			
	5		Brown - changing to grey below 5 ft., clayey fine to medium sand, clay increases with depth, from 20% near top to 60% 9.0'			
	10 15		Grey-plastic sticky slightly sandy clay 16.0'			
	20		Light grey - clayey fine to medium sand 21.0'			
			Dark grey silty, sandy clay			
	25 30					



FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-M5

947

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

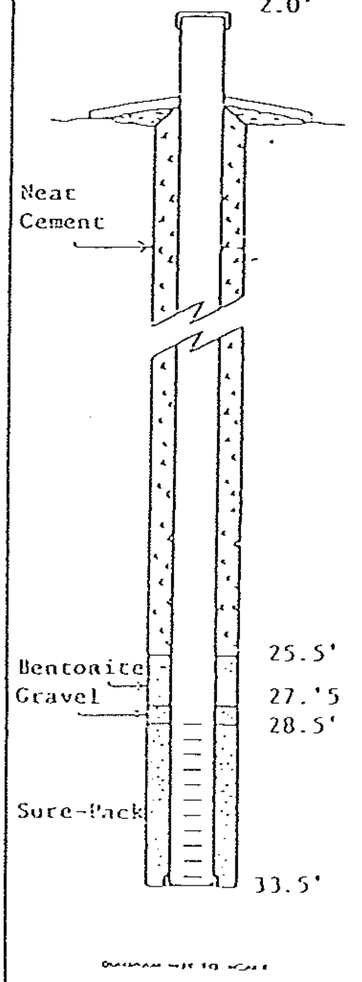
SHEET 1 OF 2 SHEETS

1. PROJECT: Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station): N687038.91 E664075.21

DRILLING AGENCY: Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number): SC-M5
5. NAME OF DRILLER: Paul N. Clawson
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK: 0'
9. TOTAL DEPTH OF HOLE: 35.0'
10. SIZE AND TYPE OF BIT: 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 0 ; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 4.5' @ 24 hrs.
16. DATE HOLE: STARTED 3/16/80 ; COMPLETED 3/19/80
17. ELEVATION TOP OF HOLE: 78.53'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Brown - clayey, medium to coarse sand, gradual color change to light grey starts about 3 ft. 4.0'			
	5		Grey, white - medium to coarse sand, clay content varies to bottom of hole			
	10					
	15					
	20					
	25		Grey, white medium to coarse sand, varying amount of clay material			
	30		30.0'			



FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 78.53'

Hole No. SC-M5

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35					

FST-001

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. SC-M6

551

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 1 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N686000.42 E662567.15
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) SC-M6
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 30'
10. SIZE AND TYPE OF BIT 9"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 6.1' @ 24 hrs.
16. DATE HOLE STARTED 3/20/80 COMPLETED 3/24/80
17. ELEVATION TOP OF HOLE 71.55'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Rust brown - clayey sand 4.0'			
	5 10 15		Buff-light grey - sandy clay clayey sand, sand mostly fine and makes up 30-70% of samples 16.0'			
	20		White-light grey - silty, sandy clay, few thin orange beds 23.5'			
	25		Fine to medium slightly clayey sand, clay 5% ± 28.0'			
	30		Dark grey - silty sandy clay, small muscovite flakes			very hard, dry

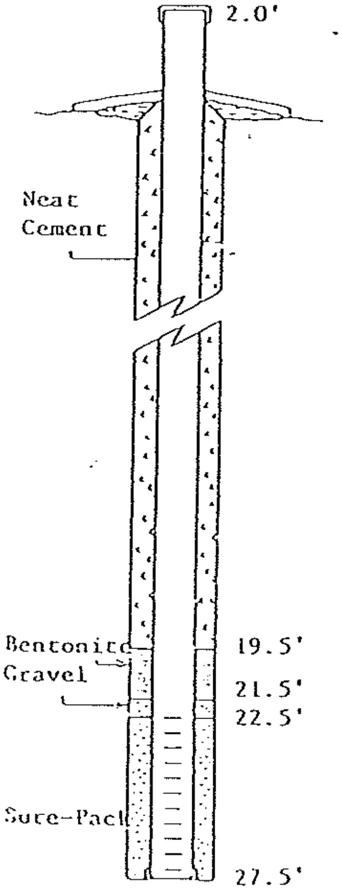


DIAGRAM NOT TO SCALE

FST-001

Source: Environmental Science and Engineering 1982

Hole No. SC-OW1

APPENDIX 4.5

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N686551.35 E665176.50
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) SC-OW1
5. NAME OF DRILLER Paul N Clawson
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 50'
10. SIZE AND TYPE OF BIT 2.5"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

553

12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE STARTED 4/13/80 COMPLETED 4/15/80
17. ELEVATION TOP OF HOLE 75.54'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Yellow orange - clayey medium to coarse sand 4.0'			easy drilling
	5					
			Tan/yellow - medium to coarse sandy clay			difficult drilling
	10					
			14.0'			
	15					
			Light grey - clayey medium to coarse sand			easy drilling
	20					
			Light grey/orange - clayey medium to coarse sand			
	25					
			Tan - clayey medium to coarse sand 31.0'			
	30					

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 75.54'

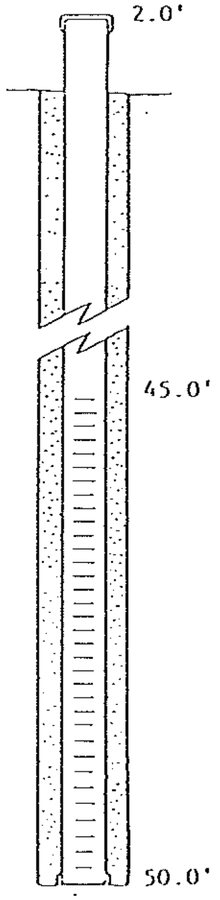
Hole No. SC-OW1

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

VATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35		Dark grey-fine sandy silt, muscovite present 39.0'			
	40 45 50		Olive - fine sandy, silty clay			compacted, very hard difficult drilling



Source: Environmental Science and Engineering 1982

Hole No. SC-OW2

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA.	SHEET 1 OF 2 SHEETS

1. PROJECT
Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station)
N686407.29 E666290.05

3. DRILLING AGENCY
Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number) SC-OW2

5. NAME OF DRILLER
Paul N. Clawson

6. DIRECTION OF HOLE
☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 50'

10. SIZE AND TYPE OF BIT 2.5"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
MSL

557

12. MANUFACTURER'S DESIGNATION OF DRILL
SIMCO

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 0 ; UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER

16. DATE HOLE: STARTED 4/16/80 ; COMPLETED 4/17/80

17. ELEVATION TOP OF HOLE 76.83'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR
Robert [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			light brown - silty fine sand 2.0'			easy drilling
	5		Orange - clayey, fine to medium sand 9.0'			easy drilling
	10		Tan - clayey, silty fine to medium sand 11.5'			easy drilling
	15		light brown - clayey fine to medium sand with very slight amounts of coarse materials 16.0'			
	20		brown - clayey fine to medium sand with coarse sand			easy drilling
	25		light brown/tan - clayey fine to medium sand with coarse sand; percentage of clay increasing 26.5'			
	30		tan - fine to medium sandy clay 32.0'			difficult drilling

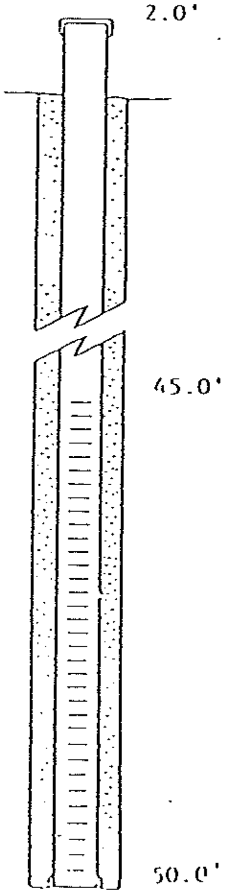
FST-001

Source: Environmental Science and Engineering 1982

559

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 76.83'	Hole No. SC-OW2
PROJECT Fort Stewart RCRA Studies	INSTALLATION Fort Stewart, GA	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35		light/dark grey - fine to medium sandy, silty clay 36.5'			
	40					
	45		Olive - very slightly clayey fine to medium sandy silt with muscovite present			compacted, very hard, difficult drilling
	50					



Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. SC-0W3 601

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT: Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station): N685632.00 E666495.87

3. DRILLING AGENCY: Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number): SC-0W3

5. NAME OF DRILLER: Paul N. Clawson

6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK: 0'

9. TOTAL DEPTH OF HOLE: 65'

10. SIZE AND TYPE OF BIT: 2.5"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL

12. MANUFACTURER'S DESIGNATION OF DRILL: SIMCO

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 0 UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER

16. DATE HOLE: STARTED 4/18/80 COMPLETED 4/19/80

17. ELEVATION TOP OF HOLE: 77.54'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	5		grey buff, brown-clayey medium sand; clay 5-15% 7.0'			
	10 15		buff - fine to medium clayey sand, clay 20-30%, color white below 10 ft. 19.0'			
	20 25		white - fine clayey sand; clay 20-30%, very slight amounts of coarse grains, few gravel sized angular quartz grains below 22.5 ft to 25 ft. 26.5'			slight mud loss 20' - 25'
	30		Grey, red, brown, buff- very clayey medium sand, few coarse angular grains 30.0'			

FST-001

Source: Environmental Science and Engineering 1982

603

DRILLING LOG (Cont Sheet)

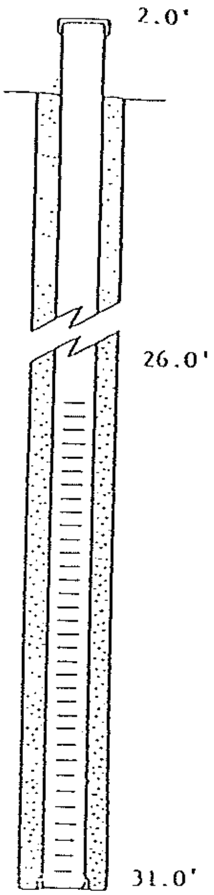
ELEVATION TOP OF HOLE 77.54'

Hole No. SC-OW3

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA.

SHEET 2 OF 2 SHEETS

ATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35 40 45		45.5'			 DIAGRAM NOT TO SCALE
	50 55		Grey, red, brown, buff - large percentage very coarse and gravel size well rounded quartz grains 55.5'			
			Dark grey - soft sandy clay, this grades into hard sandy clayey silt 59.5'			
	60 65		Olive - sandy, clayey silt			very hard , difficult drilling

Source: Environmental Science and Engineering 1982

Hole No. SC-0W4

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N684987.98 E666108.05
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) SC-0W4
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 35'
10. SIZE AND TYPE OF BIT 2.5"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

605

12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE STARTED 4/21/80 COMPLETED 4/22/80
17. ELEVATION TOP OF HOLE 72.68'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Dark brown - fine medium sand 2.0'			easy drilling
	5		light brown, grey - sandy clay, clayey sand, sand medium to coarse 6.5'			easy drilling
	10		greyish brown - alternating between clay and sandy clay, sand fine to medium 9.5'			difficult drilling
	15		tan - clayey sand, sandy clay, sand is very fine, percentage of clay about 50% 14.5'			difficult drilling
	20		tan - clayey, silty very fine sand, percentage of clay way down from last sample 19.5'			
	25 30		tan - same color but much greater percentage of coarse angular material 31.0'			loss of drilling fluid

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 72.68'

Hole No. SCOW6

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			dark grey - fine to medium sandy silt 33.0'			very soft, easy drilling
	35		Olive - sandy silt, muscovite present			very hard, compacted, difficult drilling

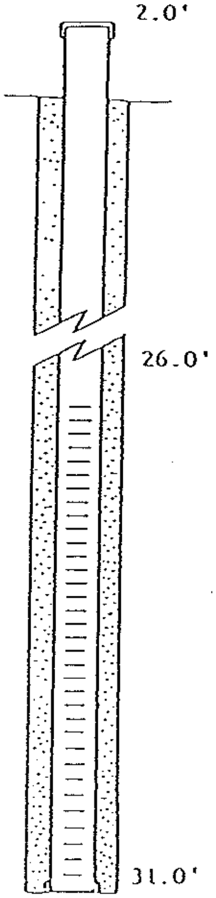


DIAGRAM NOT TO SCALE

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. SC-0W5

609

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Fort Stewart, GA
		SHEET 1 of 2 SHEETS

1. PROJECT
Fort Stewart RCRA Studies

2. LOCATION (Coordinates or Station)
N684690.69 E664922.20

3. DRILLING AGENCY
Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number) SC-0W5

5. NAME OF DRILLER
Paul N. Clawson

6. DIRECTION OF HOLE
☒ VERTICAL ☐ INCLINED ________ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 35'

10. SIZE AND TYPE OF BIT 2.5"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
MSL

12. MANUFACTURER'S DESIGNATION OF DRILL
SIMCO

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 0 ; UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER

16. DATE HOLE: STARTED 4/23/80 ; COMPLETED 4/25/80

17. ELEVATION TOP OF HOLE 72.36'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR Robert Grassy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Dark brown - fine to medium sand 2.0'			easy drilling
			Dark brown-peaty fine to medium sand 4.0'			easy drilling
	5		Pale yellow-clayey fine to medium sand with coarse sand 6.5'			easy drilling
			Orange-yellow - sandy (fine to medium) clay 8.5'			difficult drilling
	10					
	15		light grey - fine sandy silty clay; precentage of clay increasing up to 18 ft. 18.0'			easy drilling
	20		light grey - medium to coarse sandy clay, alternating amounts of standard clay with coarse angular material			
	25		light grey - fine to medium sandy clay; percentage of coarse material increasing with depth up to 30' 30.0'			
	30		dark grey - medium to coarse sandy silt, muscovite present			

FST-001

Source: Environmental Science and Engineering 1982

DRILLING LOG (Cont Sheet)
ELEVATION TOP OF HOLE 72.36'
Hole No. SC-OW5
PROJECT Fort Stewart RCRA Studies
INSTALLATION Fort Stewart, GA
SHEET 2 OF 2 SHEETS

ATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			33.0'			
	35		Olive - fine sandy silt			very hard, difficult drilling

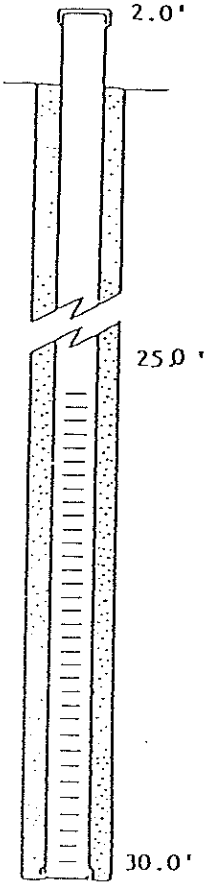


DIAGRAM NOT TO SCALE

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

Hole No. SC-OW6

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

613

1. PROJECT Fort Stewart 9CYA Studies

2. LOCATION (Coordinates or Station) N684944.49 E664723.99

3. DRILLING AGENCY Paul N. Clawson

4. HOLE NO. (As shown on drawing title and file number) SC-OW6

5. NAME OF DRILLER Paul N. Clawson

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

8. DEPTH DRILLED INTO ROCK 0'

9. TOTAL DEPTH OF HOLE 40'

10. SIZE AND TYPE OF BIT 2.5"

11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL

12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0

14. TOTAL NUMBER CORE BOXES

15. ELEVATION GROUND WATER

16. DATE HOLE STARTED 4/26/80 COMPLETED 4/27/80

17. ELEVATION TOP OF HOLE 68.62'

18. TOTAL CORE RECOVERY FOR BORING %

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Dark brown - fine to medium sand 2.0'			easy drilling
			multi color-clayey fine to medium sand 4.5'			moderate drilling
	5		dark brown-peaty fine to medium sand 6.5'			easy drilling
	10		light grey - sandy clay clay percentage 40-50%			difficult drilling
	15		light grey - sandy clay - clay percentage 20% 16.0'			
	20		light grey-clayey fine to medium sand with slight amounts of coarse material 24.0'			
	25		light grey - medium to coarse sand with slight amounts of very coarse material			easy drilling
	30		grey-black - medium to coarse sand with gravel 30.0'			easy drilling, loss of return mud

FST-001

Source: Environmental Science and Engineering 1982

6|5

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 68.62'

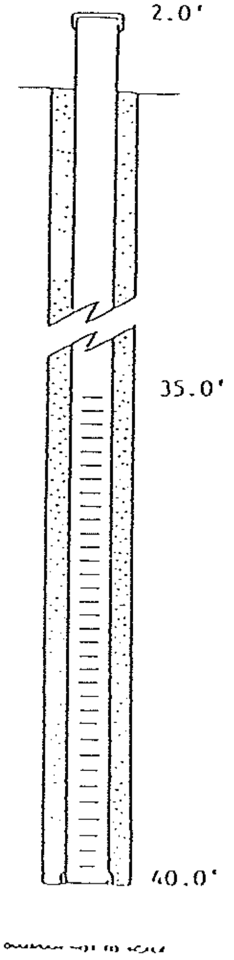
Hole No. SC-9S6

PROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

VATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	35		35.5'			
			Dark grey - slightly silty clayey medium to coarse sand 37.5'			
	40		Dark grey-clayey fine sandy silt			very hard, difficult drilling



Source: Environmental Science and Engineering 1982

APPENDIX 4.3

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Fort Stewart, GA

SHEET 1 OF 2 SHEETS

1. PROJECT Fort Stewart RCRA Studies
2. LOCATION (Coordinates or Station) N685459.00 E663601.93
3. DRILLING AGENCY Paul N. Clawson
4. HOLE NO. (As shown on drawing title and file number) SC-0W7
5. NAME OF DRILLER Paul N. Clawson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK 0'
9. TOTAL DEPTH OF HOLE 35'
10. SIZE AND TYPE OF BIT 2.5"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED 0 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE STARTED 4/28/80 COMPLETED 4/29/80
17. ELEVATION TOP OF HOLE 68.12'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Robert Gregory

617

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Tan - very slightly clayey fine to medium sand 3.0'			
	5		dark brown very slightly clayey medium to coarse sand 7.0'			slight loss of drilling fluid
			Tan-clayey medium to coarse sand, about 40% clay 9.0'			difficult drilling
	10		Orange-clayey medium to coarse sand 11.5'			difficult drilling
	15		Light grey-fine to medium sandy clay with very slight amount of coarse angular material			
	20		Light grey - clayey medium to coarse sand with very slight amount of angular gravel			
	25		light grey-clayey medium to coarse sand with very slight amount of coarse material, amount of clay increasing 25.0'			
	30		light grey-fine to medium sandy clay, amount of clay increasing 30.0'			
			Dark grey-fine to medium clayey silt, muscovite present 32.5'			very soft, easy drilling

FST-001

Source: Environmental Science and Engineering 1982

APPENDIX 4.5

619

)RILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 68.12'

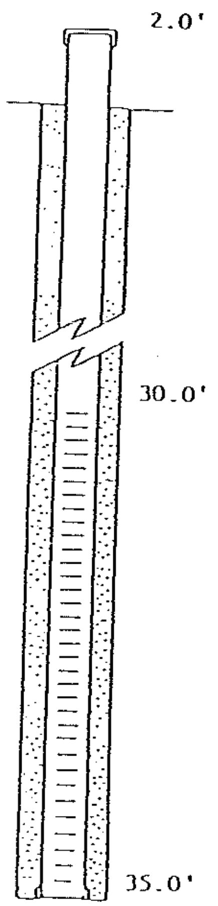
Hole No. SC-0W7

ROJECT Fort Stewart RCRA Studies

INSTALLATION Fort Stewart, GA

SHEET 2 OF 2 SHEETS

ATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			32.5'			
	35		olive-slightly clayey fine sandy silt			hard , compacted, difficult drilling



FST-001

Source: Environmental Science and Engineering 1982

APPENDIX 4.6

ANALYTICAL RESULTS, JUNE 1980
FST-001, FST-002, AND FST-003
ANALYTICAL RESULTS, SEPTEMBER 1989, SEPTEMBER 1990, FST-001

SOURCE: ESE, 1982; SAVANNAH LABS, 1988, 1989; FT. STEWART 1990

ENVIRON   L SCIENCE & ENGINEERING   01/15/81   OMPUTER ANALYSIS REPORT   SC-1   MAP# 465

PROJECT NUMBER 79234400   PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE   FIELD GROUP LEADER

PARAMETERS	STORET #	COS1-1 61500	COS1-2 61501	COS1-3 61502	COS2-1 61503	COS2-2 61504	COS2-3 61505	COM1-1 61506	COM1-2 61507	COM1-3 61508	COM3-3 61509
DATE		6/16/80	6/17/80	6/18/80	6/16/80	6/17/80	6/18/80	6/16/80	6/17/80	6/18/80	6/18/80
TIME		0	0	0	0	0	0	0	0	0	0
CHEMICAL OXYGEN DEMA ND,.025N K	335	35	40	37	40	44	39	14	15	20	16
BOD (5 DA.-MG/L)	310	2.6	2.3	2.0	3.0	2.6	2.9	5.0	3.0	2.0	1.1
IRON (UG/L)	1045	1470	1350	1380	2700	2680	2830	3760	3660	7340	8750
TKN (MG/L-N)	625	0.69	0.69	0.63	0.65	0.64	0.77	1.40	1.05	0.86	0.56
CHLORIDE (MG/L)	940	9	9	9	9	9	9	8	3	3	5
NO3 + NO2 (MG/L-N)	630	0.007	0.011	0.007	0.024	0.011	0.015	0.011	0.019	0.107	0.982
DISS. SOLIDS (MG/L)	70300	57	57	54	68	59	66	126	72	300	882
LEAD (UG/L)	1051	2.9	3.6	2.7	4.8	11	6.7	14	15	18	21
CHROMIUM (UG/L)	1034	2.2	3.1	1.9	3.4	<1.5	<1.5	2.4	2.2	7.6	14
COLOR (CPU)	80	80	80	80	80	100	90	80	80	50	20
TOTAL ALPHA (GROSS)	1501	<1.3	<0.5	<1.2	<0.8	<2.2	<1.3	1.7	<1.3	3.1	6.4
TOTAL BETA (GROSS)	3501	9.6	2.6	7.3	4.9	3.3	4.2	2.9	<2.7	16	14
SUSP. SOLIDS (MG/L)	530	11.0	11.0	36.0	11.0	16.0	22.0	70.0	25.0	293	3120
CADMIUM (UG/L)	1027	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

APPENDIX 4.6
FST-002

Source: Environmental Science and Engineering 1982

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ENVIRON. AL SCIENCE & ENGINEERING 01/15/81 COMPUTER ANALYSIS REPORT SC-1 MAP# 465

PROJECT NUMBER 79234400 PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE FIELD GROUP LEADER

PARAMETERS	STORET #	COM3-2 61510	COM3-1 61511	TXS1-1 61512	TXS1-2 61513	TXS1-3 61514	TXS2-1 61515	TXS2-2 61516	TXS2-3 61517	TXM1-1 61518	TXM1-2 61519
		SAMPLE NUMBERS									
DATE		6/17/80	6/16/80	6/16/80	6/17/80	6/18/80	6/16/80	6/17/80	6/18/80	6/16/80	6/17/80
TIME		0	0	0	0	0	0	0	0	0	0
CHEMICAL OXYGEN DEMAND,.025N K	335	23	11	19	14	14	28	12	9	13	15
BOD (5 DA.-MG/L)	310	1.3	1.3	2.9	3.1	3.7	2.1	2.3	2.2	3.0	2.7
IRON (UG/L)	1045	1570	684	4790	2160	4350	4870	1230	613	9460	6630
TKN (MG/L-N)	625	0.03	0.08	1.34	0.69	0.78	1.42	0.56	0.29	0.36	0.95
CHLORIDE (MG/L)	940	5	9	10	8	9	7	7	7	4	4
NO3 + NO2 (MG/L-N)	630	0.663	0.644	0.009	0.015	0.007	0.005	<0.004	0.005	0.013	0.016
DISS. SOLIDS (MG/L)	70300	66	45	39	37	49	31	24	24	98	106
LEAD (UG/L)	1051	3.6	7.1	17	4.6	20	2.7	2.5	<1.0	<1.0	3.6
CHROMIUM (UG/L)	1034	3.1	<1.5	<1.5	2.2	2.6	1.7	<1.5	<1.5	1.9	4.1
COLOR (CPU)	80	10	10	60	50	60	40	10	10	10	110
TOTAL ALPHA (GROSS)	1501	1.9	3.3	<1.3	<0.1	<1.2	<1.9	<1.6	<1.2	<1.5	1.7
TOTAL BETA (GROSS)	3501	3.4	0.6	6.0	<0.6	<3.9	3.3	<2.1	<3.7	7.1	4.1
SUSP. SOLIDS (MG/L)	530	90.0	54.0	31.0	12.0	50.0	5.0	6.0	6.0	49.0	15.0
CADMIUM (UG/L)	1027	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Source: Environmental Science and Engineering 1982

ENVIRONML SCIENCE & ENGINEERING 01/15/81 COMPUTER ANALYSIS REPORT SC-1 MAP# 465

PROJECT NUMBER 79234400

PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE

FIELD GROUP LEADER

PARAMETERS	STORET #	TXM1-3 61520	TXM3-1 61521	TXM3-2 61522	TXM3-3 61523	SCM1-1 61524	SCM1-2 61525	SCM1-3 61526	SCM2-1 61527	SCM2-2 61528	SCM2-3 61529
DATE		6/18/80	6/16/80	6/17/80	6/18/80	6/19/80	6/20/80	6/21/80	6/19/80	6/20/80	6/21/80
TIME		0	0	0	0	0	0	0	0	0	0
CHEMICAL OXYGEN DEMAND,.025N K	335	13	14	10	17	26	15	6	9	12	14
BOD (5 DA.-MG/L)	310	2.9	2.6	2.3	2.5	1.1	1.0	<1.0	2.5	2.4	3.0
IRON (UG/L)	1045	5930	2530	10200	2250	4090	5930	7340	2250	5230	2980
TKN (MG/L-N)	625	0.63	0.69	1.32	0.46	0.46	0.41	0.60	0.53	0.61	0.59
CHLORIDE (MG/L)	940	4	4	5	4	31	34	36	4	4	4
NO3 + NO2 (MG/L-N)	630	0.019	0.012	0.022	0.028	0.032	0.023	0.028	0.016	0.025	0.020
DISS. SOLIDS (MG/L)	70300	93	83	207	76	144	167	169	125	131	130
LEAD (UG/L)	1051	7.6	5.0	15	3.9	4.3	5.7	3.2	6.7	13	3.9
CHROMIUM (UG/L)	1034	<1.5	9.8	42	4.1	<1.5	9.8	14	<1.5	13	2.6
COLOR (CPU)	80	80	40	30	35	30	30	30	30	30	30
TOTAL ALPHA (GROSS)	1501	<1.9	<2.6	3.6	<2.7	<2.1	4.2	2.3	2.0	<1.2	2.7
TOTAL BETA (GROSS)	3501	5.5	9.1	12	7.4	9.5	14	14	3.2	6.0	4.6
SUSP. SOLIDS (MG/L)	530	44.0	104	1270	99.0	22.0	132	159	3980	152	47.0
CADMIUM (UG/L)	1027	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

APPENDIX 4.6
FST-003
FST-001

Source: Environmental Science and Engineering 1982

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ENVIRONMENTAL SCIENCE & ENGINEERING 01/15/81 COMPUTER ANALYSIS REPORT SC-1 MAP# 465

PROJECT NUMBER 79234400

PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE

FIELD GROUP LEADER

		SAMPLE NUMBERS									
PARAMETERS	STORET #	SCM4-1 61530	SCM4-2 61531	SCM4-3 61532	SCM6-1 61533	SCM6-2 61534	SCM6-3 61535	SCS1-1 61536	SCS1-2 61537	SCS1-3 61538	SCS2-1 61539
DATE		6/19/80	6/20/80	6/21/80	6/19/80	6/20/80	6/21/80	6/19/80	6/20/80	6/21/80	6/19/80
TIME		0	0	0	0	0	0	0	0	0	0
CHEMICAL OXYGEN DEMA ND,.025N K	335	22	11	1	15	26	9	17	22	25	32
BOD (5 DA.-MG/L)	310	2.4	2.1	1.2	1.4	<1.0	<1.0	3.2	2.1	<1.0	4.3
IRON (UG/L)	1045	10900	5930	5930	5930	5930	6630	1590	1210	1230	1620
TKN (MG/L-N)	625	1.32	0.28	0.42	0.25	0.19	0.43	0.94	0.77	0.80	1.01
CHLORIDE (MG/L)	940	19	18	18	7	7	7	5	7	6	5
NO3 + NO2 (MG/L-N)	630	0.019	0.008	0.012	0.069	0.089	0.103	0.132	0.021	0.016	0.131
DISS. SOLIDS (MG/L)	70300	269	137	129	95	100	98	77	96	103	76
LEAD (UG/L)	1051	19	8.6	3.2	<1.0	<1.0	4.3	<1.0	<1.0	<1.0	<1.0
CHROMIUM (UG/L)	1034	28	11	5.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
COLOR (CPU)	80	35	30	30	10	10	20	80	70	80	100
TOTAL ALPHA (GROSS)	1501	3.2	2.5	6.0	2.3	<2.3	1.6	2.3	1.6	<1.7	1.5
TOTAL BETA (GROSS)	3501	7.9	11	11	5.9	5.1	6.8	6.5	7.0	3.5	2.9
SUSP. SOLIDS (MG/L)	530	1290	31.0	179	14.0	<5.0	14.0	53.0	23.0	26.0	47.0
CADMIUM (UG/L)	1027	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Source: Environmental Science and Engineering 1982

ENVIRONMENTAL SCIENCE & ENGINEERING 01/15/81 COMPUTER ANALYSIS REPORT SC-1 MAP# 465

PROJECT NUMBER 79234400

PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE

FIELD GROUP LEADER

PARAMETERS	STORET #	SAMPLE NUMBERS SCS2-2 61540	SCS2-3 61541	SCS3-1 61542	SCS3-2 61543	SCS3-3 61544	SCS4-1 61545	SCS4-2 61546	SCS4-3 61547	SCS5-1 61548	SCS5-2 61549
DATE		6/20/80	6/21/80	6/19/80	6/20/80	6/21/80	6/19/80	6/20/80	6/21/80	6/19/80	6/20/80
TIME		0	0	0	0	0	0	0	0	0	0
CHEMICAL OXYGEN DEMAND,.025N K	335	30	21	33	27	548	36	31	21	16	35
BOD (5 DA.-MG/L)	310	4.1	4.1	21.9	20.1	16.2	5.3	7.3	5.1	5.1	5.1
IRON (UG/L)	1045	1090	1180	13000	4770	17300	1790	1380	1840	2080	2060
TKN (MG/L-N)	625	0.67	0.63	3.88	2.15	4.02	1.12	0.80	0.73	0.91	0.96
CHLORIDE (MG/L)	940	6	7	44	37	49	5	7	8	5	7
NO3 + NO2 (MG/L-N)	630	0.019	0.016	0.054	0.035	0.047	0.018	0.008	0.009	0.015	0.009
DISS. SOLIDS (MG/L)	70300	98	101	273	267	339	97	83	100	76	92
LEAD (UG/L)	1051	3.2	2.5	4.6	2.5	3.9	<1.0	<1.0	<1.0	<1.0	<1.0
CHROMIUM (UG/L)	1034	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
COLOR (CPU)	80	80	10	15	25	20	70	110	100	100	100
TOTAL ALPHA (GROSS)	1501	1.5	3.1	2.0	2.2	<2.1	<1.9	<1.7	<1.8	2.2	<1.3
TOTAL BETA (GROSS)	3501	2.5	6.7	16	15	11	6.2	3.3	4.5	4.9	5.0
SUSP. SOLIDS (MG/L)	530	17.0	18.0	49.0	88.0	77.0	32.0	122	38.0	59.0	53.0
CADMIUM (UG/L)	1027	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Source: Environmental Science and Engineering 1982

ENVIRONMENTAL SCIENCE & ENGINEERING 01/15/81 COMPUTER ANALYSIS REPORT SC-1 MAP# 465

PROJECT NUMBER 79234400 PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE FIELD GROUP LEADER

PARAMETERS	STORET #	SCS5-3 61550	SCS6-1 61551	SCS6-2 61552	SCS6-3 61553	SCS7-1 61554	SCS7-2 61555	SCS7-3 61556	SCS8-1 61557	SCS8-2 61558	SCS8-3 61559
		SAMPLE NUMBERS									
DATE		6/21/80	6/19/80	6/20/80	6/21/80	6/19/80	6/20/80	6/21/80	6/19/80	6/20/80	6/21/80
TIME		0	0	0	0	0	0	0	0	0	0
CHEMICAL OXYGEN DEMAND,.025N K	335	29	50	41	30	38	43	31	51	54	58
BOD (5 DA.-MG/L)	310	3.2	5.3	4.3	1.4	5.5	4.5	3.0	4.7	4.8	2.5
IRON (UG/L)	1045	1840	2110	2080	2130	2600	2060	2250	2180	2110	1620
TKN (MG/L-N)	625	0.68	0.93	0.58	0.68	0.96	1.04	1.50	1.06	0.77	0.74
CHLORIDE (MG/L)	940	7	5	7	7	5	6	7	5	6	7
NO3 + NO2 (MG/L-N)	630	0.007	0.016	0.011	0.007	0.018	0.012	0.009	0.037	0.011	0.008
DISS. SOLIDS (MG/L)	70300	96	63	86	89	54	66	95	77	99	99
LEAD (UG/L)	1051	<1.0	2.7	<1.0	22	8.6	1.6	1.6	3.2	4.6	<1.0
CHROMIUM (UG/L)	1034	12	14	4.1	3.1	6.6	3.1	2.6	4.6	3.1	<1.5
COLOR (CPU)	80	80	90	80	100	100	100	100	100	110	90
TOTAL ALPHA (GROSS)	1501	<1.2	<1.7	<2.3	<0.7	<1.7	<1.2	1.7	<1.7	<0.7	<1.8
TOTAL BETA (GROSS)	3501	2.9	5.2	5.5	5.9	4.2	6.0	8.5	7.8	4.1	3.0
SUSP. SOLIDS (MG/L)	530	45.0	93.0	50.0	33.0	96.0	62.0	102	77.0	45.0	21.0
CADMIUM (UG/L)	1027	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Source: Environmental Science and Engineering 1982

APPENDIX 4.6
FST-001

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ENVIRONMENTAL SCIENCE & ENGINEERING 01/15/81 COMPUTER ANALYSIS REPORT SC-2 MAP# 466

PROJECT NUMBER 79234400

PROJECT NAME SAVANNAH CORPS

PROJECT MANAGER K.TUTTLE

FIELD GROUP LEADER

PARAMETERS	STORET #	SCM3-1 61600	SCM3-2 61601	SCM3-3 61602	SCMS-1 61603	SCMS-3 61604	SCMS-2 61605
		SAMPLE NUMBERS					
DATE		6/19/80	6/20/80	6/21/80	6/19/80	6/21/80	6/20/80
TIME		0	0	0	0	0	0
ENDRIN (UG/L)	39390	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
G-BHC (UG/L)	39340	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
METHOXYCHLOR (UG/L)	39480	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
TOXAPHENE (UG/L)	39400	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66
2,4-D, TOTAL (UG/L)	39730	<0.27	<0.30	<0.30	<0.28	<0.28	<0.29
SILVEX (UG/L)	39760	<0.07	<0.08	<0.08	<0.07	<0.07	<0.08
CHEMICAL OXYGEN DEMA ND,.025N K	335	20	24	<5	49	9	14
BOD (5 DA.-MG/L)	310	<1.0	<1.0	<1.0	19.8	3.6	9.0
IRON (UG/L)	1045	1380	1940	1400	4190	1210	2030
TKN (MG/L-N)	625	0.14	0.14	0.23	0.61	0.26	0.44
CHLORIDE (MG/L)	940	3	3	3	4	5	5
NO3 + NO2 (MG/L-N)	630	<0.004	<0.004	0.005	<0.004	<0.004	<0.004
CADMIUM (UG/L)	1027	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
DISS. SOLIDS (MG/L)	70300	75	83	62	211	107	289
LEAD (UG/L)	1051	<1.0	<1.0	<1.0	2.5	<1.0	11
CHROMIUM (UG/L)	1034	<1.5	3.6	3.6	13	<1.5	8.6
COLOR (CPU)	80	15	20	10	40	25	25
TOTAL ALPHA (GROSS)	1501	<1.3	<2.2	<2.2	4.1	<0.4	3.1
TOTAL BETA (GROSS)	3501	2.1	9.4	3.7	5.9	3.8	11
SUSP. SOLIDS (MG/L)	530	19.0	63.0	10.0	423	29.0	349

Source: Environmental Science and Engineering 1982

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ENVIRONMENTAL SCIENCE & ENGINEERING          01/15/81        COMPUTER ANALYSIS REPORT        SC-2      MAP#   466

     PROJECT NUMBER  79234400                                 PROJECT NAME  SAVANNAH CORPS

     PROJECT MANAGER  K.TUTTLE                                FIELD GROUP LEADER

                                                                 SAMPLE NUMBERS
                                     SCM3-1   SCM3-2   SCM3-3   SCM5-1   SCM5-3   SCM5-2
 PARAMETERS               STORET #    61600    61601    61602    61603    61604    61605

 DATE                               6/19/80  6/20/80  6/21/80  6/19/80  6/21/80  6/20/80

 TIME                                     0        0        0        0        0        0

 ARSENIC (UG/L)               1002      <10      <10      <10      <10      <10      <10

 BARIUM (UG/L)                1007       46       43       38       77       30       60

 MERCURY (UG/L)              71900      0.3      0.6      0.4     <0.2      0.2     <0.2

 SELENIUM (UG/L)              1147      <15      <15      <15      <15      <15      <15

 SILVER (UG/L)                1077     <0.5     <0.5     <0.5     <0.5     <0.5     <0.5

 FLUORIDE (MG/L)               951     0.11     0.11     0.12     0.17     0.13     0.14
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Source: Environmental Science and Engineering 1982

James W. Andrews, Ph.D.
President

Janette Davis Long
Vice-President

SAVANNAH LABORATORIES
AND ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue (31404)
P. O. Box 13548 • Savannah, GA 31416-0548
(912) 354-7858

639

LOG NO: 89-7664

Received: 13 SEP 89

Mr. Lawson Smith
Environmental Office, DEH
Bldg. # 1139
Ft. Stewart, GA 31314

Purchase Order: DOC#9255-9124 CALL#L449

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
7664-1	MW-SCM-1 89-52-S (9-12-89)	Client
7664-2	MW-SCM-2 89-53-S (9-12-89)	
7664-3	MW-SCM-3 89-54-S (9-12-89)	
7664-4	MW-SCM-4 89-55-S (9-12-89)	
7664-5	MW-SCM-5 89-56-S (9-12-89)	

PARAMETER	7664-1	7664-2	7664-3	7664-4	7664-5
pH, units	5.7	6.2	6.7	5.7	3.5
oride, mg/l	31	26	2.9	29	5.4
cific Conductance, umhos/cm	200	200	90	210	320

Methods: EPA 40 CFR Part 136.

Source: Savannah Labs 1989

APPENDIX 4.6.
FST-001

James W. Andrews, Ph.D.
President

Janette Davis Long
Vice-President

SAVANNAH LABORATORIES
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P. O. Box 13548 • Savannah, GA 31416-0548
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LOG NO: 89-7664

641

Received: 13 SEP 89

Mr. Lawson Smith
Environmental Office, DEH
Bldg. # 1139
Ft. Stewart, GA 31314

Purchase Order: DOC#9255-9124 CALL#LA49

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
7664-6	MW-SCM-6 89-57-S (9-12-89)	Client

PARAMETER	7664-6
pH, units	6.0
Chloride, mg/l	6.8
Specific Conductance, umhos/cm	75

Methods: EPA 40 CFR Part 136.

William D. Sherrod
William D. Sherrod

Source: Savannah Labs 1989

APPENDIX 4.6.
FST-001

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SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: SO-10883

Received: 11 SEP 90

Mr. Lawson Smith
Environmental Office, DEH
Bldg. # 1139
Ft. Stewart, GA 31314

Purchase Order: DOC#02549110/CALL#L418

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
10883-6	SCM-6 (9/11/90)	Client

PARAMETER	10883-6
pH, units	5.8
Specific Conductance, umhos/cm	170
Chloride, mg/l	9.2

Methods: EPA 40 CFR Part 136

William D. Sherrod
William D. Sherrod

Source: Savannah Labs 1990
FST-001
APPENDIX 4.6

SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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645

LOG NO: SO-10883

Received: 11 SEP 90

Purchase Order: DOC#02549110/CALL#L418

Mr. Lawson Smith
Environmental Office, DEH
Bldg. # 1139
Ft. Stewart, GA 31314

REPORT OF RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
10883-1	SCM-1 (9/11/90)	
10883-2	SCM-2 (9/11/90)	Client
10883-3	SCM-3 (9/11/90)	
10883-4	SCM-4 (9/11/90)	
10883-5	SCM-5 (9/11/90)	

PARAMETER	10883-1	10883-2	10883-3	10883-4	10883-5
H, units	5.8	6.1	6.5	6.2	6.0
pecific Conductance, umhos/cm	130	200	100	140	270
Chloride, mg/l	18	29	3.1	8.1	11

Methods: EPA 40 CFR Part 136

Source: Savannah Labs 1990
FST-001
APPENDIX 4.6

Laboratory locations in Savannah, GA • Mobile, AL • Tallahassee, FL • Deerfield Beach, FL

APPENDIX 4.6

RUN DATE: 15 DEC 86

INSTALLATION: FT STEWART, GA

SITE: SANITARY LANDFILL

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS					
				B SC-M5	SC-M2	SC-M3	SC-M4	SC-M1	SC-M6
WATER LEVELS (A)	05 SEP 86		FT	71.8	60.2	53.8	55.3	53.1	58.2
CHLORIDE	08 SEP 86	1.0	MGL	10.0	11.0	11.0	22.0	36.0	16.0
PH(FIELD)	08 SEP 86		PH	5.0	5.0	5.3	5.0	5.4	5.6
SPEC COND	08 SEP 86	1.	UMC	320.	170.	130.	250.	230.	290.
SPEC COND	08 SEP 86	1.	UMC	310.	160.	120.	250.	220.	280.
SPEC COND	08 SEP 86	1.	UMC	320.	170.	120.	250.	230.	290.
SPEC COND	08 SEP 86	1.	UMC	320.	160.	120.	260.	230.	290.

Sources: Fort Stewart 1990
Savannah Labs 1988

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APPENDIX 4.6

RUN DATE: 15 DEC 86

INSTALLATION: FT STEWART, GA

SITE: SANITARY LANDFILL

LEGEND

NOTES: ALL METALS AND OTHER PARAMETERS WHERE APPROPRIATE ARE ON A DISSOLVED (FILTERED) BASIS UNLESS OTHERWISE NOTED. DETECTION LIMITS SHOWN ARE NORMAL LEVELS; ACTUAL LIMITS MAY VARY IN ENVIRONMENTAL SAMPLES. ANALYTICAL RESULTS ARE ACCURATE TO EITHER 2 OR 3 SIGNIFICANT FIGURES.

A VALUES SHOWN ARE FOR WATER LEVEL ELEVATION ABOVE A REFERENCE DATUM
B UPGRADIENT SITE
* VALUE EXCEEDS A NATIONAL SECONDARY DRINKING WATER REGULATION CRITERIA

MGL - MILLIGRAMS/LITER
UGL - MICROGRAMS/LITER
PCL - PICOCURIES/LITER
UMC - MICROMHOS/CENTIMETER
NTU - NEPHELOMETRIC TURBIDITY UNITS
TON - THRESHOLD ODOR NUMBER
TON - TASTE DILUTION INDEX NUMBER
CU - COLOR UNITS
PHM - PER 100 MILLILITERS

Sources: Fort Stewart 1990
Savannah Labs 1988

APPENDIX 4.6

RUN DATE: 05 JAN 88

INSTALLATION: FT STEWART, GA

SITE: SANITARY LANDFILL

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B SC-M5	SC-M2	SC-M3	SC-M4	SC-M1	SC-M6
WATER									
LEVELS (A)	15 SEP 87		FT	71.8	60.2		55.3	53.1	58.2
CHLORIDE	15 SEP 87	1.0	MGL	19.0	22.0	4.0	21.0	31.0	11.0
PH(FIELD)	15 SEP 87		PH	5.3	5.9	5.4	5.1	7.1	11.6
SPEC COND	15 SEP 87	1.	UMC	570.	190.	150.	260.	245.	85.
SPEC COND	15 SEP 87	1.	UMC	560.	200.	150.	270.	250.	86.
SPEC COND	15 SEP 87	1.	UMC	570.	200.	149.	270.	250.	86.
SPEC COND	15 SEP 87	1.	UMC	560.	200.	150.	270.	250.	86.

Sources: Fort Stewart 1990
Savannah Labs 1988

APPENDIX 4.6

RUN DATE: 05 JAN 88

INSTALLATION: FT STEWART, GA SITE: SANITARY LANDFILL

LEGEND

NOTES: ALL METALS AND OTHER PARAMETERS WHERE APPROPRIATE ARE ON A DISSOLVED (FILTERED) BASIS UNLESS OTHERWISE NOTED. DETECTION LIMITS SHOWN ARE NORMAL LEVELS; ACTUAL LIMITS MAY VARY IN ENVIRONMENTAL SAMPLES. ANALYTICAL RESULTS ARE ACCURATE TO EITHER 2 OR 3 SIGNIFICANT FIGURES.

A VALUES SHOWN ARE FOR WATER LEVEL ELEVATION ABOVE A REFERENCE DATUM
B UPGRADIENT SITE
VALUE EXCEEDS A NATIONAL SECONDARY DRINKING WATER REGULATION CRITERIA

MGL - MILLIGRAMS/LITER
UGL - MICROGRAMS/LITER
PCL - PICOCURIES/LITER
UMC - MICROMHOS/CENTIMETER
NTU - NEPHELOMETRIC TURBIDITY UNITS
TON - THRESHOLD ODOR NUMBER
TDN - TASTE DILUTION INDEX NUMBER
CU - COLOR UNITS
PHM - PER 100 MILLILITERS

Sources: Fort Stewart 1990
Savannah Labs 1988

APPENDIX 4.7

RESULTS OF BACTERIAL ANALYSIS ON SAMPLES OF GROUND AND SURFACE WATER, JUNE 17 TO JUNE 21, 1980, FORT STEWART, GEORGIA

FST-001, FST-002, FST-003

SOURCE: ESE, 1980

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APPENDIX 4.7

Results of Bacterial Analysis on Samples of Ground and Surface Water, June 17 to June 21, 1980, Ft. Stewart, Georgia

Site	Date	Fecal Coliform/ 100 ml MF	Site	Date	Fecal Coliform/ 100 ml MF
TXM1-1	6/17/80	0	SC-S1-1	6/19/80	68
TXM3-1		0	SC-S2-1		65
TXM1-3	6/18/80	0	SC-S3-1		0
TXM3-3		0	SC-S4-1		28
TXS1-X2	6/17/80	31	SC-S5-1		73
TXS2-X2		growth—no fecal	SC-S6-1		58
TXS1-3	6/18/80	growth—no fecal	SC-S7-1		54
TXS2-3		0	SC-S8-1		67
COM1-3		0	SC-S1-2	6/20/80	0
COM3-3		0	SC-S2-2		0
COM3-02	6/17/80	0	SC-S3-2		0
COM3-2		0	SC-S4-2		0
COS1-2		14	SC-S5-2		0
COS2-2		62	SC-S6-2		0
COS1-3	6/18/80	0	SC-S7-2		growth—no fecal
COS2-3		56	SC-S8-2		0
SCM1-1	6/19/80	0	SCS1-3	6/21/80	0
SCM2-1		0	SCS2-3		0
SCM3-1		0	SCS3-3		0
SCM4-1		0	SCS4-3		0
SCM5-1		0	SCS5-3		0
SCM6-1		0	SCS6-3		growth—no fecal
SCM1-2	6/20/80	0	SC-S7-3		growth—no fecal
SCM2-2		0	SC-S8-3		88
SCM3-2		0			
SCM4-2		0			
SCM-5		0			
SCM-6-2		0			
SCM1-3	6/21/80	0			
SCM2-3		0			
SCM3-3		0			
SCM4-3		0			
SCM5-3		0			
SCM6-3		0			

Source :

ESE, 1980.

APPENDIX 4.8

WATER SAMPLING RESULTS, POST-SOUTH CENTRAL, TAC-X AND CAMP OLIVER SITES, JUNE 16, 17, AND 18, 1980, FORT STEWART, GEORGIA

SOURCE: ESE, 1980

APPENDIX 4.8

Water Sampling Results, Post, TAC-X, and Camp Oliver Landfill Sites, June 16, 17, and 18, 1980, Ft. Stewart, Georgia.

Well No. and Site	pH	Specific Conductivity (umhos/cm)	Temperature (°C)	Dissolved Oxygen (mg/l)	Depth to Water Table (feet)
TAC-X					
TXM1-1	5.3	142	21.0		8.5
TXM3-1	5.6	38	22.0		3.16
TXS1-1	5.2	60	33.0	5.5	
TXS2-1	5.6	60	35.0	7.0	
TXM1-2	5.1	139	21.0		9.25
TXM3-2	5.9	58	21.0		3.5
TXS1-2	6.3	50	29.0	8.0	
TXS2-2	5.75	45	29.0	12.2	
TXM1-3	5.5	119	21.5		8.58
TXM3-3	5.0	59	21.5		3.33
TXS1-3	5.5	58	26.0	6.5	
TXS2-3	5.0	35	26.0	11.2	
CAMP OLIVER					
COM1-1	6.2	142	21.0		12.75
COM3-1	5.4	30	22.0		4.83
COS1-1	5.9	60	27.0	4.5	
COS2-1	6.1	58	25.0	3.1	
COM1-2	6.2	69	21.5		12.66
COM3-2	5.1	30	20.0		5.08
COS1-2	5.8	62	27.0	3.7	
COS2-2	6.0	60	30.0	2.8	
COM1-3	5.0	61	21.0		12.83
COM3-3	5.0	30	20.0		4.75
COS1-3	5.5	63	26.5	4.2	
COS2-3	5.0	65	25.0	2.3	

Source: ESE, 1980.

FST-001
FST-002
FST-003

APPENDIX 4.8

Water Sampling Results, TAC-X and Camp Oliver Sites, June 16, 17, and 18, 1980, Ft. Stewart, Georgia

Well No. and Site	pH	Specific Conductivity (umhos/cm)	Temperature (°C)	Dissolved Oxygen (mg/l)	Depth to Water Table (feet)
<u>TAC-X</u>					
TXM1-1	5.3	142	21.0		8.5
TXM3-1	5.6	38	22.0		3.16
TXS1-1	5.2	60	38.0	5.5	
TXS2-1	5.6	60	35.0	7.0	
TXM1-2	5.1	139	21.0		9.25
TXM3-2	5.9	58	21.0		3.5
TXS1-2	6.3	50	29.0	8.0	
TXS2-2	5.75	45	29.0	12.2	
TXM1-3	5.5	119	21.5		8.58
TXM3-3	5.0	59	21.5		3.33
TXS1-3	5.5	58	26.0	6.5	
TXS2-3	5.0	35	26.0	11.2	
<u>CAMP OLIVER</u>					
COM1-1	6.2	142	21.0		12.75
COM3-1	5.4	30	22.0		4.83
COS1-1	5.9	60	27.0	4.5	
COS2-1	6.1	58	25.0	3.1	
COM1-2	6.2	69	21.5		12.66
COM3-2	5.1	30	20.0		5.08
COS1-2	5.8	62	27.0	3.7	
COS2-2	6.0	60	30.0	2.8	
COM1-3	5.0	61	21.0		12.83
COM3-3	5.0	30	20.0		4.75
COS1-3	5.5	63	26.5	4.2	
COS2-3	5.0	65	25.0	2.3	

Source: ESE, 1980.

FST-002
FST-003

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APPENDIX 4.8

Water Sampling Results, South Central Site, June 19, 20, and 21, 1980,
Ft. Stewart, Georgia

FST-001

Well No. and Site	pH	Specific Conductivity (umhos/cm)	Temperature (°C)	Dissolved Oxygen (mg/l)	Depth to Water Table (feet)
SOUTH CENTRAL					
SCM1-1	5.9	270	20.5		11.06
SCM2-1	6.8	205	22.0		7.75
SCM3-1	6.7	80	20.0		Flowing
SCM4-1	6.1	160	20.0		3.17
SCM5-1	5.8	115	21.0		9.46
SCM6-1	7.2	240	20.0		11.37
SCM1-2	5.5	190	21.0		11.20
SCM2-2	6.5	175	21.0		7.79
SCM3-2	6.7	110	20.5		Flowing
SCM4-2	5.8	140	21.0		4.71
SCM5-2	5.5	135	20.5		9.22
SCM6-2	6.7	290	20.0		11.35
SCM1-3	6.2	195	21.0		11.35
SCM2-3	6.6	180	20.0		7.83
SCM3-3	6.4	120	21.0		Flowing
SCM4-3	6.1	160	22.0		4.6
SCM5-3	6.5	140	21.0		9.36
SCM6-3	8.5	240	21.0		11.35
SCS1-1	6.7	92	24.0	12.0	
SCS2-1	6.8	88	23.0	12.0	
SCS3-1	5.0	1,050	25.0	8.1	
SCS4-1	7.2	980	24.0	11.2	
SCS5-1	7.0	94	23.0	8.0	
SCS6-1	7.0	89	23.0	6.5	
SCS7-1	7.0	88	23.0	6.6	
SCS8-1	6.9	135	23.0	6.3	
SCS1-2	7.0	115	24.0	12.0	
SCS2-2	7.0	118	24.0	11.4	
SCS3-2	4.8	650	32.0	8.0	
SCS4-2	6.7	122	26.5	11.8	
SCS5-2	7.0	570	24.3	5.7	
SCS6-2	6.4	430	24.3	3.2	
SCS7-2	6.9	107	25.0	3.0	
SCS8-2	7.0	112	26.0	5.2	

APPENDIX 4.8

Water Sampling Results, South Central Site, June 19, 20, and 21, 1980, Ft. Stewart, Georgia

FST-001

Well No. and Site	pH	Specific Conductivity (umhos/cm)	Temperature (°C)	Dissolved Oxygen (mg/1)	Depth to Water Table (feet)
SCS1-3	7.1	131	24.5	12.2	
SCS2-3	6.7	120	24.5	11.6	
SCS3-3	6.5	131	25.5	12.3	
SCS4-3	6.3	132	26.0	11.6	
SCS5-3	6.6	130	25.0	5.0	
SCS6-3	6.7	132	25.0	2.7	
SCS7-3	4.6	118	24.3	2.1	
SCS8-3	5.1	321	25.0	4.2	

Source: ESE, 1980.

APPENDIX 4.9

SOIL TEST RESULTS
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1981

APPENDIX 4.9

Soil Test Results
FST-001, FST-002, FST-003

Boring	Sample Number	Depth (ft)	Plasticity Limits			Symbol from Plasticity Chart
			WL	WP	IP	
TAC-X Site						
TX-B1	7	30.0-31.5	67	25	42	CH
TX-B2	6	25.0-26.5	--	NP	--	--
TX-B3	8	35.0-36.5	—	NP	--	--
TX-B4	6	25.0-26.5	--	NP	--	--
TX-B5	6	25.0-26.5	104	36	68	CH
Camp Oliver Site						
CO-B3	3	10.0-11.5	--	NP	--	--
CO-B4	3	10.0-11.5	--	NP	--	--
CO-B4	8	35.0-36.5	—	NP	--	--
South Central Site						
SC-B3	8	35.0-36.5	59	25	34	CH
SC-B3	11	50.0-51.5	--	NP	--	--
SC-B5	8	35.0-36.5	--	NP	--	--
SC-B5	11	50.0-51.5	35	18	17	CL
SC-B7	8	35.0-36.5	41	26	15	CL-ML
SC-B7	11	50.0-51.5	43	22	21	CL
SC-B8	8	35.0-36.5	33	16	17	CL
SC-B8	11	50.0-51.5	48	19	29	CL
SC-B9	8	35.0-36.5	50	29	21	CL-CH
SC-B9	11	50.0-51.5	50	22	28	CL-CH
SC-B12	8	35.0-36.5	--	NP	--	--
SC-B14	8	35.0-36.5	--	NP	--	--
SC-B14	11	50.0-51.5	—	NP	--	--
SC-B16	8	35.0-36.5	46	29	17	ML
SC-B16	11	50.0-51.5	26	14	12	CL

NP = Nonplastic
-- = Not applicable for non plastic materials
WL = Liquid Limit
WP = Plastic Limit
IP = Index of Plasticity

Source: ESE, 1981.

APPENDIX 4.10

SOIL pH AND CATION EXCHANGE CAPACITY
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1981

APPENDIX 4.10

Soil pH and Cation Exchange Capacity (CEC)

FST-001, FST-002, FST-003

Boring	Sample Number	Depth (ft)	pH	CEC (meq/100 gm)
TAC-X Site				
TX-B1	2	5.0-6.5	7.03	5.5
TX-B1	8	35.0-36.5	4.95	1.9
TX-B2	4	15.0-16.5	6.19	1.5
TX-B2	8	35.0-36.5	3.59	24.0
TX-B3	2	5.0-6.5	5.68	<1.0
TX-B3	5	20.0-21.5	5.91	2.0
TX-B3	9	40.0-41.5	4.65	11.8
TX-B4	2	5.0-6.5	6.35	<1.0
TX-B4	5	20.0-21.5	6.59	11.7
TX-B4	8	35.0-36.5	6.65	5.7
Camp Oliver Site				
CO-B2	3	10.0-11.5	6.29	3.4
CO-B2	5	20.0-21.5	6.22	<1.0
CO-B2	9	40.0-41.5	5.97	<1.0
CO-B3	2	5.0-6.5	6.62	3.7
CO-B3	5	20.0-21.5	5.66	<1.0
CO-B3	9	40.0-41.5	6.96	11.3
CO-B4	2	5.0-6.5	5.72	6.3
CO-B4	5	20.0-21.5	5.36	14.1
CO-B4	9	40.0-41.5	6.19	13.2
CO-B5	9	40.0-41.5	6.16	<1.0
South Central Site				
SC-B1	5	20.0-21.5	6.96	67.7
SC-B1	9	40.0-41.5	6.69	6.6
SC-B2	5	20.0-21.5	6.26	<1.0
SC-B2	9	40.0-41.5	8.32	6.7
SC-B3	7	30.0-31.5	6.88	16.7
SC-B3	10	45.0-46.5	6.56	14.4
SC-B4	5	20.0-21.5	7.09	19.1
SC-B4	9	40.0-41.5	6.95	7.0
SC-B5	6	25.0-26.5	4.24	34.1
SC-B5	9	40.0-41.5	6.72	ND
SC-B6	5	20.0-21.5	5.21	3.0
SC-B6	9	40.0-41.5	7.33	20.3

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APPENDIX 4.10

Soil pH and Cation Exchange Capacity (CEC)

FST-001, FST-002, FST-003

Boring	Sample Number	Depth (ft)	pH	CEC (meq/100 gm)
South Central Site (Continued)				
SC-B7	7	30.0-31.5	9.66	4.7
SC-B7	10	45.0-46.5	7.76	8.2
SC-B8	6	25.0-26.5	7.57	3.0
SC-B8	9	40.0-41.5	4.85	3.2
SC-B9	6	25.0-26.5	6.77	19.3
SC-B9	10	45.0-46.5	7.25	17.2
SC-B10	5	20.0-21.5	7.13	43.4
SC-B10	9	40.0-41.5	7.17	56.9
SC-B11	5	20.0-21.5	5.63	12.6
SC-B11	9	40.0-41.5	6.53	21.4
SC-B12	4	15.0-16.5	5.31	2.9
SC-B12	9	40.0-41.5	6.68	7.3
SC-B13	6	25.0-26.5	6.38	5.7
SC-B13	9	40.0-41.5	7.31	14.5
SC-B14	4	15.0-16.5	7.24	3.8
SC-B14	10	45.0-46.5	4.93	6.4
SC-B16	4	15.0-16.5	7.02	20.2

Source: ESE, 1981.

APPENDIX 4.11

SPECIFIC GRAVITY, (G_S)
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1981

APPENDIX 4.11

Specific Gravity (G_s)

FST-001, FST-002, FST-003

Boring	Sample Number	Depth (ft)	G_s
TAC-X Site			
TX-B3	4	15.0-16.5	2.60
TX-B4	4	15.0-16.5	2 64
Camp Oliver Site			
CO-B3	3	10.0-11.5	2.58
CO-B4	3	10.0-11.5	2.57
South Central Site			
SC-B3	5	20.0-21.5	2.55
SC-B5	5	20.0-21.5	2.59
SC-B7	5	20.0-21.5	2.66
SC-B8	5	20.0-21.5	2.60
SC-B9	5	20.0-21.5	2.54
SC-B12	6	25.0-26.5	2.59
SC-B13	5	20.0-21.5	2.62
SC-B14	6	25.0-26.5	2.62
SC-B16	6	25.0-26.5	2.60

Source: ESE, 1981.

APPENDIX 4.12

FALLING HEAD PERMEABILITY TESTS
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1981

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APPENDIX 4.12

Falling Head Permeability Tests
FST-001, FST-002, FST-003

Boring	Sample Number(s)	Depth (ft)	Coefficient of Permeability (cm/sec)
TAC-X Site			
TX-B3	5,6,7 mix	20.0-31.5	8.9×10^{-7}
TX-B4	7,8,9,10 mix	30.0-46.5	5.0×10^{-8}
Camp Oliver Site			
CO-B3	3,4,5 mix	10.0-21.5	1.9×10^{-8}
CO-B4	4,5,6 mix	15.0-26.5	3.9×10^{-7}
South Central Site			
SC-B1	2,3,4 mix	5.0-16.5	1.3×10^{-7}
SC-B1	8 (Shelby Tube)	35.0-36.5	2.23×10^{-4}
SC-B3	6,7,8,9 mix	25.0-41.5	3.7×10^{-8}
SC-B5	1,2,3 mix	0.0-11.5	1.6×10^{-6}
SC-B5	4 (Shelby Tube)	15.0-16.5	1.5×10^{-6}
SC-B2	2,3,4 mix	5.0-16.5	2.3×10^{-6}
SC-B6	6,7,8 mix	25.0-36.5	1.4×10^{-5}
SC-B8	3,4,5 mix	10.0-21.5	3.7×10^{-4}
SC-B9	6,7,8 mix	25.0-36.5	3.5×10^{-8}
SC-B10	1,2,3 mix	0.0-11.5	3.2×10^{-5}
SC-B11	4 (Shelby Tube)	15.0-16.5	1.8×10^{-3}
SC-B12	5 (Shelby Tube)	20.0-21.5	2.8×10^{-5}
SC-B15	2,3,4 mix	5.0-16.5	3.7×10^{-9}
SC-B15	7,8,9 mix	30.0-41.5	5.9×10^{-6}
SC-B16	5 (Shelby Tube)	20.0-21.5	4.9×10^{-7}

Source: ESE, 1981.

APPENDIX 4.13

FIELD MOISTURE
FST-001, FST-002, AND FST-003

SOURCE: ESE, 1981

APPENDIX 4.13

Field Moisture (weight %)
FST-001, FST-002, FST-003

Boring	Sample Number	Depth (ft)	Moisture Content
TAC-X Site			
TX-B1	11	50.0-51.5	16.3
TX-B3	4	15.0-16.5	17.1
TX-B3	11	50.0-51.6	15.0
TX-B4	4	15.0-16.5	21.7
TX-B4	11	50.0-51.5	17.2
Camp Oliver Site			
CO-B2	8	35.0-36.5	16.4
CO-B3	3	10.0-11.5	16.3
CO-B3	7	30.0-31.5	15.4
CO-B4	3	10.0-11.5	14.5
CO-B4	10	45.0-46.5	18.6
South Central Site			
SC-B3	5	20.0-21.5	14.3
SC-B3	9	40.0-41.5	16.1
SC-B5	5	20.0-21.5	17.2
SC-B5	9	40.0-41.5	16.6
SC-B7	5	20.0-21.5	20.3
SC-B7	9	40.0-41.5	19.6
SC-B8	5	20.0-21.5	15.4
SC-B8	8	35.0-36.5	16.8
SC-B9	5	20.0-21.5	17.0
SC-B9	9	40.0-41.5	18.9
SC-B12	6	25.0-26.5	17.7
SC-B14	6	25.0-26.5	16.3
SC-B14	9	40.0-41.5	19.2
SC-B16	6	25.0-26.5	16.6
SC-B16	9	40.0-41.5	17.1

Source: ESE, 1981.

APPENDIX 4.14

ANALYTICAL RESULTS, 1987
FST-008, FST-010, FST-011, FST-012, AND FST-014

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1987

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APPENDIX 4.14

CHEMICAL PARAMETERS FOUND IN THE LABORATORY ANALYSIS, AREA EOD-1

		Parameters						
		Mercury	Barium	Lead	Cadmium	Chromium	Selenium	Arsenic
	Units	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Sample ID	Detection Limit	0.04	0.01	1.98	1.98	3.92	0.2	1.96
#1 Center of Crater		0.392	11	60.2	19.6	3.92	BDL	BDL
#2 Duplicate of #1		0.389	11.2	59.9	9.98	BDL	BDL	BDL
#3 Transect Member		0.398	10.7	34.8	1.99	BDL	0.219	BDL
#4 Transect Member		0.394	9.66	41.8	3.94	BDL	BDL	BDL
#5 Transect Member		0.396	9.71	28.5	BDL	BDL	BDL	3.96
#6 Transect Member		0.396	15.7	184	3.95	BDL	BDL	7.93
#7 Transect Member		0.359	16.7	148	10.8	BDL	BDL	1.8
#8 Transect Member		0.38	17.9	144	15.2	BDL	BDL	1.9
#9 Transect Member		0.396	8.32	53.3	3.96	BDL	BDL	1.98
#10 Transect Member		0.397	11.7	35.3	21.8	BDL	0.199	7.94

BDL - below detectable limits

CHEMICAL PARAMETERS FOUND IN THE LABORATORY ANALYSIS, AREA EOD-2

		Parameters						
		Mercury	Barium	Lead	Cadmium	Chromium	Selenium	Arsenic
	Units	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Sample ID	Detection Limit	0.04	0.01	1.98	1.98	3.92	0.2	1.96
#11 Center of Crater		3.97	11.5	10	3.97	4.78	0.259	11.9
#12 Duplicate of #11		0.368	10.7	101	BDL	4.6	BDL	12.9
#13 Transect Member		0.38	5.33	88.8	BDL	BDL	BDL	7.61
#14 Transect Member		0.395	5.93	114	19.8	4.55	BDL	9.89
#15 Transect Member		0.391	7.03	30.1	25.4	BDL	BDL	3.91
#16 Transect Member		0.371	7.42	55.5	BDL	BDL	BDL	9.28
#17 Transect Member		0.429	9.23	116	2.15	BDL	BDL	10.7
#18 Transect Member		0.373	6.9	35.8	BDL	BDL	BDL	5.59
#19 Transect Member		0.399	6.39	47.3	BDL	BDL	BDL	5.96
#20 Transect Member		0.397	6.78	41.3	1.99	BDL	BDL	3.91

BDL - below detectable limits

FST-008
FST-010

Source: U. S. Army Environmental Hygiene Agency 1987

APPENDIX 4.14

CHEMICAL PARAMETERS FOUND IN THE LABORATORY ANALYSIS, AREA EOD-3

		Parameters						
		Mercury	Barium	Lead	Cadmium	Chromium	Selenium	Arsenic
	Units	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Sample ID	Detection Limit	0.04	0.01	1.98	1.98	3.92	0.2	1.96
#21 Center of Crater		0.394	11	566	BDL	BDL	BDL	3.94
#22 Duplicate of #21		0.396	9.72	460	BDL	BDL	BDL	1.98
#23 Transect Member		0.399	15.4	97.8	24	10.4	BDL	9.91
#24 Transect Member		0.395	50.6	3281	1.98	BDL	BDL	5.93
#25 Transect Member		0.4	20.6	164	26	9	BDL	6
#26 Transect Member		0.398	23.7	98.1	BDL	BDL	BDL	5.97

BDL - below detectable limits

CHEMICAL PARAMETERS FOUND IN THE LABORATORY ANALYSIS, AREA EOD-4

		Parameters							
		Mercury	Barium	Lead	Cadmium	Chromium	Selenium	Arsenic	TEP Cadmium
	Units	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	mg/L
Sample ID	Detection Limit	0.04	0.01	1.98	1.98	3.96	0.2	1.96	0.1
#28 Center of Crater		0.398	4.18	64.7	53.8	BDL	BDL	3.98	BDL
#29 Duplicate of #28		0.414	4.35	166	60	4.35	0.787	4.14	BDL
#30 Transect Member		0.389	8.17	175	518	3.69	BDL	21.4	0.43
#31 Transect Member		0.395	5.14	45.8	1.98	BDL	BDL	1.98	BDL
#32 Transect Member		0.402	7.24	35.8	2.01	BDL	BDL	6.04	BDL
#33 Transect Member		0.395	4.54	432	73.1	4.34	BDL	3.95	BDL
#34 Transect Member		0.398	2.78	99.6	1.99	BDL	BDL	BDL	BDL
#35 Transect Member		0.4	3.2	191	12	BDL	BDL	7.99	BDL
#36 Transect Member		0.4	3.2	28	BDL	BDL	BDL	2	BDL

BDL - below detectable limits

FST-011
FST-012

Source: U. S. Army Environmental Hygiene Agency 1987

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APPENDIX 4.14

CHEMICAL PARAMETERS FOUND IN THE LABORATORY ANALYSIS, FIRE TRAINING PIT - WRIGHT AAF

			Parameters										
Sample ID	Depth (ft)	Units Detection Limit	Mercury µg/g 0.04	Barium µg/g 0.01	Lead µg/g 1.98	Chromium µg/g 3.92	Arsenic µg/g 1.96	bis(2-ethylhexyl) Phthalate µg/Kg 1	Phen-anthrene µg/Kg 1	Phen-anthrene µg/Kg 1	Benzo(a) anthra-cene µg/Kg 1	Benzo(a) pyrene µg/Kg 1	Indeno (1,2,3-cd) pyrene µg/Kg 2.5
#37 Pit Residue			0.398	5.58	147	BDL	65.7	3,000	7,900	BDL	BDL	BDL	BDL
#38 Borehole 1	0-1		0.398	15.5	33.8	4.57	3.98	BDL	BDL	BDL	BDL	BDL	BDL
#39 Borehole 1	4-5		0.392	12	82.4	17.5	15.7	BDL	BDL	BDL	BDL	BDL	BDL
#40 Borehole 1	9-10		0.4	15.4	42	13.4	16	2,500	1.700	5,100	200	1,108	500
#41 Borehole 1	0-1		0.39	12.5	82	5.27	3.9	BDL	BDL	BDL	BDL	BDL	BDL
#42 Borehole 1	7.5-8.5		0.398	7.77	43.8	4.58	1.99	BDL	BDL	BDL	BDL	BDL	BDL
#43 Borehole 1	0-1		0.39	13.6	31.9	BDL	2	200	BDL	BDL	BDL	BDL	BDL
#44 Borehole 1	7.5-8.5		0.394	3.74	25.6	4.13	3.94	BDL	BDL	BDL	BDL	BDL	BDL
#45 Borehole 1	0-1		0.399	5.88	608	7.06	3.92	BDL	BDL	BDL	BDL	BDL	BDL
#46 Borehole 1	7.5-8.5		0.394	4.34	60.7	8.88	9.86	BDL	BDL	BDL	BDL	BDL	BDL
#47 Borehole 1			0.391	4.89	74.5	10.8	9.78	BDL	BDL	BDL	BDL	BDL	BDL
#48 Borehole 1			0.392	7.45	43.6	6.08	3.92	BDL	BDL	BDL	BDL	BDL	BDL
#49 Borehole 1			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - below detectable limits

CHEMICAL PARAMETERS FOUND IN THE LABORATORY ANALYSIS, FIRE TRAINING PIT - ZOUCK'S CEMETERY

						Parameters			
Sample ID	Depth (ft)	Units Detection Limit	Mercury µg/g 0.04	Barium µg/g 0.01	Lead µg/g 1.98	Chromium µg/g 3.92	Arsenic µg/g 1.96	Cadmium µg/g 1.98	Selenium µg/g 0.2
#50 Borehole 5	0-1		0.391	8.32	61.4	BDL	3.96	3.96	BDL
#51 Duplicate of #50			0.391	8.98	82	BDL	3.91	BDL	BDL
#52 Burn Residue			0.396	20.5	505	5.9	5.9	25.7	0.317
#53 Borehole 5	7.5-8.5		0.396	1.98	15.8	11.9	11.9	4.99	BDL
#54 Duplicate of #53			0.397	1.99	11.9	10.3	13.9	BDL	BDL
#55 Borehole 6	0-1		0.397	2.97	BDL	BDL	3.92	BDL	BDL
#56 Borehole 6	4.5-5.5		0.398	5.77	31.9	7.17	1.99	BDL	BDL
#57 Borehole 7	0-1		0.391	2.93	19.6	BDL	1.96	BDL	BDL
#58 Borehole 7	4-5		0.394	1.97	BDL	BDL	BDL	BDL	BDL
#59 Borehole 8	0-1		0.397	10.7	71.4	BDL	5.95	BDL	BDL
#60 Borehole 8	4-5		0.395	3.16	19.8	BDL	1.98	BDL	BDL
#61 Borehole 9 Backgrd	0-1		0.399	6.19	25.9	BDL	3.99	BDL	BDL
#62 Borehole 9 Backgrd	5-6		0.398	1.99	3.96	BDL	BDL	BDL	BDL
#62 Quality Control Wash			BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - below detectable limits

Source: U. S. Army Environmental Hygiene Agency 1987

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APPENDIX 4.15

DRILLING LOGS, MARCH 1987
FST-004

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1985

US ARMY ENVIRONMENTAL HYGIENE AGENCY

APPENDIX 4.15

701

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT 37-26-0127
LOCATION Ft Stewart, GA
FST-014
DRILL RIG Acker ADII

DATE 31 March 1987
DRILLERS Hoddinott, Smithson, Maners
BORE HOLE BH 5

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
	050/051	Ash + burn residue + sand.	052 is a sample of the burn residue
		Brown (10yr5/3) medium sand	
		Strong brown(7.5yr5/8)loamy sand	
		Light yellowish brown(10yr6/4)medium sand	
		White (10yr8/2) medium sand	
5			
		Black medium sand	
	053/054		
		BOH	
10			

AEHA Form 130, 1 Nov 82

Replaces HSHB Form 78, 1 Jun 80, which will be used.

Source: U. S. Army Environmental Hygiene Agency 1987

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

APPENDIX 4.15

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT 37-26-0127

DATE 31 March 1987

LOCATION Ft Stewart, GA FST-014

DRILLERS Hoddinott, Smithson, Maners

DRILL RIG Acker ADII

BORE HOLE BH 6

DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
	055	Dark grayish brown(10yr4/2)medium sand	1"thick layer of black residue 6" Below surface
		Yellow (10yr 7/6) fine sand	
		White (10yr8/2) very fine sand	
		Brownish yellow (10yr6/8) fine sand	
		White (10yr8/2)medium sand	
5	056		Water encountered @5' black sand was found at the extreme lower end of the SP.
		BOH	
10			

AEHA Form 130, 1 Nov 82

Replaces HSHB Form 78, 1 Jun 80, which will be used.

Source: U. S. Army Environmental Hygiene Agency 1987

US ARMY ENVIRONMENTAL HYGIENE AGENCY

APPENDIX 4.15

705

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT 37-26-0127
DATE 31 March 1987
LOCATION Ft Stewart, GA
FST-014
DRILLERS Hoddinott, Smithson,
Maners
DRILL RIG Acker ADII
BORE HOLE BH 7

DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
	057	Black fine sand	
		Yellow (10yr6/7) fine sand	
		White (10yr8/2) fine sand	
		Gray (10yr7/1) fine sand	
5	058	BOH	Water encountered 4' Black subsurface layer in bottom of SP
10			

AEHA Form 130, 1 Nov 82

Replaces HSHB Form 78, 1 Jun 80, which will be used.

Source: U. S. Army Environmental Hygiene Agency 1987

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

APPENDIX 4.15

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT 37-26-0127

DATE 31 March 1987

LOCATION Ft Stewart, GA

FST-014

DRILLERS Hoddinott, Smithson, Maners

DRILL RIG Acker ADII

BORE HOLE BH 8

DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
	059	Black sand	
		Yellow (10yr7/6) medium sand	
		Light gray (10yr7/2) medium sand	
	060		Water encountered @ 5'
5		BOH	
10			

AEHA Form 130, 1 Nov 82

Replaces HSHB Form 78, 1 Jun 80, which will be used.

Source: U. S. Army Environmental Hygiene Agency 1987

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

APPENDIX 4.15

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT 37-26-0127

DATE 31 March 1987

LOCATION Ft Stewart, GA

FST-014

DRILLERS Hoddinott, Smithson,

Maners

DRILL RIG Acker ADII

BORE HOLE BH 9

DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
	061	Brown (10yr4/3) medium to fine sanc	
		Yellowish brown (10yr5/8) medium to fine sand	
		Very pale brown (10yr8/3) medium sand	
5	062	Light gray (10yr7/2) medium sand	Water encountered @ 5'
		BOH	
			063 is Quality Control sample on the SP washing
10			

AEHA Form 130, 1 Nov 82

Replaces HSHB Form 18, 1 Jun 80, which will be used.

Source: U. S. Army Environmental Hygiene Agency 1987

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APPENDIX 4.16

LABORATORY ANALYSES, TOXIC AND HAZARDOUS WASTE
FST-018

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1985

APPENDIX 4.16

LABORATORY ANALYSES - TOXIC AND HAZARDOUS WASTE

Analysis	Wastewater Sample No. 130-1	130-2	Sludge Sample No. 130-3	130-4	Standard
	(Units Micrograms per Gram)				
Flash Point	>140°F	>140°F	>140°F	>140°F	<140°F[1]
PCB[2]	<7.0 ppm	<7.0 ppm	<7.0 ppm	<7.0 ppm	50 ppm
E.P. Toxicity Method 1310					
Arsenic (AS)	<0.5 mg/l	<0.5 mg/l	<0.5 mg/l	<0.5 mg/l	5.0 mg/l
Barium (Ba)	<10	<10	<10	<10	100
Chromium (Cr)	<0.5	<0.5	<0.5	<0.5	5.0
Cadmium (Cd)	<0.1	<0.1	0.143	0.146	1.0
Lead (Pb)	<0.5	<0.5	<0.5	<0.5	5.0
Mercury (Hg)	<0.02	<0.02	<0.02	<0.02	0.2
Selenium (Se)	<0.1	<0.1	<0.1	<0.1	1.0
Silver (Ag)	<0.5	<0.5	<0.5	<0.5	5.0

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[1] A solid waste exhibits the characteristic of ignitability if the flash point is less than 140°F.
[2] PCB's analyzed for include Arochlor 1016, 1232, 1248, 1254.

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Source: U.S. Army Environmental Hygiene Agency 1985

APPENDIX 4.17

ANALYTICAL RESULTS, OILY WASTE EXTRACTION PROCEDURE

FST-018

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1985

APPENDIX 4.17

Oily Waste Extraction Procedure Method 1330

Analysis	Wastewater Sample No. 130-1	130-2	Sludge Sample No. 130-3	130-4	Standard
	(Units Micrograms per Gram)				
Arsenic	<0.5 mg/l	<0.5 mg/l	<0.5 mg/l	<0.5 mg/l	5.0 mg/l
Barium	<10.0	<10.0	<10.0	<10.0	100
Chromium	<0.5	<0.5	<0.5	<0.5	5.0
Cadmium	<0.1	<0.1	<0.1	<0.1	1.0
Lead	<0.5	<0.5	<0.5	<0.5	5.0
Mercury	<0.02	<0.02	<0.02	<0.02	0.2
Selenium	<0.1	<0.1	<0.1	<0.1	1.0
Silver	<0.5	<0.5	<0.5	<0.5	5.0

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*Oily Waste Extraction Procedure.

Source: U.S. Army Environmental Hygiene Agency 1985

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APPENDIX 4.18

LABORATORY ANALYSES, TOTAL METALS
FST-018

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1985

APPENDIX 4.18

LABORATORY ANALYSES - TOTAL METALS

Total Metals	Wastewater Sample No. 130-1	130-2	Sludge Sample No. 130-3	130-4
	(Units Micrograms per Gram)			
Arsenic	<0.113 µg/g	<0.124 µg/g	0.440 µg/g	0.587 µg/g
Barium	<0.225	<0.248	16.9	9.52
Chromium	3.92	2.25	19.2	10.1
Cadmium	1.60	0.965	2.03	1.83
Lead	<1.13	<1.23	10.1	9.46
Mercury	0.005	<0.005	0.009	0.007
Selenium	<0.113	<0.124	<0.139	<0.248
Silver	<0.225	<0.248	<0.249	<0.348

Source: U.S. Army Environmental Hygiene Agency 1985

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APPENDIX 4.19

LABORATORY ANALYSES, PRIORITY POLLUTANTS
FST-018

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1985

LABORATORY ANALYSES - PRIORITY POLLUTANTS*

APPENDIX 4.19

Source: U.S. Army Environmental Hygiene Agency 1985

Volatile Organics (Purgable Organics) (g/g)

FST-018

Compound	Wastewater Sample No. 130-1	Wastewater Sample No. 130-2	Sludge Sample No. 130-3	Sludge Sample No. 130-4
	(Units Micrograms per Gram)			
Benzene	<1	<1	<1	<1
Bromomethane	<1	<1	<1	<1
Bromodichloromethane	<1	<1	<1	<1
Bromoform	<1	<1	<1	<1
Carbon Tetrachloride	<1	<1	<1	<1
Chlorobenzene	<1	<1	<1	<1
Chloroethane	<1	<1	<1	<1
2-Chloroethylvinyl Ether	<1	<1	<1	<1
Chloroform	<1	<1	<1	<1
Chloromethane	<1	<1	<1	<1
Dibromochloromethane	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1	<1
1.4-Dichlorobenzene	<1	<1	<1	<1
1,1-Dichloroethane	<1	<1	<1	(1)
1,2-Dichloroethane	<1	<1	<1	<1
1,1-Dichloroethane	<1	<1	<1	<1
1,2-Dichloroethane(TRANS)	<1	<1	<1	<1
1,2-Dichloropropene	<1	<1	<1	<1
1,3-Dichloropropene(CIS)	<1	<1	<1	<1
1,3-Dichloropropene(TRANS)	<1	<1	<1	<1
Ethyl Benzene	(1)	<1	<1	<1
Methylene Chloride	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	<1	<1	<1	<1
Tetrachlorethylene	<1	<1	<1	<1
1,1,1-Trichloroethane	340	200	160	300
1,1,2-Tirchloroethane	<1	<1	<1	<1
Trichloroethylene	<1	<1	<1	<1
Trichlorofluoromethane	<1	<1	<1	<1
Toluene	<1	<1	<1	<1
Vinyl Chloride	<1	<1	<1	<1
Other Compounds	None	None	None	None

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*For base neutral extractable organics, acid extractables, and pesticides/PCB's. The detection levels were 100 times higher than normal because the high hydrocarbon (or text necessitated dilution of extract base before analysis).

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APPENDIX 4.20

ANALYTICAL RESULTS, BASE/NEUTRAL EXTRACTABLE ORGANICS

FST-018

SOURCE: U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY, 1985

APPENDIX 4.20

Base/Neutral Extrable Organics (ppb)

Compound EPA Method No.	Wastewater Sample No. 130-1	Wastewater Sample No. 130-2	Sludge Sample No. 130-3	Sludge Sample No. 130-4	Limit of DET (ppb)
	(Units Micrograms per Gram)				
Polynuclear #610 #625					
Acenaphthene	<1000	<1000	<100	<100	10
Acenaphthylene	<1000	<1000	<100	<100	10
Anthracene	<1000	<1000	<100	<100	10
Benzo(a)anthracene	<1000	<1000	<100	<100	10
Benzo(b)pyrene	<1000	<1000	<100	<100	10
Benzo(b)fluoranthene	<1000	<1000	<100	<100	10
Benzo(ghi)perylene	<2500	<2500	<250	<250	25
Benzo(k)fluoranthene	<1000	<1000	<100	<100	10
Chrysene	<1000	<1000	<100	<100	10
Dibenzo(a,h)anthracene	<2500	<2500	<250	<250	25
Fluoranthene	<1000	<1000	<100	<100	10
Fluorene	Trace	Trace	Trace	Trace	10
	<1000	<1000	<100	<100	
Indeno(1,2,3-c,d)pyrene	<2500	<2500	<250	<250	25
Naphthalene	Trace	Trace	Trace	Trace	10
	<1000		<100	<100	
Phenanthrene	Trace	Trace	Trace	Trace	10
	<1000	<1000	<100	<100	
Pyrene	<1000	<1000	<100	<100	10

Source: U.S. Army Environmental Hygiene Agency 1985

APPENDIX 4.20

Compound EPA Method No.	Wastewater Sample No. 130-1	Wastewater Sample No. 130-2	Sludge Sample No. 130-3	Sludge Sample No. 130-4	Limit of DET (ppb)
	(Units Micrograms per Gram)				
Chlorinated Hydrocarbons #612 #625					
Hexachlorocyclopentadiene	<1000	<1000	<100	<100	10
Hexachlorobenzene	<1000	<1000	<100	<100	10
Hexachlorobutadiene	<1000	<1000	<100	<100	10
Hexachloroethane	<1000	<1000	<100	<100	10
1, 2-Dichlorobenzene	<1000	<1000	<100	<100	10
1, 2, 4-Trichlorobenzene	<1000	<1000	<100	<100	10
1, 3-Dichlorobenzene	<1000	<1000	<100	<100	10
1, 4-Dichlorobenzene	<1000	<1000	<100	<100	10
2-Chloronaphthalene	<1000	<1000	<100	<100	10
Benzidines #605 #625					
Benzidine	<1000	<1000	<100	<100	10
3, 3-Dichlorobenzidine	<1000	<1000	<100	<100	10
Phthalate Esters #605 #625					
Benzyl butyl phthalate	<1000	<1000	<100	<100	10
Bis(2-ethylhexyl)phthalate	Trace <1000	Trace <1000			10
Di-n-butyl phthalate	<1000	<1000	<100	<100	10
Di-n-octyl phthalate	<1000	<1000	<100	<100	10
Diethyl phthalate	<1000	<1000	<100	<100	10
Dimethyl phthalate	<1000	<1000	<100	<100	10

Source: U.S. Army Environmental Hygiene Agency 1985

APPENDIX 4.21

ANALYTICAL RESULTS, ACID EXTRACTABLES
FST-018

SOURCE: FORT STEWART, 1990

APPENDIX 4.21

Acid Extractables (ppb)

Compound EPA Method No.	Wastewater Sample No. I2033	 I2032	Sludge Sample No. I2035	 I2036	Limit of DET (ppb)
	(Units Micrograms per Gram)				
Phenols #604 #625					
4-Chloro-3-methylphenol	<2500	<2500	<250	<250	25
2-Chlorophenol	<2500	<2500	<250	<250	25
2, 4-Dichlorophenol	<2500	<2500	<250	<250	25
2, 4-Dimethylphenol	<2500	<2500	<250	<250	25
2, 4-Dinitrophenol	<25000	<25000	<2500	<2500	250
2-Methyl-4, 6-Dinitrophenol	<25000	<25000	<2500	<2500	250
2-Nitrophenol	<2500	<2500	<250	<250	25
4-Nitrophenol	<2500	<2500	<250	<250	25
Pentachlorophenol	<2500	<2500	<250	<250	25
Phenol	<2500	<2500	<250	<250	25
2, 4, 6-Trichlorophenol	<2500	<2500	<250	<250	25

Source: U.S. Army Environmental Hygiene Agency 1985

APPENDIX 4.21

Compound EPA Method No.	Wastewater Sample No. 130-1	Wastewater Sample No. 130-2	Sludge Sample No. 130-3	Sludge Sample No. 130-4	Limit of DET (ppb)
	(Units Micrograms per Gram)				
Nitrosamines #607 #625					
N-nitrosodimethylamine	<1000	<1000	<100	<100	10
N-nitrosodiphenylamine	<1000	<1000	<100	<100	10
N-nitrosodi-n-propylamine	<1000	<1000	<100	<100	10
Nitroaromatics #609 #625					
Isophorone	<1000	<1000	<100	<100	10
Nitrobenzene	<1000	<1000	<100	<100	10
2, 4-Dinitrotoluene	<1000	<1000	<100	<100	10
2, 6-Dinitrotoluene	<1000	<1000	<100	<100	10
1, 2-Diphenylhydrazine	<1000	<1000	<100	<100	10
Haloethers #611 #625					
Bis(2-chloroethyl) ether	<1000	<1000	<100	<100	10
Bis(2-chloroethoxy)methane	<1000	<1000	<100	<100	10
Bis(2-chloroisopropyl)ether	<1000	<1000	<100	<100	10
4-Bromophenyl phenyl ether	<1000	<1000	<100	<100	10
4-Chlorophenyl phenyl ether	<1000	<1000	<100	<100	10

Source: U.S. Army Environmental Hygiene Agency 1985

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APPENDIX 4.22

ANALYTICAL RESULTS, PESTICIDES/PCBS
FST-018

SOURCE: SAVANNAH LABS, 1989

APPENDIX 4.22

Pesticides/PCB's (ppb)

Compound EPA Method No.	Wastewater Sample No. I2033	Wastewater Sample No. I2032	Sludge Sample No. I2035	Sludge Sample No. I2036	Limit of DET (ppb)
	(Units Micrograms per Gram)				
Pesticides #608 #625					
BHC (ALPHA)	<2000	<2000	<200	<200	20
BHC (BETA)	<2000	<2000	<200	<200	20
BHC (GAMMA)	<2000	<2000	<200	<200	20
BHC (DELTA)	<2000	<2000	<200	<200	20
Heptochlor	<2000	<2000	<200	<200	20
Aldrin	<2000	<2000	<200	<200	20
Heptachlor Epoxide	<2000	<2000	<200	<200	20
4, 4 - DDE	<2000	<2000	<200	<200	20
Dieldrin	<2000	<2000	<200	<200	20
Endrin	<2000	<2000	<200	<200	20
4, 4 - DDD	<2000	<2000	<200	<200	20
4, 4 - DDT	<2000	<2000	<200	<200	20
Endosulfan Sulfate	<2000	<2000	<200	<200	20
Endosulfan I	<2000	<2000	<200	<200	20
Endosulfan II	<2000	<2000	<200	<200	20
Chlordane	<2000	<2000	<200	<200	20

Source: U.S. Army Environmental Hygiene Agency 1985

APPENDIX 4.22

Pesticides/PCB's (ppb)

Compound EPA Method No.	Wastewater Sample No.		Sludge Sample No.		Limit of DET (ppb)
	I2033	I2032	I2035	I2036	
	(Units Micrograms per Gram)				
Pesticides #608 #625					
Toxaphene	<50000	<50000	<5000	<5000	500
Endrin Aldehyde	<2000	<2000	<200	<200	20
PCB 1016	<5000	<5000	<500	<500	50
PCB 1221	<5000	<5000	<500	<500	50
PCB 1232	<5000	<5000	<500	<500	50
PCB 1242	<5000	<5000	<500	<500	50
PCB 1248	<5000	<5000	<500	<500	50
PCB 1254	<5000	<5000	<500	<500	50
PCB 1260	<5000	<5000	<500	<500	50

Source: U.S. Army Environmental Hygiene Agency 1985

APPENDIX 4.23

DRILLING LOGS, 1979
FST-020

SOURCE: FORT STEWART, 1990

747

Hole No. OW-1

DRILLING LOG	DIVISION SAD	INSTALLATION FT STEWART, GA.	SHEET 1 OF 1 SHEETS

1. PROJECT WRIGHT AAF SEWAGE TREATMENT PLANT
2. LOCATION (Coordinates or Station) SEE PLAN
3. DRILLING AGENCY SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number) OW-1
5. NAME OF DRILLER P. ROUNTREE
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 16.5'
10. SIZE AND TYPE OF BIT 1 3/8" SPLITSPOON
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 314
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 4 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 13 APR. 79 COMPLETED 13 APR. 79
17. ELEVATION TOP OF HOLE + 27.6'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Carl Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows
27.6			GM - GRAY-BROWN SILTY FINE TO MEDIUM SAND WITH ROOTS AND OCCASIONAL COARSE SAND, SL. MOIST.	Moisture Content	JAR 1	Sample Lab No Class LL PL PI	7
				12.0		1* SC 30 21 9 2** SC-H 74 25 49	5
						3 SC not performed	3
22.6	5		5.0' SC - GRAY, TAN AND ORANGE CLAYEY SAND, MEDIUM TO COARSE WITH FINE GRAVEL, MOIST. GRAY AND TAN BELOW 6.0'.	15.5	2		21
							40
				—		W.T. 11.0'	55
	10		TAN-YELLOW WITH DECREASE IN CLAY BELOW 9.0'.			Date 13 APR. 79	55
			TAN, YELLOW, AND WHITE BELOW 10.5'.	18.1	3	Depth to water during drilling	40
							47
							38
	15				4		58
11.1			BOTTOM AT 16.5'			NOTE: Soils field classified in accordance with the Unified Soil Classification Systems. NOTE: FLIGHTAILED TO 1.5' WITH "REVERT" AFTER SPLITSPOON. NOTE: THIS HOLE WAS CASED WITH 18.0' OF 6" PVC PIPE - AFTER SETTING CASING HOLE WAS WASHED TO 17.0' TO ALLOW FOR PIPING OF SAND - 1.0' STICK-UP OF PVC. BOTTOM AT 17.0' AFTER FLUSHING WITH CLEAR WATER.	
	20		BLOWS PER FOOT: Number required to drive 1 3/8" ID splitspoon w/140 lb hammer falling 30".			* With a trace of rock fragments. ** with a trace of roots and rock fragments	
Mcl 2							

Source: Fort Stewart 1990

FST-020

749

Hole No. OW-2

DRILLING LOG	DIVISION SAD	INSTALLATION FT. STEWART, GA.	SHEET 1 OF 1 SHEETS

1. PROJECT WRIGHT AAF SEWAGE TREATMENT PLANT	10. SIZE AND TYPE OF BIT 1 3/8" SPLITSPOON
2. LOCATION (Coordinates or Station) SEE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 314
4. HOLE NO. (As shown on drawing title and file number) OW-2	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 4 — UNDISTURBED 0
5. NAME OF DRILLER A ROUNTREE	14. TOTAL NUMBER CORE BOXES —
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 16 APR. 79 — COMPLETED 17 APR. 79
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE + 27.1'
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 18.0'	19. SIGNATURE OF INSPECTOR Carl Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ Moisture Content e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows
27.1			SM-GRAY BROWN SILTY FINE SAND WITH ROOTS, SL. MOIST.	10.6	JAR 1		6
							7
			TAN-BROWN, SC, CLAYEY 4-4.5. 4.5'				6
22.6	5		SC - MOTTLED GRAY, TAN AND RED CLAYEY SAND, MEDIUM TO COARSE WITH OCCASIONAL FINE GRAVEL, MOIST.	14.7	2	W.T. 12.0' Date 16 APR. 79 Depth to water during drilling	32
							41
			TAN BELOW 7.5'.				34
	10					Sample No / Lab Class / LL / PL / PI	37
						1* SM Non Plastic	41
			TAN-ORANGE, WET BELOW 12.0'.		3	2 SC-H 73 26 47 4 SM Not performed	47
	15		GRAY-TAN, DECREASE CLAY BELOW 13.5'.				47
							52
				12.7	4		36
9.1			BOTTOM AT 18.0'				
	20						

BLOWS PER FOOT:

Number required to drive 1 3/8" ID splitspoon w/140 lb hammer falling 30".

NOTE: Soils field classified in accordance with the Unified Soil Classification Systems.

NOTE: FISHTAILED TO 18.0' WITH "REVERT" AFTER SPLITSPOON.

NOTE: THIS HOLE WAS CASED WITH 20.0' OF PVC PIPE WITH 2.0' STICK-UP - BOTTOM AT 17.8' AFTER FLUSHING WITH CLEAR WATER.

* With a trace of roots / rock fragments

Source: Fort Stewart 1990

Hole No. OW-3

DRILLING LOG

DIVISION: SAD

INSTALLATION: FT. STEWART, GA.

SHEET 1 OF 1 SHEETS

1. PROJECT: WRIGHT AAF SEWAGE TREATMENT PLANT
2. LOCATION (Coordinates or Station): SEE PLAN
3. DRILLING AGENCY: SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number): OW- 3
5. NAME OF DRILLER: P. ROUNTREE
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 18.0'
10. SIZE AND TYPE OF BIT: 1 3/8" SPLIT SPOON
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 314
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 5 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 17 APR. 79 COMPLETED 18 APR. 79
17. ELEVATION TOP OF HOLE: + 25.4'
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Carl Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~CORE RECOVERY~~ % e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	BLOWS
25.4			SM - GRAY AND TAN SILTY SAND WITH ROOTS, SL. MOIST.	Moisture Content 10.0	JAR 1		4
23.4	5 10		2.0 SC - MOTTLED GRAY, TAN, ORANGE CLAYEY SAND, MEDIUM TO COARSE MOIST. GRAY BELOW 4.5' OCCASIONAL GRAVEL BELOW 7.5' DECREASED CLAY BELOW 9.0' GRAY AND TAN, FINE TO MEDIUM BELOW 10.5'	19.0 14.1	2 3	Sample Lab No Class LL PL PI 2 SC-H 57 25 32 3 SC-H 92 29 63 4 SP-SM Non Plastic 5 SM Not Performed W.T. 11.5' Date 17 APR. 79 Depth to water during drilling	4 10 35 40 37 39
13.4			12.0 SW - GRAY AND TAN WELL GRADED SAND WITH SOME GRAVEL, SATURATED		4		23 36
10.4	15		15.0 SC - TAN-ORANGE CLAYEY SAND, FINE TO MEDIUM, WET.	18.2	5		37 15 7
7.4	20		BOTTOM AT 18.0' NOTE: Soils field classified in accordance with the Unified Soil Classification Systems.			BLOWS PER FOOT: Number required to drive 1 3/8" ID splitspoon w/140 lb. hammer falling 30". NOTE: FLUSHED TO 18.0' WITH "REVERT" AFTER SPLITSPOON AND SET 20.0' PVC CASING (2") - BOTTOM AT 17.1' WITH 1.4' STICK-UP AFTER FLUSHING WITH CLEAR WATER.	

3

Source: Fort Stewart 1990

Hole No. OW-4

DRILLING LOG | DIVISION: SAO | INSTALLATION: FT. STEWART, GA. | SHEET 1 OF 1 SHEETS

1. PROJECT: WRIGHT AAF SEWAGE TREATMENT PLANT
2. LOCATION (Coordinates or Station): SEE PLAN
3. DRILLING AGENCY: SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number): OW-4
5. NAME OF DRILLER: P. ROUNDTREE
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 18.0'
10. SIZE AND TYPE OF BIT: 1 3/8" SPLITSPOON
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 514
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 | UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 18 APR. 79 | COMPLETED 19 APR. 79
17. ELEVATION TOP OF HOLE: + 25.7'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Carol Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ Moisture Content e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows
25.7			SM- GRAY, BROWN SILTY FINE TO MEDIUM SAND WITH SC SEAMS AND ROOTS, MOIST. 2.0	8.2	JAR 1	Sample Lab No Class LL PL PI	15 8
23.7			CL- GRAY, BROWN AND TAN VERY SANDY CLAY, MOIST. 6.0	18.1	2	1 SM* Not Performed 2 SC-H 59 20 39 3 SC-H 73 23 50 5 SC**	9 25
	5						
19.7			SC- GRAY CLAYEY SAND, MEDIUM TO COARSE WITH OCCASIONAL GRAY CL POCKETS, MOIST.	14.0	3		54 62
			GRAY-WHITE BELOW 9.0'.				55
	10		TAN-WHITE WITH SOME GRAVEL BELOW 10.5'	18.1	4	W.T. 11.0' Date 18 APR. 79 Depth to water during drilling	41 43 40
	15		TAN-ORANGE, FINE TO MEDIUM, WET DECREASE CLAY BELOW 15.5'. 17.0			* with roots ** Lab Visual Class only	35 41
8.7			SP- TAN AND WHITE FINE TO MEDIUM POORLY GRADED SAND, SATURATED.	13.6	5		
7.7			BOTTOM AT 18.0'			BLOWS PER FOOT:	
	20		NOTE: Soils field classified in accordance with the Unified Soil Classification Systems.		Number 1 3/8" hammer	required to drive ID splitspoon w/140 lb. falling 30".	
						NOTE: INSTALLED TO 20.0' WITH "REVERT" AFTER SPLITSPOON AND SET 20.0' OF 6" PVC CASING - BOTTOM AT 17.5 WITH 1.7' STICK-UP AFTER FLUSHING WITH CLEAR WATER.	

Source: Fort Stewart 1990

Hole No. OW-5

DRILLING LOG	DIVISION SAO	INSTALLATION FT. STEWART, GA.	SHEET 1 OF 1 SHEETS

1. PROJECT: WRIGHT AAF SEWAGE TREATMENT PLANT
2. LOCATION (Coordinates or Station): SEE PLAN
3. DRILLING AGENCY: SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number): OW-5
5. NAME OF DRILLER: P. ROUNTREE
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 18.0'
10. SIZE AND TYPE OF BIT: 1 3/8" SPLITSPOON
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 314
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 4 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 18 APR. 79 COMPLETED 18 APR. 79
17. ELEVATION TOP OF HOLE: + 24.1'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Carl Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ % e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	BLOWS
24.1			SM - GRAY-BROWN SILTY FINE TO MEDIUM SAND WITH ROOTS, SL. MOIST.	Moisture Content 11.1	JAR 1		6
22.1			2.0 SC - MOTTLED TAN, ORANGE AND GRAY, MEDIUM TO COARSE CLAYEY SAND WITH OCCASIONAL GRAVEL.	17.5	2	Sample Lab No Class LL PL PI	4
						2 SC*	10
	5		GRAY BELOW 4.5'.			3 SC* 4 SM Non Plastic	27
			TAN-GRAY WITH OCCASIONAL ORGANIC TRACES BELOW 6.0'.			W.T. 10.5'	37
						Date 18 APR 79 Depth to water during drilling	40
	10		GRAVEL SEAMS 9.0-12.0'.				61
			LIGHT GRAY-TAN AND WET BELOW 10.5'.	16.6	3		41
10.6			13.5				56
	15		SP - TAN-ORANGE FINE TO MEDIUM POORLY GRADED SAND, SL. CLAYEY, SATURATED. — MEDIUM TO COARSE BELOW 15.0'.		4	* Lab visual classification only.	25
							29
							14
6.1			BOTTOM AT 18.0'			BLOWS PER FOOT: Number required to drive 1 3/8" ID splitspoon w/140 lb hammer falling 30".	
	20		NOTE: Soils field classified in accordance with the Unified Soil Classification System.			NOTE: FISHTAILED TO 18.0' WITH "REVERT" AFTER SPLITSPOON AND SET 20.0' OF 6" PVC CASING - BOTTOM AT 18.0' WITH 1.5' STICK-UP AFTER FLUSHING WITH CLEAR WATER.	

5

Source: Fort Stewart 1990

Hole No. OW-6

DRILLING LOG	DIVISION SAD	INSTALLATION FT. STEWART, GA.	SHEET 1 OF 1 SHEETS

1. PROJECT WRIGHT AAF SEWAGE TREATMENT PLANT
2. LOCATION (Coordinates or Station) SEE PLAN
3. DRILLING AGENCY SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number) OW-6
5. NAME OF DRILLER A ROUNTREE
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ________ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 18.0'
10. SIZE AND TYPE OF BIT 1 3/8" SPLITSPOON
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 314
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 ; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 20 APR 79 ; COMPLETED 20 APR 79
17. ELEVATION TOP OF HOLE + 25.1'
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Carl Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ Moisture Content e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	BLOWS
25.1		▨	SC- GRAY & BROWN CLAYEY FINE TO MEDIUM SAND WITH ROOTS, MOIST. 1.5	16.1	JAR 1	Sample Lab No. Class LL PL PI	7
23.6		▨	CL- MOTTLED RED-BROWN SANDY CLAY WITH GRAVEL, MOIST. 6.0	17.1	2	1 SC* 47 24 23 2 SC-H 74 25 49 3 SM-H 72 37 35	5 14
20.1	5	▨	SC- TAN, GRAY AND WHITE CLAYEY SAND, MEDIUM TO COARSE WITH GRAVEL, MOIST. WHITE BELOW 8.0'. WET WITH OCCASIONAL WHITE FINE SAND SEAMS AND DECREASE IN CLAY BELOW 10.5'. TAN-YELLOW BELOW 12.5'. 13.5	15.9	3	4 SM Non Plastic W.T. 10.5' Date 20 APR 79 Depth to water during drilling	35 60 41 52 57 51
	10						
11.6	15	░	SP- WHITE POORLY GRADED SAND, FINE TO MEDIUM, SL. CLAYEY, WET. MEDIUM TO COARSE BELOW 16.5'.		4	* with a trace of rock fragments	61 34 50
7.1			BOTTOM AT 18.0'				
	20						

NOTE: Soils field classified in accordance with the Unified Soil Classification Systems.

BLOWS PER FOOT:

Number required to drive 1 3/8" ID splitspoon w/140 lb hammer falling 30".

NOTE: FISHTAILED TO 18.0' WITH "ROCKET" AFTER SPLITSPOON AND SET 20.0' OF 6" PVC CASING - BOTTOM AT 17.1' WITH 1.9' STICK-UP AFTER FLUSHING WITH CLEAR WATER.

Source: Fort Stewart 1990

759

Hole No. OW-7

DRILLING LOG

DIVISION: SAD

INSTALLATION: FT. STEWART, GA.

SHEET 1 OF 1 SHEETS

1. PROJECT: WRIGHT AAF SEWAGE TREATMENT PLANT
2. LOCATION (Coordinates or Station): SEE PLAN
3. DRILLING AGENCY: SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number): OW-7
5. NAME OF DRILLER: P. ROUNTREE
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 18.0'
10. SIZE AND TYPE OF BIT: 1 3/8" SPLITSPOON
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 314
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 19 APR. 79; COMPLETED 19 APR. 79
17. ELEVATION TOP OF HOLE: + 25.2
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Carl Smith

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOV-ERY~~ e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows
25.2			SM- DARK GRAY FINE TO MEDIUM SAND WITH ROOTS AND OCCASIONAL THIN BROWN SC SEAMS, SL. MOIST.	Moisture Content 5.4	JAR 1	Sample Lab No Class LL PL PI 1 SP-SM* Non Plastic 2 SC-H 89 32 57 3 SC-H 94 30 64 4 SP-SM Non Plastic	10 6
21.7			MOIST 2.0 - 3.5' 3.5				
			CL- MOTTLED RED, GRAY AND TAN SANDY CLAY, STIFF, SL. MOIST. 5.0	20.4	2		11
20.2	5		SC- TAN AND GRAY CLAYEY SAND, MEDIUM TO COARSE WITH OCCASIONAL GRAVEL, SL. MOIST. -GRAY, WHITE AND TAN BELOW 6.0'.	13.2	3		50 40
	10		WET WITH INCREASE IN GRAVEL BELOW 9.0'. DECREASE IN CLAY BELOW 10.5'. 11.5			W.T. 9.0' Date 19APR.79 Depth to water during drilling	50 63
13.7	15		SW- TAN AND YELLOW WELL GRADED SAND, SL. CLAYEY, SATURATED WITH SOME GRAVEL AND OCCASIONAL THIN SEAMS OF FINE GRAVEL TAN AND ORANGE BELOW 17.0'.		4	* with a trace of roots and rock fragments.	50 53 22 22 20
7.2	20		BOTTOM AT 18.0' NOTE: Soils field classified in accordance with the Unified Soil Classification Systems.			BLOWS PER FOOT: Number required to drive 1 3/8" ID splitspoon w/140 lb. hammer falling 30". Note: FISHTAILED TO 18.0' WITH "REVERT" INSIDE SPLITSPOON AND SET 20.0' OF 6" PVC CASING - BOTTOM AT 16.5 AFTER FLUSHING WITH CLEAR WATER.	

7

Source: Fort Stewart 1990

Hole No. CS-3

DRILLING LOG

DIVISION SOUTH ATLANTIC

INSTALLATION FT. STEWART

SHEET 1 OF 1 SHEETS

1. PROJECT WATER POLLUTION CONTROL WRIGHT AAF SEWAGE PLANT
2. LOCATION (Coordinates or Station) SEE PLAN
3. DRILLING AGENCY SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number) CS-3
5. NAME OF DRILLER T.W. SCOTT
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ________ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 25.5'
10. SIZE AND TYPE OF BIT 1 3/8" ID, SPLITSPOON,
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED 6 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 23.7
16. DATE HOLE | STARTED 3 MAY 1976 | COMPLETED 3 MAY 1976
17. ELEVATION TOP OF HOLE 25.7
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Charles M. Deaver

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ % e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
		⁞	SM - BROWN AND BLACK SILTY FINE SAND, SLIGHTLY CLAYEY.	Moisture Content 10.0	1		9
		⁞					15
		▨	SC - GREY SILTY CLAYEY SAND, SATURATED, GIVES OFF SULFUROUS ODOR.				4
	5	▨		21.5	2	Lab Classification	
		▨	- SOFT ZONE FROM 3' TO 6'.			Sample No. 1 SM	4
		▨				2 SC-H	34
		▨					30
	10	▨	- CLAY CONTENT DECREASES.	16.6	3		29
		▨					17
		▨					19
	15	░	SP - GREY FINE TO MEDIUM SAND, SATURATED.	16.4	4		17
		░					9
		░					11
		░					9
	20	▨	SC - GREY CLAYEY SAND.	19.1	5	W.T. 2.0' Date 3 MAY 1976	20
		▨				Depth to water during drilling	15
		▨	TAN AND RED.				27
	25	▨			6		26

BLOWS PER FOOT:

Number required to drive 1 3/8" ID splitspoon w/140 lb. hammer falling 30".

NOTE: Soils field classified in accordance with the Unified Soil Classification System.

W.T. 2.0'

Water table reading 24 hrs. after hole completed.

4

3

Source: Fort Stewart 1990

Hole No. A-21

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION FT. STEWART	SHEET 1 OF 1 SHEETS

1. PROJECT WATER POLLUTION CONTROL WRIGHT AAF SEWAGE PLANT
2. LOCATION (Coordinates or Station) SEE PLAN
3. DRILLING AGENCY SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number) A-21
5. NAME OF DRILLER T.W. SCOTT
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ________ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 10.0'
10. SIZE AND TYPE OF BIT 4" HAND AUGER
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL N.A.
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED 3 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 23.0
16. DATE HOLE | STARTED 3 MAY 1976 | COMPLETED 3 MAY 1976
17. ELEVATION TOP OF HOLE 29.0
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR Charles M. Deaver

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ % Moisture Content e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM- BROWN AND BLACK FINE SILTY SAND.			NOTE: DRILLED ON EXISTING DIKE OF OXIDATION POND.
			SC- TAN AND GREY CLAYEY FINE SAND.	9.5	1	
	5			20.0	2	Lab Classification Sample No. 1 SM-SC 2 SC-H
			SM- DARK GREY FINE SILTY SAND.			
	10			8.1	3	
			NOTE: Soils field classified in accordance with the Unified Soil Classification System.			W.T. 6.0' Date 3 MAY 1976 Depth to water during drilling W.T. 6.0' Water table reading 24 hrs. after hole completed.

Source: Fort Stewart 1990

765

Hole No. A-22

DRILLING LOG

DIVISION SOUTH ATLANTIC

INSTALLATION FT. STEWART

SHEET 1 OF 1 SHEETS

1. PROJECT WATER POLLUTION CONTROL WRIGHT AAF SEWAGE PLANT
2. LOCATION (Coordinates or Station) SEE PLAN
3. DRILLING AGENCY SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number) A-22
5. NAME OF DRILLER T.W. SCOTT
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 10.0'
10. SIZE AND TYPE OF BIT 4" HAND AUGER
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL N.A.
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 3 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 22.0
16. DATE HOLE STARTED 3 MAY 1976 COMPLETED 3 MAY 1976
17. ELEVATION TOP OF HOLE 25.0
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Charles M. Deaver

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ % e Moisture Content	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM-DARK GREY FINE SILTY SAND.	7.9	1	
	5	▨	SC-GREY AND TAN FINE CLAYEY SAND.	18.5	2	
	10	▨		19.9	3	

NOTE: Soils field classified in accordance with the Unified Soil Classification System.

W.T. 3.0'
Date 3 MAY 1976
Depth to water
during drilling

3.0'

24

10

Source: Fort Stewart 1990

FST-020

767

Hole No. A-23

DRILLING LOG

DIVISION SOUTH ATLANTIC

INSTALLATION FT. STEWART

SHEET 1 OF 1 SHEETS

1. PROJECT WATER POLLUTION CONTROL WRIGHT AAF SEWAGE PLANT
2. LOCATION (Coordinates or Station) SEE PLAN
3. DRILLING AGENCY SAVANNAH DISTRICT
4. HOLE NO. (As shown on drawing title and file number) A-23
5. NAME OF DRILLER T.W. SCOTT
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 10.0'
10. SIZE AND TYPE OF BIT 4" HAND AUGER
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL N.A.
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 3 UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 20.9
16. DATE HOLE STARTED 3 MAY 1976 COMPLETED 3 MAY 1976
17. ELEVATION TOP OF HOLE 26.4
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR Charles M. Deaver

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~CORE RECOVERY~~ % e Moisture Content	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM - DARK GREY AND BLACK FINE SILTY SAND.		1	
	5		SC - GREY AND TAN FINE CLAYEY SAND.	24.5	2	
	10			20.3	3	
			NOTE: Soils were classified in accordance with the Unified Soil Classification System.			W.T. 5.5' Date 3 MAY 1976 Depth to water during drilling W.T. 5.5' Water table reading 24 hrs. after hole completed.

11

Source: Fort Stewart 1990

APPENDIX 4.24

ANALYTICAL RESULTS, JULY 1989
FST-028

SOURCE: SAVANNAH LABS, 1989

James W. Andrews, Ph.D.
President

Janette Davis Long
Vice-President

SAVANNAH LABORATORIES
AND ENVIRONMENTAL SERVICES, INC.
5102 LaRoche Avenue (31404)
P. O. Box 13548 • Savannah, GA 31416-0548
(912) 354-7858

771

LOG NO: 89-5730

Received: 19 JUL 89

Mr. Lawson Smith
Environmental Office, DEH
Bldg. # 1139
Ft. Stewart, GA 31314

Purchase Order: DOC# 9199-9106

Project: Call#L352

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION , QC SAMPLES	SAMPLED BY
5730-3	Detection Limits	Client
5730-4	Accuracy (Mean % Recovery)	
5730-5	Precision (% RPD)	

PARAMETER	5730-3	5730-4	5730-5
EP Metals			
Arsenic (EP Tox), mg/l	0.20	90 %	1.1 %
Barium (EP Tox), mg/l	0.050	94 %	1.1 %
Cadmium (EP-Tox), mg/l	0.010	113 %	0.88 %
Chromium (EP Tox), mg/l	0.050	92 %	1.1 %
Lead (EP Tox), mg/l	0.20	90 %	1.1 %
Selenium (EP Tox), mg/l	0.50	92 %	4.3 %
Silver (EP Tox), mg/l	0.010	77 %	3.9 %
Mercury - EP Tox (7470), mg/l	0.0020	101 %	5.0 %

Methods: EPA SW-846.

William D. Sherrod
William D. Sherrod

Source: Savannah Labs 1989
FST-028

APPENDIX 4.24

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Vice-President

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Environmental Office, DEH
Bldg. # 1139
Ft. Stewart, GA 31314

Purchase Order: DOC# 9199-9106

Project: Call#L352

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
5730-1	89-30-S	
5730-2	89-31-S	Client

PARAMETER	5730-1	5730-2
EP Toxicity (SW846-1310)		
% that passes 9.5 mm sieve,	100 %	100 %
Percent Solids,	91 %	96 %
EP Extract Initial pH,	6.8	6.5
EP Extract final pH,	5.0	4.8
Ml 0.5N acetic acid/liter extract,	3	3
EP Metals		
Arsenic (EP Tox), mg/l	<0.20	<0.20
Barium (EP Tox), mg/l	<0.050	<0.050
Cadmium (EP-Tox), mg/l	<0.010	<0.010
Chromium (EP Tox), mg/l	<0.050	<0.050
Lead (EP Tox), mg/l	<0.20	<0.20
Selenium (EP Tox), mg/l	<0.50	<0.50
Silver (EP Tox), mg/l	<0.010	<0.010
Mercury - EP Tox (7470), mg/l	<0.0020	<0.0020

Source: Savannah Labs 1989
FST-028
APPENDIX 4.24