US Army Corps of Engineers

Toxic and Hazardous Materials Agency

PRELIMINARY SITE INSPECTION FOR HUNTER army AIRFIELD

Site Inspection Report No. 91045

FINAL

February 1992

Prepared For:
U.S. Army Corps of Engineers
Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, MD

Contract No. DAAA15-90-D-0001, Task 9

Prepared By:
Advanced Sciences, Inc.
165 Mitchell Road
Oak Ridge, TN 37830

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AEHA	Army Environmental Hygiene Agency
AQCR	Air Quality Control Region
CAP	Corrective Action Plan
DEH	Directorate of Engineering and Housing
DPDO	Defense Property Disposal Office
EPA	U.S. Environmental Protection Agency
FST	Fort Stewart
FWHI	Freshwater Wetlands Heritage Inventory
FY	Fiscal Year
GaDNR	Georgia Department of Natural Resources
HAA	Hunter Army Airfield
HRS2	revised Hazard Ranking System
MGPD	Million Gallons Per Day
NAAQS	National Ambient Air Quality Standards
POL	Petroleum, Oil, and Lubricant
SO_2	Sulfur Dioxide
SOCS	Synthetic Organic Chemical Survey
STP	Sewage Treatment Plant
TSP	Total Suspended Solids
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
UST	Underground Storage Tanks
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

A. SITE DESCRIPTION

The U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) has contracted Advanced Sciences, Inc. to prepare a Preliminary Site Inspection for Hunter Army Airfield (HAA), Savannah Georgia. The U.S. Environmental Protection Agency (EPA), Region IV deemed it necessary to rescore selected U.S. Army installations not currently on the National Priority List (NPL) using EPA's revised Hazard Ranking System (HRS2). This report provides data updated since the previous Installation Assessment conducted at this facility. This report was prepared entirely from records and data gathered from a site visit to HAA on July 11, 1991, a site visit on February 5, 1992, and from data gathered from other sources. The scope of this report is based solely on the review of available reports and communications with Base personnel.

The Facility Commanding Officer for HAA is Major General Barry R. McCaffrey. The Facility Environmental Coordinator is Thomas Houston. The facility address is:

Hunter Army Airfield
HQ 24th Infantry Division
Environmental Office Bldg. 1135
ATTN: AFZP-DEN-E
Ft. Stewart, GA 31314

HAA is located on 2,185 hectares of land in Chatham County, Georgia, adjacent to the southwest boundary of the City of Savannah. The area to the north of HAA is bounded by residential and light commercial areas and to the west by the Forest River.

B. HISTORY

HAA was acquired from the U.S. Air Force (USAF) in 1967 to support the increased U. S. helicopter pilot training program necessitated by the Vietnam Conflict. Advanced helicopter training for Vietnamese Air Force flight students was conducted at HAA from 1970 to 1972. Aviation training was phased out in 1973 when all aviation training was consolidated at Ft. Rucker, Alabama. HAA is currently employed to provide support facilities, conduct training opportunities, and prepare to mobilize and deploy the 24th Infantry Division (Mechanized). HAA is under the administrative and operations control of Fort Stewart, located approximately 40 miles west of HAA.

FIGURE 1.1. HUNTER ARMY AIRFIELD LOCATION MAP

2. SITE CHARACTERISTICS

2.1 SITE BACKGROUND AND HISTORY

2.1.1 History of Ownership

HAA was acquired from the U.S. Air Force (USAF) in 1967 to support the increased U. S. helicopter pilot training program necessitated by the Vietnam Conflict. Advanced helicopter training for Vietnamese Air Force flight students was conducted at HAA from 1970 to 1972. Aviation training was phased out in 1973 when all aviation training was consolidated at Ft. Rucker, Alabama.

An archaeological survey was conducted in 1984 to determine if any historically or archaeologically significant sites existed at HAA. Because this report was not available at the time of this investigation, the results could not be obtained.

2.1.2 Regulatory History

Fort Stewart (FST) filed a Resource Conservation and Recovery Act (RCRA) notification form with EPA for FST and HAA in July 1980. A RCRA Part A permit application for interim status as a generator and storage facility was filed in November 1980. Subsequently, HAA has obtained a Part A permit and is under interim status as a hazardous waste generation and storage facility. In 1983, EPA requested HAA to file a RCRA Part B permit application and conducted a compliance inspection of HAA. Following the compliance inspection, EPA advised the Department of Environmental Hygiene (DEH) personnel to withdraw the Part A permit application for HAA because hazardous wastes generated at HAA are not stored at HAA; they are transferred to the Defense Property Disposal Office (DPDO) storage yard at FST for storage. Because of this, it was found that HAA did not require a Part A or B permit. The Part A permit for FST was revised to include quantities of wastes generated at HAA (McMaster et al. 1983). Permits that have been issued to HAA by the Georgia Department of Natural Resources-Environmental Protection Division (Ga\DNR-EP) are listed in Table 2.1. A copy of the current permits issued to HAA are included in Appendix B.

Table 2.1. Permits issued to HAA

YEAR	PERMIT TYPE	PERMIT NUMBER
1982	Public water system operation	2025 J 1239
1978	Boiler Operation	9711 025 6356 0
1991	Discharge Authorization	GA0027588

2.1.3 Process and Waste Disposal History

The processing and disposal of industrial waste at HAA in the past was similar to current operations. Non-hazardous scrap material with no salvage value generated at HAA was shipped to the landfill located near the northwest boundary of the facility. The landfill was in operation from 1941 to 1980. Since 1980, non-salvageable materials have been transported to the City of Savannah sanitary landfill. Specific industrial wastes and their disposal history will be discussed in detail.

Vehicle maintenance and repair generates waste lubricating oil, hydraulic fluid, degreasing solvent, scrap metal and wire and waste asbestos. Prior to the mid-1960s segregation of waste oil, hydraulic fluid, and degreasing solvent reportedly was not practiced. These wastes were collected in 55-gal drums, creating a petroleum, oil and lubricant (POL) mixture (oil mixed with degreasing solvent). Since the mid-1960s, waste lubricating oil, hydraulic fluid, and degreasing solvent generated at HAA have been sold to reclamation contractors. Spent hydraulic fluid is collected in 55-gal drums and is not mixed with waste oil or degreasing solvents. However, waste oil and degreasing solvents are generally mixed together and collected in 55-gal drums or underground storage tanks. USTs are currently used for storage of waste POL at motor repair shops that conduct major maintenance and repair work. These wastes are then transported to the DPDO storage yard at FST in drums for storage prior to sale to reclamation contractors.

In the mid-1970s, oil/water separators were installed at the vehicle wash racks on HAA. Prior to the installation of the separators, wash rack waste water was discharged untreated to the storm drainage system. When the separators were installed, the separator effluent lines were directed to the storm drainage system. In 1986, the wash racks were connected to the sanitary sewer system.

Building maintenance and repair operations generate empty paint cans, scrap metal, wood, and wire. In the past, these wastes were taken to the on-site landfill. Large quantities of salvageable wastes, such as scrap metal and wire, are hauled to the DPDO storage yard at FST for storage prior to sale to salvaging contractors.

Operational maintenance of helicopters and fixed-wing aircraft conducted at HAA generates spent solvents (including benzene, xylene, and toluene), waste aircraft engine oil/transmission fluid, and contaminated fuel (JP-4). Disposal of theses wastes is by sale to reclamation contractors or by contract hauling to an EPA-approved hazardous waste disposal facility.

Waste water at HAA was treated at three sewage treatment plants on the Post. The sanitary and storm sewer systems are separate. Storm drains discharge untreated stormwater runoff to the various drainage canals that traverse the site. Prior to 1991, the secondary effluent from the sewage treatment

plant (STP) was chlorinated in a chlorine contact chamber prior to discharge to Lamar Canal, which eventually dumps into the Little Ogeechee River. Dewatered sludge was disposed of in the Base sanitary landfill which is now closed. Previously, three package plants were used to treat wastewaters generated at remote areas. These plants have since been abandoned and the discharges connected to the main STP. In 1991, secondary effluent from the STP was diverted to discharge to the Savannah River.

From the early 1940s to 1980, solid waste was disposed of at the sanitary landfill on HAA. It was probably operated as an area fill until its last year of operation when the trench method was employed. Burn pits were in use for garbage disposal until the late 1960s (McMaster et al. 1983).

2.1.4 Descriptions of Remedial Actions to Date

Several remedial activities have been conducted at HAA. The sites that have been or are in the process of being remediated are the Base Gas Station, Building 133; the Tactical Equipment Shop Refueling Station, Building 1343; and the Transportation Motor Pool, Building 710. Detailed explanations of these activities are provided in Section 2.2.

2.1.5 Previous Reports

Previous reports that have been written for investigations conducted at HAA in the past are listed below.

- Solid Waste Disposal Study of HAA, Savannah, Georgia, Contract No. DACA-21-80-C-0111, March 1982, by Gulf Tex Engineers, Inc.
- Installation Assessment of HQ, 24th Infantry Division and Fort Stewart, Georgia, Report No. 334, October 1983, by Environmental Sciences Engineering, Inc.
- U. S. Army Environmental Health Agency (AEHA), Hazardous Waste Study, No. 37-26-0127-88, Fort Stewart Georgia, 24-31 March 1987.
- U. S. Army Toxic and Hazardous Materials Agency (USATHAMA), Property Report, 1988.
- AEHA Environmental Program Review (EPR), No. 32-24-7038-89, August 1988.
- Water Quality Consultation, Report No. 31-62-0140-90,
- Tracer Leak Test for Five Underground Storage Tanks, HAA, Savannah, Georgia, February 1990, by Tracer Research Corporation.
- Tracer Tight™ Leak Test of Four Underground Storage Tanks, HAA, March 1990, by Tracer Research Corporation.
- Tracer Tight™ Leak Test of Two Underground Storage Tanks, HAA, July 1990 by Tracer Research Corporation.

- Shallow Soil Gas Investigation, HAA, Buildings 133 and 710, Savannah, Georgia, July 1990, by Tracer Research Corporation.
- Synthetic Organic Chemicals Survey, HSHB-ME-WR, August 1990.
- U.S. Army-COE, Savannah District, Phase II Site Investigation, Tactical Equipment Shop Refueling Station, Building 1343, HAA, Savannah, Georgia, Draft Report, April 1991.
- Design Remediation Report, Subsurface Remediation at the HAA Base Gas Station, June 1991, RMT, Inc.
- Corrective Action Plan, 90% Draft, HAA Building 710, Contract #DACA21-91-D-001, October 1991, Atlanta Testing and Engineering.

2.2 SITE DESCRIPTION AND FEATURES

HAA is adjacent to the City of Savannah. The facility is contained wholly in Chatham County, as shown in Fig. 2.1. HAA occupies approximately 2185 hectares. The ground surface at HAA slopes gently to the west toward the Little Ogeechee River. The area drains towards the west along a canal which runs west approximately 400 ft then runs southeast approximately 1500 ft where it intersects the Little Ogeechee River tidal floodplain. Most of the land within HAA is flat lying, planted pine woods interfingered with freshwater swamps and tidal creeks. Fig. 2.2a, 2.2b, and 2.2c show the locations of the hazardous waste sites on the facility. There are 24 waste sites identified from previous investigations. Twenty-two waste sites are in the cantonment area within 1 mile of each other and two waste sites are in the outlying areas. Accessibility to HAA is restricted by security gates and the facility is surrounded by a chain-link fence. Each of the waste sites at HAA are discussed individually in the following subsections with regards to size and features of site, accessibility, waste characteristics, waste types, and disposal methods. Table 2.2 gives a summary of all the waste sites at HAA.

2.2.1 Landfills

2.2.1.1 Inactive Landfill

Site Features. The HAA property contains one inactive landfill. This landfill is located approximately 3000 ft north of the western end of the runway and is approximately 10 acres in size. The landfill was used extensively from the early 1940s to March 1981, when it was closed for sanitary landfill purposes.


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FIGURES 2.2 a., b., c. HAZARDOUS WASTE SITES LOCATED AT HUNTER ARMY AIRFIELD

Legend:

1 Closed Landfills
2 Fire Training Pit
3 Property Disposal Office
4 Sewage Treatment Plan
5-15 Wash Racks
16 Drum Storage Yard, Bldg. 840
17 Drum Storage Yard, Bldg. 850
18 Drum Storage Yard, Bldg. 860
19 Base Gas Station, Bldg. 133
20 Transmotor Pool, Bldg. 710
21 Tactical Equipment Shop and Refueling Sta., Bldg. 1343

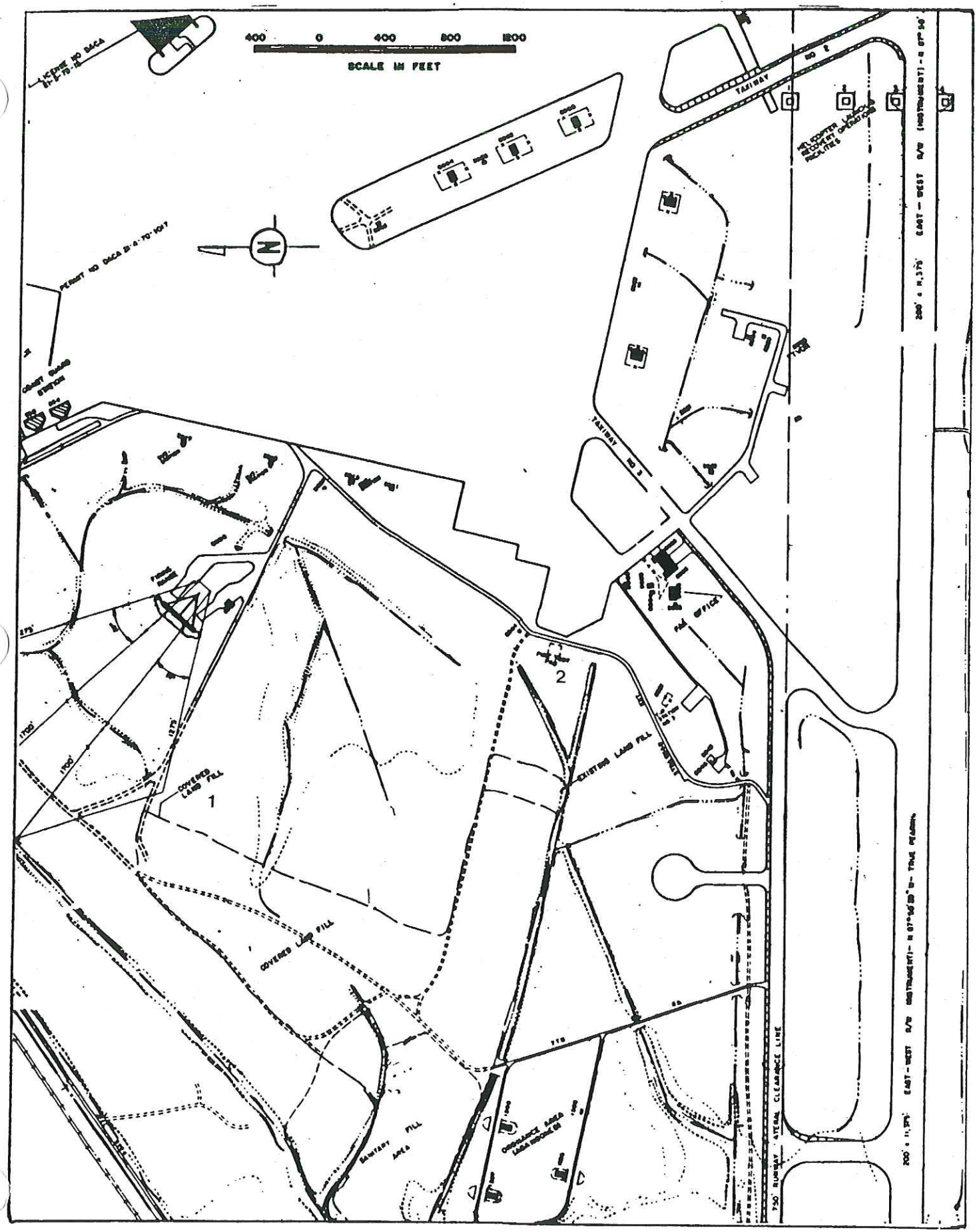
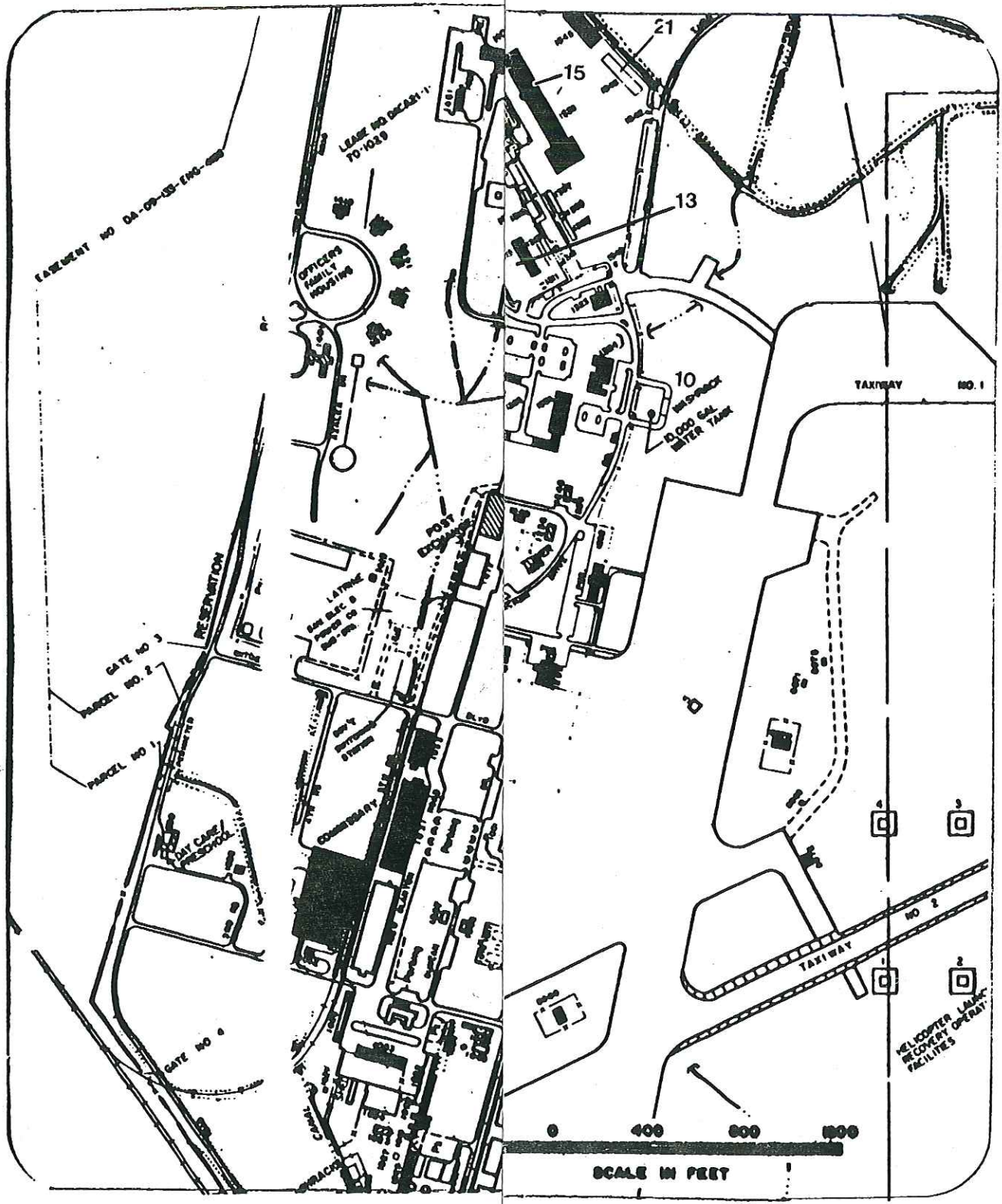


FIGURE 2.2a. HAZARDOUS WASTE SITES LOCATED AT HUNTER ARMY AIRFIELD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15
13
10
OFFICERS FAMILY HOUSING
POST HQ
RESERVATION
GATE NO 3
PARCEL NO. 2
PARCEL NO. 1
GATE NO 4
COMMISSARY
TAXIWAY NO. 1
TAXIWAY NO. 2
HELICOPTER LANDING RECOVERY OPERATIONS FACILITIES
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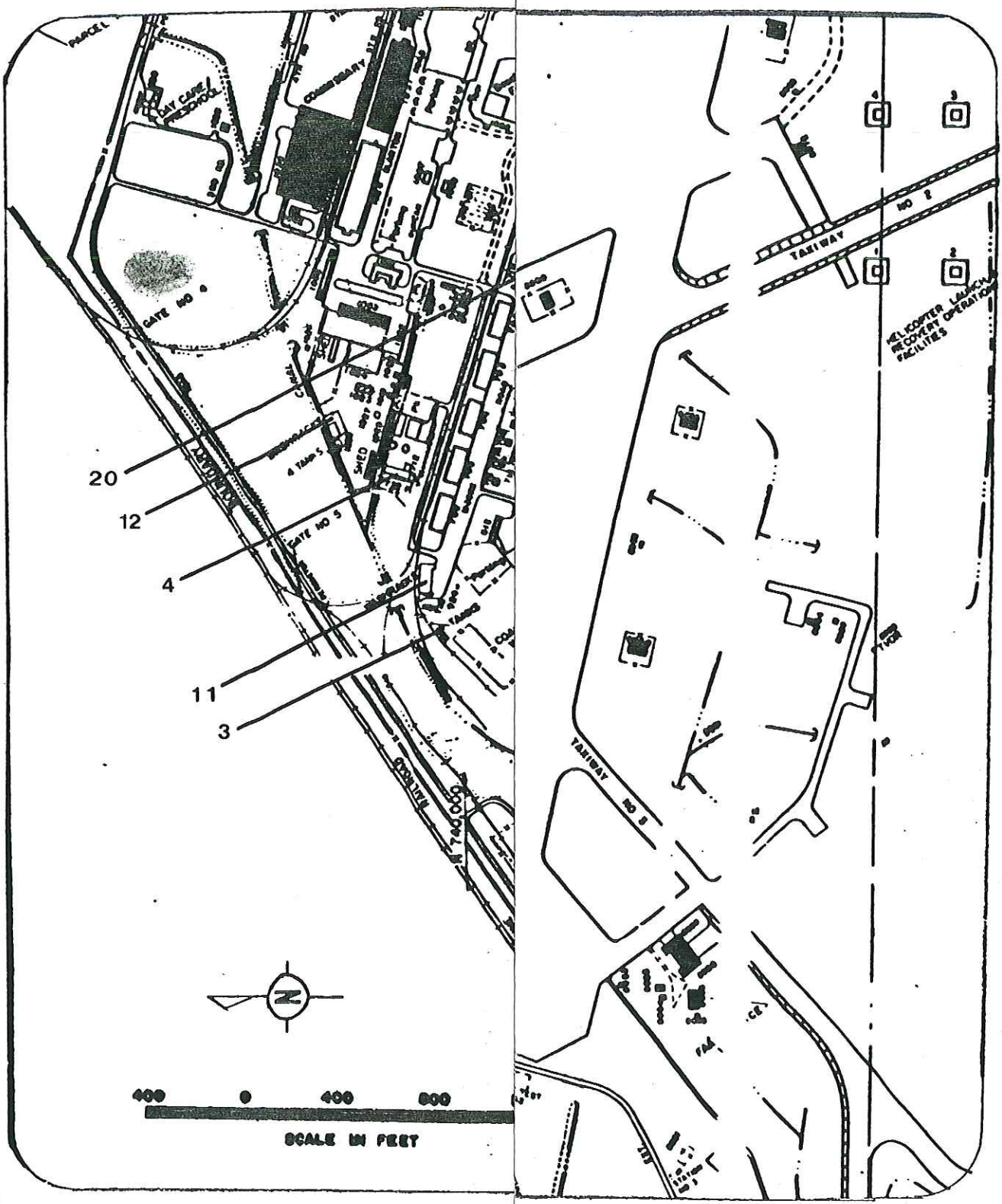
400
800
1600
SCALE IN FEET


20
12
4
11
3
GATE NO 5
TAXIWAY
TAXIWAY NO 5
HELICOPTER LAUNCH RECOVERY FACILITIES
400
400
800
SCALE IN FEET

	Site Name	Detail Provided	General Dimensions Capacity &/or Quantity	Function of unit	Approx. Date of Use	Specific Waste Managed	Releases
	Sanitary Landfill	yes	Approx. 10 acres located about 3,000 ft. north of the western end of the runway[2]		Early 1940's to March 1981[2]	Construction debris, trash, ash and some hospital wastes.[1]	None Documented.
Comments: Garbage and debris were put into a pit and covered with native soil.[1]							
	Fire Training Pit	yes	5000 ft.[2] foot square-shaped concrete lined area bermed on all sides. 1,000 gallons/burn.[2]	HAA used this facility to train fire fighters in a live fire situation and for storage of the JP-4 fuel used to produce the live fire.[2]		Waste fuels: JP-4 and Gasoline, waste oil and waste solvents burned.[1]	Stained soil surrounding the site was evidence of spillage and leakage from the pit. Borehole samples contained various amounts of volatile organic compounds and base-neutral acid extractables due to burning JP-4 and diesel fuels. Evidence of past POL spills exists.[2]
Comments: Numerous cracks in the concrete berm exist.[2] Pit is not currently in use. A contamination evaluation was conducted by Hunter/ESE and results reported in November 1990. Contamination of soil and groundwater was determined to be significant for a set of chemical parameters.[11]							
	Sewage Treatment Plant[1]	yes	1.1 MGD	Sanitary Sewage			None Documented.
Comment: In 1991, effluent was diverted to join with the City of Savannah force main and discharge to the Savannah River.							
	Firing Range	no	Spent small arms ammunition[1]				None Documented.

	Site Name	Detail Provided	General Dimensions Capacity &/or Quantity	Function of unit	Approx. Date of Use	Specific Waste Managed	Releases
Comment: Outdoor small arms range.[1]							
	Closed Landfills[1]	yes	Trash and dry rubble		1939-1941		None Documented.
Comments: One drum containing fuel was found at this site.[1]							
	Washracks[1]	yes	Waste oils	Used to clean vehicle engines with steam and vehicle exterior with pressurized water.[2]		waste oils	None Documented.
Comments: All active washracks have oil/water separators. 5-6 wash racks are active; the rest are inactive.[1]							
	Base Gas Station	yes	Six USTs, five are for gasoline and one is a waste oil tank.[10]			Gasoline	Gasoline seepage from underground storage tanks has resulted in contaminated soil over an area of approximately 190 x 350 feet.[3]
Comment: A preliminary site investigation, tank tightness testing, and a phase I remediation have been completed. A Phase II remediation is being developed to complete closure of the base gas station.[3]							

	Site Name	Detail Provided	General Dimensions Capacity &/or Quantity	Function of unit	Approx. Date of Use	Specific Waste Managed	Releases
	Outside storage area. Two sets of pods NE of Hangar 850[2]	yes	Consists of three, 600-gallon pods bermed by three layers of sandbags. The base of each site is the in situ soil. One pod is for waste oil, one is for waste solvent, and one is for waste fuel. JP-4: 1 gal/day oil: 1/2 gal/day solvents: 8-10 gal/month[2]			JP-4, waste oil, and waste solvents[2]	None Documented.
1	Outside storage area near hangar 860[2]	yes	Consists of three, 600-gallon pods bermed by three layers of sandbags. The base of each site is the in situ soil. One pod is for waste oil, one is for waste solvent, and one is for waste fuel. JP-4: 1 gal/day oil: 1/2 gal/day solvents: 8-10 gal/month JP-4, waste oil, and waste solvents[2]			JP-4, waste oil, and waste solvents[2]	Periodic spillage has occured at this site near hangar 860.[2]
	Outside storage area north of hangar 840[2]	yes	Consists of three, 600-gallon pods bermed by three layers of broken sandbags. The base of each site is gravel. One pod is for waste oil, one is for waste solvent, and one is for waste fuel. JP-4: 1 gal/day oil: 1/2 gal/day solvents: 8-10 gal/month[2]			JP-4, waste oil, and waste solvents[2]	None Documented.

Table 2.2 Hunter Army Air... Facility Assessment Report

	Site Name	Detail Provided	General Dimensions Capacity &/or Quantity	Function of unit	Approx. Date of Use	Specific Waste Managed	Releases
	Aircraft Maintenance Hangar 840	yes	A drum storage yard containing 4 drums of a liquid analyzed to have hazardous waste.[2]	Inside: Aircraft maintenance. Outside: A drum storage[2] yard.		JP-4, waste oil, and waste solvents[2]	None Documented
Comments: Some of the drums had labeled contents some not, some of the drums were open to the atmosphere some not. Most of the drums showed some degree of corrosion.[2]							
	Property Disposal Office[2]	yes	2-acre site containing concrete bins for material storage and enclosed by an eight foot chain link fence and topped with barbed wire. Capacity: 20,000 gal waste oil and 1,000 gal waste solvent [2]	The DEH at HAA collects the waste oil and waste solvents from the pod storage sites and delivers it to this site.[2]		waste oil, PCB transformers, and waste solvent[2]	None Documented.
Comments: The 90 day accumulation deadlline is usually exceeded. One bin housed a sand bermed 20,000 gal unsecured tank for waste oil. Another bin housed two smaller (400 gal, and 600 gal) unsecured tanks for waste solvents. Various 55 gallon drums and miscellaneous scrap metal. Contents of the drums ranged from aircraft cleaning compounds to waste solvents. Some drums were empty. Some open to atmosphere, corrosion or both.[2]							
	Consolidated Motor Pool, BLDG. 1336[2]	yes	The units dump waste oil and stoddard solvent II into the underground waste oil tanks[2]	Automobile maintenance, wask rack facilities, degreasing, minor engine repair[2]		Generator of waste oil, solvent[2]	None Documented.
Comments: The wash rack, fueling point drainage, and grease pits were connected to the same oil and water separator.[2]							
	Bulk Fuel Storage, Bldg 7001-7009	no	This facility consists of several bulk fuel tanks with secondary containment.[2]	Storage site for diesel fuel and JP-4.			None Documented.
	Hangar 813	no	2 gallon per year[2]	Cleaning, repairing and painting helicopter wheels[2]		MEK, MIK[2]	None Documented.
Comment: The shop disposes of the spent solvent in the pod system.[2]							
	Hangar 813 and 811[2]	no		Aircraft maintenance including sheet metal work, hydraulic work, engine repair, NiCd battery repair, general maintenance, and CARC painting.[2]		Stored a variety of hazardous materials ranging from POL to Acids.[2]	None Documented

	Site Name	Detail Provided	General Dimensions Capacity &/or Quantity	Function of unit	Approx. Date of Use	Specific Waste Managed	Releases
	DEH Supply and Storage, bldgs 1020 and 1026[2]	no		Storage of a variety of hazardous materials used by the utility engineers of HAA. [2]		Materials range from paints to acids, compressed gases to fuel.[2]	None Documented.
	Tactical Equipment Shop, Bldg 1343[7]	yes	6,000gal mogas tank, 30,000gal diesel tank[7]	Refueling station consisting of 7 fuel dispensing islands[7]	1989		10/90 evidence of contamination found due to leaking fuel distribution lines.[7]
A Phase I investigation was conducted in October 1990 at which time evidence of contamination was found. A Phase II investigation was conducted in April 1991. Fuel leaking from piping and underground tanks have resulted in soil and groundwater contamination.[6]							
	Transportation Motor Pool, Bldg 710[6]	yes	4 underground storage tanks[6]				In March 1990, a leak test was performed which indicated that a 12,000 gallon diesel fuel tank was leaking.[6] A shallow soil gas survey was conducted and significant concentrations of total hydrocarbon were detected.[9]
Comment: Based on the findings of hte Leak test and soil gas survey it has been proposed that the four USTs be removed.[8]							
	Lockheed Hangar, Hangar 841[2]	no		Helicopter maintenance.[2]		Generator of waste oil, waste fuel, and solvent .[2]	None Documented.
Comments: Lockheed turns its waste oil, waste fuel, and solvent into the Coast Guard for disposal. The Coast Guard uses HAA's pod system, for its waste.[2]							

[1] USATHAMA 1988
[2] AEHA 1988
[3] RMT 1991
[4] McMASTER ET AL 1983
[5] HUNTER/ESE 1989
[6] TRACER RESEARCH CORPORATION MARCH 1990
[7] US ARMY-COE APRIL 1990
[8] ATLANTA TESTING AND ENGINEERING 1991
[9] TRACER RESEARCH CORPORATION JULY 1990
[10] BUILDING 133 PROJECT SUMMARY
[11] HUNTER/ESE 1990

Waste Characteristics. Four groundwater monitoring wells were installed by COE, Savannah District, in the shallow aquifer around the landfill, as required by the State of Georgia for reporting and closure of the landfill. The initial sampling locations and analytical results can be found in Appendix B. Continued monitoring of these wells has not been required by the state, therefore no analysis data were available to substantiate any concern over leachate from the landfill into the aquifer.

2.2.1.2 Active Landfills (On-site and Off-site)

Site Features. There are no active landfills at HAA at this time. There is an 2 acre site proposed for a inert waste landfill for such materials as tree limbs and construction debris. The inert waste landfill will be operated under a permit by rule basis through the Ga-DNR/EPD. According to facility personnel, other wastes generated at HAA are hauled to the City of Savannah incinerator. Bulky items and non-cumbustibles are hauled to the city landfill which is located on Dean Forest Road between U.S. Highway 17 and Interstate Highway 16. The City of Savannah landfill is 458 acres in size and is permitted by the State of Georgia. The City of Savannah landfill, located on U.S. Highway 17 about 5.2 miles from the HAA main gate, was used by HAA from 1981 to 1984.

Waste Characteristics. Wastes which are hauled to the offsite landfill include both household/office and industrial wastes. Estimates of disposed wastes at the city landfills can be made from the daily logs of the landfills. For reference purposes, the total amount of refuse generated and disposed of at the existing landfill in fiscal year (FY) 1987 was 86,879 yd^3 (AEHA 1988).

2.2.2 Sewage Treatment Plant

Site Features. The main STP at HAA is located near gate five. All wastewater generated on HAA, including industrial wastewater from wash racks, is discharged to the sanitary sewer for treatment at the main STP. Previously, three package plants were used to treat wastewater generated at remote areas; however, these plants have since been abandoned and the discharges connected to the main STP. The plant has a reported average design flow of 1.25 MGD.

Waste Characteristics. In July 1991, the HAA effluent was diverted to join with the City of Savannah effluent and discharges to the Savannah River. The sludge generated is anaerobically digested, dried on sand drying beds, and land applied to open areas surrounding the STP. In addition to the domestic wastewater generated at HAA, the industrial wastewater from the aircraft and vehicle washing operations are discharged to the sanitary sewer system. Wastewater from the washracks consists primarily of oils, fuels, suspended soils, and cleaning compounds such as soaps, detergents, and some organic cleaning solvents. Reportedly, no chlorinated organic solvents are used, although containers of low-flashpoint,

petroleum naphtha solvents were stored at the wash rack adjacent to Building 850 indicating that they were used for cleaning. There was no analytical monitoring of the STP influent to quantify whether any toxic, or incompatible wastes were being discharged to the sanitary sewer. Effluent data from the STP at HAA is included in Appendix B.

The HAA STP operators reported that they had not experienced any repeated significant problems with industrial type discharges to the STP, although they have received some oils and fuels on occasion (AEHA 1988).

2.2.3 Fire Training Pit

Description. The fire training pit is located on the northwest corner of the runway and until 1991 was used to train fire fighters in a live fire situation. Fire fighter training is a necessary part of the safety program of any post. The final test of a fire fighter's ability to deal with a real fire is by training using a real fire. This is recognized at the MACOM and the Department of the Army level by regulation, (FORSCOM 420-4 and AR 420-90, section 3).

Waste Characteristics. Until 1991, Fire training at HAA took place approximately eight times per year. Each burn used from 300 to 500 gal of material which amounts to approximately 4000 gal per year. The material used for burning consists of waste oil, solvents, and primarily waste fuels (AVGAS and JP-4) that may have been contaminated with water. During the EPR, it was noted that the pit was full of POL-contaminated sand, and some possible contaminated water was present within the pit. It was speculated that the sand probably blows or washes into the pit, as the concrete base or floor could not be seen. The oil/water separator or sump had a thin film of POL on top of the water. Some of this unburned POL may seep out of the pit and potentially contaminate the shallow aquifer in this area. An oil stained overflow area was observed immediately south of the pit at the time of the EPR. Because HAA currently produces approximately 20,000 gal/yr waste oil, a large surplus exists which HAA may have to handle as a hazardous waste. The on-site storage tank consists of a 20,000-gal tank bermed with in situ soil. The berm was noted to be cracked some greater than 0.5 in. in width (AEHA 1988).

Environmental Conditions. The fire pit consists of a 5000 ft^2 concrete pad, bermed on all sides. Crusher run gravel fills the internal volume. During the 1988 EPR, numerous cracks in the concrete berms were noticed. Stained soil around the site was evident, indicating that the pit had overflowed frequently. The AEHA, in its EPR, concluded that the operation of this site resulted in contamination of the surrounding soil as a result of spillage and leakage from the pit. The study also concluded that the contamination migrated to the watertable and possibly away from the Facility. The soils around this location are sandy (high permeability) and exhibit a high water table (approx. 8 ft below the surface). This area slopes

rapidly to two small drainage ditches, about 150 yds from the pit, which flank and drain this area. Based on topography and sandy soil conditions it is likely that runoff would migrate vertically from the site to the watertable and then move laterally west with groundwater flow towards two drainage ditches. Based on this scenario, groundwater contamination may enter streams, or drainage ditches and be drained to the Ossabaw Sound by the Forest River (AEHA 1987).

Monitoring History. During 24-31 March 1987, the AEHA drilled four boreholes (BH10-BH13), around the pit as shown in Fig. 2.3. Ten soil samples were collected and chemically analyzed from the four boreholes and split for quality control. One additional sample was collected of the rinse alcohol following the washing of the sampling equipment to ensure adequate equipment decontamination. A summary of these results is shown in Appendix C. The wash sample showed that the decontamination procedure was adequate as there were no total metals, volatile organics, or acid and base-neutral extractables from the burning of JP-4 and diesel fuels. In addition, three soil samples collected from the approximate top of the phreatic surface contained various priority pollutants. Samples were analyzed for total metals and extraction procedure (EP) toxicity. The analytical results for total metals showed the existence of various levels of arsenic, barium, mercury, and lead in all the samples. These metals were also found in the background samples in approximately the same concentration, except for lead. Four samples contained total lead levels which significantly exceeded the lead concentrations in the background samples. Other metals found in these samples were selenium in 6 out of 10 samples, chromium in 5 out of 10 samples, and cadmium in 3 out of 10 samples. The occurrence of these metals probably resulted from the past use of waste POLs which may have contained lead compounds or lead additives. The analyses for EP toxicity failed to reveal the existence of any metals; therefore, these metals are not leachable (AEHA 1988).

In 1989, a Work Plan to guide the field effort for contamination evaluation at two fire training areas associated with FST was prepared. The fire training areas are located at Wright Army Airfield and HAA. Only HAA's fire training area is considered here. The objective of the investigation will be to determine whether fuel used during fire training contaminated soil or water, and if so to define the extent of soil contamination and to make an initial estimate of the extent of groundwater contamination. The field activities consist of a soil gas survey, soil sampling, monitoring well installation and groundwater sampling, and sediment sampling. A summary of the analytical requirements are included in Appendix B. Locations of the proposed sampling sites are shown in Fig. 2.4. (Hunter/ESE 1989).

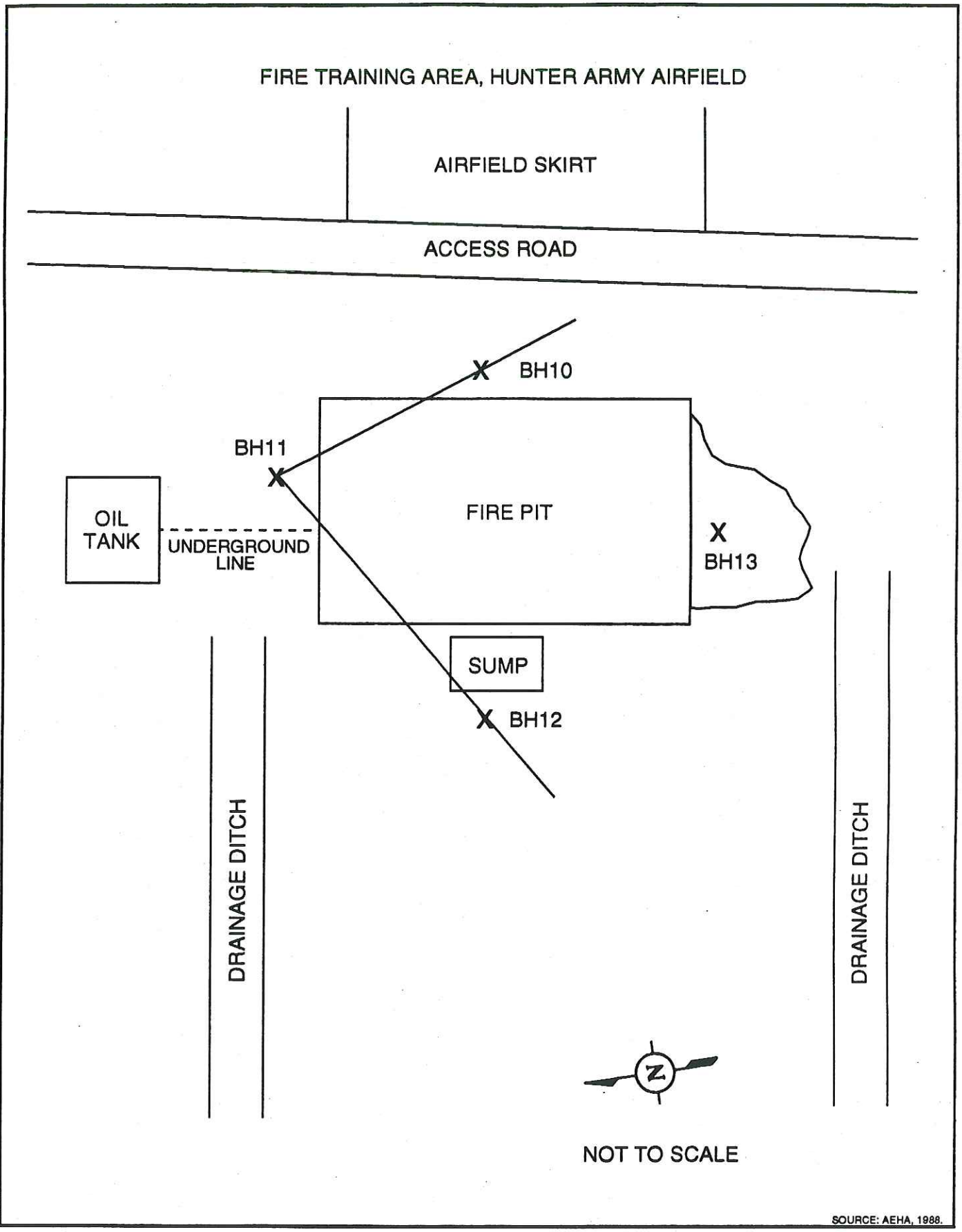


FIGURE 2.3. MAP SHOWING APPROXIMATE LOCATIONS OF FOUR BOREHOLES DRILLED IN MARCH 1987 AT THE FIRE TRAINIG PIT, HUNTER ARMY AIRFIELD, GA.

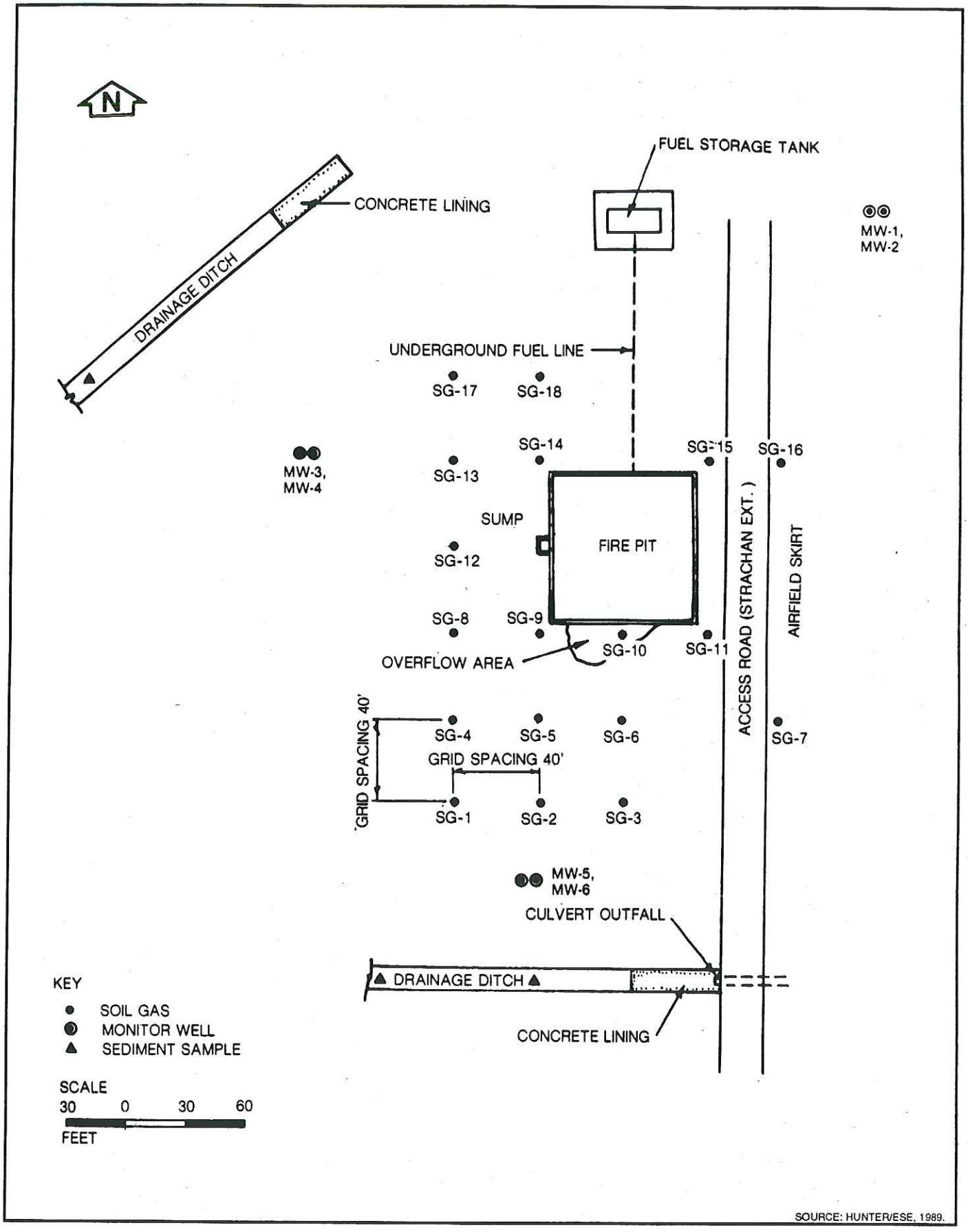


FIGURE 2.4. PROPOSED SAMPLING LOCATIONS - HUNTER ARMY AIRFIELD FIRE TRAINING AREA

A Contamination Evaluation Report was prepared by Hunter/ESE in November 1990. Hunter/ESE examined the extent of contamination in the groundwater and soil at HAA and established background levels of the contamination. Soil gas surveys, soils and groundwater samples were evaluated for volatile organic compounds (VOCs), metals, and polynuclear aromatic hydrocarbons (PAHs). Results of these analysis are included in Appendix B. The contamination of groundwater and soils was determined to be

significant for a set of chemical parameters. Because of potential health risks of metals, VOCs, and PAHs, Hunter/ESE recommended that the site not be closed until further studies and potential soil and groundwater remediation is conducted (Hunter/ESE 1990).

2.2.4 Vehicle Washracks

Site Description. Vehicle washracks are used throughout the cantonment area. There are six active washracks currently being used to clean vehicle engines with steam and vehicle exteriors with pressurized water. All vehicle washracks discharge to the installation sanitary sewer system. Waste oil/grease is recovered from oil/water separators.All of them are equipped with oil/water separators and generate waste oil.

2.2.5 Underground Storage Tanks (USTs)

Site Description. There are approximately 105 USTs buried at HAA. All have been tested for leaks according to their age group requirement. The USTs that are known to leak have been identified and are listed here as waste sites. The USTs in connection with hydrant refueling systems are exempt from testing provisions under RCRA. The exemptions from testing are defined in 40 CFR 280.10(c)(4), Subpart A, Program Scope and Interim Prohibition.

2.2.6 Outside Storage Areas

Site Description. There are several outside storage areas at HAA; these areas are used to collect waste solvents, and oils before transferring them to Fort Stewart. These area are located at Buildings 840, 850, and 860.

Waste Characterization. Waste fuels (JP-4) waste oil and waste solvents are temporarily stored at all of the outside storage areas, Buildings 840, 850, and 860. These waste are generated as a result of maintenance and repair of vehicles. The amount of wastes accumulated at each site are: JP-4, 1 gal/day; oil, 1/2 gal/day; and solvents, 8-10 gal/day.

Environmental Conditions. The outside storage areas consist of three 600-gal pods bermed by three layers of sandbags. The base of several are insitu soil and for others the base is gravel. One of the pods is for waste fuel, one is for waste oil and one is for waste solvent. At the time of the EPR, some evidence of spillage was noted around the site at hangar 860 (AEHA 1988).

2.2.7. Drum Storage Yard

Description. A drum storage yard outside of Hangar 840 contains drums of hazardous wastes. This hangar is used for aircraft maintenance.

Waste characteristics. During the EPR in 1988, four drums containing unknown liquids were found to contain hazardous wastes. Two drums contained trace levels of tetrachloroethylene and two drums contained organics and exceeded the EP toxicity limit for metals. The types of wastes managed at this site are waste solvent, waste oil, and waste fuel. Approximately 1 gal of JP-4 and 0.5 gal of oil are managed per day and 8 to 10 gal of solvent per month.

2.2.8. Property Disposal Office (PDO)

Description. The property disposal office is located close to the northwestern boundary of the Post. The DEH at HAA collects the waste oil and solvents from the pod storage sites and delivers it to the old property disposal salvage yard. This site consists of a 2-acre site containing concrete bins for material storage and enclosed by an 8-ft high chain link fence topped with barbed wire. One bin houses a sand-bermed 20,000 gal unsecured tank for waste oil, and another bin houses two smaller unsecured tanks (one 400 gallon and one 600 gallon) for storage of waste solvents. Other bins house miscellaneous scrap metal and 55-gal drums in varying amounts. In the past, this site frequently exceeded the RCRA 90-day accumulation deadline (AEHA 1988).

2.2.9 Bulk Fuel Storage

The bulk fuel storage area is located at Buildings 7001-7009. The site consists of bulk fuel tanks with secondary containment. It is used as a storage site for diesel fuel and JP-4.

2.2.10 Tactical Equipment Shop Refueling Station, Building 1343

Site Description. Building 1343 houses the Tactical Equipment Shop Refueling Station. It is located at HAA near Tubb Street approximately one-third mile southwest of Gate No. 1 on Wilson Boulevard. The refueling station consists of seven fuel dispensing islands with each island having two dispensers. Mogas is pumped from two islands and diesel is dispensed from the other five islands. The fuel is stored in a 6,000 gallon mogas tank and a 30,000 gallon diesel tank.

Waste Characterization and Environmental Conditions. A Phase I study conducted in October 1990 found evidence of contamination and recommended the drilling of additional borings and installation of groundwater monitoring wells for this site. A Phase II study followed so as to determine the magnitude of the contamination, delineate the extent of contamination, and determine if remediation would be required for the site. Fig. 2.5 shows the location of the Phase II monitoring wells and borings for the site. Appendix B contains the results of the soil and water sample analyses. Based on the findings of the Phase II Site Investigation, the U.S. Army Corps of Engineers (COE), Savannah District, made the following preliminary conclusions:

> "Due to several instances of leakage of fuel at the facility, both soil and groundwater contamination are present at the site and are above the Georgia action levels. The Phase II investigation found considerably more contamination than the Phase I. This is partially because many of the borings of Phase II were drilled closer to the potential source. However, it also appears that

further leakage had occurred since October of 1990. Leakage has occurred from the piping at various locations due to piping deterioration and the presence of faulty fitting. The tank tightness testing report indicated a slight possibility that the mogas tank is leaking also.

The limits of soil contamination do not appear to be far beyond the facility boundaries, and the contamination has not reached the small creek area. The eastern extent has not been fully defined. Groundwater contamination appears to be more widespread, with all wells yielding contaminated samples.

The action levels for groundwater at the site may be less stringent, because groundwater from the surficial aquifer is not used for drinking purposes in this area. Drinking water for the Cantonment Area is supplied by Well No. 1 and Well No. 2 Production from these wells is from the Floridan aquifer by two confining units. Furthermore, action levels for soils may also be less stringent. Any alteration of action levels will require state approval" (COE 1991).

2.2.11 Base Gas Station, Building 133

Site Description. The Base Gas Station, building 133, is located at the intersection of Barksdale Circle and Mitchell Boulevard. The gas station was closed due to contamination from leaking USTs. A total of 6 USTs are present, four of which are 6000-gal gasoline-containing tanks, one is a 4,000-gal tank that held diesel fuel for many years (but later contained gasoline) and one tank (behind the station) is for waste oil (COE 1991).

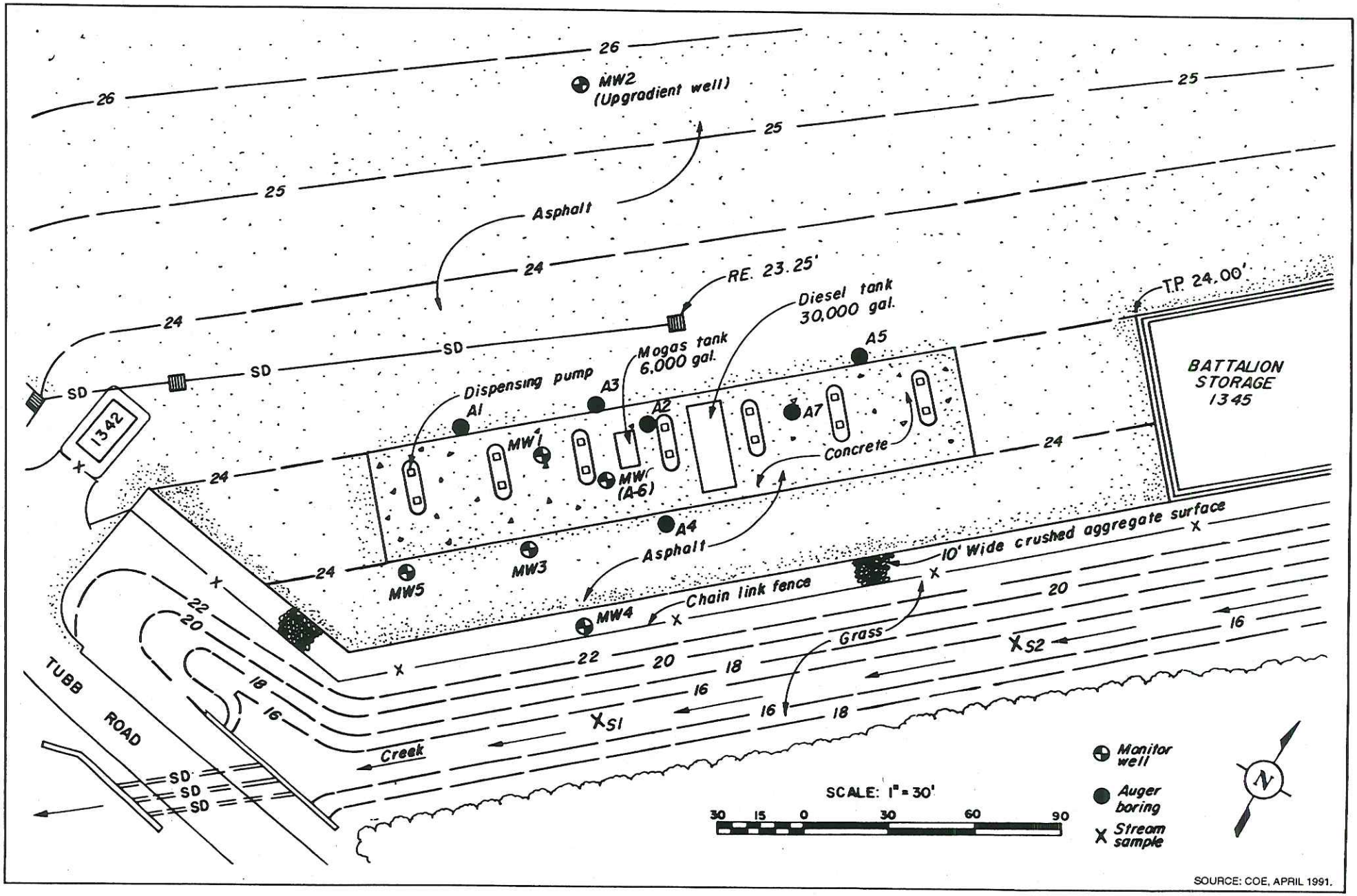


FIGURE 2.5. SAMPLING LOCATIONS, BUILDING 1343

Waste Characterization. A Phase I remediation was completed at the base gas station in 1990. A total of sixteen groundwater monitoring wells were installed and data from these wells indicated a contaminated area of approximately 190 by 350 feet. The Phase I remediation involved free product removal from the watertable using skimmers installed in recovery wells (RMT 1991). In February and July 1990, leak checks were conducted by Tracer Research Corporation, on several USTs at the Base Gas Station. Figs. 2.6, 2.7, and 2.8 show the sampling locations for these leak checks. Analytical data for these tests are in Appendix B. The results indicated that the Crown and Supercrown tanks had a leak status of "three", small or intermittent product leak, less than 0.05 g/h. The diesel fuel tank had a leak status of "two", indicating a vapor leak, maximum tracer concentration less than 1 g/L in soil vapor diminishing at depths below 3 ft (Tracer Research Corporation 1990a). During July 11 and 12, 1990, Tracer performed a shallow soil gas investigation. Fig. 2.9 shows the sampling locations for the soil gas survey as well as the isoconcentration contours for total hydrocarbons. Analysis of these contour maps indicate possible source areas for subsurface contamination. Analytical results for the soil gas survey are presented in Appendix B (Tracer Research Corporation 1990d). The free product has accummulated on the water table and is found at a depth of about 5 ft. In April and June 1991, two additional monitoring wells were installed. Twenty auger borings were also drilled. Groundwater and soil samples were analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX), total petroleum hydrocarbons (TPH), and lead. The results of these analyses were not available at the time of this report. A Phase II remediation plan is currently being prepared. The objective of this plan will be to remove the six tanks, the contaminated soil in the area and the remaining free product. Contaminated soil will be excavated free product will be recovered during tank removal; soil samples will be collected and analyzed and monitoring wells will be installed in the area of the former plume to evaluate the efficiency of the remedial actions. Vent pipes will be included for future remedial activities if needed.

In accordance with Rule 391-3-15-.09 of the Georgia Rules for UST management, the extent of action required is based on the location of the hydrocarbon plume with respect to public water systems and surface water bodies in close proximity to the contamination source. Based on a water system survey conducted by Atlanta Testing and Engineering (AT&E), it was determined that public water systems and surface water bodies exist within 3 miles of the site; however, the water withdrawal systems obtain their water from aquifers other than the surficial aquifers and therefore, are not hydraulically interconnected with the contaminant plume.

The Phase III interim remediation plan will consist of monitoring only. A confirmatory sample will be collected from the water supply well located approximately 1000 ft downgradient and analyzed for

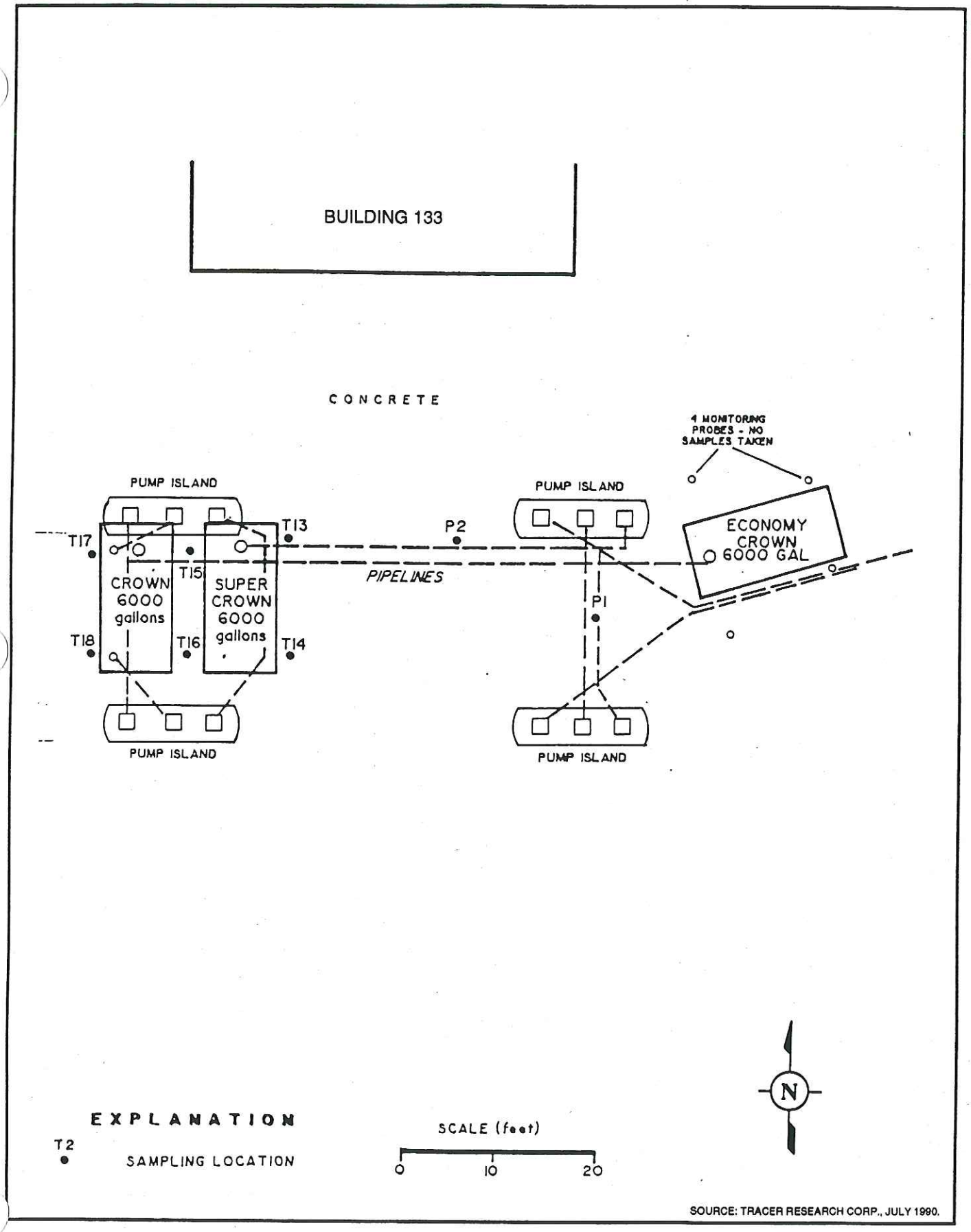


FIGURE 2.6. SAMPLING LOCATIONS FOR USTs LEAK CHECK, BUILDING 133

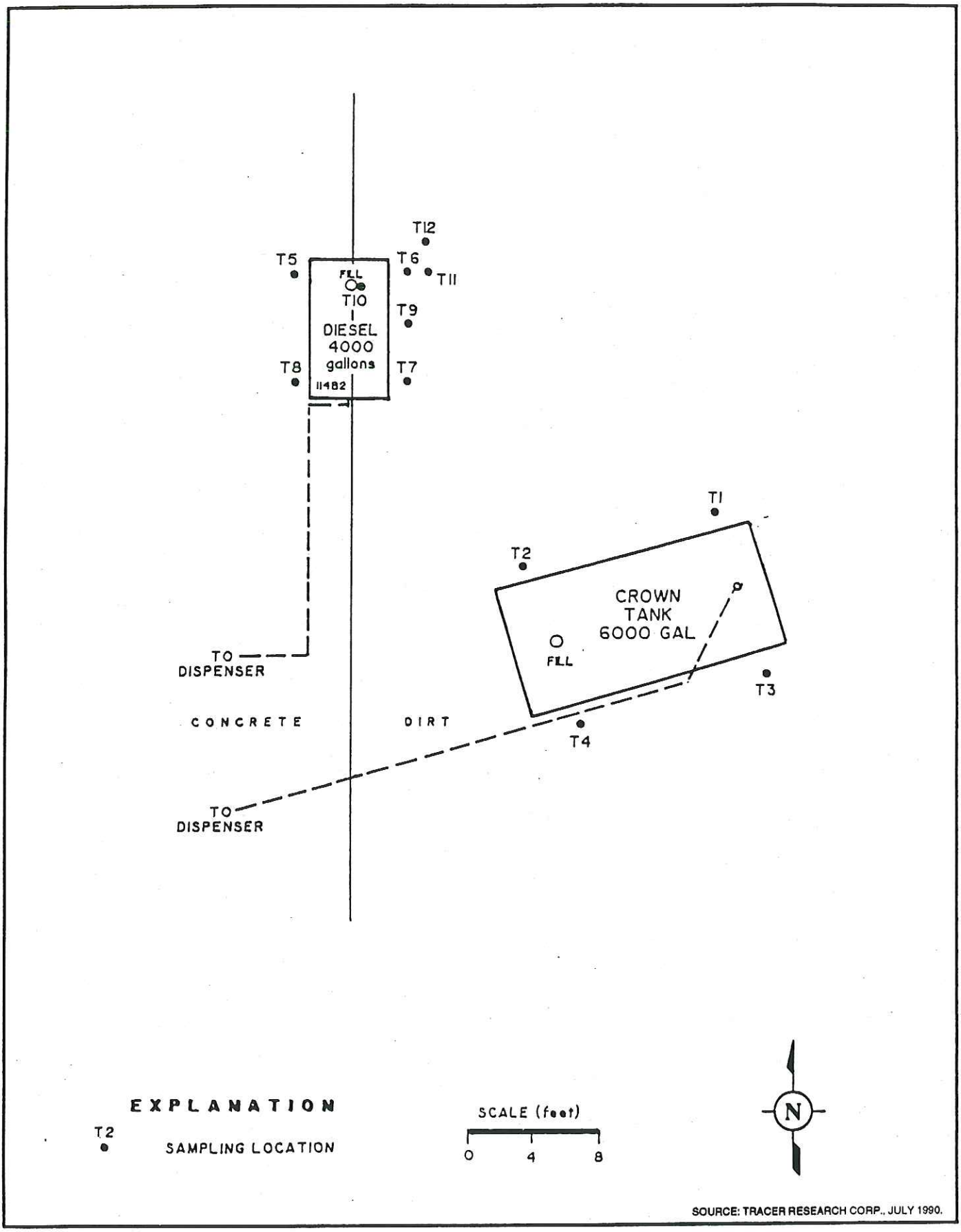


FIGURE 2.7. SAMPLING LOCATIONS FOR USTs LEAK CHECK, BUILDING 133

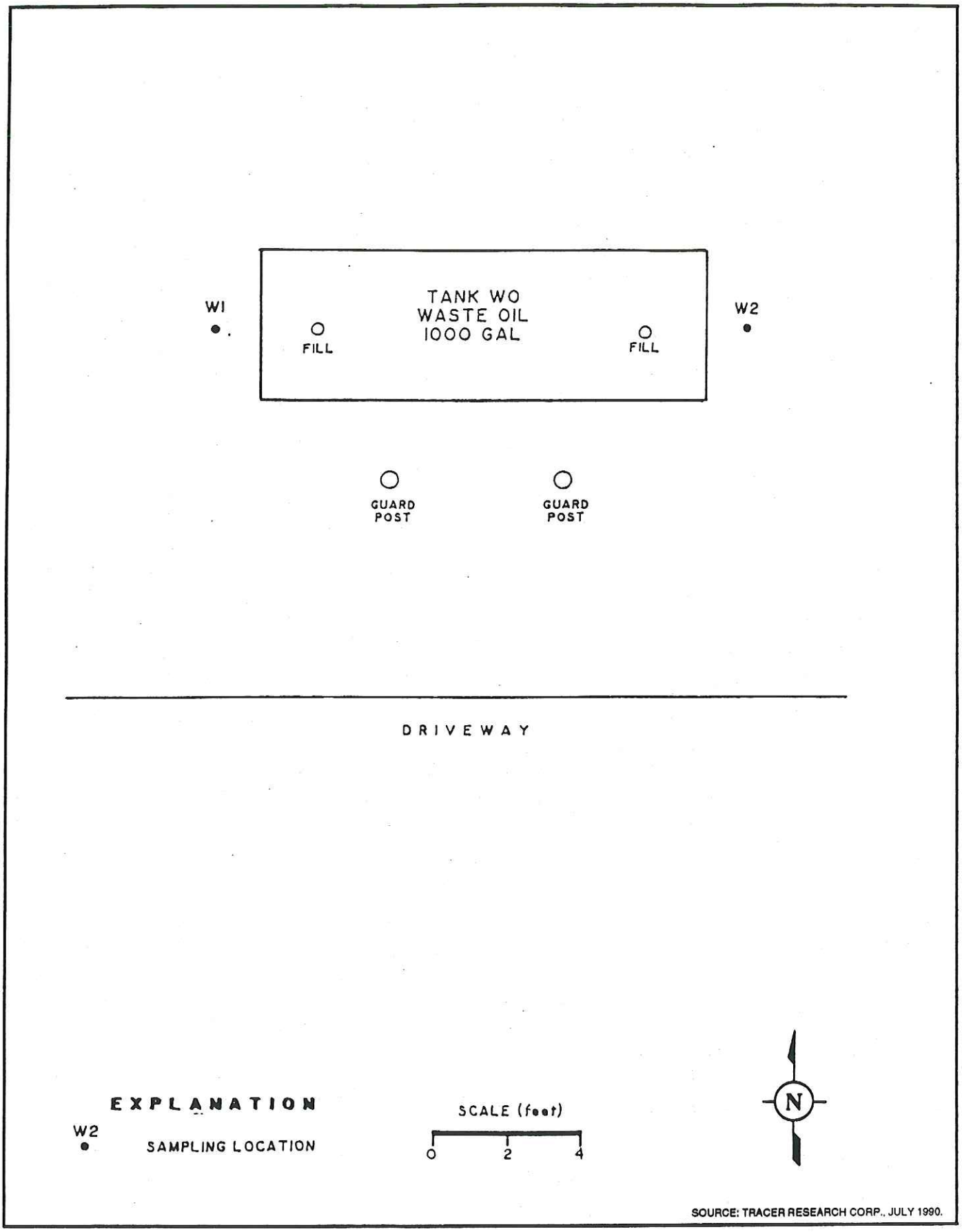


FIGURE 2.8. SAMPLING LOCATIONS FOR USTs LEAK CHECK, BUILDING 133

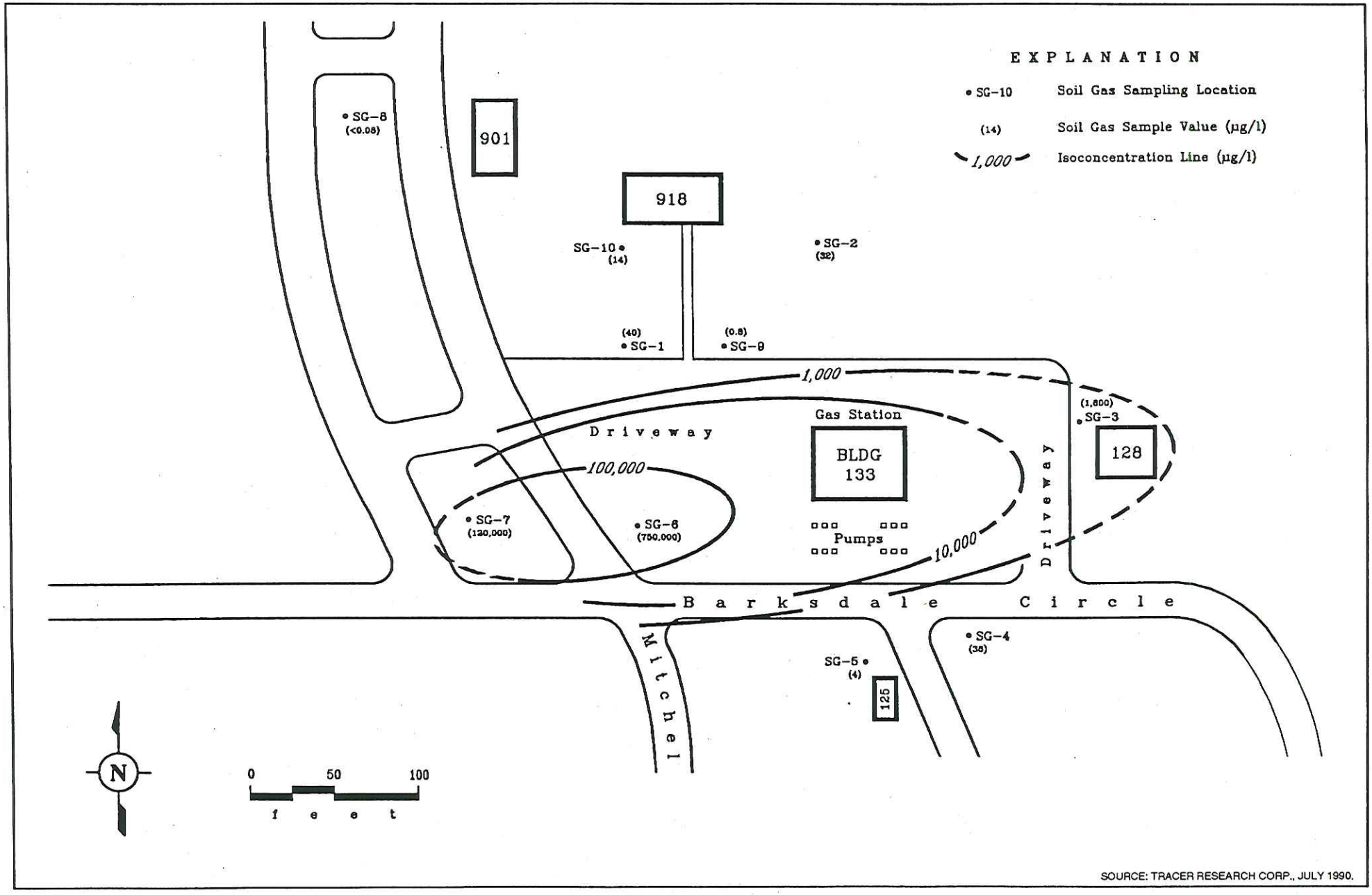


FIGURE 2.9. SAMPLING LOCATIONS FOR SOIL GAS SURVEY, BUILDING 133

gasoline constituents. The dissolved hydrocarbon plume movement will be monitored to evaluate potential impacts to the water quality of the nearby lakes (AT&E 1991, a).

2.2.12 Building 710

Site Description. Building 710 is located on Moore Road at HAA. There are four USTs located at the site. In March 1990, leak tests were performed on two of these tanks. These tests indicated that the 12,000-gal diesel tank was leaking. Based on this information, a preliminary contamination assessment was conducted by Tracer Research Corporation. Results of this assessment indicated that soils in the vicinity of the USTs had been adversely affected by the leak.

Waste Characteristics. Soil borings and monitoring wells were installed at the site to further evaluate the extent of vertical and horizontal contamination. Sample analysis indicated that approximately 700 yd^3 of soil have been highly contaminated and that free product is floating on the groundwater surface. Also, dissolved hydrocarbon appears to be present in the groundwater (AT&E 1991, b). Tracer Research Corporation conducted a soil gas survey at Building 710 in July 1990. Fig. 2.10 shows the sampling locations and isoconcentration contours for total hydrocarbons. Hydrocarbon concentrations were detected above the level of significance (1 g/L) at all of the sampling locations. Analytical data is presented in Appendix B (Tracer Research Corporation 1990d).

A water system survey was conducted to determine corrective action required at this site. Water withdrawal systems and surface water bodies exist within 3 miles; based on this finding, it was proposed that the four USTs be removed. Contaminated soil will be excavated and free product will be recovered during tank removal. Confirmatory soil samples will be collected and analyzed and one monitoring well will be installed in the area of the former plume to evaluate the efficiency of the remedial action.

Environmental Conditions. The nearest public withdrawal system is less than 150 ft away from the contaminant plume. Even though this well is upgradient and not hydraulically connected with the contaminated plume, a confirmatory sample of the groundwater will be collected and analyzed. A lake

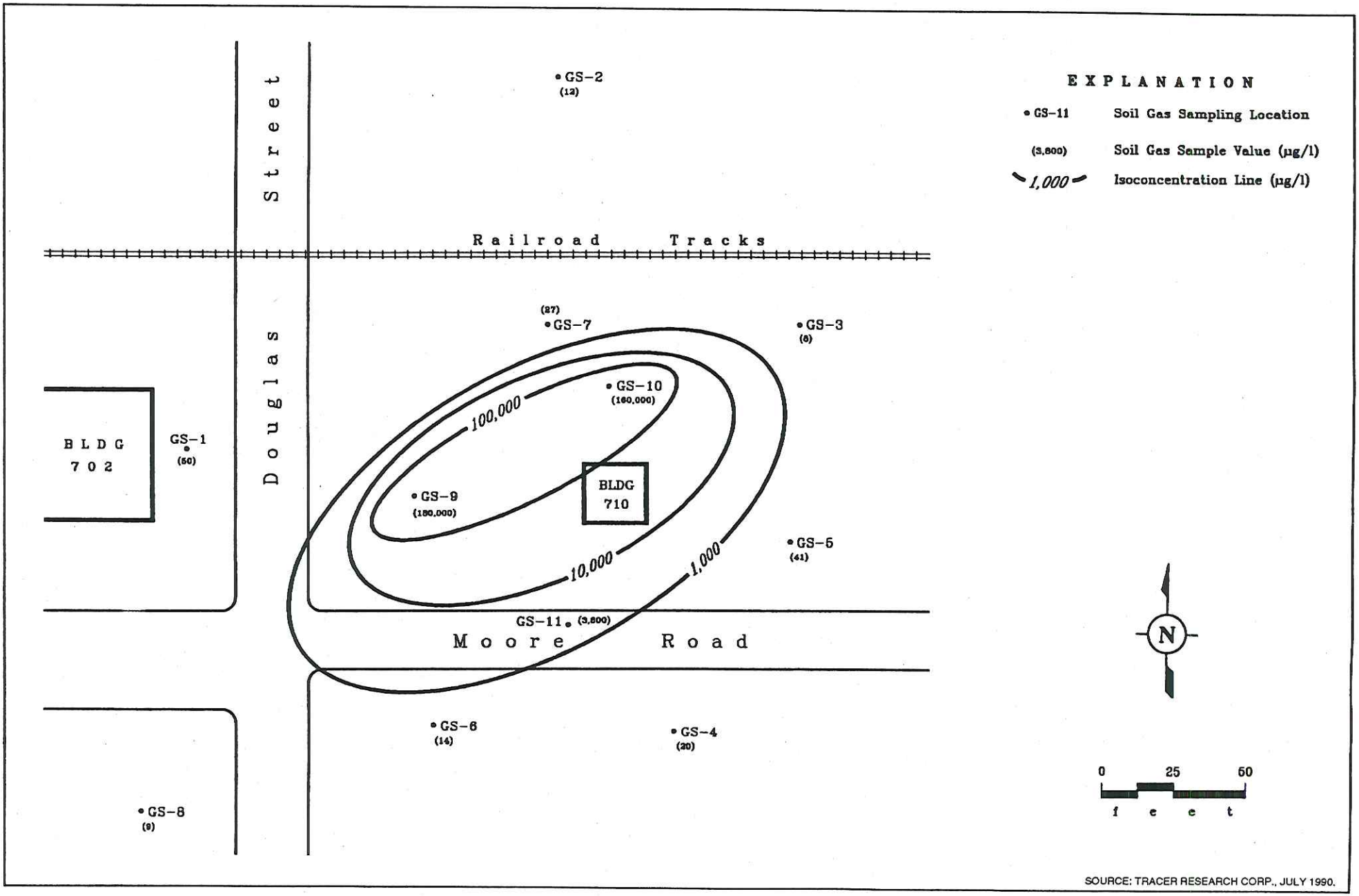


FIGURE 2.10. SAMPLING LOCATIONS FOR SOIL GAS SURVEY, TOTAL HYDROCARBONS (THC), BUILDING 710

located approximately 0.5 mile downgradient from the contaminated plume, is the closest surface water body. The dissolved hydrocarbon plume movement will be monitored to evaluate potential impacts to the water quality of the lake (AT&E 1991b).

2.3 ENVIRONMENTAL AND REGIONAL SETTING

This section describes the general demographics, land uses and sensitive environments of HAA and the surrounding area. This information is based on previous investigations and the best available information.

2.3.1 Demography

HAA is located in south eastern Georgia. The coordinates for HAA are 32 00 minutes North and 81 08 minutes West. The Facility extends approximately 2 miles north to south and 5 miles east to west at its widest points. HAA is fully contained within Chatham County, Georgia.

Municipalities located in proximity to HAA include the City of Savannah, the Town of Thunderbolt and the Town of Vernonberg. The City of Savannah is adjacent to the northeast boundary of HAA. The Town of Thunderbolt is to the east and Vernonberg is to the southeast of HAA. Many unincorporated communities are also located close to HAA. Table 2.3 is a list of population distribution figures for the area as of the 1990 Census.

Table 2.3. Population Distribution for the HAA Vicinity

LOCALITY	TOTAL POP.	TOTAL NO. OF OCCUPIED HOUSING UNITS	AVE. # OF PERSONS IN HOUSEHOLD
Chatham Co.	216,935	81,178	Not available
City of Savannah	137,560	51,938	2.55
Town of Thunderbolt	2786	793	2.36
Town of Vernonberg	74	30	2.52

Source: City of Savannah, Georgia, Metropolitan Planning Commission, (telephone conversation with Mr. Al Quinn, October 31, 1991).

As shown in Fig. 2.11, the population distribution within a 4-mile radius of HAA includes the communities listed in Table 2.3 as well as rural areas in Chatham county. This population is estimated to be approximately 182,016. The population for HAA is presented in Table 2.4, showing the existing population and peak mobilization populations for both residents and non-residents (AEHA 1988). There are 488 officer and enlisted family units and 43 trailer spaces on the Post (U. S. Army 1991). There are no schools on the Facility property. Students are bused to schools in the Savannah area. The are two day care centers located on the Post. The number of public school students in the Savannah area school system enrolled in the elementary schools is 17,912. The total middle school population is 7,993 and the high school population is 7702. These populations are approximate and are based on the 1991-92 registration enrollment information.

2.3.2 Land Use

HAA covers an area of 5,400 acres (8.4 miles^2). The majority of HAA is characterized by developed cantonment and aircraft runway and parking areas. The cantonment area is located in the northeastern portion of the Facility. Located on the site are storage and training areas, a firing range, and an airfield. The southern portion contains approximately 885 acres of national wetlands, recreational facilities and a small private cemetery. The southwestern boundary of the Facility follows the Little Ogeechee (Forest) River. The Seaboard Coast Line railroad runs along the northwestern boundary. A map of the facility is shown in Figure 2.12.

Within the cantonment area are recreational facilities such as baseball, football, and softball fields; tennis and basketball courts; playgrounds; bowling lanes; and several lakes. Also located within the cantonment area are a hospital, clinic, preschool and nursery school, and two private cemeteries.

Outside the boundary of HAA, land use consists of residential, institutional, industrial, and community businesses. The areas to the south and southeastern portion of the Facility are dominated mainly by residential communities and some businesses; the northeastern portion is mainly community business, institution, and light industry, while the western portion is almost entirely heavy industry. The south western boundary of HAA is bordered by marsh conservation and some residential areas (Higginbothom 1988).

2.3.3 Biota

Much of HAA is developed cantonment and aircraft runway and parking area, with associated open lawns. Natural habitats are restricted to the perimeter and the western portion of the facility. Pines are the dominant tree species in this area; predominantly, longleaf (*Pinus palustris*), slash (*Pinus caribea*), and

FIGURE 2.11. POPULATION WITHIN 4 MILES

Table 2.4. Hunter Army Airfield Effective Population[1]

Type of Residents	Existing Population[1]	Peak Mobilization Population[2]
Military (onpost)	500	4,600
Dependents (onpost)	1,305	1,208
Total Residents	1,805	5,808
Military (offpost)	1,832	1,650
Civilians (offpost)	904	956
Total Nonresidents	2,736	2,606
Total Population	4,541	8,414
Effective Population	2,717	6,677

[1] The effective population is defined as the total number of onpost residents plus one-third of the nonresidents who work on post.

Source: [1]Directorate of Engineering and Housing, January 1992.
[2]Environmental Program Review, 32-24-7038-89, 1-12 August 1988.

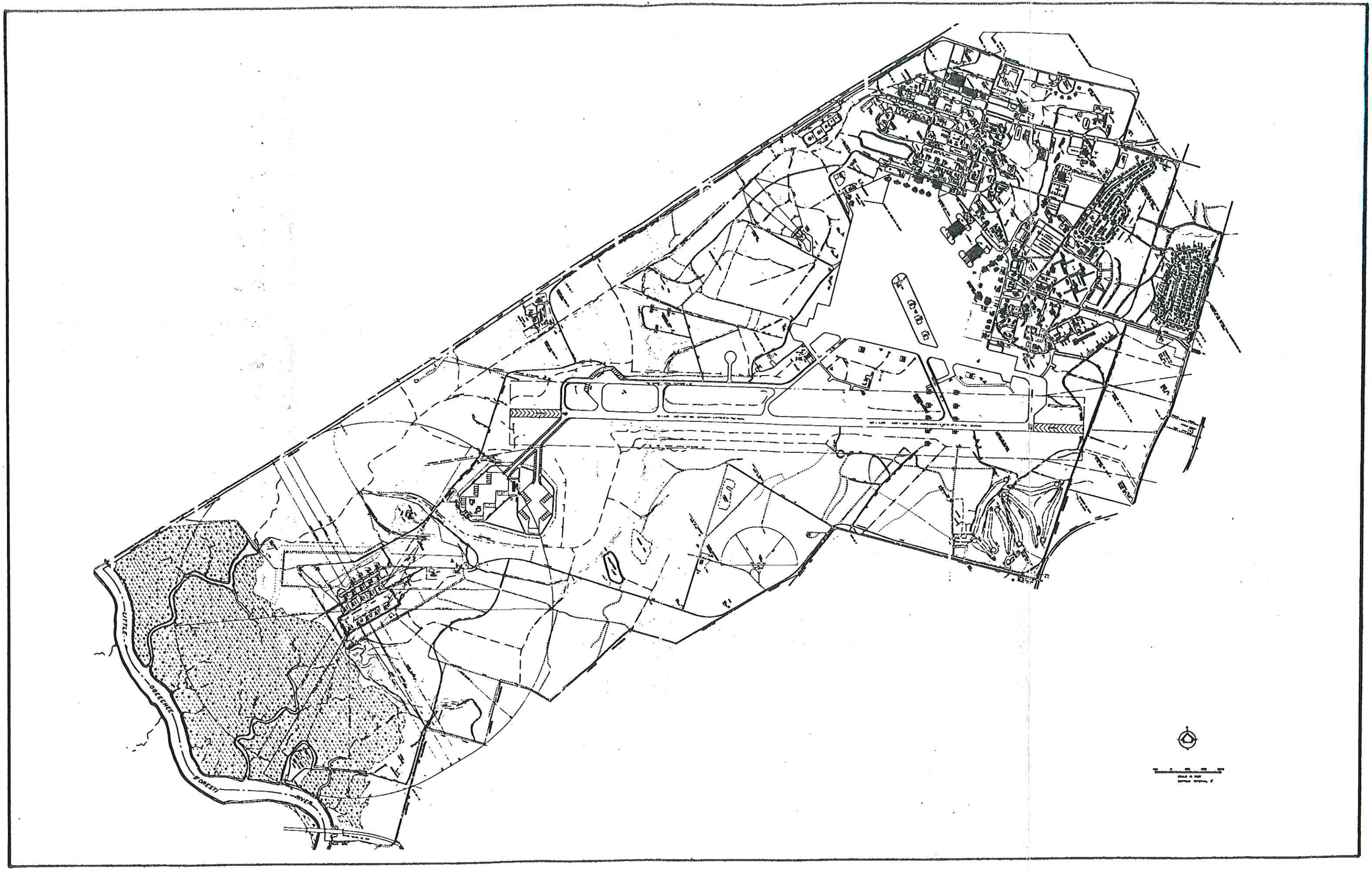


FIGURE 2.12. HUNTER ARMY AIRFIELD FACILITY MAP

loblolly (*Pinus taeda*) are found. Live oaks (*Quercus virginiana*) and pin oaks (*Quercus palustris*) are also found abundantly but sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), carolina poplar (*Poplulus canadensis*), southern magnolia (*Magnolia grandiflora*), cypress (*Taxodiem distichum*), pecan (*Caryo illinoensis*) and palms (*Sabal palmetto*) are found in lesser numbers scattered throughout the reservation. Ornamental species of trees and shrubs have been planted around buildings and along roads and walkways of the cantonment area (McMaster et al. 1983).

The wildlife management regime for HAA is structured so as not to promote populations of game species which may interfere with operations at the Facility. Hunts are conducted periodically to reduce populations of game species (Swindell 1991). The species found on HAA include deer (*Odocoileus virginianis*), raccoons (*Procyon lotor*), beaver (*Castor canadensis*), armadillo, oppossum (*Didelphis virginiana*), feral hogs (*Porcinis* spp.), skunks (*Mephitis mephitis*) and small rodents (Houston 1991). A variety of birds, reptiles and amphibian species, either as permanent or seasonal residents or as migrants, also may be found on the Facility. (McMaster et al. 1983).

Both Hallstrom and Oglethorpe ponds are stocked with game species of fish including large mouth bass (*Micropterus salmoides*), catfish (*Ictalurus* spp.), brim, and perch. Non-game species of fish include killifish (*Heterandria formosa*), minnows (*Fundulus* spp.), shiners (*Notropis* spp.). bullhead (*Ictalurus* spp.) and mosquitofish (*Gambusia affinis*).

Approximately 885 acres of HAA, mostly located in the western portion of the Facility, are wetlands regulated as part of the Coastal Plain-National Wetlands management system under the U.S. Fish and Wildlife Service (Houston 1991). It is assumed that there are no endangered species residing at HAA, but, no wildlife surveys have been conducted to confirm this. Several endangered species, the woodstork (*Mcytera americana)* and the bald eagle (*Haliaeetus leucocephalus*) have been seen on the Facility, but are not known to be residents (Houston 1991). The red-cockaded woodpecker (*Picoides borealis*) has not been seen on this facility, though this area of Georgia is considered to be within the historical range of the red-cockaded woodpecker (Metz 1991). Table 2.5 lists the species listed on the Federal and/or state endangered or threatened species list. These species are known to reside or are transient to the area including HAA and along the surface water migration pathway.

Table 2.5. Endangered or threatened species that either reside in or are transient to the area around HAA and along its surface water migration pathway. (source: Harley 1991 and GaDNR-FWHI 1991).

Common Name	Scientific Name	Federal		State	
		E	T	E	T
Amber Darter	Percina Antesella	X			
American Peregrine Falcon	Falco Peregrinus Anatum	X		X	
American Alligator	Alligator Mississippiensis		X		
American Oystercatcher	Haematopus Palliatus				
Arctic Peregrine Falcon	Falco Peregrinus Tundrius		X		
Atlantic Ridley Turtle	Lepidochelys Kempi	X		X	
Bachmans Warbler	Vermivora Bachmanii	X		X	
Bald Eagle	Haliaeetus Leucocephalus	X		X	
Bannerfin Shiner	Notropis Leedsi				
Black Skimmer	Rynchops Niger				
Black-Crowned Night-Heron	Nycticorax Nycticorax				
Black-necked Stilt	Himantopus Mexicanus				
Conasauga Logperch	Percina Jenkinsi	X			
Curlands Warbler		X		X	
Eastern Mudminnow	Umbra Pygmaea				
Eastern Brown Pelican	Pelecanus Occidentalis			X	
Eastern Cougar	Felis Concolor Cougar	X		X	
False Killer Whale	Pseudorca Crassidens				
Finback Whale	Balaenoptera Physalus	X			
Florida Panther	Felis Concolor Coryi	X			
Georgia's Blind Cave Salamander	Haideotriton Wallacei				
Golden Topminnow	Fundulus Chrysotus				
Gray Bat	Myotis Grisescens	X		X	
Gray Kingbird	Tyrannus Dominicenis				

* Possibly extinct
E Endangered
T Threatened

Table 2.5. Endangered or threatened species that either reside in or are transient to the area around HAA and along its surface water migration pathway. (source: Harley 1991 and GaDNR-FWHI 1991).

Common Name	Scientific Name	Federal		State	
		E	T	E	T
Green Sea Turtle	Chelonia Mydas		X		
Green-Fly Orchid	Epidendrum Conopseum				
Hawksbill Turtle	Eretmochelys Imbricata	X		X	
Humpback Whale	Megaptera Novaeangliae	X		X	
Indiana Bat	Myotis Sodalis	X		X	
Indigo Snake	Drymarchon Corais Couperi		X		X
Ivory-Billed Woodpecker*	Campephilus Principalis	X		X	
Kemp's Turtle		X		X	
Kirtland's Warbler	Dendroica Kirtlandii	X		X	
Leatherback Turtle	Dermochelys Coriacea	X		X	
Loggerhead Turtle	Caretta Caretta		X		
Manatee	Trichechus Manatus	X		X	
Perigrine Falcon		X		X	
Piping Plover	Charadrius Melodus		X		
Red Wolf	Canis Rufus	X			
Red-Cockaded Woodpecker	Picoides Borealis	X		X	
Right Whale	Balaena Glacialis	X		X	
Sea Lamprey	Petromyzon Marinus				
Seaside Sparrow	Ammodramus Maritimus				
Sei Whale	Balaenopter Borealis	X			
Sherman's Pocket Gopher	Geomys Pinetis Fontenalus			X	
Sherman's Pocket Gopher*	Geomys fontanelus			X	
Short-nosed Sturgeon	Acipenser Brevirostrum	X		X	
Smallfin Redhorse	Moxostoma Robustum				

*Possibly extinct
E Endangered
T Threatened

Table 2.5. Endangered or threatened species that either reside in or are transient to the area around HAA and along its surface water migration pathway. (source: Harley 1991 and GaDNR-FWHI 1991).

Common Name	Scientific Name	Federal		State	
		E	T	E	T
Snail Darter	Percina Tanasi		X		
Southern Cave Fish	Typhlichthys Subterraneus			X	
Southern Bald Eagle	Haliaeetus Leucocephalus	X		X	
Sperm Whale	Physeter Macrocephalus	X			
Spotfin Chub	Cyprinella Monacha		X		
Star-Nosed Mole	Condylura Cristata				
Striped Newt	Notophthalmus Perstriatus				
Striped Mud Turtle	Kinosternon Baurii				
Tidewater Silverside	Menidia Beryllina				
West Indian Manatee	Trichechus Manatus	X		X	
Whitefin Shiner	Notropis Niveus				
Woodstork	Mycteria Americana	X			
Yellow Flytrap	Sarracenia Flava				X
Yellow-Crowned Night-Heron	Nyctanassa Violacea				
Yellowfin Madtom	Noturus Flavipinnis		X		
ENDANGERED PLANTS					
Arrow-Wood	Viburnum Bracteatum			X	
Ashe Savory	Calamintha Ashei				X
Bay Starvine	Schisandra Glabra				X
Biltmore Sedge	Carex Biltmoreana				X
Black-Spored Quillwort	Isoetes Melanospora	X			X
Blackwater Swamp	Blackwater Stream Floodplain Forest				
Bluestem	Schizachyrium Niveum				X

* Possibly extinct
E Endangered
T Threatened

Table 2.5. Endangered or threatened species that either reside in or are transient to the area around HAA and along its surface water migration pathway. (source: Harley 1991 and GaDNR-FWHI 1991).

Common Name	Scientific Name	Federal		State	
		E	T	E	T
Buckthorn	Bumelia Thornei			X	
Canby Dropwort	Oxypolis Canbyi	X			X
Cooley Meadowrue	Thalictrum Cooleyi	X			
Croomia	Croomia Pauciflora				X
Curtiss Loosestrife	Lythrum Curtissii			X	
Dwarf Witch-alder	Fothergilla Gardenii				X
False Pimpernel	Lindernia Saxicola			X	
False Dragon-Head	Physostegia Veroniciformis				X
Florida Willow	Salix Floridana				X
Florida Torreya	Torreya Taxifolia	X		X	
Fringed Campion	Silene Polypetala	X		X	
Georgia Rockcress	Arabis Georgiana				X
Georgia Plume	Elliottia Racemosa			X	
Glade-Cress	Leavenworthia Exiqua				X
Goldenseal	Hydrastis Canadensis			X	
Granite Rock Stonecrop	Sedum Pusillum				X
Green Pitcherplant	Sarracenia Oreophila	X			
Hairy Rattleweed	Baptisia Arachnifera	X		X	
Harper Fimbristylis	Fimbristylis Perpusilla			X	
Harper Dodder	Cuscuta Harperi				X
Harperella	Ptilimnium Nodosum	X			
Hartwrightia	Hartwrightia Floridana				X
Hirst Panic Grass	Panicum Hirstii			X	
Hooded Pitcherplant	Sarracenia Minor				X

?ossibly extinct
E Endangered
T Threatened

Table 2.5. Endangered or threatened species that either reside in or are transient to the area around HAA and along its surface water migration pathway. (source: Harley 1991 and GaDNR-FWHI 1991).

Common Name	Scientific Name	Federal		State	
		E	T	E	T
Indian Olive	Nestronia Umbellula				X
Kral Water-Plantain	Sagittaria Secundifolia			X	
Large-Flower Skullcap	Scutellaria Montana	X			X
Least Tern	Sterna Antillarum				
Mat-Forming Quillwort	Isoetes Tegetiformans	X			
Michaux Sumac	Rhus Michauxii	X			
Mohr Barbara-buttons	Marshallia Mohrii		X		
Needle Palm	Rhapidophyllium Hystrix				
Northern Pitcherplant	Sarracenia Purpurea			X	
Oconee-Bells	Shortia Galacifolia			X	
Oglethorpe Oak	Quercus Oglethorpensis				X
Open-ground Whitlow-Grass	Draba Aprica			X	
Parrot Pitcherplant	Sarracenia Psittacina				X
Persistent Trillium	Trillium Persistens	X		X	
Piedmont Barren Strawberry	Waldsteinia Lobata				X
Piedmont Water-Milfoil	Myriophyllum Laxum				X
Piedmont Ragwort	Senecio Millefolium				X
Pink Ladyslipper	Cypripedium Acaule				
Plumleaf Azalea	Rhododendron Prunifolium				X
Pondberry	Lindera Melissifolia	X			
Pondspice	Litsea Aestivalis				X
Pool Sprite	Amphianthus Pusillus		X	X	
Purple Sedge	Carex Purpurifera				X
Relict Trillium	Trillium Reliquum	X			

?ossibly extinct
Endangered
T Threatened

Table 2.5. Endangered or threatened species that either reside in or are transient to the area around HAA and along its surface water migration pathway. (source: Harley 1991 and GaDNR-FWHI 1991).

Common Name	Scientific Name	Federal		State	
		E	T	E	T
Sedge	Carex Amplisquama				X
Sedge	Carex Misera				X
Shoals Spiderlily	Hymenocallis Coronaria			X	
Silky Camellia	Stewartia Malacodendron				
Small Whorled Pogonia	Isotria Medeoloides	X			
Smooth Purple Coneflower	Echinacea Laevigata				X
Soapberry	Sapindus Saponaria				
Southern Meadowrue	Thalictrum Debile				X
Star-Flower	Trientalis Borealis			X	
Swamp Pink	Helonias Bullata		X		
Sweet Pitcherplant	Sarracenia Rubra			X	
Tennessee Yellow-eye Grass	Xyris Tennesseensis	X			
Three-Tooth Cinquefoil	Potentilla Tridentata			X	
Twinleaf	Jeffersonia Diphylla			X	
Variable-Leaf Indian Plantain	Cacalia Diversifolia				X
Virginia Spirea	Spiraea Virgininana		X		
Wagner Spleenwort	Asplenium Heteroresiliens				X
Whitetop Pitcherplant	Sarracenia Leucophylla				X
Woods False Hellebore, Ozark Bunchflower	Veratrum Woodii			X	
Yellow Flytrap	Sarracenia Flava				X
Yellow Ladyslipper	Cypridpedium Calceolus				

* Possibly extinct
E Endangered
T Threatened

2.4 HYDROLOGY

2.4.1 Climatology

The climate of HAA is humid subtropical. Temperatures range from an average of 27 Celsius in July to 10 Celsius in December. The annual precipitation averages 124 cm. Under normal conditions, wind speeds rarely exceed five knots; however, thunderstorms are prevalent from May to September and may produce gusty surface winds over 25 knots from the northwest (McMaster et al. 1983).

2.4.2 Overland Drainage

HAA is located in the Little Ogeechee River (Forest River) watershed, which forms the Western boundary of HAA. The river is part of the Ogeechee River system. Surface drainage at HAA is conveyed to the Little Ogeechee River by a system of open drainage channels. This in turn flows south to the Atlantic via the Ogeechee system. Two small water bodies are located in the eastcentral portion of HAA, Hallstrom Lake and Borrow Pit. Hallstrom Lake is an unlined manmade structure (approximately 4 acres in area) for recreational use. It receives inflow via storm runoff and possibly groundwater infiltration during high water table conditions. Borrow Pit generally contains shallow standing water (no surface inlet or outlet) at a level consistent with the local water table (McMaster et al. 1983). Oglethorpe Lake (pond No. 29) was constructed in 1986 and opened as a fishery in 1987, it covers an area of approximately 10 acres and is located in the northwestern portion of the facility. Oglethorpe Lake receives storm water runoff from the area surrounding it. Both Oglethorpe and Hallstrom Lakes are fish-stocked recreational waters (Brice 1991).

2.4.3 Potentially Affected Water Bodies

Waterbodies located within HAA boundaries include Hallstrom and Oglethrope Lakes. Both lakes receive storm runoff and possibly groundwater infiltration. Lamar Canal is located along the northwestern boundary of the facility. It receives stormwater runoff and ultimately discharges to the Little Ogeechee River. The Little Ogeechee River receives surface drainage from HAA through a series of open drainage channels located throughout the Facility. The STP at HAA is connected to the City of Savannah sewer system and discharges to the Savannah River at Bull and Stephenson streets in Savannah. Discharge data (Appendix B) from the HAA sewage treatment plant indicates that the effluent meets NPDES requirements.

Due to tidal influence, the surface water migration pathway includes a 15 mile downgradient region and a fifteen mile upgradient region for the Little Ogeechee and Savannah Rivers. One surface water

intake on the Savannah River is located approximately thirteen miles upgradient from the point of entry of the HAA STP effluent. The surface water is primarily for industrial use.

The Little Ogeechee River is used primarily for recreational purposes but it has very little public access. The Savannah River and its tributaries are used for both industrial and recreational purposes. Commercial use is not permitted on restricted areas of the Savannah River. Recreational harvest areas are shown in figs. 2.13, 2.14, and 2.15 for the Savannah River, Ossawba Sound, and Wassaw Sound. Fig. 2.16 shows the commercial and sport bait shrimp zones for the Savannah area. Surface water quality reports collected from the Lathrop Avenue Booster Station indicate that contamination from the HAA STP effluent is not evident in the Savannah River (Appendix B). Water Discharge records for the Ogeechee River basin and the Savannah River basin are shown in Appendix B.

2.5 REGIONAL AQUIFER CHARACTERISTICS

2.5.1 Aquifer Description

Groundwater is the principle source of water in the thirteen-county coastal area of Georgia. There are two groundwater systems in the vicinity of HAA. The Floridan aquifer (formerly known as the Principal Artesian aquifer) and the shallow sand aquifer (Fig. 2.17). The Floridan aquifer consists of limestone units of the Miocene, Oligocene, and Eocene ages. The shallow sand aquifer is vulnerable to surface contamination because the upper part of the aquifer is unconfined and is overlain by a sandy overburden. Fig. 2.18 is a composite geological column for the Savannah area. The shallow sand aquifer ranges in depth from just below the ground surface to approximately 55 meters; it is separated from the lower Floridan aquifer by a relatively impermeable confining layer consisting of the Hawthorn formation (clay with interbedded dolomitic limestone). Depth to the Floridan aquifer ranges from 80 to 140 meters in the HAA vicinity. The rocks of the Floridan aquifer crop out in a belt 60-100 miles northwest of Savannah, and this outcrop belt marks the recharge area for the aquifer. This aquifer consists of the Talahatta Formation, (the lower confining bed), the Lisbon Formation, (the lowermost unit of the aquifer in some areas and part of the lower confining bed in other areas), and the Gosport Sand, the Upper Eocene Ocala Limestone (the most productive zone of the aquifer), the undifferentiated limestones of Oligocene age (also a productive unit), the Lower Miocene Tampa Limestone equivalent (the uppermost unit of the aquifer) and the Middle Miocene Hawthorn Formation (the upper confining bed, as shown in Fig. 2.19 (AEHA 1988).

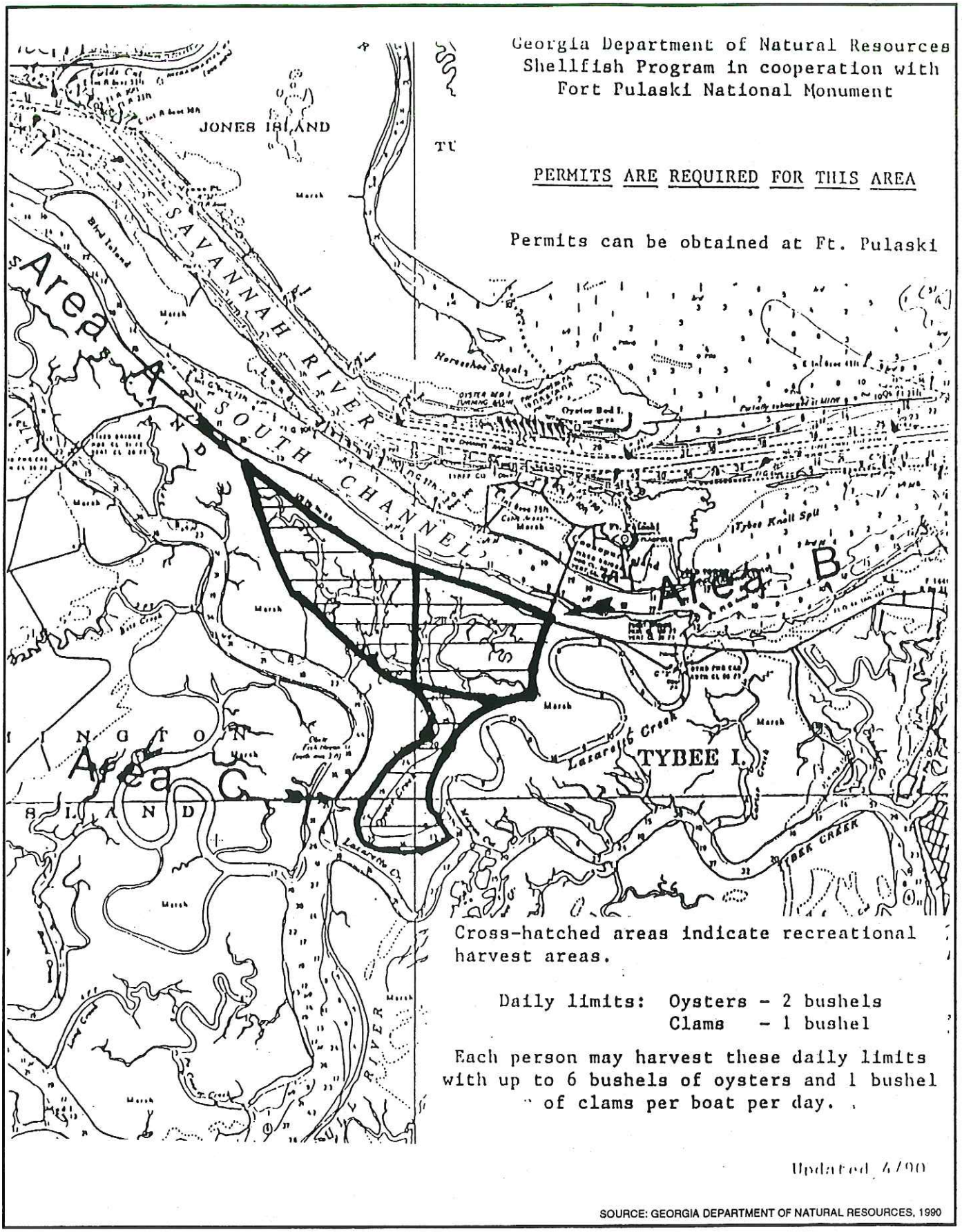


FIGURE 2.13. CHATHAM RECREATIONAL SHELLFISH HARVESTING AREAS FOR THE SAVANNAH RIVER TYBEE ISLAND AREA

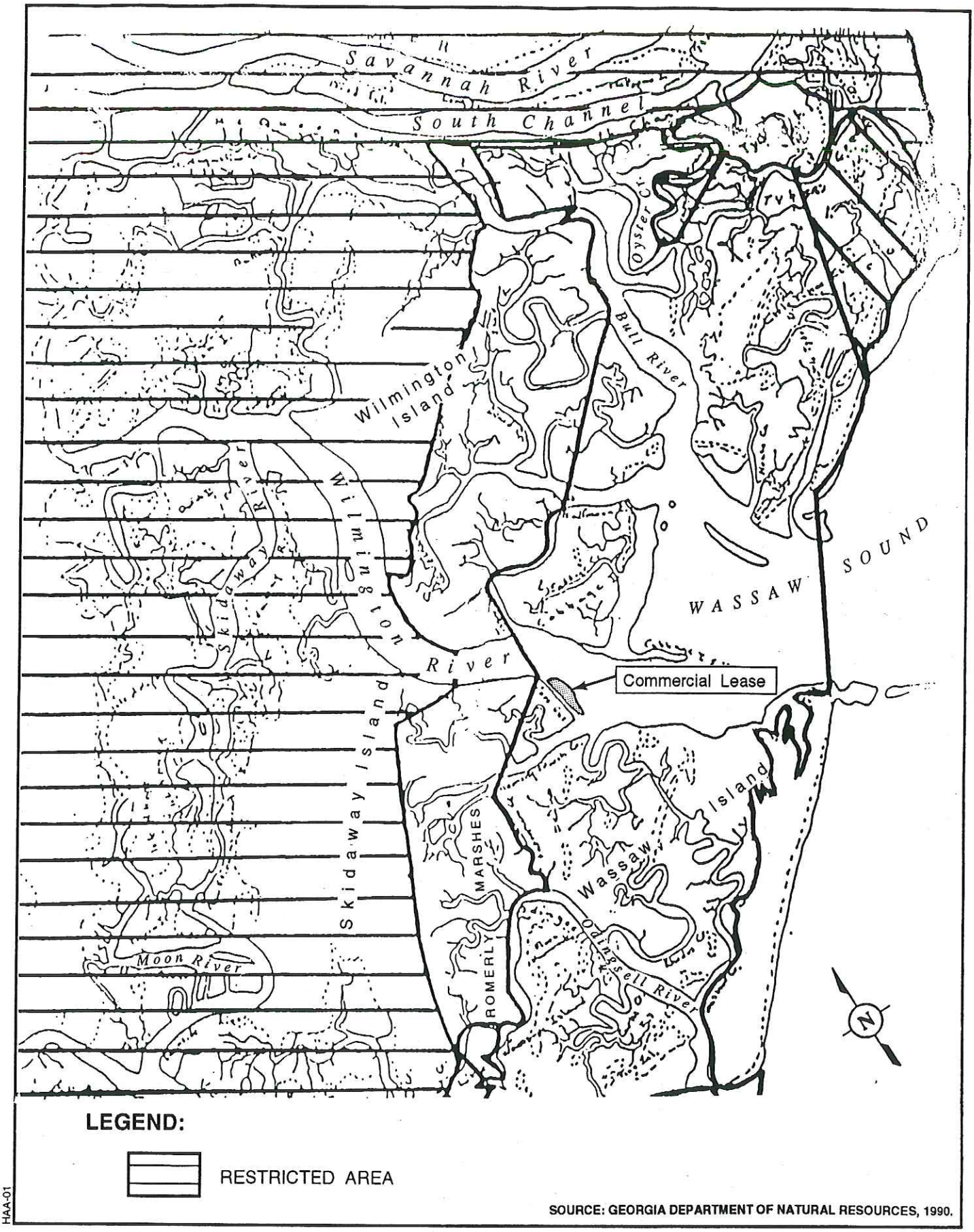


FIGURE 2.14. CHATHAM RECREATIONAL SHELLFISH HARVEST AREA CLASSIFICATIONS, NORTHERN PORTION

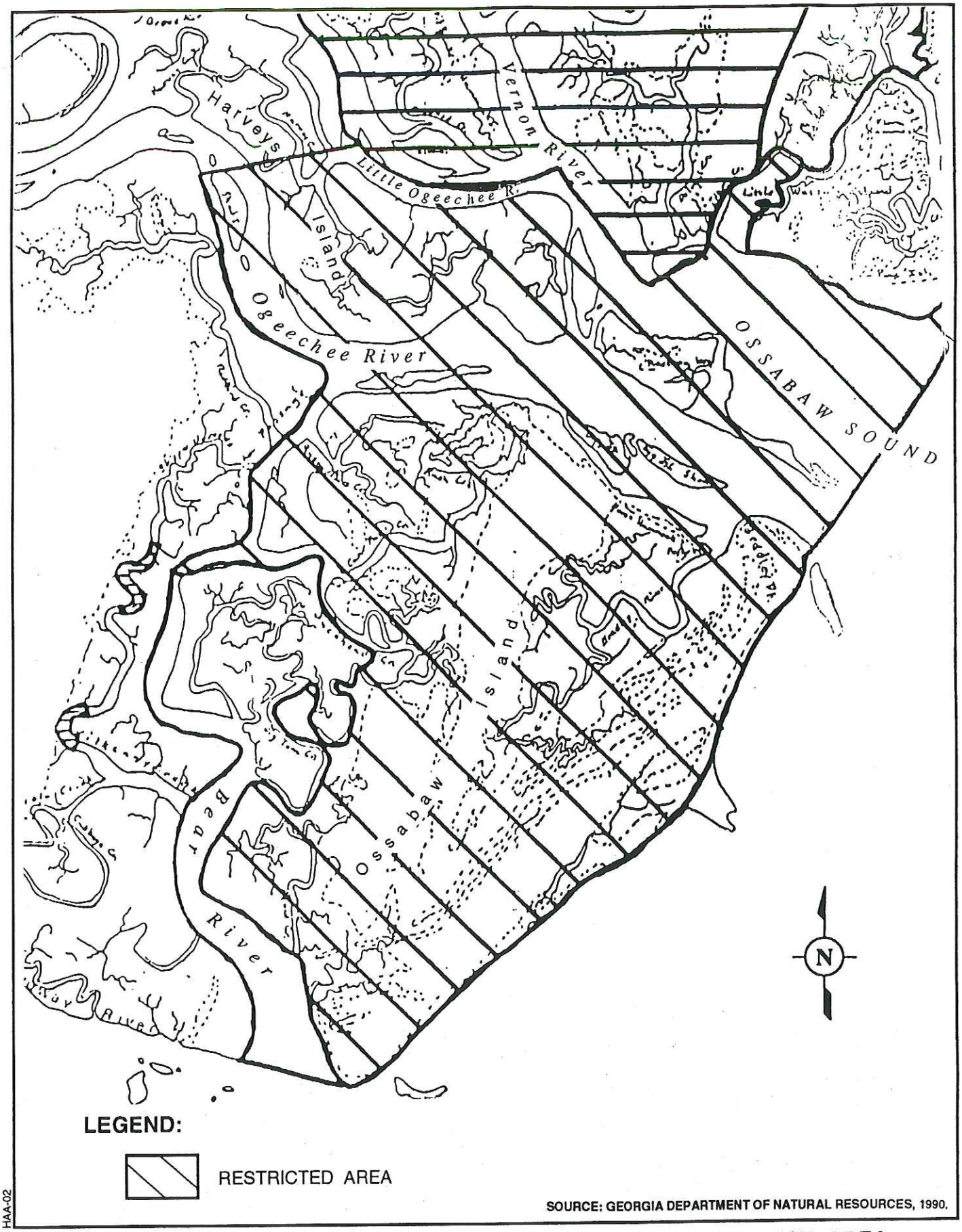


FIGURE 2.15. CHATHAM RECREATIONAL SHELLFISH HARVEST AREA CLASSIFICATIONS, SOUTHERN PORTION

FIGURE 2.16. COMMERCIAL AND SPORT BAIT SHRIMP ZONES FOR THE SAVANNAH RIVER AND WASSAW SOUND AREAS

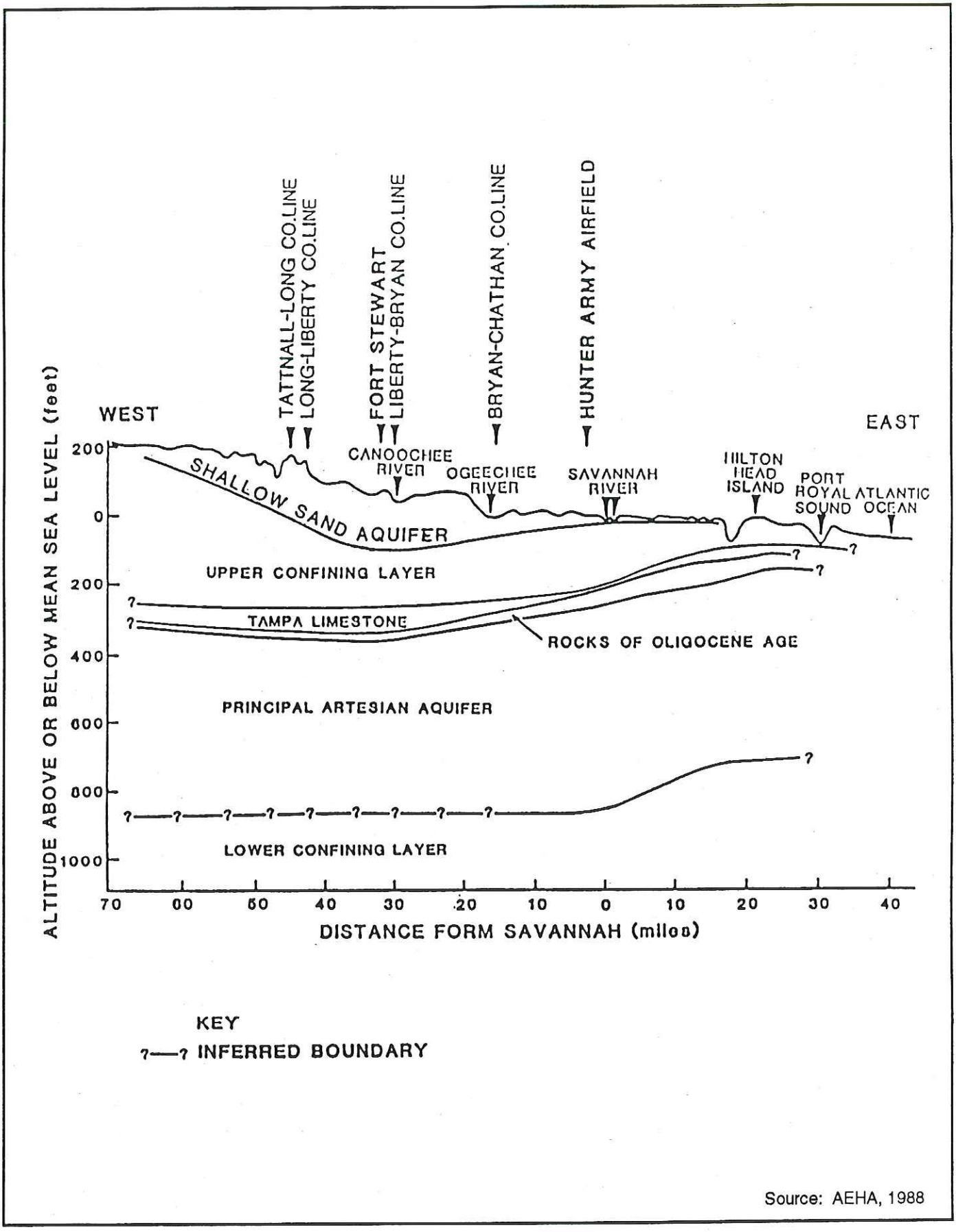
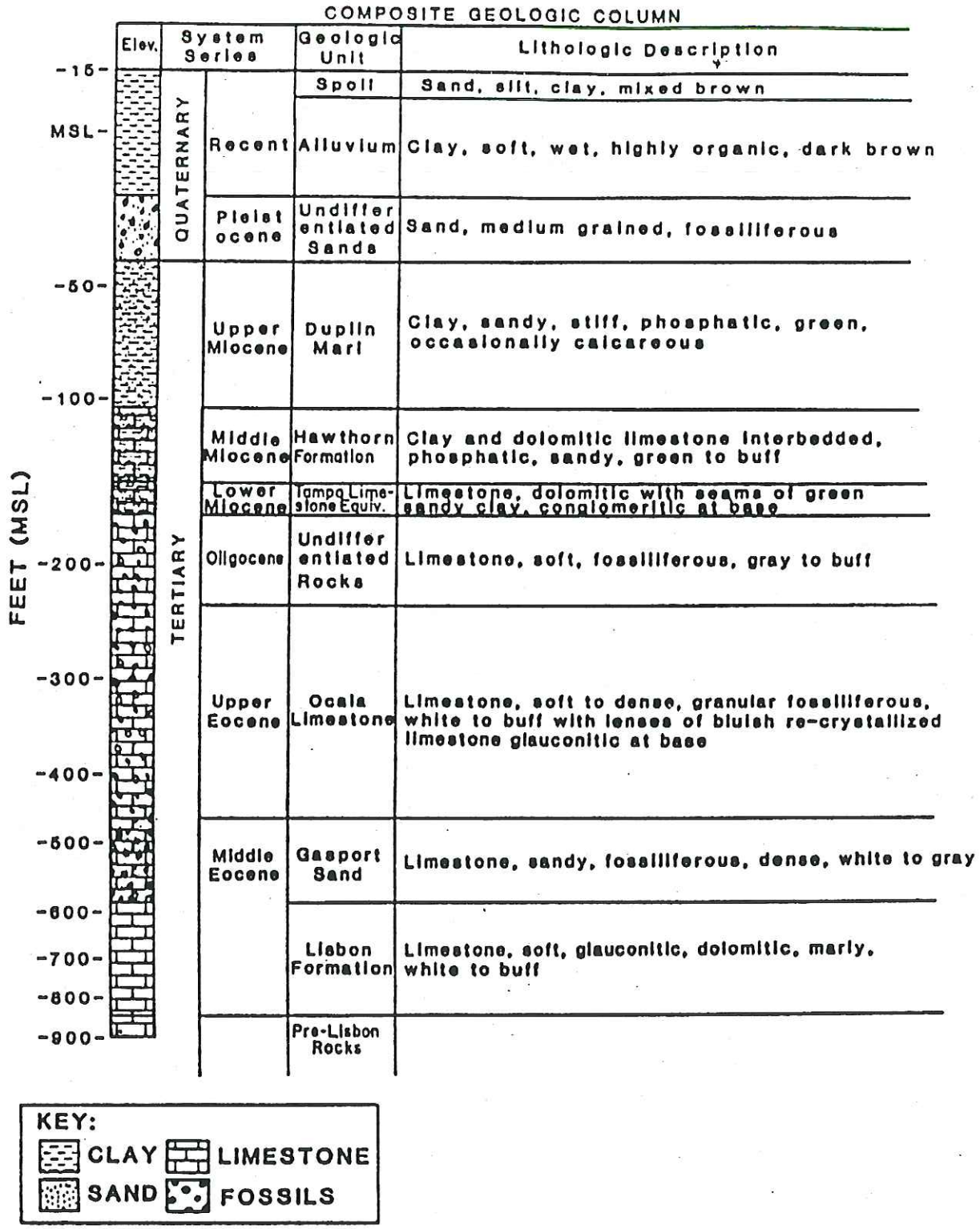
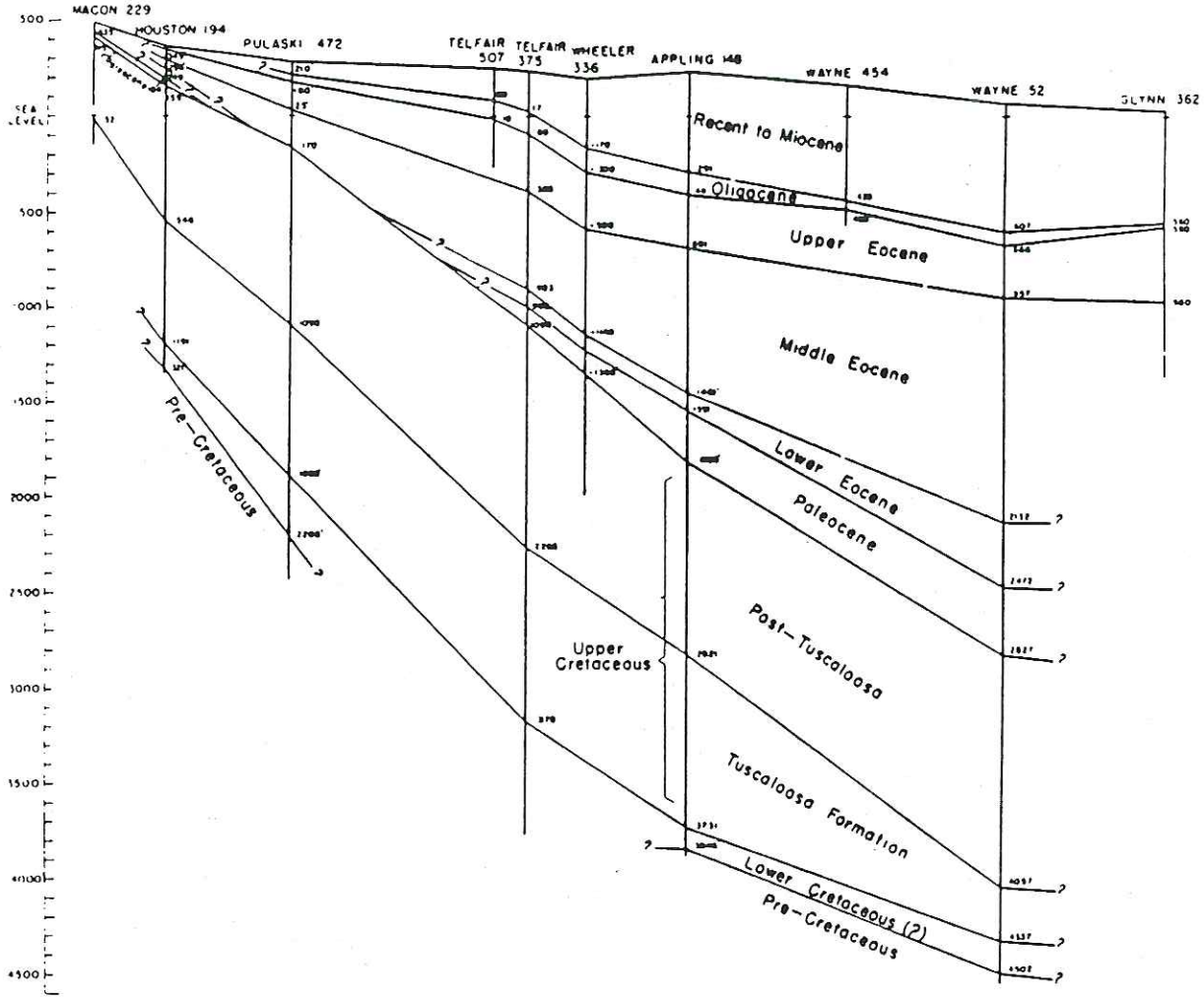


FIGURE 2.17. AQUIFER SYSTEMS IN THE SAVANNAH VICINITY



SOURCE: ESE, 1983.

FIGURE 2.18. COMPOSITE GEOLOGICAL COLUMN OF HUNTER ARMY AIRFIELD



Source: ESE, 1983

FIGURE 2.19. GENERAL STRATIGRAPHIC SECTION OF SEDIMENTS UNDERLYING THE REGION

Regional groundwater flow direction of the Floridan aquifer is greatly influenced by the heavy withdrawals of water by the city of Savannah for potable supply. This results in a flow direction most likely to be to the northeast. The shallow sand aquifer's direction of flow is generally from higher elevations to nearby streams. Local recharge of the shallow sand aquifer occurs through the bottom of streambeds and by rainfall infiltration. Recharge of the Floridan aquifer occurs upland. Low permeability of the confining layer impedes the infiltration of water from the shallow sand aquifer downward to the principal artesian aquifer. Although they are separate, an exchange of water may occur between the shallow sand aquifer and the Floridan aquifer under certain conditions (McMaster et al. 1983)

2.5.2 Aquifer Use

Potable Water. All of the wells at HAA pump from the Floridan aquifer. There are nine deep potable wells as can be seen in Fig. 2.20. Two water wells are in the cantonment area, and seven water wells occur in the outlying areas. Two of the outlying wells are not in use. The total pumping capacity is 5,494,000 gal/d and the total storage capacity is 822,080 gal (AEHA 1988). Potable water consumption at HAA is 1,017,058 gallons per day; the average per capita consumption was 252 gal/d (AEHA 1989).

The two deep potable wells, located in the cantonment area are the primary HAA potable water system. All of these wells are reportedly protected from surface runoff and properly constructed to prevent contaminated water or deleterious material from entering the well. Water treatment at the two main Post wells consists of chlorination and fluoridation automatically performed at each well site. The outlying facilities on the Post are supplied with water from individual wells. Water treatment consists of automatic chlorination at each outlying well. Table 2.6 lists the characteristics of all the wells on HAA (AEHA 1988). Table 2.7 lists groundwater uses for Chatham County. The City of Savannah has eight water systems with a total of 38 wells. Nineteen of these wells are within four miles of HAA; well characteristics for these wells are listed in Table 2.8 Analytical data for the City of Savannah potable wells is in Appendix B. There are 65,000 connections in the city; residential connections account for 58,500. The population served by the water system in Savannah is approximately 149,175. Chatham county owns and operates approximately fourteen wells, all of which tap into the Floridan aquifer at approximately 600 ft. Eight of these wells are within 4 miles of HAA. This system services a population of approximately 7936. The county system has 3200 connections, most of which are residential. (Dalson 1991). Since the rural areas are to the west and north of the facility and most of the private wells in the county are used by people in rural areas, it can be assumed that most of these wells are upgradient from HAA. There are over 1400 private wells scattered throughout the county. One hundred and fifty two of the private wells classified as community and noncommunity in Chatham Co. are permitted wells serving a population of approximately 72, 861. No further information is available on the permitted wells or the

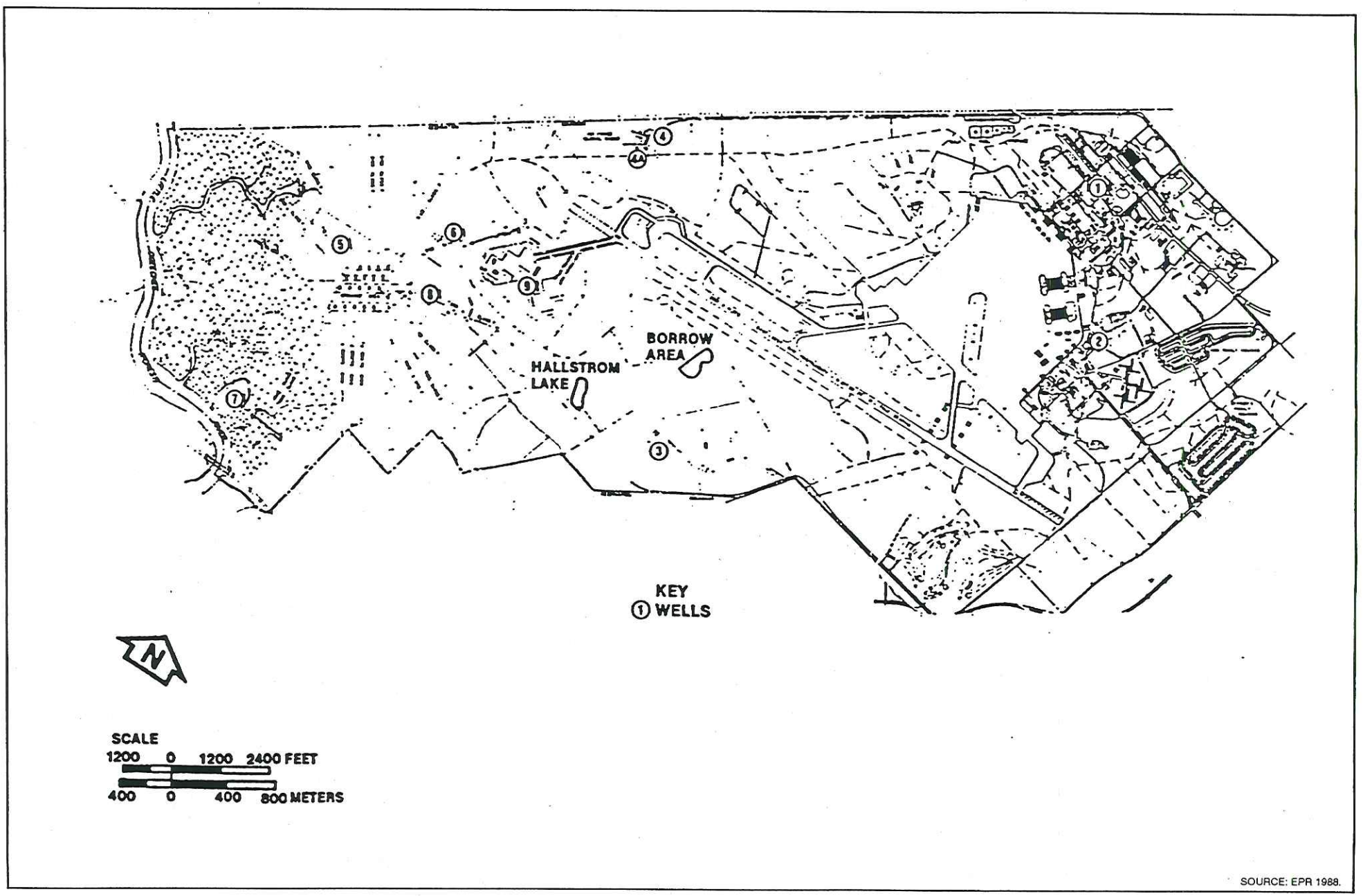


FIGURE 2.20. MAP SHOWING APPROXIMATE LOCATIONS OF POTABLE WATER WELLS AT HUNTER ARMY AIRFIELD, GA.

Table 2.6 HUNTER ARMY AIRFIELD WELL CHARACTERIZATION

Well	Diameter (Inches)	Yr. of Constr	Location Bldg. No.	Provides Water for	Depth (Feet)	Casing Depth (Feet)	Flow (Gpm)	Standby Power Flow (Gpm)	Water Storage Facilities, Type	Water Storage Capacity, (Gallons)
Cantonment Area:										
1	12	1940	711	Main Post	550	250	1,300	1,300	Elevated	100,000
2	12	1942	1205	Golf course	600	250	1,300	1,300	Elevated	200,000
Outlying Areas:										
3	4	1952	8455	FAA Bldg. and outdoor Recreation	360	40	30	N/A	Pressure Tank	1,000
4a	4	1952	8581	Air National Guard 702nd Radar	300	92	80	N/A	Pressure Tank	1,000
5	4	1955	8641	Horse Stables	380	85	30	N/A	Pressure Tank	800
6	Well abandoned; no information available									
7	4	1960	8703	Lotts Island	450	330	70	N/A	Pressure Tank	5,000
8	4	1957	8632	Ammunition supply point and Saber Hall	370	255	80	80	Elevated	15,000
9		1956	8661	Fire pump, Saber Hall						

Source: Environmental Program Review No. 32-24-7038-89, 1-12 August 1988.

Table 2.7. PUBLIC WATER SUPPLIES IN SOUTHEAST GEORGIA

CHATHAM COUNTY

Population: 216,935 (1990 Census)
Population served by public supply: 215,890
Acres irrigated: 930
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic and Commercial	Industry and Mining	Irrig-ation	Live-stock	Thermoelectric	TOTALS
Groundwater	31.31	2.69	36.06	1.3	0.01	2.31	73.68
Surface water	34.5	0	37.16	0.28	0.02	350	421.96
Totals	65.81	2.69	73.22	1.58	0.03	352.31	495.64

Withdrawals by Major Public Suppliers (Mgal/d) within 4 miles of HAA:

	GW	SW	No. of Supply Wells
Chatham county	0.89	0.00	14
HAA	1.03	0.00	8
City of Savannah	23.88	0.00	38
Savannah Ind. & Dom. Water Syst.	0.00	34.5	0
Town of Thunderbolt	0.43	0.00	2
Town of Vernonberg[1]			

Withdrawals by Major Industrial Groups (Mgal/d) within the county:

	GW	SW
Mining	0.01	0.00
Construction	0.15	0.00
Food	3.41	0.00
Lumber	0.06	0.00
Paper	23.89	25.00
Chemicals	7.07	12.16
Petroleum	0.72	0.00
Stone, Clay	0.17	0.00

[1] Information not available at the time of this report

TABLE 2.8. Well Characteristics For City of Savannah Potable Water Wells Within Four Miles of Hunter Army Airfield

Well No.	Bore Depth in feet	Well Capacity[1] in Gal/Min	Casing Depth in feet
1	1006	1300	300
2	540	700	244
3	700	1875	220
4	700	2750	256
5	900	2850	265
6	750	1020	240
7	525	2880	200
9	710	1550	267
12	550	1600	265
13	1000	1300	270
14	800	700	338
15	414	1000	252
23	639	1100	320
25	540	1100	287
26	580	1340	308
27	550	1470	321
29	620	1235	311
30	608	1500	331
31	498	1000	340

[1] Well capacity is with well pumping into system against 60 psi static head.

unpermitted wells. Fig. 2.21 shows the location of U.S. Geological Survey Groundwater Site Inventory (GWSI) Database wells as well as potable water wells in the City of Savannah, Veronburg and Chatham County within 4 miles of HAA.

Monitoring. In 1980, groundwater monitoring wells were drilled at depths ranging from 50-100 ft below ground level in the shallow sand aquifer around the sanitary landfill at HAA. These wells were required by Ga-EPA for the 1980 reporting and closure of this site. Samples collected and chemically analyzed showed no groundwater quality problems and the landfill was closed. A review of soil boring data indicated that the groundwater level ranged from 5.7 to 18.6 ft below the surface. The soils ranged from clean sands to fat clays (AEHA 1988).

Groundwater supplies from the potable deep artesian wells within HAA boundaries are reportedly of good quality, having a relatively constant temperature and free from microbial contamination and sediment. This water is moderately hard to hard and is treated by chlorination and fluoridation. Hydrogen sulfide is detectable but does not pose a problem (AEHA 1988).

In 1987, the Synthetic Organic Chemicals Survey (SOCS) was initiated by the Office of the Surgeon General (OSG). The purpose of the survey is to obtain an organic pollutant scan for all Army-owned or Army-operated drinking water wells in order to ascertain the nature and magnitude of any local aquifer contamination caused by past practices. A copy of the SOCS report for HAA is included in Appendix B. All known sources of groundwater that could be used to supply drinking water were tested. Regulated contaminants were found in five of eight wells sampled. However, all of the contaminants were below the current or proposed EPA maximum contaminant levels (AEHA 1991).

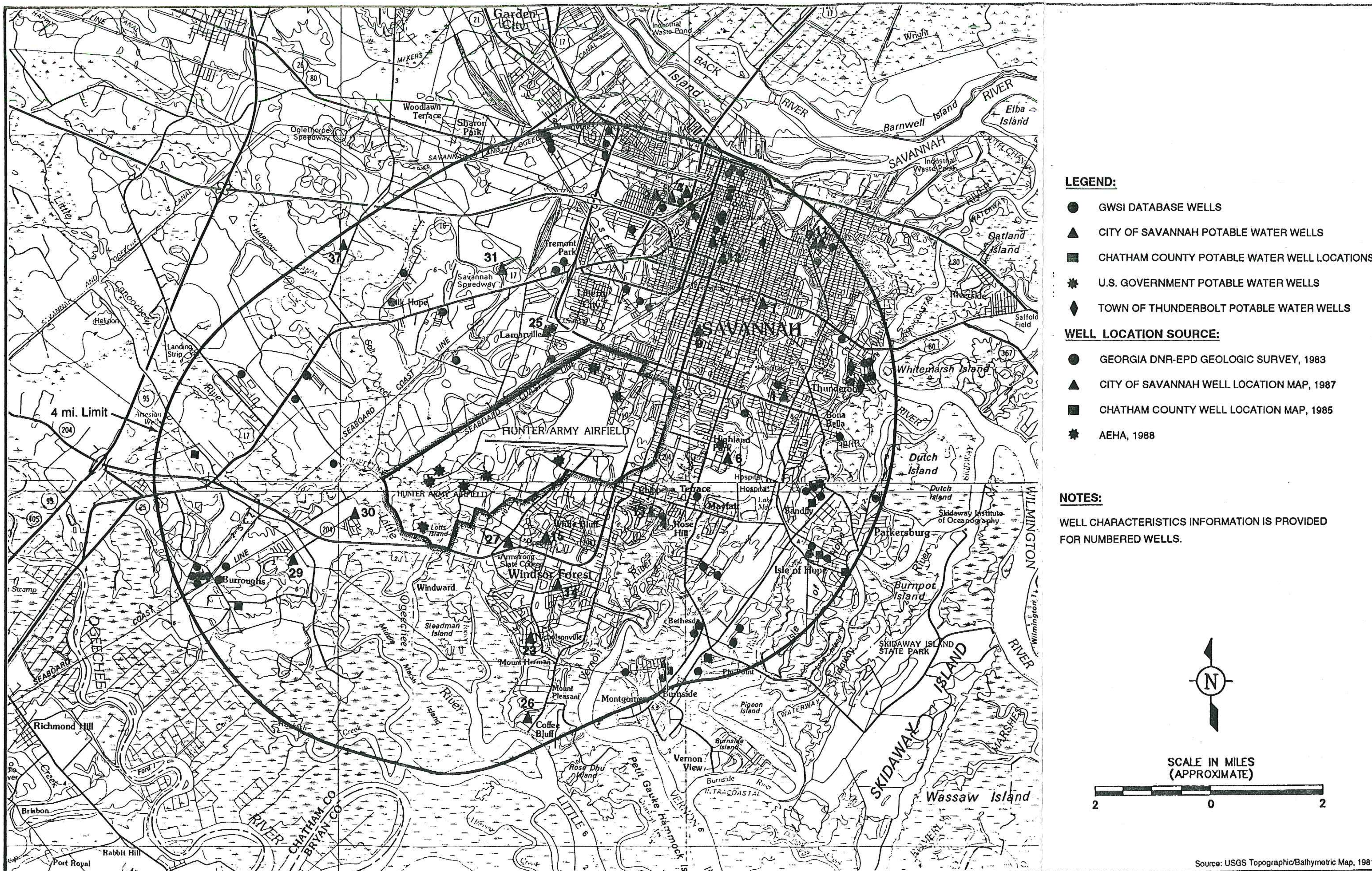


FIGURE 2.21. WATER WELL LOCATIONS WITHIN FOUR MILES OF HUNTER ARMY AIRFIELD

3. TARGET ANALYSIS

3.1 SURFACE WATER MIGRATION PATHWAY

The region surrounding HAA is largely estuarine with many intracoastal waterways. The major population hub is the City of Savannah. There are no surface water intakes used for drinking water in the area. However, most of the surface waters are used for industrial, commercial and recreational purposes. As a receptacle of the effluent from the sewage treatment plant at HAA, the Savannah River is a potential target of contamination; however, no documented incidents of contaminant release have occured. Tidal effects on the Savannah River extend up to Ebenezer landing well beyond the 15-mile surface migration pathway. The population targeted for potential exposure is approximately 232,422. This population is based on those people in Chatham County, Georgia and Jasper County, South Carolina, who may contact the water because they live close to it, work on or near it or use it for recreation.

Drainage channels on HAA drain directly into the Little Ogeechee River. No surface water intakes are located on the Little Ogeechee. It is used mostly for recreational purposes; however, there is little public access. Tidal influence affects the Little Ogeechee River to Eden, well beyond the 15-mile migration pathway. The two lakes located on the Post, Hallstrom and Oglethorpe, are used for recreation.

3.2 GROUNDWATER MIGRATION PATHWAY

Evaluation of groundwater use within 4 miles of HAA reveals eight wells on HAA, nineteen water wells owned by the City of Savannah, and nine water wells owned by Chatham County. It is estimated that within 4 miles of HAA, there are 1200 privately owned unpermitted wells and approximately 156 privately owned permitted wells. The total population potentially affected by groundwater contamination is 182,016.

3.3 AIR MIGRATION PATHWAY

HAA is situated in the Savannah-Beaufort Interstate (Georgia-South Carolina) Air Quality Control Region (AQCR). Those portions of the AQCR which contain HAA have been classified by USEPA as "better than National Ambient Air Quality Standards (NAAQS)" for total suspended particles (TSP) and sulfur dioxide (SO_2); and "cannot be classified as better than NAAQS" for carbon monoxide (CO), ozone (O_3), and nitrous oxide (NO) (AEHA 1988).

HAA is permitted under the Ga-DNR permit number 9711-025-6356-0, to operate nine boilers firing natural gas, or number 2 fuel oil and associated fuel storage tanks. Spray painting operations at the facility produce volatile organic compounds (VOC) emissions. It has not yet been determined if these emission exceeds the 100-ton/yr limit and are consequently, subject to regulation under DNR regulations Chapter 391-3-1-.02 (2)(y).

Small-scale industrial operations at HAA that may adversely affect air quality include cold-bath solvent cleaning, woodworking operations, painting and construction/renovation projects. No permits have been required for these operations. The Georgia DNR maintains and operates numerous ambient air quality monitoring stations throughout the state (AEHA 1988). Monitoring data for those stations in

proximity to HAA are presented in Appendix B. The population potentially affected within 4 miles is 182,016.

3.4 ON-SITE EXPOSURE

The potentially affected population for on-site exposure includes the effective population on HAA as well as persons living close to HAA. This population is estimated to be approximately 7500. Exposure could come from recreational use of the two lakes located on the Post, groundwater, VOC emission from solvent cleaning baths, woodworking operations, painting, and construction.

4. FIELD INVESTIGATIONS

Field investigations were not conducted as part of this preliminary site investigation. Data from previous investigations were used, however, where possible to aid in the assessment process.

5. SUMMARY

Hunter Army Airfield is located adjacent to the City of Savannah, Chatham County, Georgia. The Facility covers an area of 2185 hectares within the Southern Coastal Plain physiographic province. HAA is underlain by a moderately thick wedge of unconsolidated and semiconsolidated sediments that dip towards the coast. Sediments range in permeability from low to moderate and consist of a sandy surface layer over a subsoil which may be sandy, clayey, loamy or a combination thereof. Potentially affected targets include human, animal, and plant populations on or near the facility. The possible pathways for contamination are groundwater, surface water, soil and air. There are 24 potential sources that exist on HAA.

Twenty-four waste sites have been identified on the Facility. Of these sites, 22 occur in the cantonment area within 1-mile of each other. The remaining 2 sites occur in the outlying areas. The cantonment area sites include, USTs, above ground waste solvent and oil tanks, STP, vehicle washracks, pod system storage areas, and a drum storage yard. A sanitary landfill and a fire training pit occur in the outlying areas. Several of the waste sites were investigated and found to have leaking USTs. Site investigations were begun to assess the extent of contamination and determine what steps to take to remediate the areas. These sites include the base gas station (Building 133), the Tactical Equipment Shop and Refueling Station (Building 1343), and the Transportation Motor Pool (Building 710) and a Corrective Action Plan (CAP) has been developed for each. The fire training pit is also being evaluated to determine the extent of contamination due to waste fuel spillage. Further investigation and monitoring is needed at these sites to evaluate the environmental conditions in the areas.

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APPENDIX A

SI FORM

APPENDIX

SITE INSPECTION REPORT

Basic Information

Facility Name: Hunter Army Airfield

EPA ID# CERCLIS

City Savannah County Chatham State GA

Facility Commanding Officer
or Chief Executive Officer Major General Barry R. McCaffrey
Address: Headquarters, 24th Infantry Division (Mechanized) and Ft. Stewart
Ft. Stewart, Georgia 31314-5000
Phone # (606) 293-3911

Facility Environmental
Officer or Coordinator Tom Houston, Environmental Coordinator
Address:

Phone # (919) 767-2010

Facility Environmental
Command or Agency Contact same as above
Address:

Phone #

Facility Major Command or
Headquarters Contact
Address:

Phone #

Facility Primary Mission or Purpose:
Provide support facilities, conduct training opportunities and prepare to mobilize and deploy the 24th ID (m)

Secondary Mission or Purpose:

Hazardous Waste Types Generated
by Facility Operations:

Waste oil, solvents, fuels, empty pesticide containers

Other Hazardous Substances
Present on Facility:

CERCLA 103C
Submitted? (Date) _____

RCRA PART A
Submitted? (Date) _____

RCRA PART B
Submitted? (Date) _____

Additional Hazardous Waste Data (check where applicable):

_____ Generator	__X__ Small Quantity Generator	_____ Interim Status
_____ TSD Facility	_____ Corrective Action Order	_____ Violations

Other Permits: Public Water System # 2025 J 1239
Boiler Operation # 9711-025-6356-0
NPDES # GA0027588

RCRA Corrective Actions:

CERCLA Remedial Actions:

Environmental Information

Land Uses Within Facility Boundary:

____ Urban	____ Suburban	____ Agricultural	_X_ Recreational
_X_ Industrial	____ Commercial	_X_ Residential	____ Institutional

Potable Water System Serving Within the Facility Boundary:

Name: Principle Artesian Aquifer - 2 wells 1 & 2 BLDG 711, and 1205 are the only ones connected to the distribution system

Number of Connections: _____

Source Type: Groundwater _X_ Surface Water ____

____ Intake, _X_ Well, or ____ Well Field
Distance (feet) from Nearest Facility Boundary: _____

Land Uses With 4-Miles of Facility Boundary:

____ Intake, _X_ Well, or ____ Well Field
Distance (feet) from Nearest Facility Boundary: 3/4 mile (near Armstrong St. College)

All Municipal Systems Serving Groundwater Within 4 miles or Surface Water Within 15 miles of Facility Boundary:

Name: City of Savannah

Number of Connections: 65K

Source Type: Groundwater _X_ Surface Water ____

____ Intake, _X_ Well, or ____ Well Field
Distance (feet) from Nearest Facility Boundary: _____

Name: Chatcham County

Number of Connections: 1600

Source Type: Groundwater _X_ Surface Water ____

____ Intake _X_ Well, or ____ Well Field
Distance (feet) from Nearest Facility Boundary: _____

Number of Private Potable Groundwater Wells
Within 4 miles of Facility Boundary: ~152 permitted wells
~500 nonpermitted wells

Distance (feet) to Private Potable Groundwater Well Closest to Facility Boundary: _____

Number of Houses Served by Private Potable Groundwater Wells Within 4 miles of Facility Boundary: _____

Estimate Total Population Served by Groundwater Within 4 miles of Facility Boundary: _____

Estimate Total Population Served by Surface Water Within 15 miles of Facility Boundary: 0

Sensitive Environments on Facility:

X Wetlands	____ Critical Habitat or Area
____ Endangered or Threatened Species	X Fisheries
____ Commerical, Subsistance, or Recreational Fishing	____ National Monument or Park

Sensitive Environments Within 1-mile of Facility Boundary:

X Wetlands	____ Critical Habitat or Area
X Endangered or Threatened Species	X Fisheries
X Commerical, Subsistance, or Recreational Fishing	____ National Monument or Park

Sensitive Environments from 1 mile to 15 miles of Facility Boundary:

X Wetlands	X Critical Habitat or Area
X Endangered or Threatened Species	X Fisheries
X Commerical, Subsistance, or Recreational Fishing	X National Monument or Park

Facility on: _____ 10-year _____ 100-year _____ 500-year Floodplain

Distance (feet) to Nearest Off-Facility Residence: _____

Number of Workers Living on Facility: 4600

Number of Other Residents on Facility: 1208

Number of Workers Working on Facility: 7200

Describe the Facility Access Controls:

_____

_____

_____

_____

Geologic and Hydrogeologic Information

Local Bedrock Geophysical Features:

None Karst _____ Fractures _____ Solution Pits None Faults

Predominant Local Unsaturated Zone Soil Type:

X Sands X Silts X Clays

Local Average Depth (feet) to Water Table: _____

Local Aquifers in Descending Order:

Water Table Aquifer - Name Shallow Sand Aquifer
Depth (feet) Below Land Surface _____
Thickness (feet) _____

Aquifer - Name Principle Artesian Aquifer (Ocala)
Depth (feet) Below Land Surface _____
Thickness (feet) _____

Aquifer - Name _____
Depth (feet) Below Land Surface _____
Thickness (feet) _____

Aquifer - Name _____
Depth (feet) Below Land Surface _____
Thickness (feet) _____

Local Geologic Formations in Descending Order: From EPR '88 p. D-3

Unit Name Middle Miocene Hawthorn Formation
Depth (feet) Below Land Surface zero
Thickness (feet) _____

Unit Name Lower Miocene Tampa Limestone
Depth (feet) Below Land Surface _____
Thickness (feet) 0-600 feet

Unit Name Undifferentiated Limestone of Oligocene Age
Depth (feet) Below Land Surface _____
Thickness (feet) _____

Unit Name Upper Eocene Ocala Limestone (most production zone of the aquifer)
Depth (feet) Below Land Surface _____
Thickness (feet) 0-155

Water Use Survey for Individual Residences

Name and address of resident(s)

_____

_____

_____

(_____)_____

Check water source(s) used by resident(s)

1. Drilled well _____ depth (feet) _____ water level (feet) _____
2. Dug well _____ depth (feet) _____ water level (feet) _____
3. Spring _____ Artesian _____ Gravity _____
4. Surface Water _____ _____
5. Public Supply _____ _____
6. Other _____ _____

Check water use(s) and specify water source of each

Drinking _____ Number of users _____ Source _____

Household _____ Number of users _____ Source _____

Irrigation _____ acres _____ crop _____ Source _____

Other _____

Any problems with water? _____

_____

How long have sources been is use? _____

Any monitoring wells on property? _____

Prepared by _____ Date _____

Comments: _____

APPENDIX B

ANALYTICAL RESULTS

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF
HSHB-ME-WR (40)

14 JAN 1991

MEMORANDUM FOR Commander in Chief, FORSCOM, ATTN: FCEN-RDO, Fort McPherson, GA 30330-6000

SUBJECT: Results of Synthetic Organic Chemicals Survey for Hunter Army Airfield

1. References:

a. Letter, USAEHA, HSHB-ME-WR, 25 February 1987, subject: Synthetic Organic Chemicals Survey (SOCS).

b. Memorandum, USAEHA, HSHB-ME-WR, 24 August 1990, Drinking Water Surveillance Program.

c. Title 40, Code of Federal Regulations (CFR) 141, National Drinking Water Regulations, 1990.

d. The Installation Restoration Program Toxicology Guide, Volume 1, Biomedical & Environmental Information Analysis, Oak Ridge Tennessee, July 1989.

2. Background. The SOCS was initiated in 1987 (reference 1a) under a tasking from the Office of The Surgeon General (OTSG), with the concurrence of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). The primary purpose of the survey is to obtain an organic pollutant scan for all Army owned or operated drinking water wells, in order to determine the nature and magnitude of any local aquifer contamination caused by past practices. The SOCS is not a part of the Drinking Water Surveillance Program (DWSP). Your installation should be making arrangements to have organic monitoring performed for regulatory compliance, as discussed in reference 1b.

3. Results. Enclosed are the results of the SOCS analyses which were performed on water samples collected from the drinking water wells at Hunter Army Airfield. Summarized in Table 1 are the organic categories analyzed during the initial and confirmatory sampling phases. Presented in enclosure 1 is a list of all SOCS analyzed and their detection limits. A list of significant contaminants detected during the initial and confirmatory sampling is presented in Table 2. Other contaminants detected are listed in enclosure 2. All values are in micrograms per liter (ug/L).

TABLE 1. Wells Sampled.

Well No.	Pesticide I	Pesticide C	Herbicide I	Herbicide C	VOCs I	VOCs C	SVOCs I	SVOCs C	Explosives I	Explosives C
1 - 8	X		X		X	X	X	X	X	X

I - Initial sample, April 1988.
C - Confirmatory sample, July 1990.
VOC - Volatile Organic Compounds
SVOC - Semivolatile Organic Compounds

TABLE 2. Significant Synthetic Organic Chemicals Detected, ug/L.

Well No.	Chemical	Initial	Confirm
1	Dichloromethane	BDL	0.9B
2	Dichloromethane	0.69B	BDL
5	Chloroform	8.93	BDL
	Bromodichloromethane	5.35	BDL
	Dibromochloromethane	3.05	BDL
	Bromoform	0.57	BDL
7	Dichloromethane	0.68B	BDL
8	Chloroform	7.75	BDL
	Bromodichloromethane	5.75	BDL
	Dibromochloromethane	4.46	BDL
	Bromoform	0.93	BDL
	Propazine	0.235	BDL

B - compound found in blank sample.
BDL - below detection limit of 0.5 ug/L.

4. Water Systems. Wells No. 1 and 2 serve as the primary source of potable water supply for the cantonment area of Hunter Army Airfield. The water supply system is regulated as a community water supply (system which serve year-round at least 15 service connections or 25 residents). A separate water system using well No. 4A serves the Air National Guard which is regulated as a non-transient non-community water system (NTNCWS) (system which serves the same 25 or more people at least 6 months of the year). All other wells provide water to Individual water systems which support recreational areas and are regulated as noncommunity water supplies.

5. Regulatory Standards. The following health-based Maximum Contaminant Levels (MCLs) for drinking water have been established or proposed under the National Primary Drinking Water Regulations for the organic chemicals detected.

a. The United States Environmental Protection Agency (EPA) has proposed a MCL for dichloromethane (methylene chloride) of 5 ug/L. These MCLs also apply to all community water systems and NTNCWS.

b. Chloroform, chlorodibromomethane, bromoform, and bromochloromethane are regulated as part of the total trihalomethanes (TTHMs). The sum of the four regulated TTHMs must not exceed the EPA primary MCL of 100 ug/L. This MCL is applicable only to community water systems which serve populations greater than 10,000 and use a disinfectant to treat the water.

c. The EPA has not established regulatory standards for propazine, a herbicide used for controlling annual weeds and grasses in sorghum. However, a lifetime health advisory level (HAL) of 10 ug/L has been established. A HAL represents a recommended maximum concentration of a contaminant in water that may safely be consumed over an average human lifetime.

6. Discussion and Conclusions. Regulated contaminants (see Table 2) were found in five of the eight wells sampled. However, all of these contaminants were below the current or proposed MCLs.

a. Dichloromethane (methylene chloride) was found in the initial sampling of wells No. 2 and No. 8 at levels well below the proposed MCL. This contaminate was also found in the initial sampling blank at level above the detection limit. Confirmation testing did not identify dichloromethane as a contaminate. Therefore, dichloromethane is probably a laboratory contaminate and is of little concern.

b. Low levels of all four regulated TTHMs were detected in wells No. 5 and No. 8 in the initial sampling. No TTHMs were detected in the confirmatory sampling. The SOCS samples were collected at the wellhead, before any treatment occurred. Usually, the maximum concentration of TTHMs occurs after chlorination, when the chlorine disinfectant combines with naturally occurring organic compounds in the water. TTHM concentration in the water at the point of consumption may be much higher than levels measured by SOCS. The TTHM regulations do not apply to the Hunter Army Airfield water system, but high levels of TTHMs are a health concern. The EPA is considering reducing the TTHM standard to 25 - 50 ug/L.

c. The pesticide propazine was detected during the initial sampling of well No. 8 at a level slightly above the detection level and well below the HAL. This pesticide was not identified in the confirmatory sampling. This chemical does not represent a problem at this time.

d. Low level organics (unregulated) and unknowns are often introduced into samples during sampling, storage and analytical procedures. A number of unknown and unknown aliphatic hydrocarbon compounds were detected in the confirmatory samples and in the blank samples but were not detected in the initial samples. These compounds are not considered significant at this time. The identified compounds which were not found in the blank sample are listed in enclosure 2. All of these compounds are solvents and don't pose a significant health risk at measured concentrations. These contaminates are not considered significant at this time. If any are detected during future sampling, further investigation maybe warranted.

7. It is possible that the results of this survey may be used to meet a phase of the EPA monitoring requirements for organic chemicals. The SOCS used EPA Method 524.2 for VOCs analysis. However, SOCS samples were taken at the wellhead (before any treatment), not at the point where the water enters the distribution system. Maximum levels of organics should occur at the wellhead, except for TTHMs (bromoform, chloroform, bromodichloromethane, and chlorodibromomethane). Your State or Federal regulatory authority will have to decide if the SOCS results are acceptable to fulfill the requirements.

8. All known sources of ground water which could be used to supply drinking water at your installation were tested. If any sources were not included in the survey, or are brought on line in the future, please contact this Agency to make arrangements for analyses.

9. Recommendation. Analyze for TTHM at points of consumption which provide maximum residence time in each of the systems to determine if the TTHM concentration increases significantly after chlorination. If TTHMs exceed the standard investigate remedial actions.

10. The point of contact is CPT David Jones or 2LT Paul Rawlins, this Agency, DSN 584-3816/3554.

FOR THE COMMANDER:

Robert S. Ryczak

2 Encls

ROBERT S. RYCZAK
MAJ, MS
Chief, Water Quality Engineering Division

HSHB-ME-WR
SUBJECT: Results of Synthetic Organic Chemicals Survey for Hunter Army Airfield

CF:
HQDA(SGPS-PSP) (wo/encl)
HQDA(ENVR-E) (wo/encl)
DA, USAEHSC, ATTN: CEHSC-F (wo/encl)
CINC, FORSCOM, ATTN: FCMD-PC (4 cys)(w/encl)
CDR, HSC, ATTN: HSCL-P (wo/encl)
CDR, Hunter Army AIrfield, ATTN: DEH (2 cys) (w/encl)
CDR, MEDDAC, Ft. Stewart, ATTN: PVNTMED Svc (wo/encl)
CDR, DDEAMC, ATTN: PVNTMED Svc (2 cys) (wo/encl)
CDR, USATHAMA, ATTN: CETHA-TE-E (w/encl)
CDR, USATHAMA, ATTN: CETHA-RM(TIC) (2 cys) (w/encl)
CDR, USAEHA-S (wo/encl)

HSHB-ME-WR
SUBJECT: Results of Synthetic Organic Chemicals Survey for Hunter Army Airfield

SYNTHETIC ORGANIC CHEMICAL SURVEY
Organic Chemicals Analyzed

TABLE 1. Volatile Organic Chemicals (ug/L).*

CHEMICAL	DL	CHEMICAL	DL
Dichlorodifluoromethane	0.50	Chloromethane	0.50
Vinyl Chloride	0.50	Bromomethane	0.50
Chloroethane	0.50	Trichlorofluoromethane	0.50
1,1-Dichloroethene	0.50	Methylene Chloride	0.50
trans-1,2-Dichloroethene	0.50	1,1-Dichloroethane	0.50
2,2-Dichloropropane	0.50	cis-1,2-Dichloroethene	0.50
Chloroform	0.50	Bromochloromethane	0.50
1,1,1-Trichloroethane	0.50	Carbon Tetrachloride	0.50
1,1-Dichloropropene	0.50	Benzene	0.50
1,2-Dichloroethane	0.50	Trichloroethene	0.50
1,2-Dichloropropane	0.50	Bromodichloromethane	0.50
Dibromomethane	0.50	Toluene	0.50
1,1,2-Trichloroethane	0.50	Tetrachloroethene	0.50
1,3-Dichloropropane	0.50	Dibromochloromethane	0.50
1,2-Dibromoethane	0.50	Chlorobenzene	0.50
1,1,1,2-Tetrachloroethane	0.50	Ethylbenzene	0.50
Total Xylene	0.50	Styrene	0.50
Bromoform	0.50	Isopropylbenzene	0.50
1,1,2,2-Tetrachloroethane	0.50	Bromobenzene	0.50
1,2,3-Trichloropropane	0.50	n-Propylbenzene	0.50
2-Chlorotoluene	0.50	1,3,5-Trimethylbenzene	0.50
4-Chlorotoluene	0.50	tert-Butylbenzene	0.50
1,2,4-Trimethylbenzene	0.50	sec-Butylbenzene	0.50
p-Isopropyltoluene	0.50	1,3-Dichlorobenzene	0.50
1,4-Dichlorobenzene	0.50	n-Butylbenzene	0.50
Naphthalene	0.50	1,2,3-Trichlorobenzene	0.50
1,2,4-Trichlorobenzene	0.50	Hexachlorobutadiene	0.50
1,2-Dichlorobenzene	0.50	1,2-Dibromo-3chloropropane	0.50
--Military Specific			
trans-1,3-Dichloropropene	0.50	cis-1,3-Dichloropropene	0.50
2-Chloroethylvinyl ether	0.50	1,4-Dithiane	0.50

DL - Detection Limit
* - EPA Method 524.2 was used for analyses.

ENC! !

HSHB-ME-WR
SUBJECT: Results of Synthetic Organic Chemiclas Survey for Hunter Army Airfield

TABLE 2. Semi-Volatile Organic Chemicals (ug/L).

CHEMICAL	DL1988	DL1990	CHEMICAL	DL1988	DL1990
2-Chlorophenol	10.	10.	Phenol	10.	10.
2-Nitrophenol	10.	10.	2,4-Dimethylphenol	10.	10.
2,4-Dichlorophenol	10.	10.	4-Chloro-3-methylphenol	10.	10.
2,4,6-Trichlorophenol	10.	10.	2,4-Dinitrophenol	25.	25.
4-Nitrophenol	25.	25.	2-Methyl-4,6-dinitrophenol	25.	25.
Pentachlorophenol	25.	50.	N-Nitrosodimethylamine	10.	10.
bis(-2-Chloroethyl)ether	10.	10.	1,3-Dichlorobenzene	10.	10.
1,4-Dichlorobenzene	10.	10.	1,2-Dichlorobenzene	10.	10.
bis(2-Chloroisopropyl)ether	10.	10.	Hexachloroethane	10.	10.
N-Nitroso-Di-n-propylamine	10.	10.	Nitrobenzene	10.	10.
Isophorone	10.	10.	bis(-2-Chloroethoxy)methane	10.	10.
1,2,4-Trichlorobenzene	10.	10.	Naphthalene	10.	10.
Hexachlorobutadiene	10.	10.	Hexachlorocyclopentadiene	10.	10.
2-Chloronaphthalene	10.	10.	Acenaphthylene	10.	10.
Dimethyl phthalate	10.	10.	2,6-Dinitrotoluene	10.	10.
Acenaphthene	10.	10.	2,4-Dinitrotoluene	10.	10.
Fluorene	10.	10.	4-Chlorophenyl-phenylether	10.	10
Diethylphthalate	10.	10.	1,2-Diphenylhydrazine	10.	10.
N-Nitrosodiphenylamine +	10.	10.	4-Bromophenyl-phenylether	10.	10.
Hexachlorobenzene	10.	10.	Phenanthrene	10.	10.
Anthracene	10.	10.	di-n-Butylphthalate	10.	10.
Fluoranthene	10.	10.	Pyrene	10.	10.
Benzidine	25.	25.	Butylbenzylphthalate	10.	10.
Benzo(a)anthracene	10.	10.	Chrysene	10.	10.
3,3'-Dichlorobenzidine	25.	25.	bis(2-Ethylhexyl)phthalate	10.	10.
di-n-octyl Phthalate	10.	10.	Benzo(b)fluoranthene	10.	10.
Benzo(K)fluoranthene	10.	10.	Benzo(a)pyrene	10.	10.
Indeno(1,2,3-cd)pyrene	10.	10.	Dibenz(a,h)anthracene	10.	10.
Benzo(g,h,i)perylene	10.	10.			
---Military Specific SVOC					
2,3-Dinitrotoluene	10.	10.	2,5-Dinitrotoluene	10.	10.
3,4-Dinitrotoluene	10.	10.	3,5-Dinitrotoluene	10.	10.
1,3,5-Trinitrobenzene	10.	10.	Diphenylamine	10.	10.
Di-Isopropyl-methylphosphonate	10.	10.			

DL1987 - Detection Limit 1988
DL1989 - Detection Limit 1990
* - EPA Method 8270 was used for analysis.
+ - Cannot be separated from Diphenylamine.

HSHB-ME-WR
SUBJECT: Results of Synthetic Organic Chemicals Survey for Hunter Army Airfield

TABLE 3. Pesticides and PCBs (ug/L).

CHEMICAL	DL 1988*	DL 1990**	CHEMICAL	DL 1988*	DL 1990**
Heptachlor	0.05	0.06	Aldrin	0.05	0.16
Heptachlor epoxide	0.05	0.16	Dieldrin	0.05	0.24
Endrin	0.05	0.04	Methoxychlor	0.05	1.6
PCB (Aroclor 1016)	5.	0.8	PCB (Aroclor 1221)	5.	0.8
PCB (Aroclor 1232)	5.	0.8	PCB (Aroclor 1242)	5.	0.8
PCB (Aroclor 1248)	5.	0.8	PCB (Aroclor 1254)	5.	0.8
PCB (Aroclor 1260)	5.	0.8	alpha-BHC	0.05	0.2
Beta-BHC	0.05	0.2	delta-BHC	0.05	0.2
DDD	0.05		DDE	0.05	
DDT	0.05		Chlordane	0.5	1.2
Endrin Aldehyde	0.5	0.6	Lindane	0.05	0.08
Endosulfan I	0.05	0.6	Endosulfan II	0.05	0.6
Endosulfan Cyclic Sulfate	0.2	0.6	Toxaphene	5.	1.6
Atrazine	0.20	0.2	Propazine	0.20	0.2
Simazine	0.20	0.2	Alachlor	0.8	0.8
Hexachlorobenzene		0.8	O,P'-DDD		0.4
P,P'-DDD		0.4	O,P'-DDE		0.4
P,P'-DDE		0.4	O,P'-DDT		0.6
P,P'-DDT		0.6	cis-Chlordane		0.16
trans-Chlordane		0.16	Oxychlordane		0.16
Mirex		0.04	Diazinon		0.10
Methyl Parathion		0.6	Parathion		0.4
Malathion		1.6	Chlorpyrifos (Dursban)		0.24
Ronnel		0.2			

DL - Detection Limit
* - EPA Methods 608 was used for analyses.
** - EPA Methods 505, 507, and 508 were used for analyses.

TABLE 4. Herbicides (ug/L).*+

CHEMICAL	DL 1988
2,4-D	1.0
2,4,5-TP (Silvex)	0.50
2,4,5-T	0.50

DL - Detection Limit
* AEHA/OECD/PAB SOP #16.2 was used for analysis.
+ Acid equivalent.

TABLE 5. Explosives (ug/L).

CHEMICAL	DL
HMX	100
RDX	30
Tetryl	5
2,4,6-Trinitrotoluene	1
2,6-Dinitrotoluene	1
2,4-Dinitrotoluene	1

DL - Detection Limit 1988 and 1990

HSHB-ME-WR
SUBJECT: Results of Synthetic Organic Chemicals Survey for Hunter Army Airfield

OTHER SYNTHETIC ORGANIC CHEMICALS
(ug/L)

	WELL NO.			
CONTAMINATE	4	5	6	11
3-Methylpentane*				1.4
Methylcyclopentane*				1.2
1,13 - Tetradecadiene**	30J	40J	16J	10J

* - Initial sampling
** - Confirmatory Sampling
J - Estimated value.
B - Contaminate was also found in the blank sample.
Detection limit for all contaminates was 0.50 ug/L.

Landfill Data

HUNTER AAF

SCALE: 1" = 800'

DATE: 22 July 80

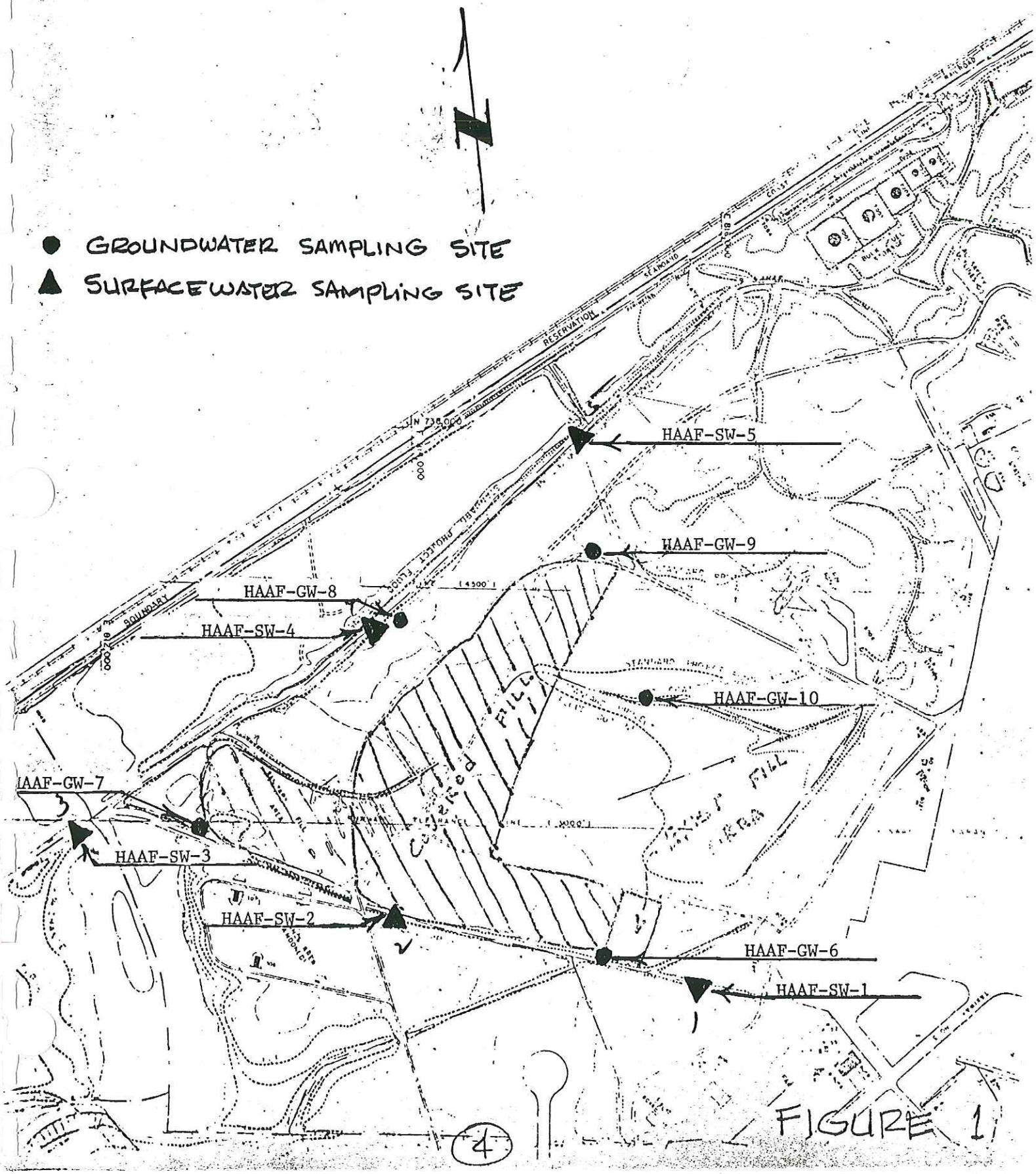

FIGURE 1

SAMPLE DATA SHEET

Groundwater Samples
Project Identification at Hunter AAF, Ga.
Location of Sample HAAF-GW-6
Date of Sample 1/14/81
Time of Sample 5:15 PM
Date of Analyses 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	2.2
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.32
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	< 0.01
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	2.0
Gross Beta (pCi/l)	2.6
Turbidity (NTU)	24
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	6
Copper	< 0.01
Foaming Agents (MBAS)	0.01
Hydrogen Sulfide	< 0.05
Iron	0.1
Manganese	0.02
Sulfate	4
TDS	224
Zinc	< 0.01
Color (apparent) units	14
Corrosivity	non-corrosive
Odor (TON)	4
pH (units)	6.7
BOD_5	2.5
SS	2.1
DS	224

SAMPLE DATA SHEET

Groundwater Samples
Project Identification at Hunter AAF, Ga.
Location of Sample HAAF-GW-6
Date of Sample 1/15/81
Time of Sample 4:30 PM
Date of Analyses 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	2.7
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.38
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	< 0.01
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.6
Gross Beta (pCi/l)	0.1

Turbidity (NTU)	12
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	7
Copper	< 0.01
Foaming Agents (MBAS)	0.02
Hydrogen Sulfide	< 0.05
Iron	0.2
Manganese	0.02
Sulfate	5
TDS	234
Zinc	0.01
Color (apparent) units	12
Corrosivity	non-corrosive
Odor (TON)	< 1
pH (units)	6.7
BOD_5	1.5
SS	0.9
DS	234

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-6
Date of Sample: 1/16/81
Time of Sample: 4:20 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	2.1
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.45
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.02
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.9
Gross Beta (pCi/l)	0.8

Turbidity (NTU)	14
Fecal Coliform Bacteria (colonies/100 mls)	2
Chloride	7
Copper	0.01
Foaming Agents (MBAS)	0.02
Hydrogen Sulfide	0.1
Iron	0.1
Manganese	0.02
Sulfate	4
TDS	214
Zinc	0.01
Color (apparent) units	9
Corrosivity	non-corrosive
Odor (TON)	6
pH (units)	6.8
BOD_5	2.1
SS	1.9
DS	214

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-7
Date of Sample: 1/14/81
Time of Sample: 2:40 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	1.0
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.50
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.02
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.2
Gross Beta (pCi/l)	0.5

Turbidity (NTU)	10
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	9
Copper	< 0.01
Foaming Agents (MBAS)	0.02
Hydrogen Sulfide	0.5
Iron	1.6
Manganese	0.02
Sulfate	3
TDS	122
Zinc	< 0.01
Color (apparent) units	9
Corrosivity	non-corrosiv
Odor (TON)	28
pH (units)	6.6
BOD_5	4.1
SS	1.8
DS	122

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-7
Date of Sample: 1/15/81
Time of Sample: 1:50 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	0.9
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.52
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.02
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.2
Gross Beta (pCi/l)	0.9

Turbidity (NTU)	7
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	8
Copper	< 0.01
Foaming Agents (MBAS)	0.02
Hydrogen Sulfide	0.7
Iron	2.1
Manganese	0.03
Sulfate	5
TDS	143
Zinc	< 0.01
Color (apparent) units	11
Corrosivity	non-corrosive
Odor (TON)	37
pH (units)	6.8
BOD_5	7.9
SS	2.7
DS	143

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-7
Date of Sample: 1/16/81
Time of Sample: 2:00 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	0.9
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.45
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.02
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.2
Gross Beta (pCi/l)	0.3

Turbidity (NTU)	6
Fecal Coliform Bacteria (colonies/100 mls)	1
Chloride	7
Copper	< 0.01
Foaming Agents (MBAS)	0.05
Hydrogen Sulfide	0.9
Iron	2.7
Manganese	0.03
Sulfate	5
TDS	157
Zinc	0.01
Color (apparent) units	7
Corrosivity	non-corrosive
Odor (TON)	25
pH (units)	6.7
BOD_5	7.2
SS	2.2
DS	157

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-8
Date of Sample: 1/14/81
Time of Sample: 2:00 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	0.9
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.69
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.018
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.8
Gross Beta (pCi/l)	1.8

Turbidity (NTU)	21
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	12
Copper	< 0.01
Foaming Agents (MBAS)	< 0.01
Hydrogen Sulfide	< 0.05
Iron	0.6
Manganese	0.01
Sulfate	6
TDS	222
Zinc	< 0.01
Color (apparent) units	18
Corrosivity	non-corrosive
Odor (TON)	< 1
pH (units)	6.8
BOD_5	2.1
SS	1.2
DS	222

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-8
Date of Sample: 1/15/81
Time of Sample: 1:15 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	0.7
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.72
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.015
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	1.7
Gross Beta (pCi/l)	< 0.1

Turbidity (NTU)	14
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	13
Copper	< 0.01
Foaming Agents (MBAS)	< 0.01
Hydrogen Sulfide	< 0.05
Iron	0.5
Manganese	0.01
Sulfate	5
TDS	232
Zinc	< 0.01
Color (apparent) units	14
Corrosivity	non-corrosive
Odor (TON)	< 1
pH (units)	6.9
BOD_5	1.4
SS	1.7
DS	232

SAMPLE DATA SHEET

Project Identification: Groundwater Samples at Hunter AAF, Ga.
Location of Sample: HAAF-GW-8
Date of Sample: 1/16/81
Time of Sample: 1:00 PM
Date of Analyses: 1/14/81-2/3/81

All values are expressed as mg/l unless otherwise specified.

Parameter	
Arsenic	< 0.001
Barium	0.7
Cadmium	< 0.001
Chromium (VI)	< 0.005
Fluoride	0.62
Lead	< 0.01
Mercury	< 0.0005
Nitrate (as N)	0.01
Selenium	< 0.002
Silver	< 0.001
Endrin	< 0.0001
Lindane	< 0.0001
Methoxychlor	< 0.001
Toxaphene	< 0.001
2, 4-D	< 0.01
2, 4, 5- TP Silvex	< 0.001
Radium 226 (pCi/l)	
Radium 228 (pCi/l)	
Gross Alpha (pCi/l)	0.5
Gross Beta (pCi/l)	2.9

Turbidity (NTU)	7
Fecal Coliform Bacteria (colonies/100 mls)	0
Chloride	10
Copper	0.01
Foaming Agents (MBAS)	< 0.01
Hydrogen Sulfide	< 0.05
Iron	0.4
Manganese	0.01
Sulfate	5
TDS	206
Zinc	< 0.01
Color (apparent) units	10
Corrosivity	non-corrosive
Odor (TON)	< 1
pH (units)	6.8
BOD_5	1.7
SS	2.9
DS	206