

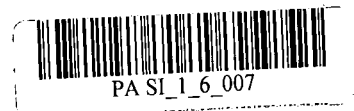
**Proposed**

**Decision Document**

**Multiple Sites**

**Fort Riley, Kansas**

**January 1998**



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## ACRONYM LIST

CD	Construction/Debris
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
1,1-DDD	1,1-Dichloro-2,2-bis(p-chlorophenyl)ethane
1,2-DCE	1,2-Dichloroethylene
4,4'-DDE	4,4'-Dichlorodiphenyldichloroethane
4,4'-DDT	4,4'-Dichlorodiphenyltrichloroethane
DRMO	Defense Reutilization and Marketing Office
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FID	Flame Ionization Detector
IAG	Interagency Agreement
IWSA	Draft Final Installation Wide Site Assessment
KDHE	Kansas Department of Health and Environment
KPL	Kansas Power & Light
KSWQS	Kansas Surface Water Quality Standards
MCL	Maximum Contaminant Levels (established by EPA under the Safe Drinking Water Act)
MPRC	Multi-purpose Range Complex
NCP	National Contingency Plan
NPL	National Priorities List
OSWER	U.S. EPA Office of Solid Waste and Emergency Response
PAOC	Potential Area of Concern
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethylene or Perchloroethylene
POL	Petroleum, Oil, and Lubricants
PP	Priority Pollutant
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SSLs	Soil Screening Levels
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
TPH-DRO	Total Petroleum Hydrocarbon - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbon - Gasoline Range Organics
USAEHA	United States Army Environmental Hygiene Agency
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WWTPs	Wastewater Treatment Plants

## ACRONYM LIST - con't

### Units of measure for chemical analyses:

mg/kg	milligrams per kilogram (approximately equivalent to parts per million)
mg/l	milligrams per liter (approximately equivalent to parts per million)
$\mu\text{g}/\text{kg}$	micrograms per kilogram (approximately equivalent to parts per billion)
$\mu\text{g}/\text{l}$	micrograms per liter (approximately equivalent to parts per billion)

### Abbreviations found on data tables:

NA	Not Analyzed
NAv	Not Available
NAp	Not Applicable
ND	Not Detected
NM	Not Measured
NS	Not Sampled

**Proposed**

**DECISION DOCUMENT**

**FOR MULTIPLE SITES AT FORT RILEY, KANSAS**

This Decision Document addresses numerous sites where hazardous substances could have been released or come to be located. These sites have been evaluated and determinations made as to their impact on human health and the environment. The sites addressed have been determined to warrant No Action, No Further Action or are being addressed under existing regulatory programs. Information concerning environmental investigations and findings will be included in the Fort Riley Master Plan Environmental Overlay (MPEO) (under development) and its supporting Geographic Information System (GIS) database for consideration in future land use management actions.

This Decision Document describes the rationale for the site disposition decisions under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) at multiple sites at Fort Riley, Kansas, evaluated in accordance with CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA), the National Contingency Plan (NCP), and Resource Conservation and Recovery Act (RCRA), as applicable.

This Decision Document was developed by the Department of the Army, Fort Riley, Kansas. The U.S. Environmental Protection Agency (EPA) Region VII and Kansas Department of Environment (KDHE) concur with the decisions for these sites.

Fort Riley has been an active U.S. Army installation since 1853. Environmental investigations and sampling events performed at Fort Riley in the 1970s and 1980s, identified activities and facilities where hazardous substances had been released or had the potential to be released to the environment.

On 14 July 1989, the United States Environmental Protection Agency (EPA) proposed inclusion of Fort Riley on the National Priorities List (NPL), and listed the installation on the NPL as of October 1, 1990, pursuant to CERCLA. The Army and Fort Riley entered into a Federal Facility Agreement (FFA) (also referred to as the Interagency Agreement [IAG]) with the Kansas Department of Health and Environment (KDHE) and EPA Region VII to address environmental pollution subject to CERCLA and/or RCRA. The IAG, which became effective in June 1991, required Fort Riley to conduct a systematic site assessment to identify all potential areas of concern (PAOCs) at Fort Riley. The systematic site assessment was performed in 1992 with the results presented in the Installation Wide Site Assessment (IWSA) (Ref. 1). The IWSA identified 24 groupings of PAOCs consisting of over 45 individual PAOCs.

The sites addressed in this Decision Document fall into three categories: those not warranting investigation, those which are being addressed under other regulatory programs, and those warranting No Action or No Further Action following investigations or Removal Actions.

As a result of the IWSA, numerous sites were determined to not have the potential to pose a risk to human health or the environment and, therefore, not warrant site investigations. These sites or site groupings were:

- Former Fire Training Area - Camp Funston
- Multi-purpose Range Complex (MPRC)

- Pistol Range - Marshall Army Airfield (MAAF)
- Soils Moved from Small Arms Ranges
- Construction/Demolition Debris Landfill - Custer Hill
- Commissary Landfill - Main Post
- Disposal of Trash and Demolition - Milford Recreation Center
- Central Wash Facility
- Former Oil Testing Laboratory
- Mercury Use Sites
- Radioactive Storage Facilities
- Petroleum, Oil, and Lubricant (POL) Facilities (Tactical Equipment and Maintenance Shops, Former Gasoline Stations/ Garages, Former Fuel Facilities)

The PAOCs being addressed under other existing regulatory programs are the Custer Hill Sanitary Landfill and the Wastewater Treatment Plants (WWTPs) and Sludge Drying Beds (Former Camp Funston, Camp Forsyth, Main Post, Custer Hill).

Investigations of the remaining sites were performed under the general designation of "Multiple Site Investigations" and divided into three projects for phased execution. These projects are designated as the Sensitive-Receptor Lead Sites, High-Priority Sites, and "Other Sites" Site Investigations. While most of the sites investigated in these projects are addressed by this Decision Document, a few are being investigated and considered further.

The Site Investigation (SI) for the Sensitive-Receptor Lead Sites was initiated in June 1993. These sites were identified and evaluated based on a potential for lead contamination in shallow soils in areas readily accessible to the public. The Sensitive-Receptor Lead Sites project was later incorporated into the High Priority Sites project. The High Priority sites were identified as having the potential to pose a more immediate risk to human health and the environment than other sites, or there was a desire by Fort Riley to collect environmental information at an earlier stage for these sites due to other planned activities. The High Priority Sites SI was initiated in September 1993 and the results were reported in the SI Report for High Priority Sites (Ref. 2). The remaining sites, referred to as the "Other Sites", were examined in an SI initiated in March 1994 and the results were reported in the SI Report for Other Sites (Ref. 3). The SI reports provide detailed information about the site history, and the scope and results of the investigations.

Decisions have been made that No Action or No Further Action is warranted, or that issues are being addressed under existing regulatory programs for the following sites:

- Sensitive-Receptor Lead Sites
- Custer Hill Wastewater Ponds
- Former Furniture Repair Shops
- Camp Forsyth Landfills Areas 1, 2, 3, 4, and 5
- Print and Publications Shop
- Former Livestock Dipping Facility
- Former Furniture Repair and Small Arms Shop
- Whitside Former Incinerator
- Defense Reutilization and Marketing Office (DRMO) Area 2 and Area 3
- Former Milford Lake Recreation Area
- Custer Hill Golf Course Pesticide Storage Facility
- Former Electrical Substations
- Former Camp Whitside and Construction/Debris Landfills

Information concerning environmental investigations and findings will be included in the Fort Riley Master Plan Environmental Overlay (MPEO) (under development) and its supporting Geographic Information System (GIS) database for consideration in future land use management actions. The Master Plan includes the delineation of land use zones. The MPEO will identify all sites, including those which are not currently being used.

A general location map of Fort Riley is provided at Figure 1. All of these sites are located in the various cantonment areas in the southeastern portion of Fort Riley (Figure 2), except for the Former Milford Lake Recreation Area, which is along the western boundary (Figure 3). Figures 4 through 7 identify the sites in the Main Post, Camp Funston, Camp Forsyth, and Camp Whitside cantonment areas. Figure 2 also identifies the locations of residential housing areas on-post and of adjacent communities.

### Decision-Making Process

In lieu of conducting a full detailed risk assessment for each of these sites, decisions were made based on knowledge of the site setting, the potential routes of exposures and migration, the probable durations of exposures, the levels of contamination, if any, and the toxicity of the contaminants found at each site. Data gathered during the site investigations have been compared against regulatory standards, risk-based guidelines, and federal and state agency guidelines or screening levels for groundwater and soil contamination, where available, as a means to assess the impact of the contamination levels.

The investigation of each site considered the site conditions, the most likely routes of exposure, characterization of contamination away from a site, and other existing information about each site. Both screening (grab samples and/or field analysis) and definitive (quality-controlled sampling and laboratory analysis) sampling and analysis techniques were used. For many sites, soil gas surveys and groundwater screening were used to provide preliminary data on the potential extent of contamination. If levels exceeded established threshold levels, soil sampling was then accomplished.

Results of soil gas samples and groundwater screening samples were compared to threshold levels of 10 or 20  $\mu\text{g/l}$  (depending on the chemicals being considered). These were established as guidance levels above the reporting limits (detection limits) to determine whether further investigation was necessary.

The guidelines used for evaluation of groundwater contamination were the federal regulatory standards for drinking water, the EPA's Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act (Ref. 4). These are the permissible levels of contaminants that can be present in water provided in public water systems (i.e., concentrations at the tap). The Kansas Surface Water Quality Standards (KSWQS) (Ref. 5) were also considered. The KSWQSs, established for public health and domestic water supply, are equal to the MCLs for most compounds detected in these investigations. Surface waters are defined under the Kansas regulation to include the alluvial aquifer associated with the surface water.

The guidelines used for evaluation of soil contamination were generally the risk-based guidelines developed by EPA Regions III and IX (Refs. 6 and 7). These guidelines allow for evaluation of the concentrations of hazardous substances detected at a site relative to those likely to present an unacceptable health hazard under specific exposure conditions. The guidelines from Regions III and IX distinguish between residential and commercial/industrial sites when evaluating



risks associated with soil contamination. Most of the sites addressed in this document are not currently used for residential purposes, nor likely to be used for residential purposes in the future. Risk-based values from both Regions III and IX, based on commercial/industrial sites, were used to evaluate results of the soil sampling and provide a range of values to compare the levels of soil contamination. Soil that contains contamination at concentrations that are less than the risk-based value is considered to present an acceptable risk hazard under specific assumed exposure conditions.

In addition, site-specific removal action goals identified for specific constituents (i.e., pesticides) at other sites investigated at Fort Riley have been used for comparison where appropriate. The EPA screening level for lead (Ref. 8) in residential settings was also considered. These levels are not cleanup levels, but may be used to determine which sites do not require further study. The EPA Region III Soil Screening Levels (SSLs) (Ref. 6) were also considered for arsenic and beryllium. These SSLs provide reasonable maximum estimates of transfers of contaminants from soil to groundwater which would be protective of groundwater quality for residential exposure.

The standards and guidelines considered are summarized in Table 1 for the analytes detected at these sites. A principal reason for the wide range for the values for Region III and IX are the different assumptions and exposure scenarios used in developing the values. Region IX assumes exposure by soil ingestion, skin contact, and inhalation of volatiles and fugitive dusts while Region III assumes only soil ingestion. Both Regions assume occupational exposure of 250 days per year for 25 years. These are quite conservative assumptions for these sites at Fort Riley since many of the sites are no longer operational or are in remote areas such that exposure is expected to be limited to brief, infrequent periods.

For each analyte in Table 1, the standard or guideline that was used for comparison of the detected contaminants is shown in bold. The comparison values are conservatively *either* the lowest values available, or the most representative for the analyte, media, and exposure route.

Attached to this document is site-specific information for each of the sites listed above where site investigations were performed. This information provides a description of the site, the principal exposure routes of concern, results of the investigations, a summary of the potential risk at each site, and, if applicable, a summary of remedial alternatives. The sampling locations are shown on each site-specific figure. The figures also include a summary tables of positive detections compared to the applicable standards and guidelines.

## **PUBLIC/COMMUNITY INVOLVEMENT**

Fort Riley, the EPA, and the KDHE rely on public input to ensure that concerns of the community are considered in making decisions. To this end, the Decision Document report and supporting documentation, which are part of the Administrative Record, are available to the public for a 30-day public comment period that begins on or about January 28, 1998. Comments may be provided in writing at any time during the public comment period. This document was also provided to the Restoration Advisory Board (RAB) at the January 20, 1998 meeting. Questions and comments will be received at the February meeting. Comments and responses will be documented to finalize this Decision Document.

## References

1. *Installation Wide Site Assessment for Fort Riley, Kansas*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, 7 December 1993.
2. *Site Investigation for High Priority Sites at Fort Riley, Kansas*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, 28 February 1994.
3. *Site Investigation for "Other Sites" at Fort Riley, Kansas*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, 19 April 1995.
4. *Site Investigation Report Addenda for Former Wherry Substation and DRMO Area 1 Drainage Ditch*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Engineer District, Kansas City, 5 February 1997.
5. U.S. Environmental Protection Agency, Office of Water, *Drinking Water Regulations and Health Advisories*, May 1995.
6. Kansas Department of Health and Environment, *Article 16 - Water Pollution Control, Surface Water Quality Standards*, Kansas Register, Vol. 13, No. 28, July 14, 1994.
7. *EPA Region III Risk-Based Concentration Table*, Technical Support Section, March 7 1995.
8. *EPA Region IX Preliminary Remediation Goals (PRGs)*, February 1, 1995.
9. U.S. Environmental Protection Agency, *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive # 9355.4-12, 14 July 1994.

Table 1. Summary of Federal, State, and Other Regulatory Standards and Guideline Levels for Water and Soils

	MCL +	KSWQS + +	Region IX *	Region III **	Other
Date	5/95	7/94	2/1/95	3/7/95	
Matrix	Water		Soil (Industrial)		Soil
Units ***	µg/l	µg/l	µg/kg	µg/kg	µg/kg
<b>Volatile Organics</b>					
Benzene	5	5	3,200	200,000	---
Carbon Disulfide	NAv (21 [a])	NAv	52,000	200,000,000	---
1,1-Dichloroethane	NAv	NAv	3,900,000	200,000,000	---
1,1-Dichloroethylene	7	7	82	9,500	---
Dichloromethane	5	5	25,000	760,000	---
Ethylbenzene	700	700	3,100,000	200,000,000	---
Tetrachloroethylene	5	5	25,000	110,000	---
Toluene	1,000	1,000	2,700,000	410,000,000	---
Total Petroleum Hydrocarbons - GRO	NAv	NAv	NAv	NAv	---
1,1,1-Trichloroethane	200	200	3,000,000	180,000,000	---
Trichloroethylene	5	5	17,000	520,000	---
Tribromomethane	100/80 (b)	NAv	240,000	720,000	---
Trichloromethane	100/80 (b)	100	1,100	940,000	---
m- &/or p-Xylenes	10,000 (c)	NAv	980,000 (c)	1,000,000,000 (c)	---
o-Xylene	NAv	NAv	980,000	1,000,000,000	---
Xylenes (mixed)	10,000	10,000	980,000	1,000,000,000	---
<b>Semivolatile Organics</b>					
Bis(2-ethylhexyl) phthalate	NAv	4	140,000	410,000	---
Dibutyl phthalate	NAv	NAv	68,000,000	200,000,000	---
Dibenzofuran	NAv	NAv	2,700	8,200,000	---
Fluoranthene	NAv	NAv	NAv	NAv	---
Fluorene	NAv	NAv	NAv	NAv	---
2-Methyl Naphthalene	NAv	NAv	NAv	NAv	---
Naphthalene	NAv	NAv	800,000	82,000,000	---
Phenanthrene	NAv	NAv	NAv	NAv	---
Total Petroleum Hydrocarbons - DRO	NAv	NAv	NAv	NAv	---
<b>Pesticides/PCBs and Herbicides</b>					
4,4'-DDD	NAv	NAv	7,900	24,000	1,730 (d)
4,4'-DDE	NAv	NAv	5,600	17,000	1,730 (d)
4,4'-DDT	NAv	NAv	5,600	17,000	1,730 (d)
Chlordane	2	2	1,500	4,400	---
Dieldrin	NAv	NAv	120	360	---
PCBs	0.5	NAv	340	740	50,000 (e)

\*\*\* Units: µg/l (micrograms per liter) and µg/kg (micrograms per kilogram) are approximately parts per billion.

\*\*\* Units: mg/l (milligrams per liter) and mg/kg (milligrams per kilogram) are approximately parts per million.

Values shown in bold are the levels used to compare detections in groundwater or soil for each analyte for the appropriate setting and exposure route.

Summary of Federal, State, and Other Regulatory Standards and Guideline Levels for Water and Soils (continued)

	MCL +	KSWQS ++	Region IX *	Region III **	Other
Date	5/95	7/94	2/1/95	3/7/95	
Matrix	Water		Soil (Industrial)		Soil (Residential)
Units ***	mg/l	mg/l	mg/kg	mg/kg	mg/kg
<b>Metals</b>					
Arsenic	0.05	0.05	NAv	610	---
Arsenic (as carcinogen)	NAv	NAv	2.0	3.3	15 (f)
Barium	2	2	NAv	NAv	---
Barium and compounds	NAv	NAv	10,000	140,000	---
Beryllium	0.004	0.004	NAv	NAv	---
Beryllium and compounds	NAv	NAv	1.1	1.3	180 (f)
Cadmium	0.005	0.005	NAv	NAv	---
Cadmium and compounds	NAv	NAv	850	1,000	---
Chromium Total	0.1	0.1	NAv	NAv	---
Chromium Total (1/6 ratio of CrVI/CrIII)	NAv	NAv	1,600	NAv	---
Chromium III	NAv	0.05	NAv	NAv	---
Chromium III and compounds	NAv	NAv	NAv	1,000,000	---
Chromium VI	NAv	0.05	230	NAv	---
Chromium VI and compounds	NAv	NAv	NAv	10,000	---
Copper	1.3 (g)	1.3	NAv	NAv	---
Copper and compounds	NAv	NAv	63,000	76,000	---
Lead	0.015 (g)	0.015	1,000	NAv	400 (h)
Mercury (inorganic)	0.002	0.002	510	610	---
Nickel	0.1	0.1	NAv	NAv	---
Nickel (Soluble Salts)	NAv	NAv	34,000	NAv	---
Nickel and compounds	NAv	NAv	NAv	41,000	---
Silver	0.1 (i)	0.05	NAv	NAv	---
Silver and compounds	NAv	NAv	8,500	10,000	---
Zinc	NAv (5 (j))	NAv	100,000	610,000	---

NAv -- Not Available

+ EPA, Office of Water, Drinking Water Regulations and Health Advisories, May 1995.

++ Kansas Department of Health and Environment, Article 16 - Water Pollution Control, Surface Water Quality Standards, Kansas Register, Vol. 13, No. 28, July 14, 1994.

\* EPA Region IX Preliminary Remediation Goals (PRGs), February 1995.

\*\* EPA Region III Risk-based Concentration Table, March 1995, Technical Support Section.

(a) Although no MCL is available for carbon disulfide, EPA Risk-based Concentrations for Tap Water for both Region III and IX is 21 µg/l.

(b) 100/80 Total for all halogenated methanes cannot exceed 80 level.

(c) Concentrations reported as m- &/or p-xylenes will be compared to the standards and guidelines for xylenes (mixed).

(d) Pesticide Storage Facility Removal Action Goals.

(e) EPA Toxic Substances and Control Act (TSCA) level for regulation of PCB waste.

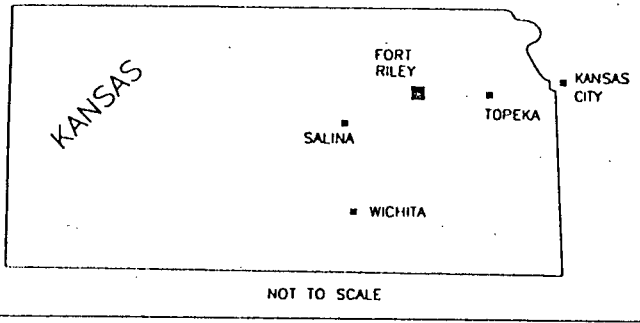
(f) Soil Screening Level, EPA Region III Risk-based Concentration Table, March 1995, Technical Support Section.

(g) MCLs have not been established for copper or lead. The Safe Drinking Water Act established Treatment Thresholds, above which treatment is required.

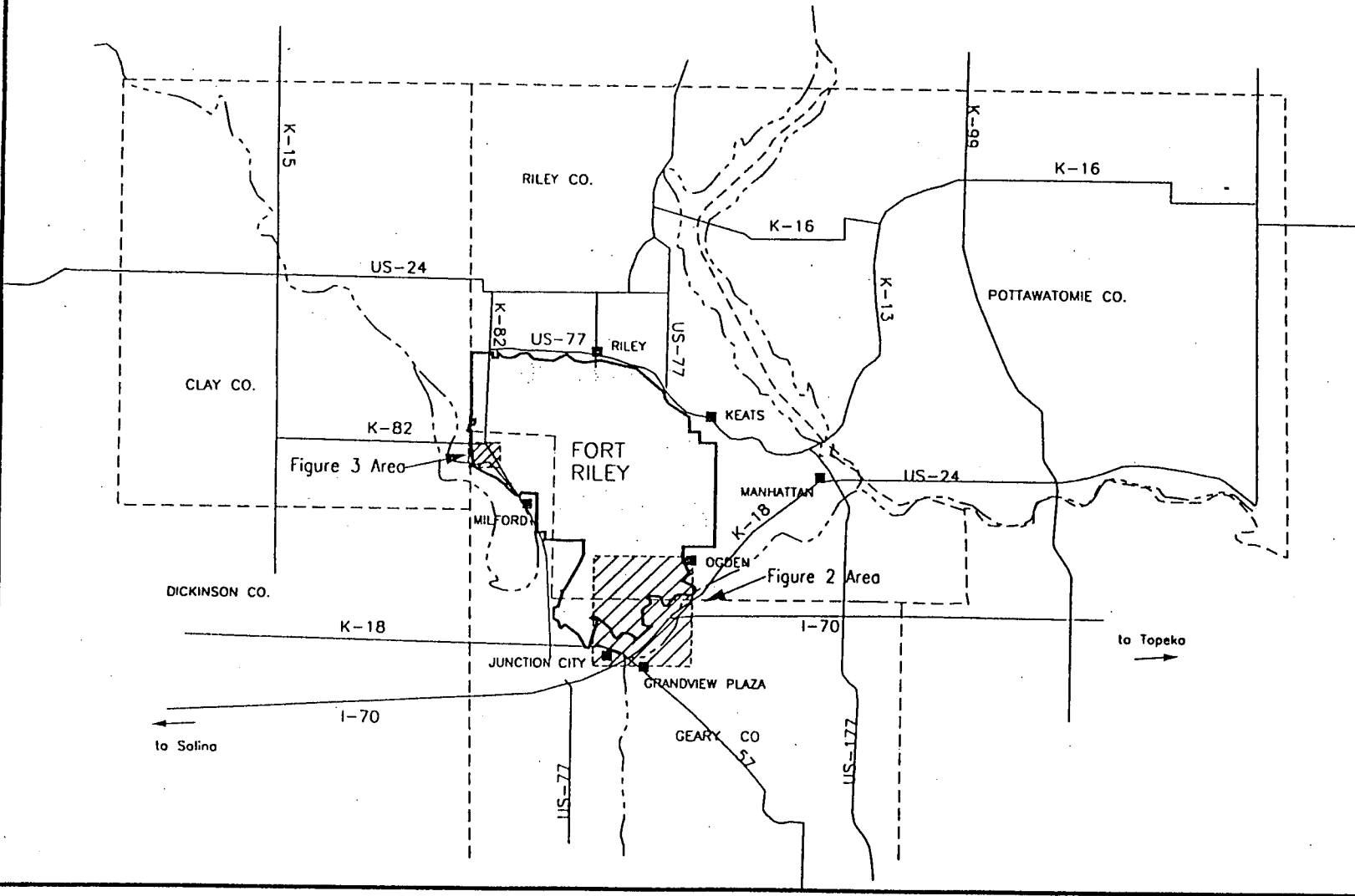
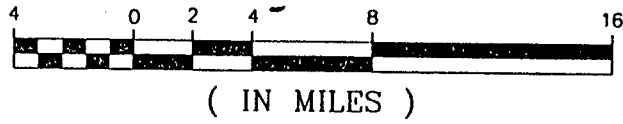
(h) OSWER Directive 9355.4-12, EPA Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, 14 July 1994, residential screening level

(i) No MCL available for silver, 0.1 mg/l is secondary MCL based on protection of public welfare, which replaced the MCL of 0.05 mg/l on 30 July 1992.

(j) No MCL available for zinc, 5 mg/l is secondary MCL based on taste.



GRAPHIC SCALE

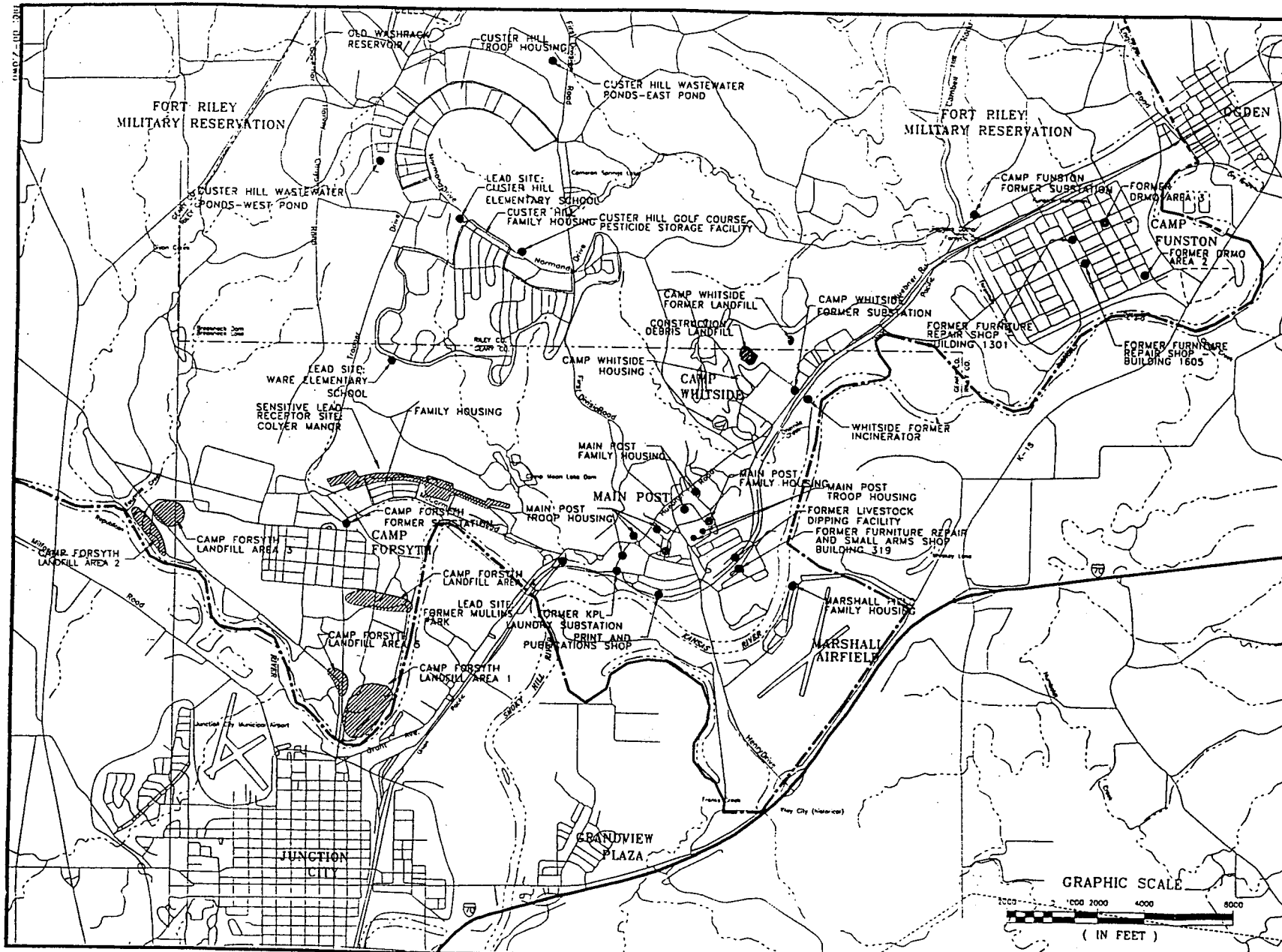


**LEGEND**

- HIGHWAY
- SURFACE WATER BODIES
- RIVER
- MILITARY RESERVATION BOUNDARY
- CITY
- COUNTY BOUNDARY

**Figure 1:**  
GENERAL LOCATION  
MAP  
FORT RILEY, KANSAS

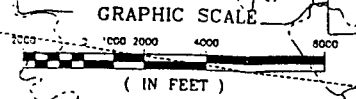
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**LEGEND:**

- LANDFILL AREA
- HOUSING AREA
- INSTALLATION BOUNDARY
- STREAMS

**Figure 2:**  
**GENERAL LOCATION MAP FOR**  
**SITES AT FORT RILEY**  
**LOCATED WITHIN THE**  
**CANTONMENT AREAS**  
**FORT RILEY, KANSAS**



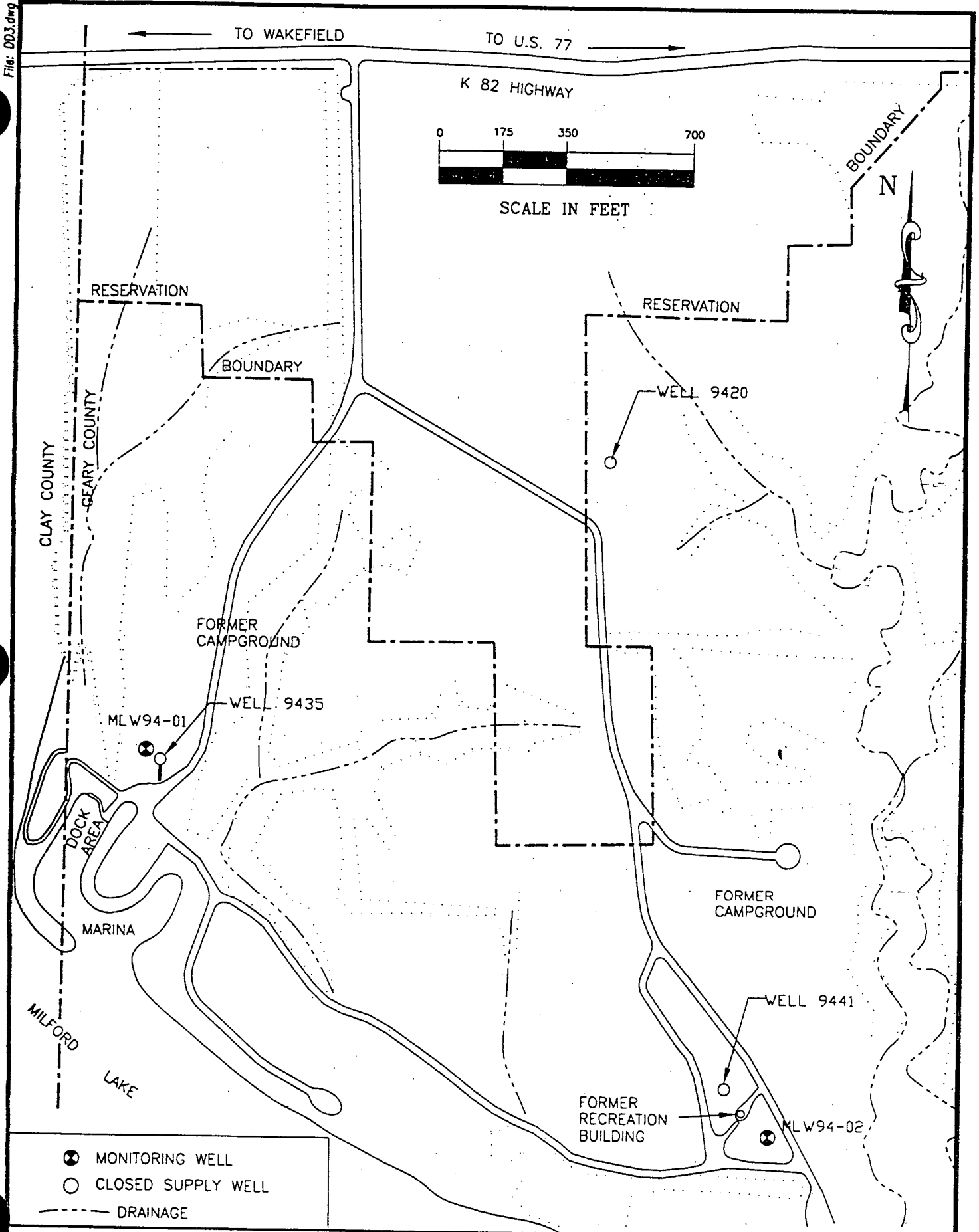
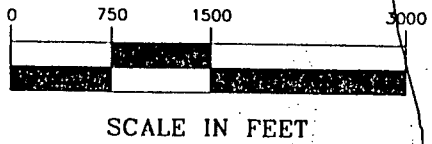
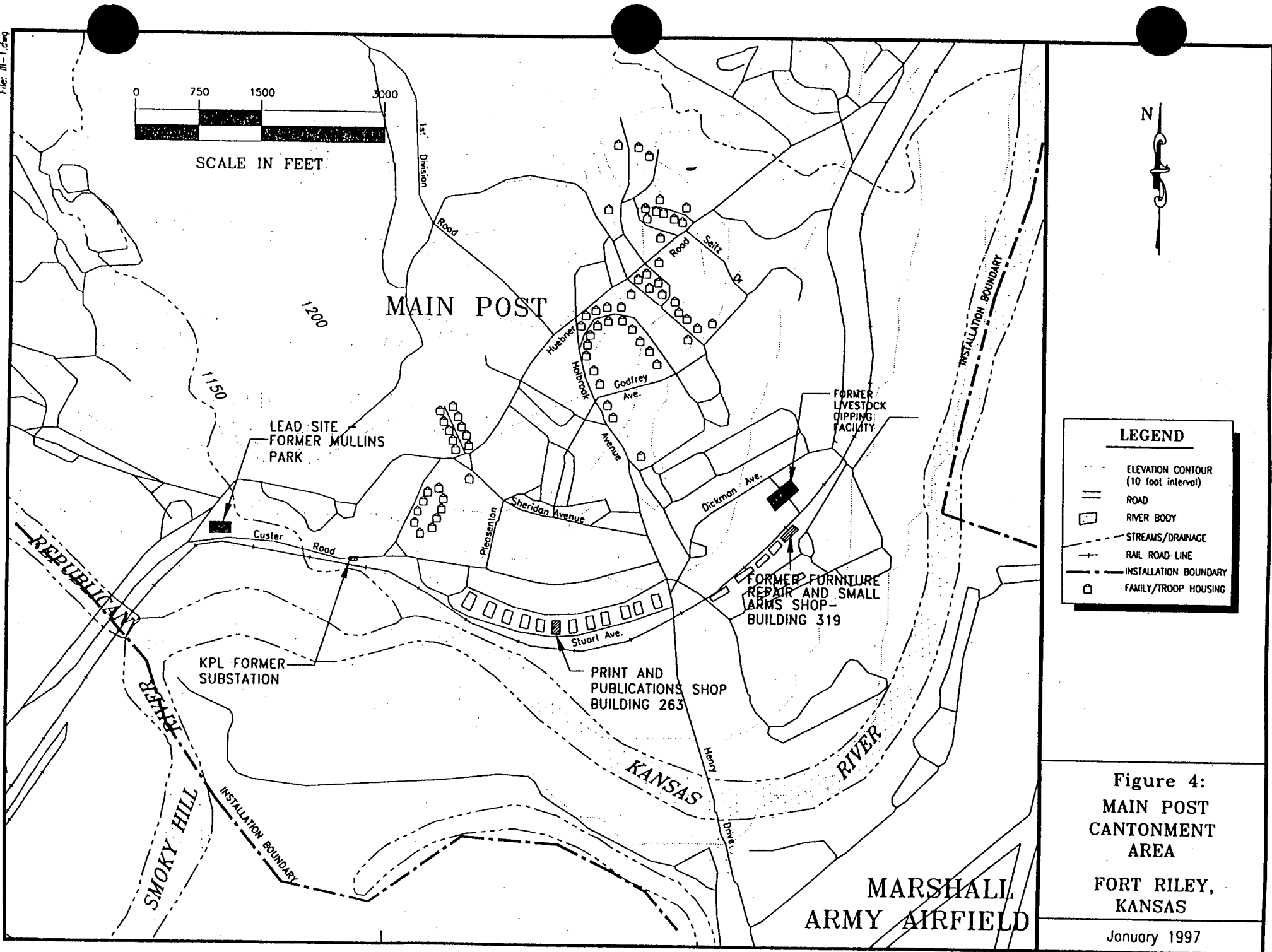


Figure 3: LOCATION-MILFORD AREA  
CAMPGROUND WELLS  
FORT RILEY, KANSAS

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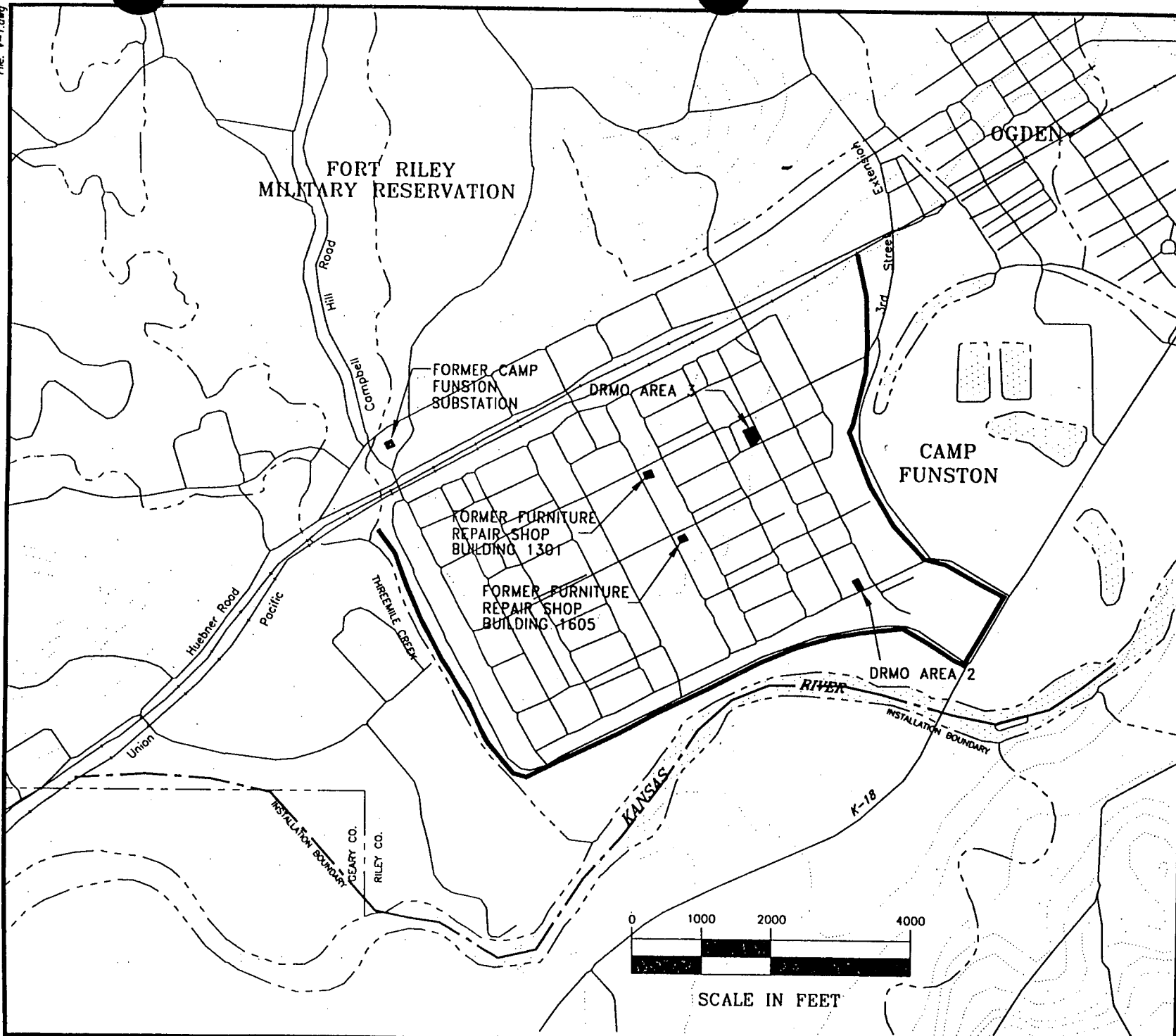
LEGEND	
	ELEVATION CONTOUR (10 foot interval)
	ROAD
	RIVER BODY
	STREAMS/DRAINAGE
	RAIL ROAD LINE
	INSTALLATION BOUNDARY
	FAMILY/TROOP HOUSING

**Figure 4:**  
**MAIN POST**  
**CANTONMENT**  
**AREA**  
**FORT RILEY,**  
**KANSAS**

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**MARSHALL**  
**ARMY AIRFIELD**



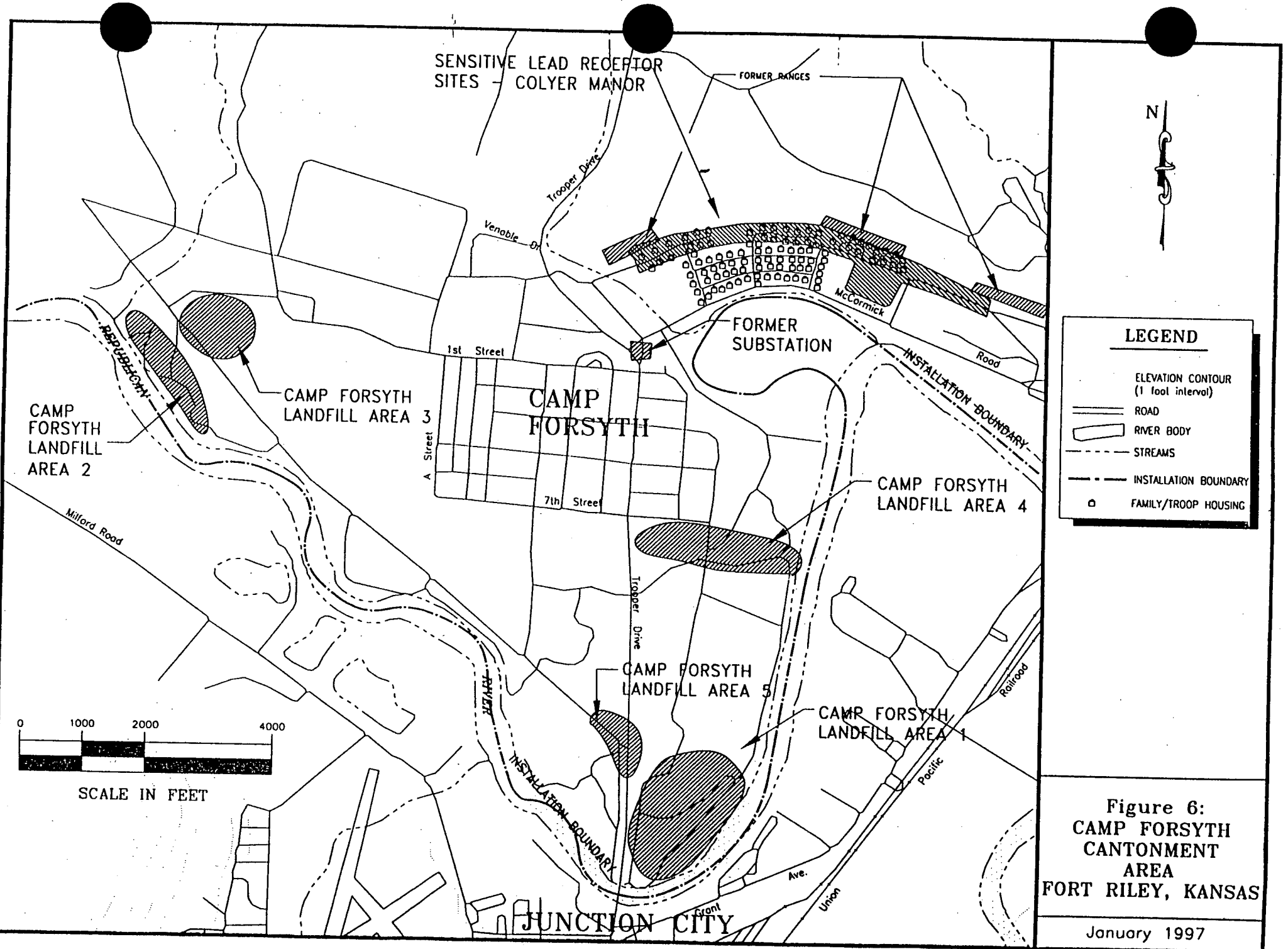


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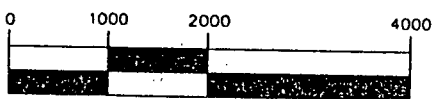
- ELEVATION CONTOUR (1 foot interval)
- ROAD
- WATER BODY
- STREAMS
- LEVEE
- INSTALLATION BOUNDARY
- RAILROAD

**Figure 5:  
CAMP FUNSTON  
CANTONMENT  
AREA  
FORT RILEY, KANSAS**

January 1997



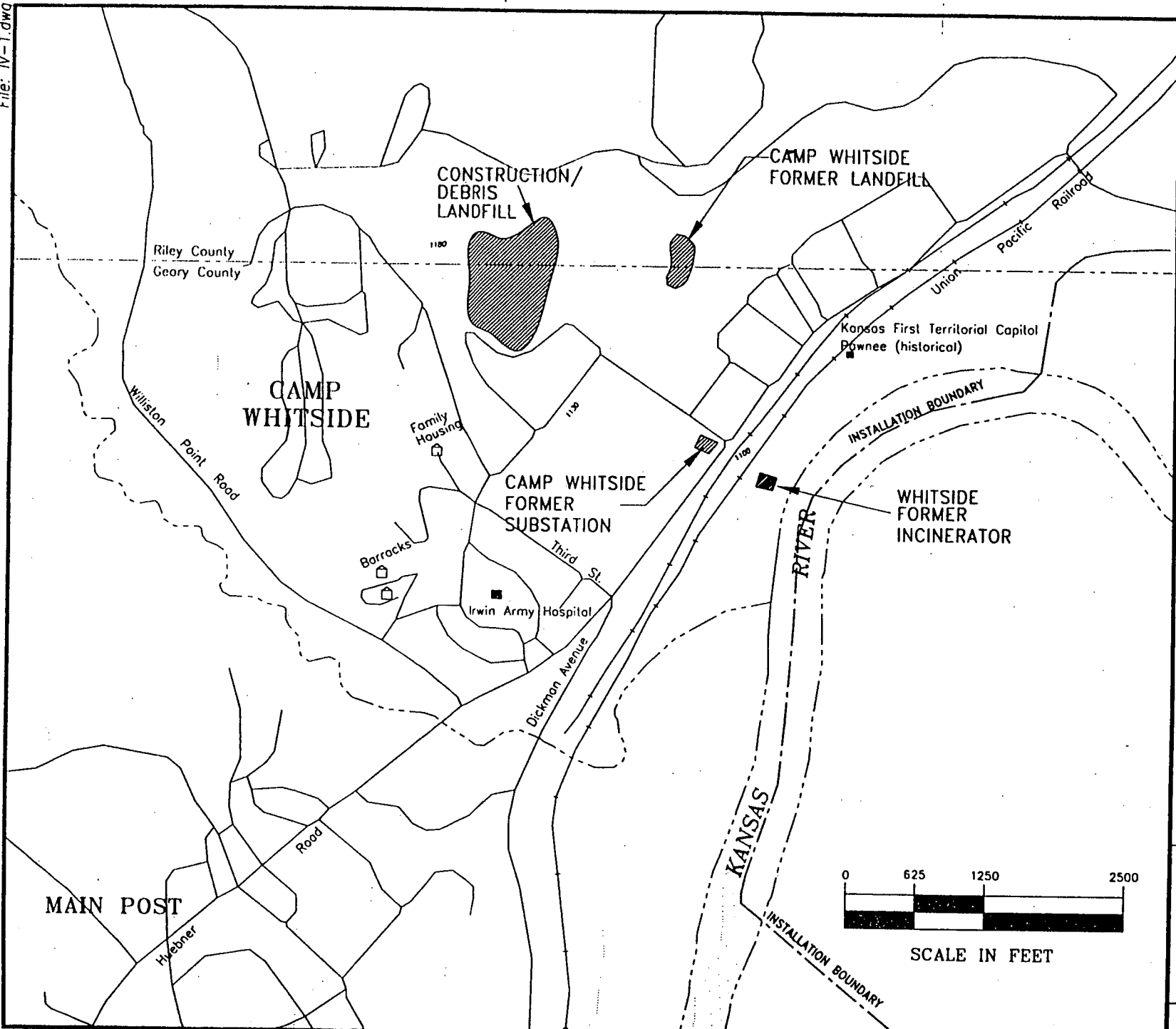
LEGEND	
	ELEVATION CONTOUR (1 foot interval)
	ROAD
	RIVER BODY
	STREAMS
	INSTALLATION BOUNDARY
	FAMILY/TROOP HOUSING



SCALE IN FEET

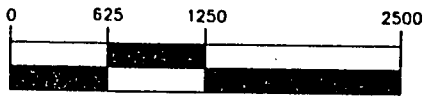
**Figure 6:  
CAMP FORSYTH  
CANTONMENT  
AREA  
FORT RILEY, KANSAS**

January 1997



**LEGEND**

- ELEVATION CONTOUR (10 foot interval)
- ROAD
- ▭ RIVER BODY
- - - STREAMS
- + + + RAILROAD LINE
- - - INSTALLATION BOUNDARY
- 🏠 FAMILY/TROOP HOUSING



SCALE IN FEET

**Figure 7:  
CAMP WHITESIDE  
CANTONMENT  
AREA  
FORT RILEY, KANSAS**

January 1997

# **Attachments**

## **Decision Document**

### **Multiple Sites**

**Fort Riley, Kansas**

## **I. SITE: Sensitive-Receptor Lead Sites**

### **1. SITE DESCRIPTION**

The Sensitive-Receptor Lead Sites include the Colyer Manor Family Housing Area, Former Mullins Park, Ware Elementary School, and Custer Hill Elementary School at Fort Riley, Kansas (Figures I-1 to I-4). The Ware and Custer Hill Elementary Schools are located adjacent to residential housing, while the nearest residential area to the Former Mullins Park is the Main Post Housing Area which is approximately a half mile to the northwest.

The site investigation results for the Sensitive-Receptor Lead Sites were reported in the SI report for High Priority Sites. The SI focused on delineating areas of soil contamination because since the most likely route of human exposure posed at these sites is incidental ingestion of lead-contaminated soils. At the Colyer Manor Family Housing Area, the investigation focused on the top foot of soil since this is where human exposure would be most likely to occur. However, samples were also taken at greater depths to evaluate whether lead-contaminated soil had been buried or had migrated to lower depths. Samples were taken in nearby drainage ditches to evaluate whether contamination had been spread through runoff and overland flow.

#### **Colyer Manor Family Housing Area**

A number of small arms ranges were once located in the area north of Camp Forsyth, on both the east and west side of the Colyer Manor Family Housing Area (Figure I-1). Rounds of small arms ammunition from the firing ranges were assumed to have struck targets and backstops south of the ridge or may have struck the ridge. Some of the earth along the bluffs was disturbed during construction of the Colyer Manor Family Housing Area, and during installation of a utility line behind the housing area. The SI addressed an area of about 400 feet by 6,000 feet within and east of the housing area along the base of the ridge and an area of about 600 feet by 1,000 feet in a recreational area. Over 165 soil samples were collected, with all but 11 of the collected from depths of 0-3 feet (those 11 samples were collected from depths of 3-6 feet). The majority of the samples had lead detections at concentrations below 40 mg/kg. An area around one of the former small arms ranges east of the housing area, the lead concentrations were in the range of 100-200 mg/kg. These concentrations were well below the EPA screening level of 400 mg/kg for lead in residential settings. Copper was detected in three samples at 280-390 mg/kg, compared to the EPA Region IX risk-based guideline of 2,800 mg/kg for residential soil. Barium was detected in all samples at 210-380 mg/kg, compared to the EPA risk-based guideline of 5,300 mg/kg for residential soil.

In one area of about 150 by 200 near the base of the bluff behind the quarters, lead was detected in concentrations as high as 1,700 mg/kg, exceeding the EPA screening level of 400 mg/kg. A removal action was undertaken in the spring of 1994 and a 1,337.7 tons of soil were excavated and disposed of in an approved landfill (Rapid Response Removal of Contaminated Soils at Pesticide Storage Facility and Colyer Manor, Fort Riley, Kansas, June 16, 1994).

#### **Former Mullins Park**

Soil from several former ranges was used in re-grading open, grassy area which was formerly the site of Mullins Park, located at the intersection of Huebner and Custer Roads (Figure I-2). (This site is an unused, open area. While not frequented by sensitive-receptors or other persons, it was investigated with this group due to the nature of the site and proximity to the Colyer Manor area.) Thirty-five (35) soil samples were taken from an area of about 100 feet by 200 feet at depths of 0-3 feet. Lead was

detected in four samples at a maximum concentration of 160 mg/kg, below the EPA screening level of 400 mg/kg. Barium was detected in 32 samples at 240-420 mg/kg, an order of magnitude below the EPA risk-based guideline of 5,300 mg/kg for residential soil.

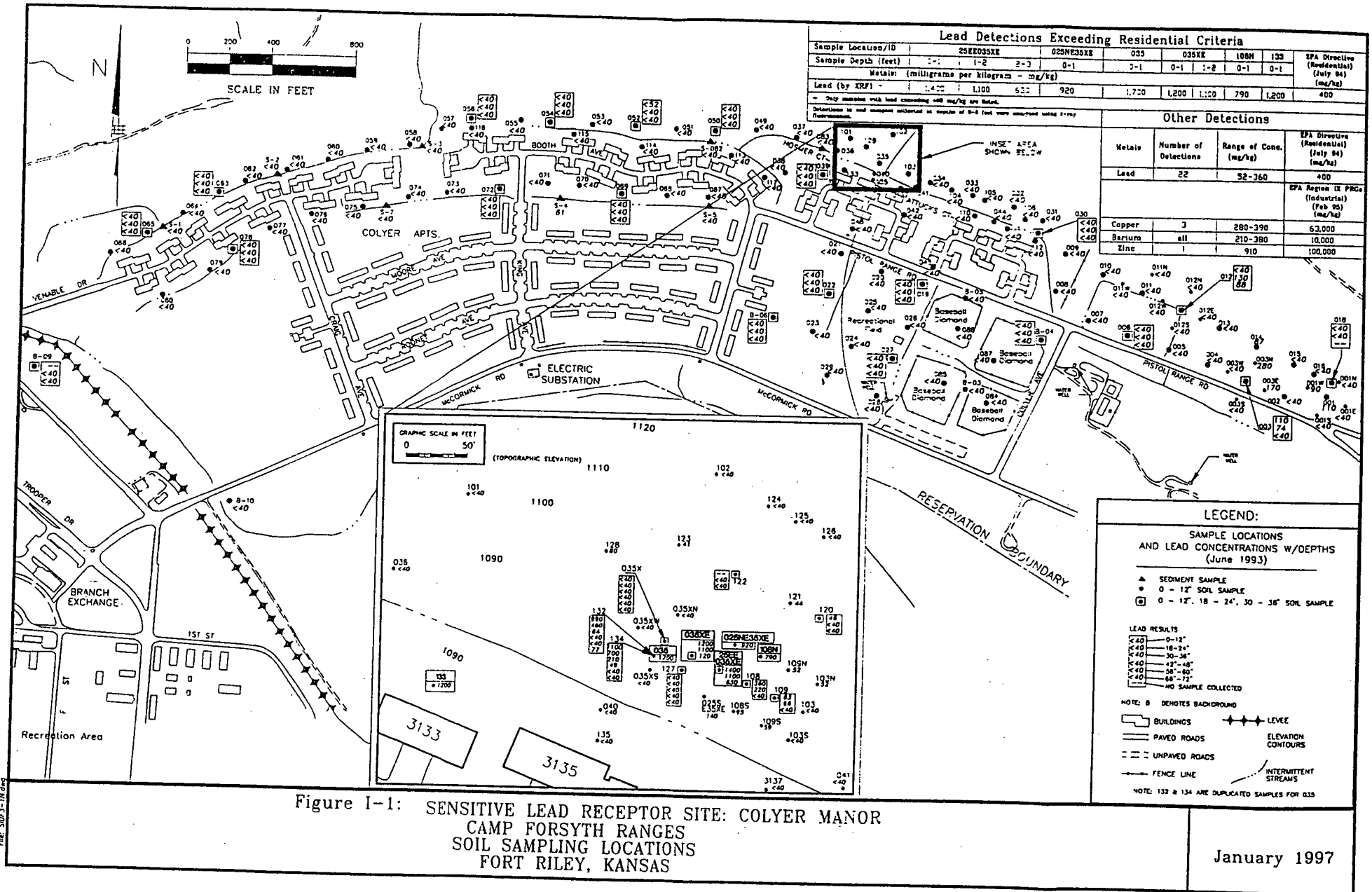
#### **Ware and Custer Hill Elementary Schools**

Ware Elementary School is located between Camp Forsyth and Custer Hill, east of Trooper Drive (Figure I-3). Custer Hill Elementary School is located at Custer Hill, off Morris Hill Road (Figure I-4). During the construction of Ware and Custer Hill Elementary Schools, soil was taken from an area adjacent to a firing range. Fifty-two (52) soil samples were taken from depths of 0-3 feet at Ware Elementary School over an area of about 400 feet by 400 feet. Sixty-nine (69) soil samples were taken from depths of 0-3 feet at Custer Hill Elementary School over an area of about 200 feet by 600 feet. There were no detections of lead or other metals in any of these soil samples.

#### **2.SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION / NO FURTHER ACTION DECISION**

No further action at the Colyer Manor Housing Area and no action at the Former Mullins Park, and the Ware and Custer Hill Schools is necessary as these sites pose no risk to human health or the environment. The soil in the Colyer Manor Housing Area where the elevated lead concentrations were found has been removed. Lead detections at the Former Mullins Park area were below the EPA screening level and there were no detections of lead in the soil at the Ware and Custer Hill Elementary Schools.

In addition, while the ranges and their remnants have existed at the Colyer Manor Housing and McCormick Park are location for over 100 years, lead has not been detected in the soil below 3 feet. The Fort Riley drinking water supply wells are located in the Recreational Field and McCormick Park area, with some wells within 500 feet of the former range backstops. These wells are tested on a regular basis as required by the Clean Water Act and lead concentrations have been below regulatory levels (Personal communication with Fort Riley Directorate of Environment and Safety, Water Branch, Manager, 16 October 1996).



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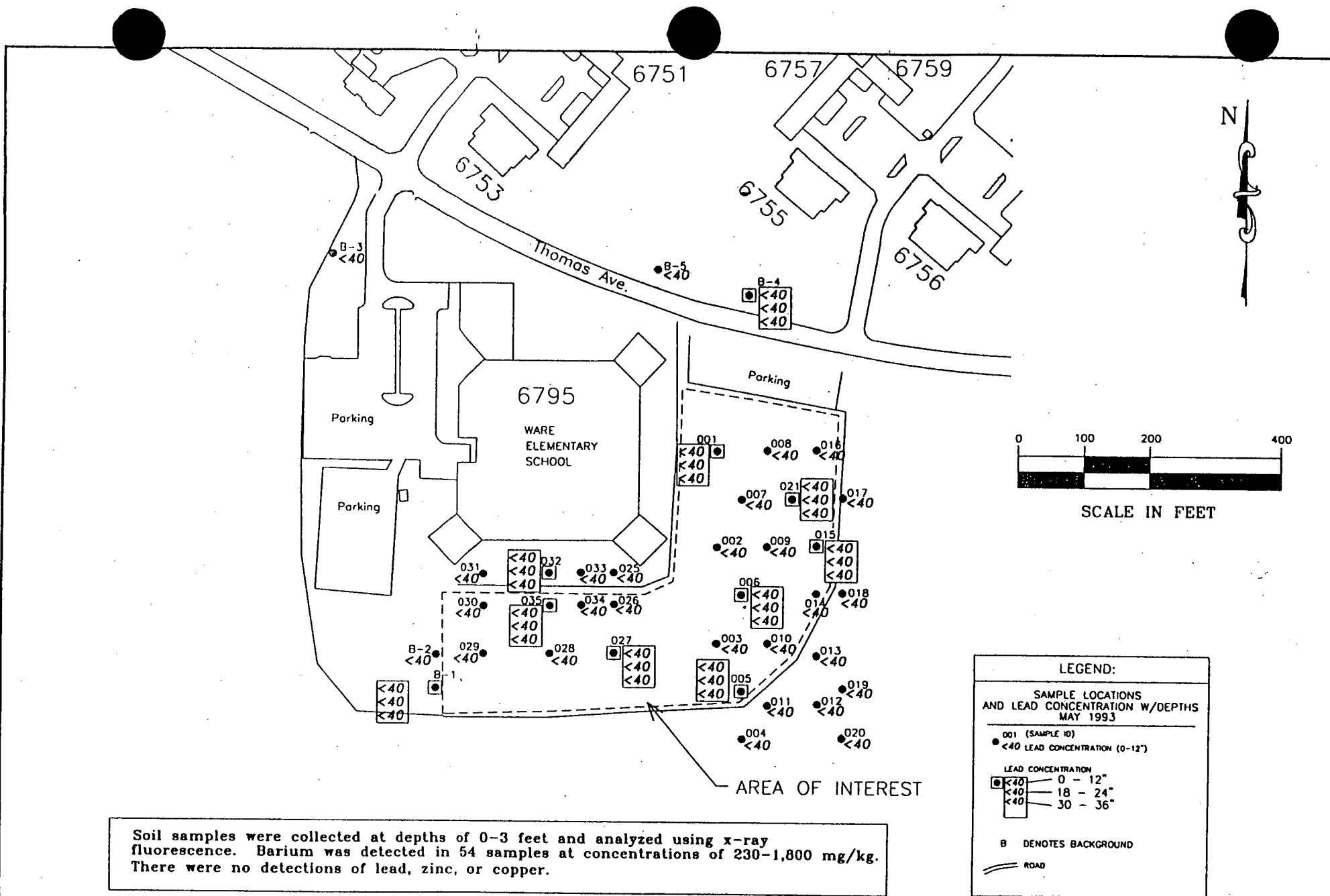


Figure I-2: LEAD SITES - WARE ELEMENTARY SCHOOL  
 SOIL SAMPLING LOCATIONS - CUSTER HILL  
 FORT RILEY, KANSAS

January 1997



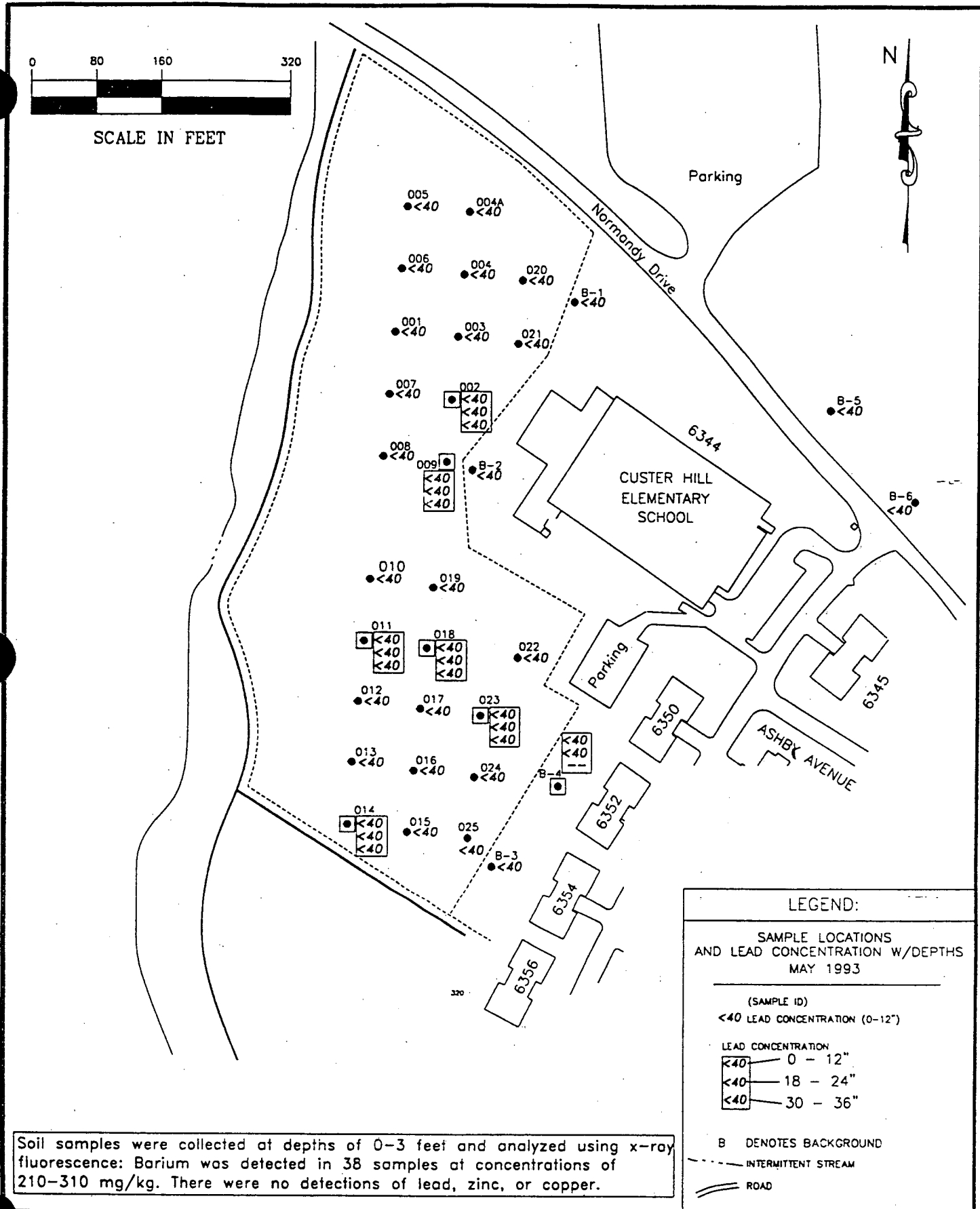
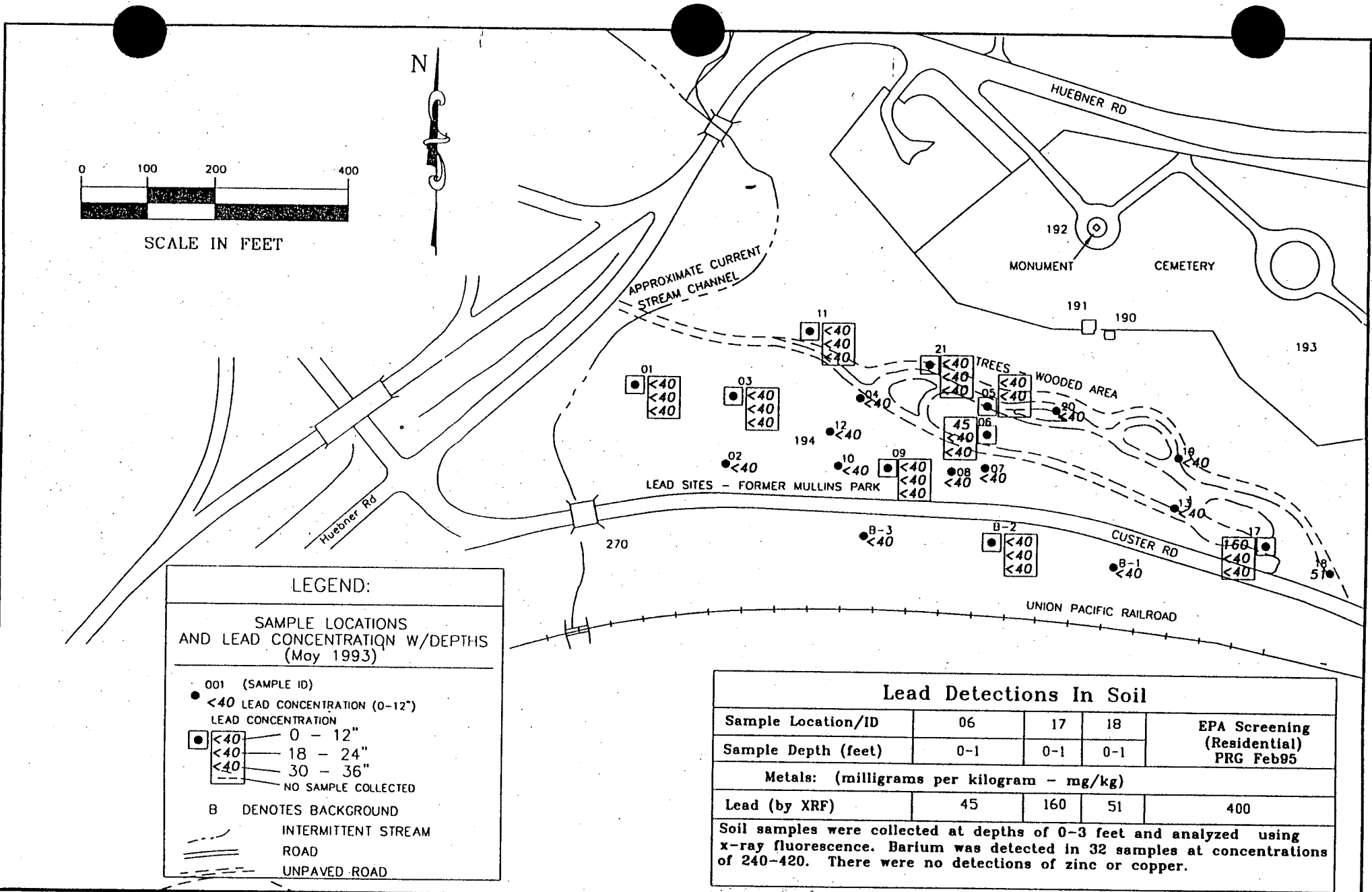


Figure I-3: LEAD SITES - CUSTER HILL ELEMENTARY SCHOOL  
SOIL SAMPLING LOCATIONS  
FORT RILEY, KANSAS

January 1997



**Figure I-4: LEAD SITES - FORMER MULLINS PARK  
SOIL SAMPLING LOCATIONS  
FORT RILEY, KANSAS**

January 1997

## **II. SITE: Custer Hill Wastewater Ponds**

### **1. SITE DESCRIPTION**

The Custer Hill Wastewater Ponds include the East Pond, West Pond, Old Wash Rack Reservoir, and Cells 1 through 4 (Figures II-1 to II-4). The Old Wash Rack Reservoir and Cells 1 through 4 are adjacent to each other and are interconnected. The East Pond was constructed in about 1988, the West Pond in about 1982, while the Old Wash Rack Reservoir and Cells 1 through 4 were placed in operation in about 1986. The nearest residential area is Custer Hill Troop Housing (barracks) which is about 1,000-3,000 feet away.

The site investigation results for the Custer Hill Wastewater Ponds site were reported in the SI report for High Priority Sites. The site investigation focused on identifying whether hazardous substances had been released to the ponds and whether releases had occurred from the ponds to the subsurface environment and/or nearby streams. The unlined ponds and reservoir are known to have received petroleum hydrocarbons. The East Pond receives water from facilities with activities that generate petroleum and hazardous wastes (e.g. trichloroethane from the oil laboratory, paint waste and filters, lead acid battery waste, and cutting oils). There is also the potential for small quantities of hazardous substances to be deposited from surface runoff from the equipment shops on Custer Hill. The East Pond and West Pond have floating booms that collect and skim the oil, which is then placed in tanks for disposal. The water from both ponds is pumped to the Old Wash Rack Reservoir. There are no visible petroleum hydrocarbons, odors or vapors at the Old Wash Rack Reservoir or Cells 1 through 4.

Existing data for the Old Wash Rack Reservoir indicated chlorinated solvents were present at low concentrations.

#### **East Pond**

The POL (Petroleum, Oil and Lubricants) Tank Farm, which is the subject of a separate environmental investigation, is located across the street from the East Pond (Figure II-1). In the past, spills have occurred that could have impacted the East Pond. Overflows of petroleum products from the manhole southeast of the East Pond is a potential source of contamination. Detections in the samples collected southeast of the East Pond from contamination caused by these spills are not discussed in the following sections since they are addressed in the separate POL Tank Farm investigation.

Investigation of the East Pond included collection of soil gas samples at 29 locations; three aqueous and two sediment samples from within the pond; three groundwater monitoring wells, and aqueous and sediment samples from three locations in the adjacent stream (for details on sampling data, see Figure II-2). The soil gas survey results identified petroleum hydrocarbons southeast of the East Pond in the area of the spills, while volatile chlorinated compounds (solvents) and much lower levels of petroleum hydrocarbons were present in areas to the southwest.

The two pond aqueous samples from the surface had detections of organic compounds (toluene, xylenes, total petroleum hydrocarbons - diesel range organics [TPH-DRO], bis (2-ethylhexyl) phthalate, and phenanthrene) and metals (lead and zinc), which were below the MCLs (see Table 1). There were no detections in the aqueous sample from the pond bottom. Two of the three stream-aqueous samples had detections of TPH-DRO and/or zinc, for which no MCLs are applicable.

The pond sediment samples from the inlet and outlet locations had similar levels of detections of organic compounds (toluene, ethylbenzene, xylenes, total petroleum hydrocarbons - gasoline and diesel range organics [TPH-GRO and TPH-DRO], naphthalene, 2-methylnaphthalene, bis (2-ethylhexyl)

phthalate, and phenanthrene) and metals (beryllium, cadmium, chromium, copper, lead, nickel, and zinc), which were also below the EPA Region IX Industrial risk-based guidelines for soil (see Table 1). Arsenic and beryllium were detected in the pond-sediment samples at levels of 4 - 6 mg/kg, above the EPA Region IX Industrial risk-based guidelines of 2.0 mg/kg for arsenic. The sediment stream samples had one detection of TPH-DRO, and detections of metals (cadmium, chromium, copper, lead, nickel, and zinc), which were below the EPA Region IX Industrial guideline. (see Table 1). Arsenic and beryllium were detected in the stream-sediment samples at levels of 3-7 and 0.7-4.2 mg/kg respectively, which were above the EPA risk-based guidelines of 2.0 and 1.1 mg/kg. A limited background soil sampling effort performed in 1994 in the Fort Riley area identified arsenic in soils of up to 7.1 mg/kg. Since the area around the east pond is not used or frequented by residents or workers, therefore the Industrial guidelines are overly conservative for this site. The detected levels of arsenic and beryllium are below the EPA Region III Soil Screening Levels (SSLs) for transfer to groundwater of 15 and 180 mg/kg, respectively.

The only detections in the upgradient well were 1,1,1-trichloroethane at 5.1  $\mu\text{g/l}$ , which is significantly less than the MCL of 200  $\mu\text{g/l}$ , and 1,1-dichloroethane at 1  $\mu\text{g/l}$ , for which no MCL is applicable. There were no detections in the downgradient well east of the pond, while detections in the other downgradient well, southeast of the pond, are associated with the POL Tank Farm site.

#### West Pond

Investigation of the West Pond included collection of 16 soil gas samples at 8 locations at depths of 4 and 12 feet, plus two aqueous and two sediment samples from within the pond near the inlet and outlet (for details on sampling data, see Figure II-3). There were no detections in the soil gas samples collected around the perimeter of the pond. The pond-aqueous samples had detections of petroleum hydrocarbons (benzene, ethylbenzene, toluene, xylenes, TPH-DRO), chlorinated organic compounds (1,1,1-trichloroethane, 1,1-dichloroethane, dichloromethane, and dichloromethane), and metals (lead and zinc), which were less than MCLs (see Table 1). One pond aqueous sample contained cadmium at a concentration equal to the MCL of 0.005 mg/l while cadmium was not detected in the other sample.

The pond-sediment samples had detections of petroleum hydrocarbons (toluene, xylenes, TPH-GRO, TPH-DRO, naphthalene, 2-methyl naphthalene, bis (2-ethylhexyl) phthalate, fluorene and dibenzofuran) and metals (cadmium, chromium, copper, lead, nickel, and zinc), which were below EPA Region IX Industrial risk-based levels (see Table 1). Arsenic was detected in the pond-sediment samples at levels of 4-5 mg/kg, which was above the EPA risk-based guideline of 2.0 mg/kg, but below the EPA Region III SSL of 15 mg/kg for transfer to groundwater and within the range of identified background levels (7.1) in the Fort Riley area.

#### Old Wash Rack Reservoir and Cells 1 through 4

Investigation of the Old Wash Rack Reservoir and Cells 1 through 4 included collection of soil gas samples from 30 locations, two aqueous and three sediment samples from each site pond for a total of 10 aqueous and 15 sediment samples, and samples from the groundwater monitoring wells (for details on sampling data, see Figure II-4). Three aqueous and sediment samples were also collected from the intermittent streams that flow along the eastern and western sides of the Cells and where the streams join north of Cell 4. There were only three soil gas detections: toluene at 1.1 and 1.6  $\mu\text{g/l}$  in two samples and Total FID at 12  $\mu\text{g/l}$  in a third sample.

Detections in the pond-aqueous samples included TPH-DRO in all but one sample, bis (2-

ethylhexyl) phthalate in one sample, lead in one sample, and zinc in two samples, which were all less than the MCLs.

Detections in the pond-sediment samples included toluene, xylenes, TPH-GRO, dichloromethane, bis (2-ethylhexyl) phthalate, and/or di-n-butyl phthalate in seven samples; TPH-DRO in all but one sample; and metals (cadmium, chromium, copper, lead, nickel, and zinc) in all samples; and beryllium in all but five samples. These detections were all below the EPA Region IX Industrial risk-based guidelines. Arsenic was detected in all pond-sediment samples. Detections in 14 of the samples ranged from 2-6 mg/kg; the remaining sample had a detection at 18 mg/kg. These were equal to or above the EPA risk-based guideline of 2.0 mg/kg, but all but one was below the SSL of 15 mg/kg for transfer to groundwater and within the range of identified background levels (7.1) in the Fort Riley area.

The only detection in the monitoring wells was arsenic in one well at a concentration of 0.02 mg/l, below the MCL of 0.05 mg/l.

The only detections in the stream-aqueous samples were at one location where lead and zinc were detected below the MCLs. The stream-sediment samples had detections of TPH-DRO in two samples and metals (beryllium, cadmium, chromium, copper, lead, nickel, and zinc) at levels below or equal to the EPA risk-based guidelines for soil (see Table 1). Arsenic was detected in all stream-sediment samples at levels of 3-10 mg/kg, which were above the EPA risk-based guideline of 2.0 mg/kg, but less than the SSL of 15 mg/kg for transfer to groundwater and near the range of identified background levels (7.1 mg/kg) in the Fort Riley area.

## **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to ensure protection of human health and the environment. The Custer Hill Wastewater ponds pose no significant threat to human health and the environment as a result of activities conducted at the site. Also, the operation and closure activities for the sites are addressed under state-authorized programs.

Contamination associated with the POL Tank Farm site is being evaluated under a separate investigation as noted previously. Volatile and semi-volatile organic compounds, and petroleum hydrocarbons, were detected at low concentrations, well below MCLs. Similarly, metals in the water in the ponds, and in surrounding soil, streams, and groundwater were detected at levels that were below risk based guidelines or MCLs. The risk-based guidelines used for comparison are conservative for these sites which are not frequented by residents or workers. The groundwater at these sites is within the bedrock and not used for consumption in the area of the sites. Arsenic and beryllium were detected in the sediment samples from the pond and stream at concentrations above the EPA risk-based guideline, but below the SSL for transfer to groundwater. Petroleum hydrocarbons were detected in the pond sediment but there have been no releases to the environment. The unlined East and West Ponds will be closed under State authority and replaced by new concrete settling basins.

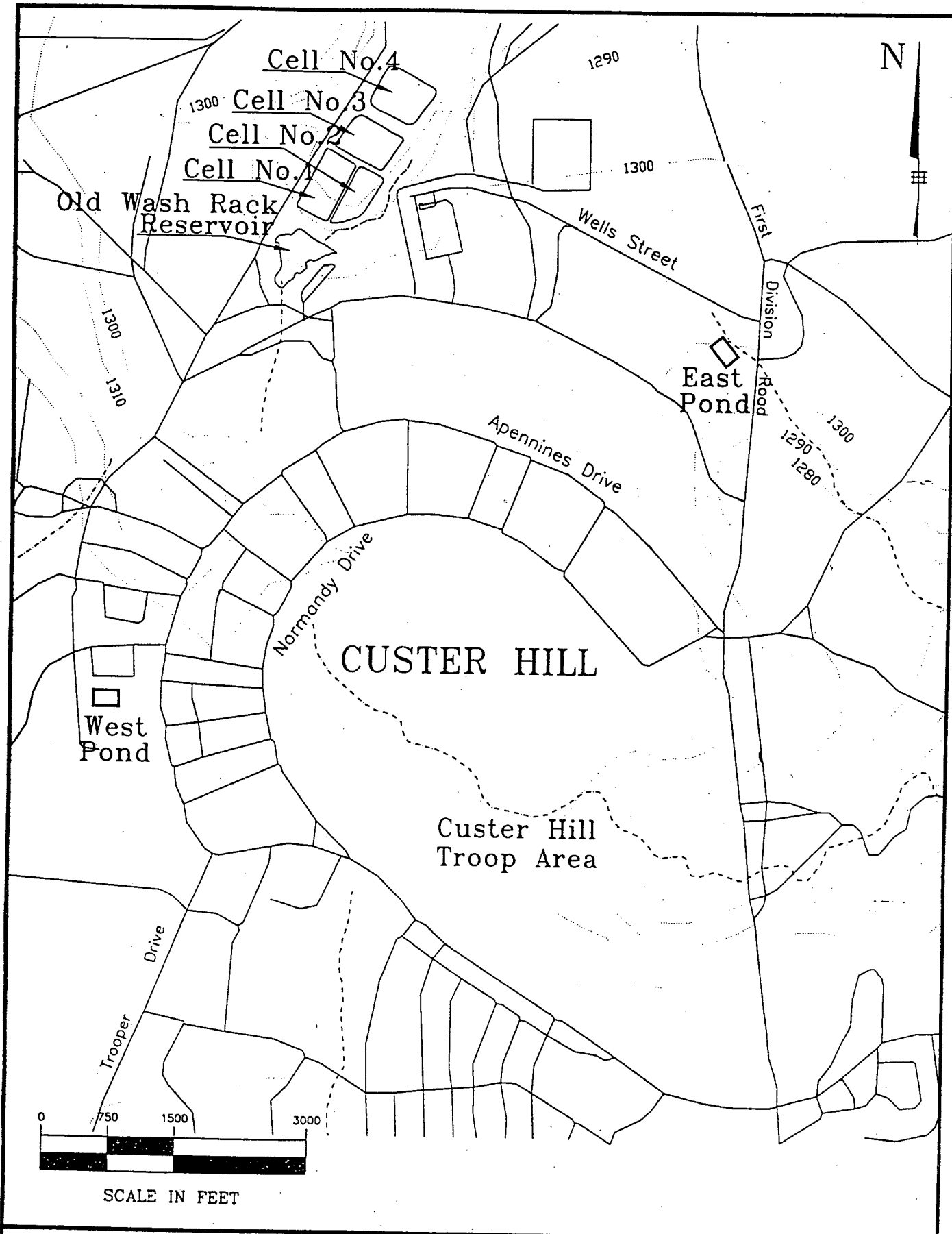
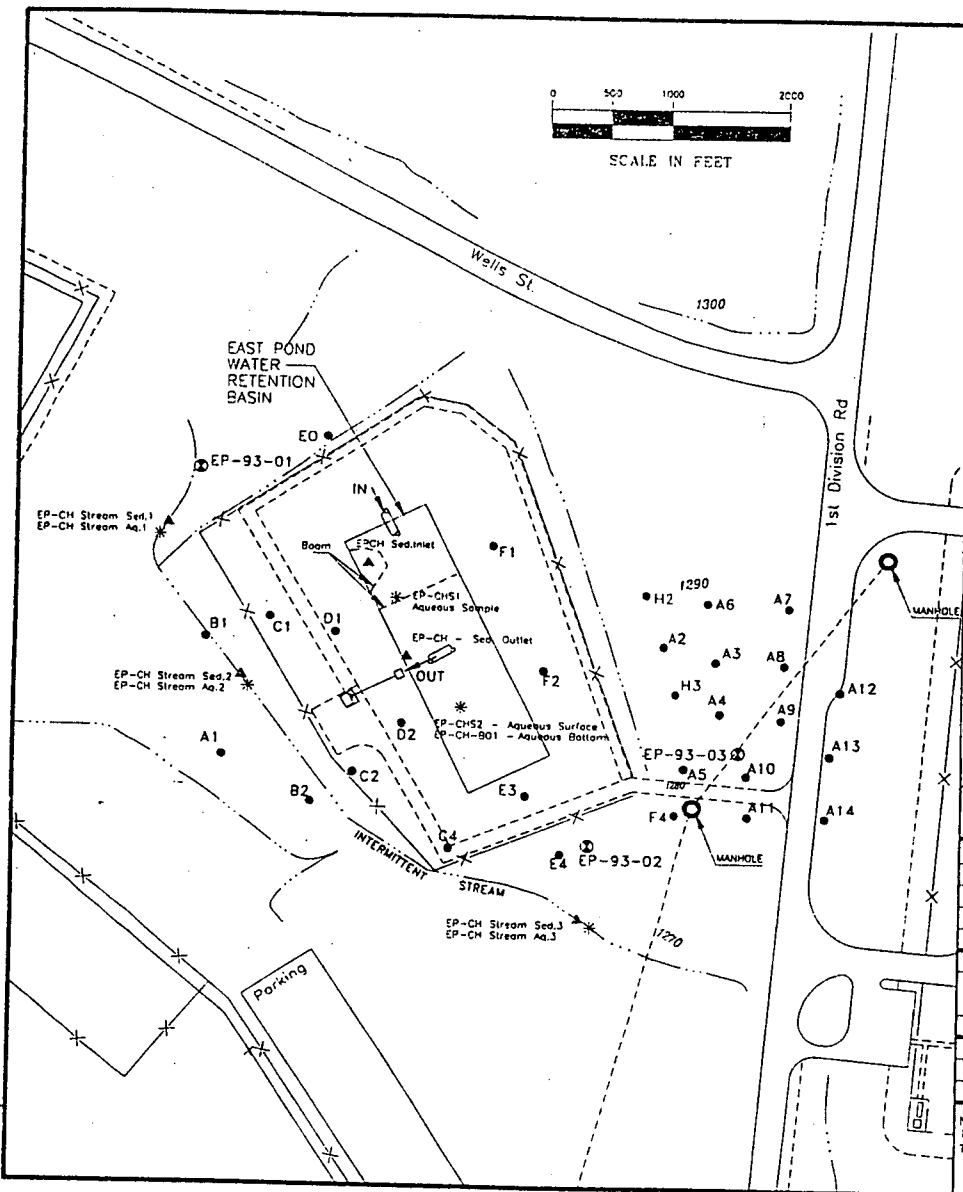


FIGURE II-1: CUSTER HILL INDUSTRIAL  
WASTEWATER PONDS  
FORT RILEY, KANSAS

January 1997

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**Detections in Stream and Pond Sediment Samples**

Sample Location/ID	Stream Sediment			Pond Sediment			EPA Region IX PRGs (Industrial) (Feb 95)
	EP-CH - Sed Outlet	EP-CH - Sed Inlet	EP-93 - Stream Sed 1	EP-CH - Stream Sed 2	EP-CH - Stream Sed 3		
<b>Volatiles (micrograms per kilogram - <math>\mu\text{g}/\text{kg}</math>) EPA Methods 8240, 8015 modified</b>							
Toluene	ND <sup>M</sup>	1.810 <sup>M</sup>	ND	ND	ND		2,700,000
Ethylbenzene	ND <sup>M</sup>	442 <sup>M</sup>	ND	ND	ND		3,150,000
Xylene (O/M/P)	ND	1,540 <sup>M</sup>	ND	ND	ND		980,000
<b>Semi-Volatiles (micrograms per kilogram - <math>\mu\text{g}/\text{kg}</math>) EPA Methods 8270, 8015 modified</b>							
Naphthalene	ND <sup>M</sup>	13,500 <sup>M</sup>	ND	ND	ND		900,000
2-Methylnaphthalene	12,000 <sup>M</sup>	34,500 <sup>M</sup>	ND	ND	ND		Nav
Phenanthrene	ND <sup>M</sup>	16,500 <sup>M</sup>	ND	ND	ND		Nav
Bis (2-Ethylhexyl) Phthalate	11,000 <sup>M</sup>	ND	ND	ND	ND		140,000
<b>Metals (Priority Pollutant) (milligrams per kilogram - <math>\text{mg}/\text{kg}</math>) EPA Methods 8010/7000</b>							
Arsenic	6	4	3	4	7		23
Beryllium	0.8	ND	1.7	2.7	4.2		1.1
Cadmium	10	9.4		0.8	5.1		850
Chromium	28	18	24	16	96		230
Copper	41	32	12	10	63		63,000
Lead	57	50	13	15	22		1,000
Nickel	17	10	18	13	72		34,000
Zinc	200	250	21	34	223		100,000

NA: Not Available  
 ND: Not Detected  
 H: Result is an estimated value. Recommended holding time was exceeded R: Data rejected by data validator.  
 M: Reporting limit higher than normal due to matrix interference.  
 Soil gas samples were collected and analyzed for volatile chlorinated and petroleum hydrocarbon compounds using EPA Methods 8010 and 8020, respectively. All FID detections were less than 5000 mg/l except at location A11.

**Detections in Aqueous and Groundwater Samples**

Sample Location/ID	Pond Aqueous			Stream Aqueous			Groundwater	Maximum Contaminant Levels
	EP-CH-S1	EP-CH-S2	EP-CH-901	EP-CH Stream AQ-1	EP-CH Stream AQ-2	EP-CH Stream AQ-3	EP-93-01	
<b>Volatiles (micrograms per liter - <math>\mu\text{g}/\text{l}</math>) EPA Methods 8240</b>								
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	51	250
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	1	NAv
Toluene	1	1.1	1.4	ND	ND	ND	ND	1000
Xylene (O/M/P)	0.9	1.7	2.6	ND	ND	ND	ND	10000
<b>Semi-volatiles (micrograms per liter - <math>\mu\text{g}/\text{l}</math>) EPA Methods 8270, 8015 modified</b>								
Bis (2-Ethylhexyl) Phthalate	30	ND	ND	ND	ND	ND	ND	NAv
Phenanthrene	10	ND	ND	ND	ND	ND	ND	NAv
<b>Metals (Priority Pollutant) (milligrams per liter - <math>\text{mg}/\text{l}</math>) EPA Methods 8010/7000</b>								
Lead	0.007	0.004	0.005	ND	ND	ND	ND	0.015
Zinc	0.05	0.02	0.03	ND	ND	0.02	ND	5

ND: Not Detected  
 NA: Not Available  
 These results do not include groundwater from well EP-93-22, which was contaminated from a spill.

N

**LEGEND**

- SOIL GAS SAMPLES (September 1993)
- ▲ SEDIMENT SAMPLES (20-24 September 1994)
- \* AQUEOUS SAMPLES (20-24 September 1994)
- ⊙ GROUNDWATER MONITOR WELL (26 October 1993)

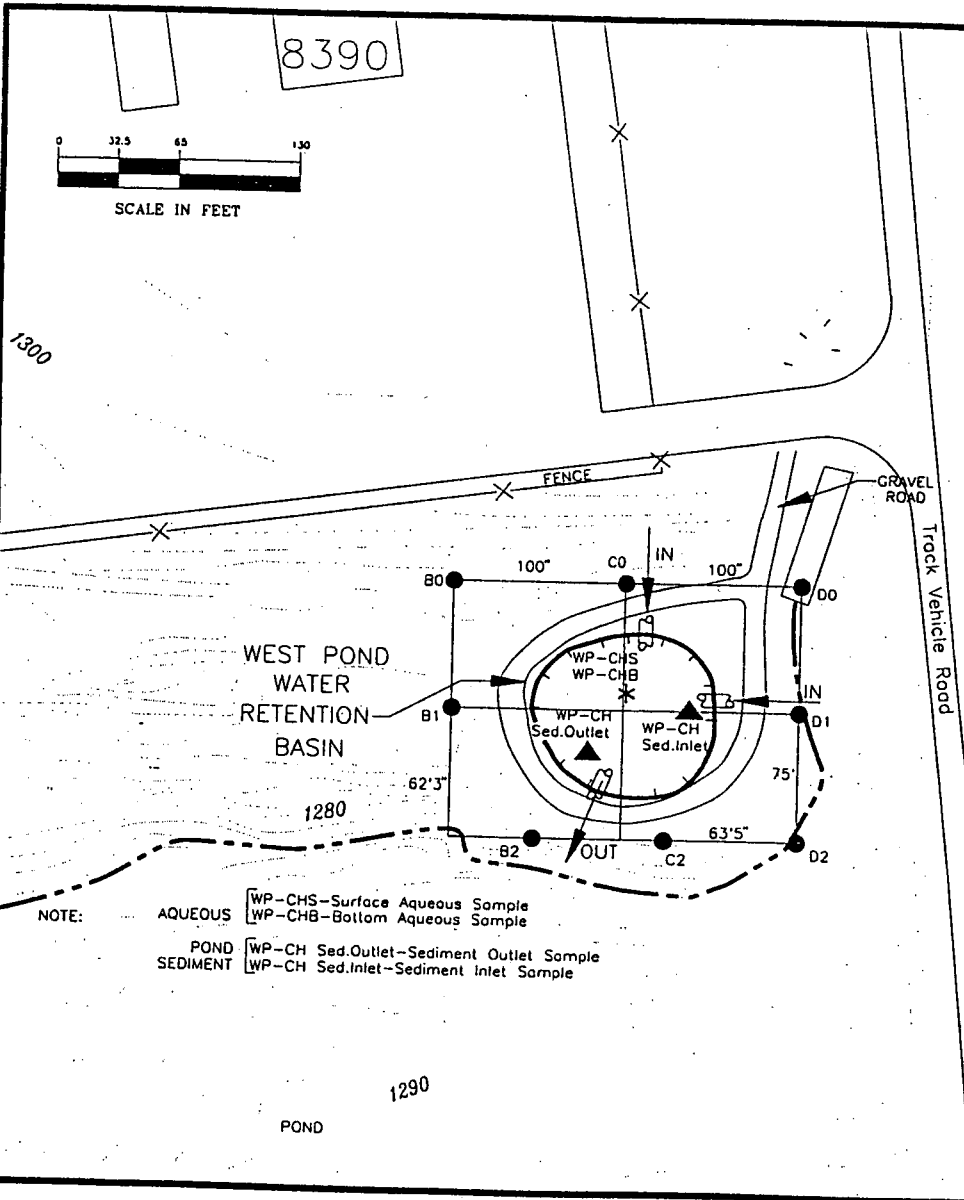
— PAVED ROAD  
 - - - UNPAVED ROAD  
 -X- FENCE LINES  
 - - - SEWER LINE  
 - - - ELEVATION CONTOUR

**Figure H-2:**  
**EAST POND SAMPLING LOCATIONS**  
**CUSTER HILL FORT RILEY, KANSAS**

8390



SCALE IN FEET



Detections in Pond Sediment Samples			
Sample Location/ID	WP-CH Sed. Outlet	WP-CH Sed. Inlet	EPA Region IX PCBs (tentative) (Feb 85)
Sample Date	9/20/93	9/20/93	
Sample Media	Pond Sediment		
Sample Depth (feet)	Bottom	Bottom	
Analytical Methods	EPA Methods 8240, 8270, 8010/7000, 9015 modified		
Volatiles (micrograms per kilogram - $\mu\text{g/kg}$ )			
Toluene	1,200	1,200	2,700,000
Xylene (O/M/P)	ND	900	888,000
Semi-Volatiles (micrograms per kilogram - $\mu\text{g/kg}$ )			
Naphthalene	ND	13,000M	808,000
2-Methylnaphthalene	20,000M	34,800M	NM
Phenanthrene	19,000M	19,000M	NM
Bis (2-Ethylhexyl) Phthalate	18,000M	18,000M	148,000
Fluorene	ND	6,300M	NM
Dibenzofuran	ND	3,300M	2,700
Metals (Priority Pollutant) (micrograms per kilogram - $\mu\text{g/kg}$ )			
Arsenic	3	4	2
Cadmium	11	10	800
Chromium	17	11	830
Copper	20	16	63,000
Lead	40	20	1,000
Nickel	11	7	34,000
Zinc	140	98	108,000

ND: Not Detected  
 NAv: Not Available  
 M: Reporting limit higher than normal due to matrix interference.  
 Soil gas samples were collected and analyzed for volatile chlorinated and petroleum hydrocarbon compounds using EPA Methods 8010 and 8020, respectively. There were no detections.

Detections in Pond Aqueous Samples			
Sample Location/ID	WP-CHS	WP-CHB	Maximum Contaminant Levels
Sample Date	9/20/93	9/20/93	
Sample Media	Aqueous		
Sample Depth (feet)	Surface	Bottom	
Analytical Methods	EPA Methods 8240, 8270, 8010/7000, 9015 modified		
Volatiles (micrograms per liter - $\mu\text{g/l}$ )			
Benzene	0.8	0.7	5.0
Toluene	6.7	4.3	1,000
Ethylbenzene	1.0	1.1	700
O/M/P Xylene	2.7	3.9	10,000
1,1,1-Trichloroethane	2.4	3.7	200
1,1-Dichloroethylene	ND	1.9	7
Dichloromethane	1.7	ND	5.0
Trichloromethane	2.9	1.1	100
Metals (Priority Pollutant) (micrograms per liter - $\mu\text{g/l}$ )			
Cadmium	ND	0.003	0.003
Lead	3.004	ND	0.013
Zinc	8.08	0.10	3

ND: Not Detected



**LEGEND**

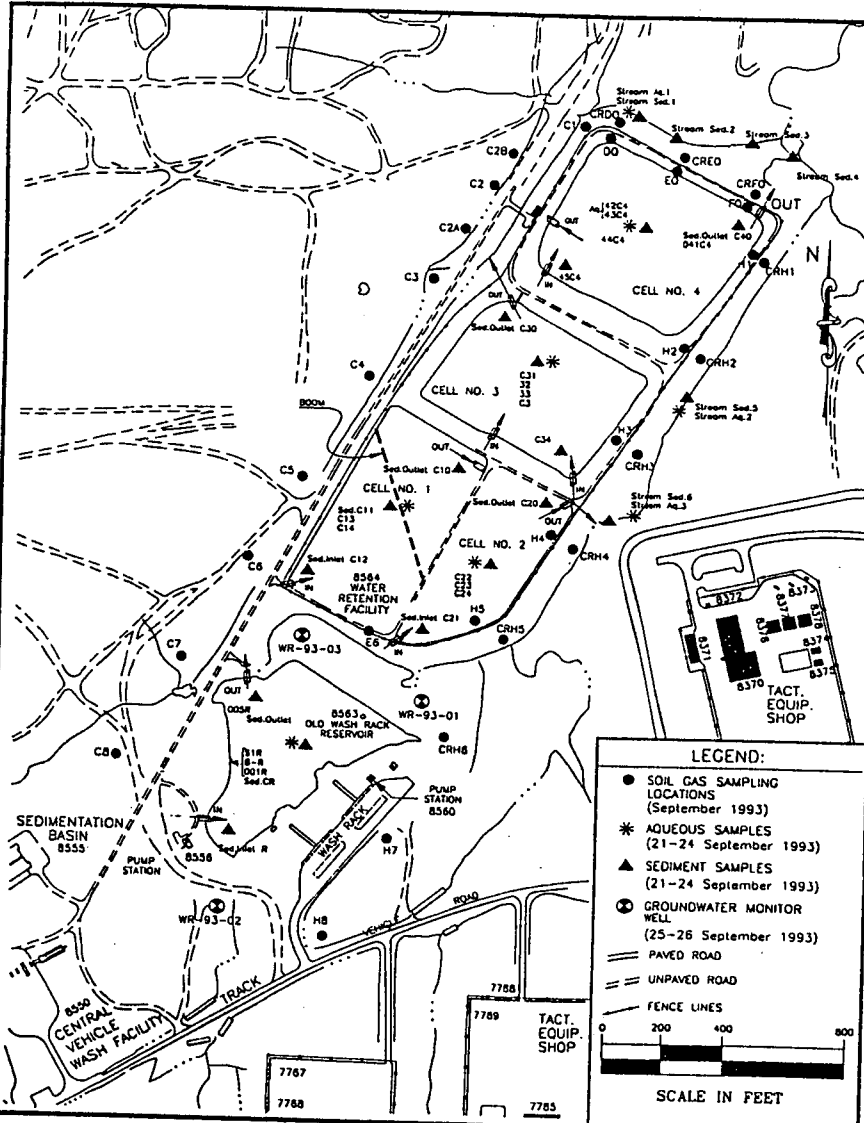
- SOIL GAS SAMPLES (4' and 12') (September 1993)
- ▲ SEDIMENT SAMPLES (20 September 1993)
- \* AQUEOUS SAMPLES (20 September 1993)
- - - INTERMITTENT DRAINAGE
- ✕ FENCE

Figure II-3:  
 WEST POND SAMPLING LOCATIONS  
 CUSTER HILL  
 FORT RILEY, KANSAS

January 1997

S073-11.DWG





Detections in Sediment Samples						
Sample location/ID	Old Wash Rack Reservoir		Cells 1 to 4		North and East of the Cell Complex	
Sample Date	9/21/93	9/22/93	9/24/93			
Sample Media	Pond Sediment		Stream Sediment			
Analytical Methods	EPA Methods 8240, 8270, 8210/7000, 8015 modified					
	No. of Detections	Range of Detections	No. of Detections	Range of Detections	No. of Detections	Range of Detections
<b>Volatiles (micrograms per liter - µg/l)</b>						
Dichloromethane	None	-	24	None	-	25,000
Toluene	None	-	220	None	-	2,700,000
m, p-Xylene	1	2,400	None	None	-	980,000
<b>Semi-Volatiles (micrograms per liter - µg/l)</b>						
Bis (2-Ethylhexyl) Phthalate	2	27,000 M - 51,000 M	None	None	-	140,000
Di-n-butyl Phthalate	1	21,000 M	None	None	-	68,000,000
<b>Metals (Priority Pollutant) (milligrams per kilograms - mg/kg)</b>						
Arsenic	3	3-6	12	2-18	5	3-10
Beryllium	2	0.5-0.8	8	0.5-0.8	4	0.6-1.1
Cadmium	3	4.7-7.5	12	0.7-4.3	5	0.7-1.3
Chromium	3	21-26	12	5-32	5	15-31
Copper	3	22-31	12	5-27	5	10-20
Lead	3	30-40	12	5-75	5	8-22
Nickel	3	14-19	12	4-25	5	13-27
Zinc	3	110-260	12	35-220	5	40-88

M: Reporting limit higher than normal due to matrix interference.  
 There were no other detections of volatile organic compounds, semi-volatile organic compounds, or metals in these samples.

Figure II-4: OLD WASHRACK RESERVOIR AND CELLS 1 THROUGH 4 SAMPLING LOCATIONS

Fig. 4105-15.dwg

### **III. SITE: Former Furniture Repair Shops**

#### **1. SITE DESCRIPTION**

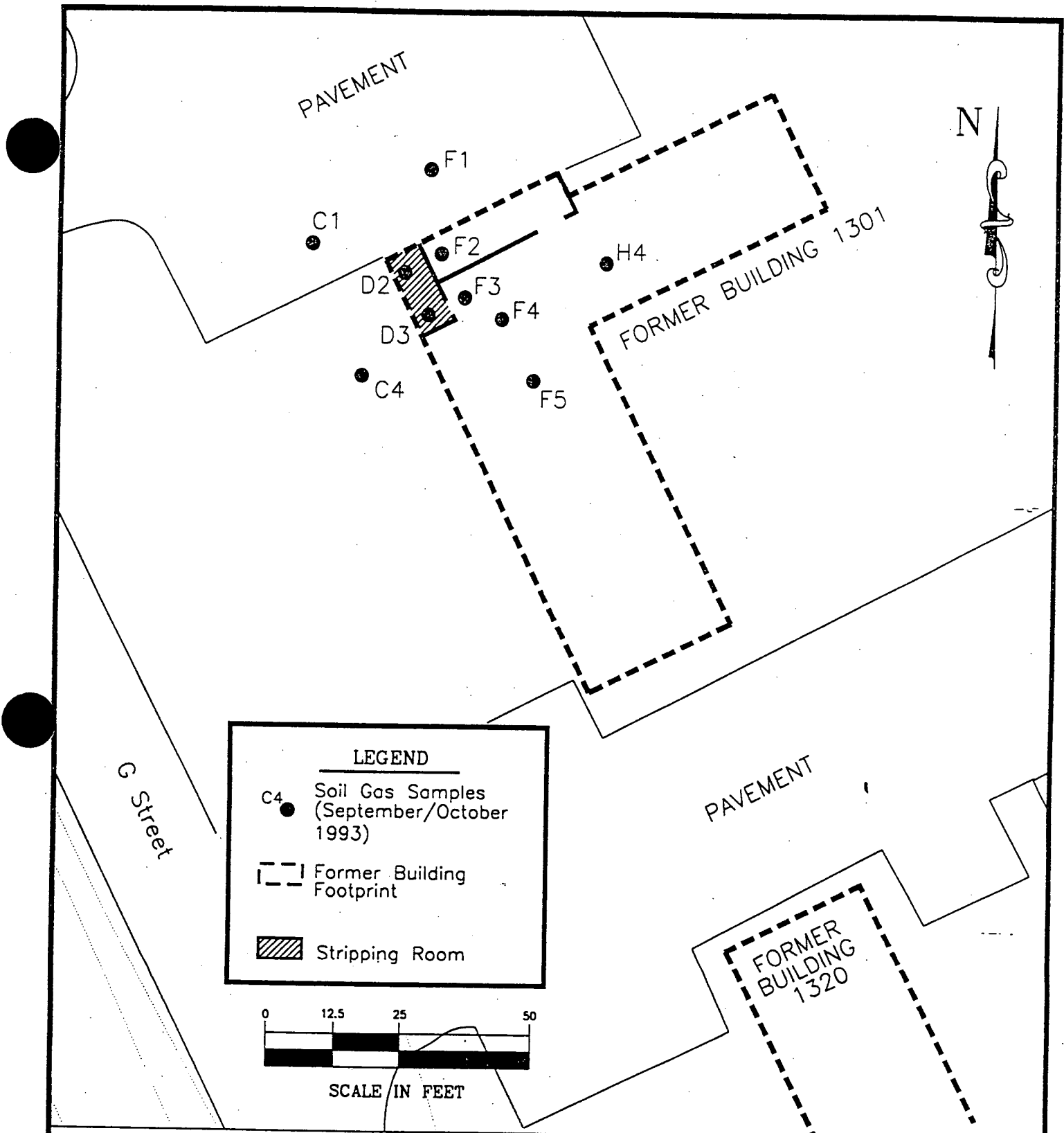
The site investigation results for the Former Furniture Repair Shops (Former Buildings 1301 and 1605) (Figures III-1 and III-2) were reported in the SI report for High Priority Sites. This site is one of the High Priority Sites because Building 1301 at Camp Funston was to be scheduled for demolition. The nearest residential area is Ogden, Kansas, approximately one mile east.

The investigation at the Former Furniture Repair Shops focused on identifying whether there was soil contamination around the perimeter of the then existing or former building locations from volatile organic compounds (VOCs) used in furniture stripping, cleaning, and refurbishing. Former Building 1301 was used for furniture repair and paint stripping between 1988 and 1992. One room had holes drilled in the floor for ventilation during furniture stripping operations. It was demolished in late 1993 after an investigation in the summer of 1993. Former Building 1605 was used for similar purposes from about 1984 to 1988. The site of Former Building 1605 is now a vacant lot covered with soil and used for parking. There were no detections of VOCs in the soil gas samples collected in and around Former Building 1301. At Former Building 1605, there was one detection of petroleum hydrocarbons (660  $\mu\text{g/l}$ ) from the 15 soil gas samples collected. Based on this detection in the soil gas sample, groundwater screening and soil boring samples were collected at the same location. There were no detections of VOCs in the groundwater screening sample, nor any detections of VOCs or petroleum hydrocarbons in the soil samples.

On 26 October 1993, prior to receipt of the laboratory report, Fort Riley DEH personnel excavated and removed approximately 2 cubic yards of soil from the area at the Former Building 1605 where the soil gas detection occurred. The soil removal was performed so that preparation of a temporary military storage area could be accomplished without delay.

#### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to protect human health and environment since no contamination was identified at the Former Furniture Repair Shops.

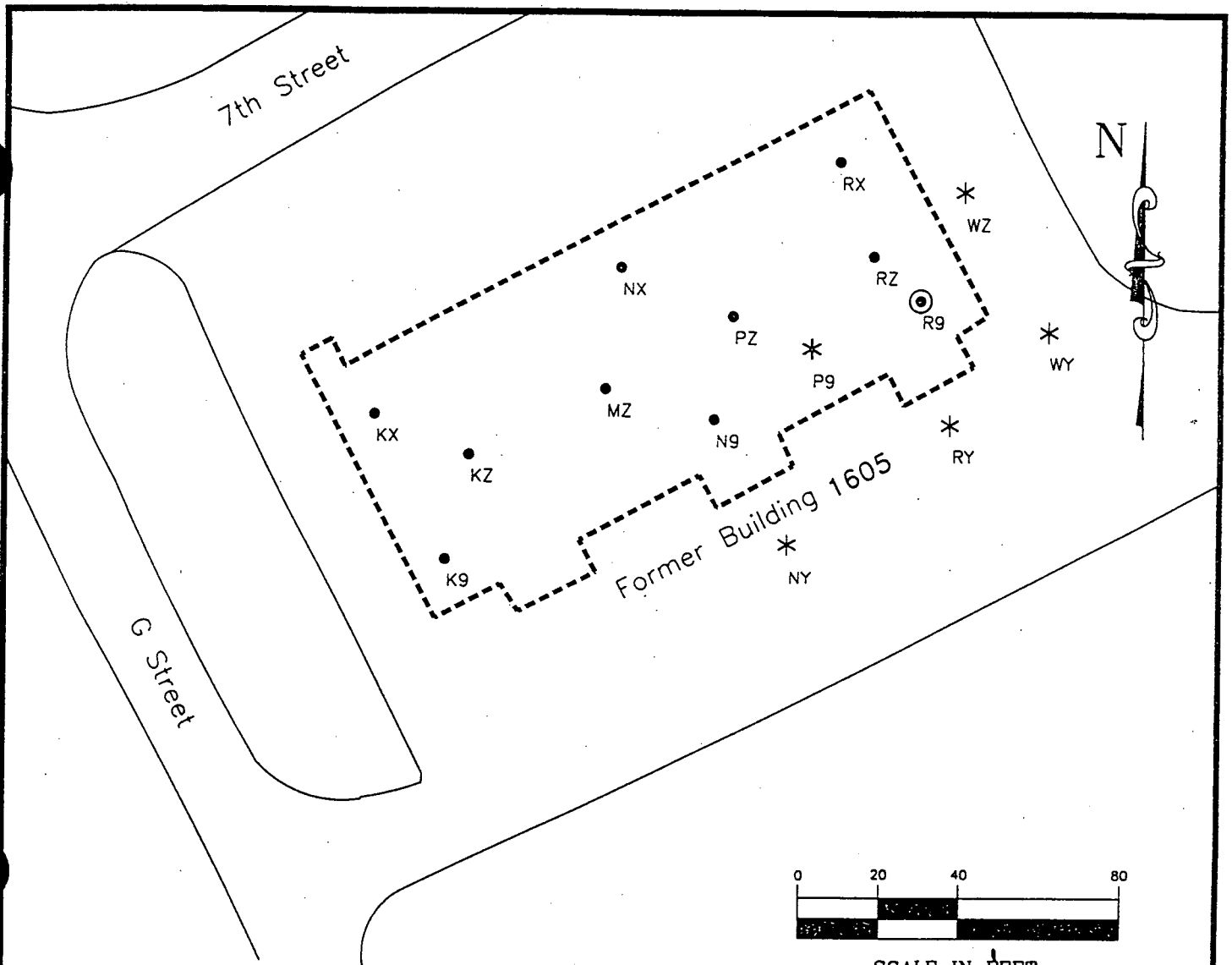


Soil gas samples were collected and analyzed for chlorinated organic compounds and petroleum hydrocarbons using EPA Methods 8010 and 8020 modified, respectively. No detections were found.

Figure III-1: FORMER FURNITURE REPAIR SHOP -  
 FORMER BUILDING 1301 - CAMP FUNSTON  
 SAMPLING LOCATIONS  
 FORT RILEY, KANSAS

January 1997

File: sid.dwg



LEGEND	
	Former Building Footprint
C4 ●	Phase I Soil Gas Samples (September 1993)
P9* ●	Phase II Soil Gas and Samples (September 1993) Groundwater Screening
⊙	Phase I Soil Gas, and Phase II Groundwater Screening and Soil Samples (Sep/Oct 1993)

DETECTION AT SAMPLE LOCATION R9	
Sample Media	Soil Gas
Sample Depth (feet)	4
Analytical Methods	EPA Methods 8010 and 8020 modified
Organic Compounds (micrograms per liter - µg/l)	
Total Flame Ionization Detector Volatiles	660
Groundwater screening samples were collected and analyzed for chlorinated organic compounds and petroleum hydrocarbons using EPA Methods 8010 and 8020 modified, respectively. There were no detections.	
Soil samples were collected from depths of 18" and 3'-4' and analyzed for volatile organic compounds and petroleum hydrocarbons using EPA Methods 8240 and 8015 modified, respectively. There were no detections.	

Figure III-2: FORMER FURNITURE REPAIR SHOP - FORMER BUILDING 1605 - CAMP FUNSTON SAMPLING LOCATIONS FORT RILEY, KANSAS

January 1997

File: sid...

#### **IV. SITE: Camp Forsyth Landfills Areas 1, 2, 3, 4, and 5**

##### **1. SITE DESCRIPTION**

The site investigation results for the Camp Forsyth Landfills Areas 1, 2, 3, 4, and 5 (Figure IV-1) were reported in the SI report for Other Sites. The nearest residential area is on the outskirts of Junction City, Kansas, which is about one-fourth mile south of Area 1 on the opposite side of the Republican River. This Decision Document addresses the surface condition of the landfill areas and groundwater concerns.

The investigation at Camp Forsyth Landfills Areas 1, 2, 3, 4, and 5 focused on whether groundwater or soil contamination exists in and around the landfill areas that could have received hazardous substances as a result of landfill operations. While some areas were known to have been landfills, others were addressed as suspected sites. Area 1 was used as a landfill prior to 1950 and included historic dump areas, while Area 2 was used as a landfill from about 1950 to 1956. The waste materials observed in Area 2 consist primarily of household trash and housing unit renovation debris (clotheslines, washing machines, etc.). On the other hand, Area 3 is in an area formerly used as a quarry where excavation occurred; Area 4 shows evidence of construction debris; and Area 5 shows evidence of excavation. Areas 3, 4, and 5 were determined not to be landfill areas. In 1994, unexploded ordnance (UXO) was observed on a sand bar near Area 2 and was detonated in place. This material may have eroded out of the riverbank in Area 2 as a result of the 1993 flooding.

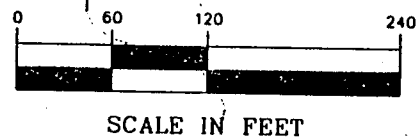
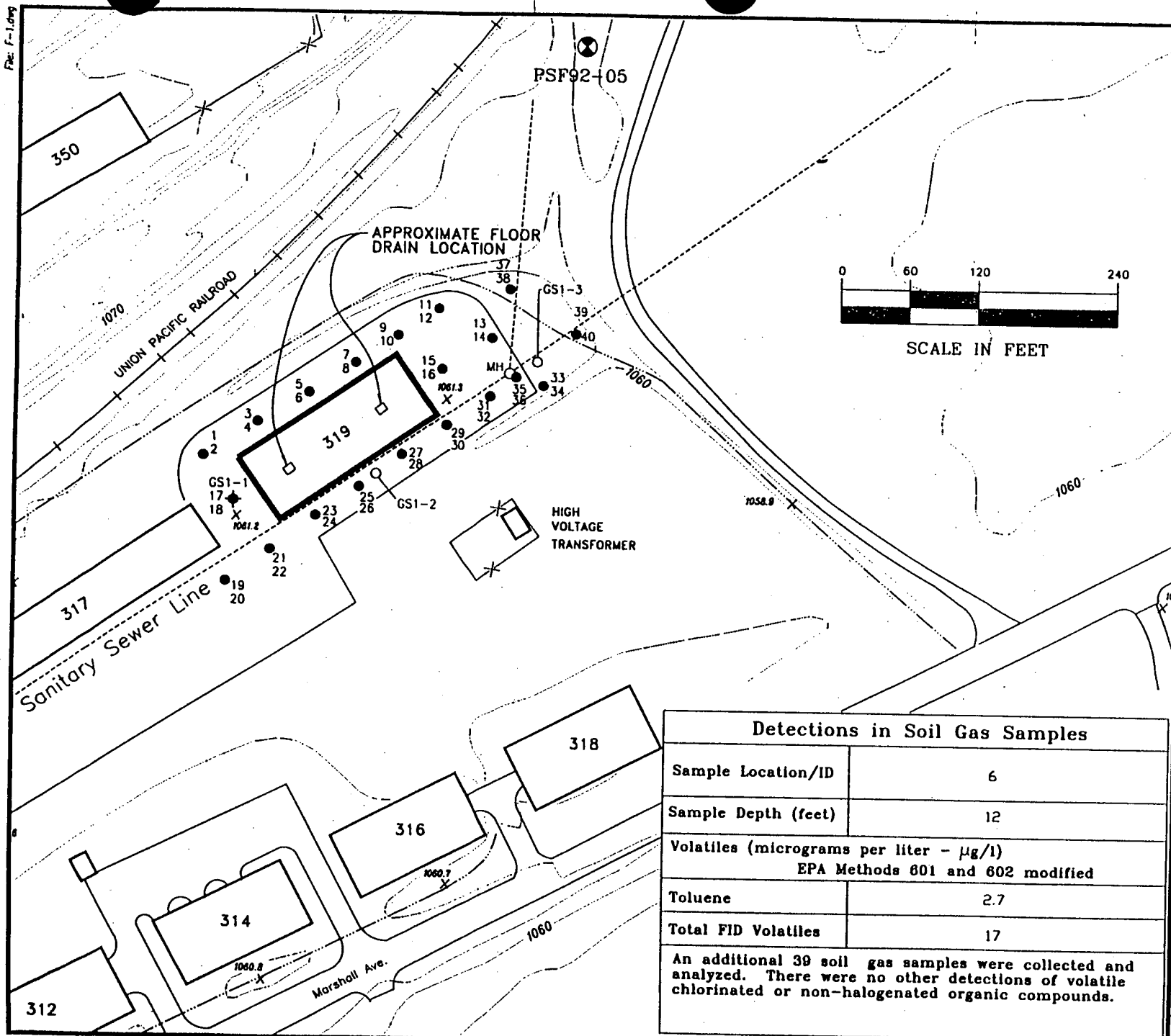
Ten soil gas samples were collected from the eastern boundary of Area 1 and along the western edge of Area 2 at a depth of approximately 4 feet, equivalent to the visible or potential depth of the waste in the landfill. Eight groundwater screening samples were collected around the northern edge of Area 1, from the southeastern edge of Area 2, and the eastern boundary of Area 4, and from the eastern side of Area 5. There were no detections of VOCs in any of the soil gas or groundwater screening samples except in Area 2 where dichloromethane was detected at a concentration of 1.8  $\mu\text{g/l}$  in one soil gas sample and carbon disulfide was detected at a concentration of 22  $\mu\text{g/l}$  in one groundwater screening sample. This carbon disulfide was approximately equivalent to the EPA risk-based guideline for tap water of 21  $\mu\text{g/l}$ . The detection of carbon disulfide in the screening sample was not confirmed by subsequent sampling in February 1996 of three downgradient wells. No volatile or semivolatile organic compounds were detected in the February 1996 groundwater sampling.

In December 1993, five monitoring wells in the area were sampled and analyzed. There was a single detection of silver in one well downgradient of Area 3, in a duplicate sample at a concentration of 0.02 mg/l, an order of magnitude below the EPA guidance level of 0.1 mg/l, as a secondary MCL. (Secondary MCL address aesthetic characteristics, not health concerns.)

##### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to protect human health and the environment due to landfill surface condition or groundwater contamination as no significant contamination exists at the sites. Potential hazards due to exposed debris in the riverbank and bank stability concerns are being addressed as a separate project.

File: F-1.dwg



**LEGEND**

- ⊗ MONITOR WELL
- SOIL GAS (4' and 12') (March 1993)  
EVEN Numbers = 12' Sample  
ODD Numbers = 4' Sample
- ◆ SOIL GAS and GROUNDWATER SCREENING (March 1993)
- GS1 ○ GROUNDWATER SCREENING (18') (9 March 1993)
- ELEVATION CONTOUR
- - - DRAINAGE
- BUILDINGS
- == ROAD
- + RAIL LINES
- × FENCE LINES
- - - - SANITARY SEWER LINE
- MH MANHOLE

**Detections in Soil Gas Samples**

Sample Location/ID	6
Sample Depth (feet)	12
Volatiles (micrograms per liter - $\mu\text{g}/\text{l}$ ) EPA Methods 801 and 802 modified	
Toluene	2.7
Total FID Volatiles	17

An additional 39 soil gas samples were collected and analyzed. There were no other detections of volatile chlorinated or non-halogenated organic compounds.

**Figure IV-1:  
FORMER FURNITURE  
REPAIR AND  
SMALL ARMS SHOP -  
BUILDING 319  
SAMPLING LOCATIONS  
FORT RILEY, KANSAS**

January 1997

## **V. SITE: Print and Publications Shop**

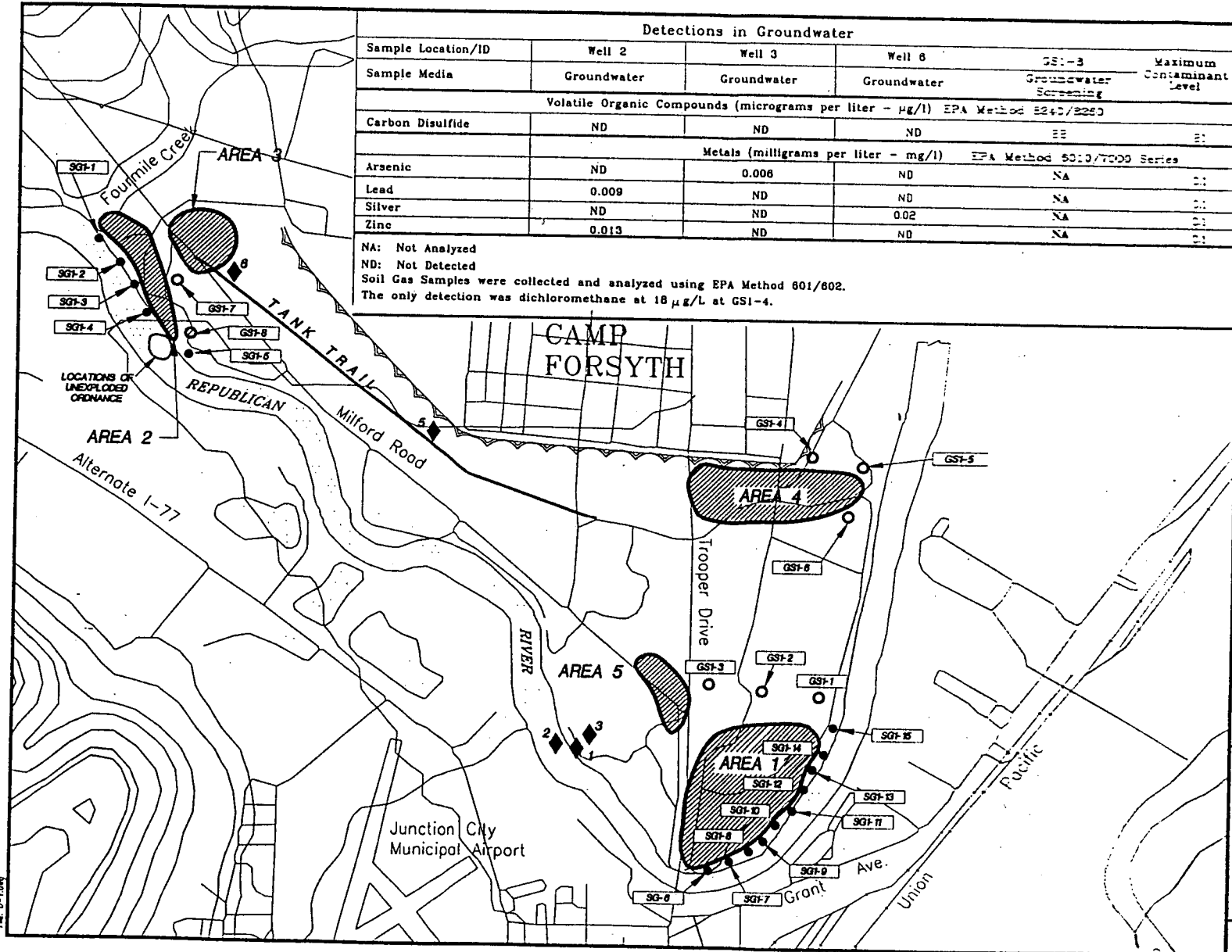
### **1. SITE DESCRIPTION**

The site investigation results for the Print and Publications Shop, building 263 on Main Post (Figure V-1) were reported in the SI report for Other Sites. The nearest residential area is Main Post Family Housing, about one-fourth mile north of this site. Much of the area around the building is paved. Adjacent buildings are used for administrative and light industrial activities.

The investigation at the Print and Publications Shop focused on identifying whether soil contamination exists around the perimeter of the building from accidental spills or discharges or from leaks from sanitary sewer lines which may have received hazardous substances disposed down the drain. In the past, waste inks and solvents were poured down the sink drain into the sanitary sewer. Waste rags and cleaning pads wetted with solvents were disposed of in a dumpster. There were detections of volatile chlorinated organics and petroleum hydrocarbons in the 16 of 51 soil gas samples that were collected around the building and near sewer lines. To further assess the potential for soil contamination, twenty-three soil samples were collected from six soil boring locations along the sewer line at selected depths to assess vertical migration. Groundwater was not encountered in the soil borings, thus impact to groundwater is unlikely. Tetrachloroethylene [PCE] at 83  $\mu\text{g}/\text{kg}$ , trichloroethylene [TCE] at 33  $\mu\text{g}/\text{kg}$ , and toluene at 33  $\mu\text{g}/\text{kg}$  were detected in one soil sample. The detected concentrations were much lower than the EPA Region IX Industrial risk-based guidelines of 25,000, 17,000, and 2,700,000  $\mu\text{g}/\text{kg}$ , respectively.

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

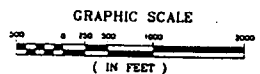
No action is necessary at the Print and Publication Shop site to protect human health and the environment as contamination detected was of limited extent and at levels significantly below EPA risk-based guidelines. In addition, the area is paved with asphalt, which prevents human exposure.



N

**LEGEND**

- SOIL GAS SAMPLE (9 MARCH 1994) (4')
- GROUNDWATER SCREENING SAMPLE LOCATIONS (12 MARCH 1994)
- ◆ USGS INSTALLED WELLS (DECEMBER 1993) (FEBRUARY 1996)
- ▨ AREA OF INTEREST
- ROAD
- - - RAILROAD
- ▬ LEVEE



**Figure V-1:**  
**CAMP FORSYTH FORMER**  
**LANDFILL AREAS**  
**SAMPLING LOCATIONS**  
**FORT RILEY, KANSAS**

Fig. D-1.dwg



## **VI. SITE: Former Livestock Dipping Facility**

### **1. SITE DESCRIPTION**

The site investigation results for the Former Livestock Dipping Facility ( Figure VI-1) were reported in the SI report for Other Sites. The nearest residential area is Main Post Family Housing, which is about one-fourth mile northwest of the site. The site is located in a wooded area not frequented by residents or workers on the opposite side of a drainage ditch from the Pesticide Storage Facility site where a Removal Action was performed in 1994.

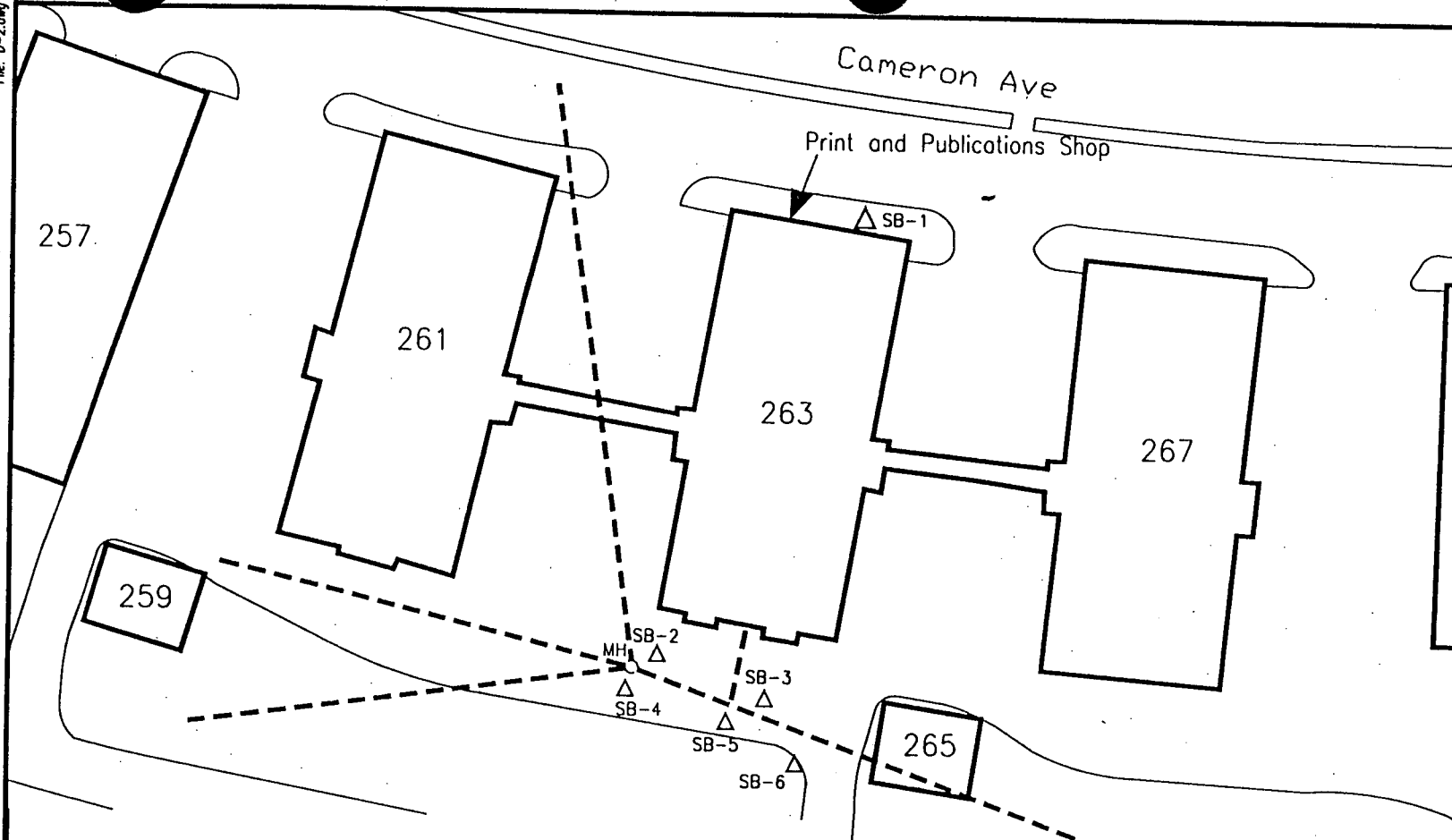
The investigation at the Former Livestock Dipping Facility focused on identifying whether soil contamination exists around the remnants of main facilities such as the foot bath, dipping pit, draining pen, and the areas east of the adjacent drainage ditch. Pesticides, some compounds of which contained metals, were used to kill parasites and disease-carrying organisms infecting the animals brought on-post. Chemicals could potentially have been released into the environment by spills, overflows, poor material handling practices, drippings from the animals, subsurface leaks from the concrete structures, or leaks from piping leading to and from the structures. Thirty-one (31) Soil samples were collected from 16 soil boring locations, from surface level to a depth of 12 feet from inside the draining pen, mixing building, dipping pit, and cut-out pen.

Pesticides and metals were detected within the perimeter of the former mixing building, near the drainage pen, and within the dipping pit, with the highest concentration found in the mixing pit. The concentrations of the pesticides 4,4'-dichlorodiphenyldichloroethane (4,4'-DDE) and 4,4'-dichlorodiphenyltrichloroethane (4,4'-DDT) found in the less than 1 cubic foot of soil in the pit were 3,600  $\mu\text{g}/\text{kg}$  and 4,000  $\mu\text{g}/\text{kg}$ , respectively. While these levels exceeded the Pesticide Storage Facility Removal Action Goal of 1,730  $\mu\text{g}/\text{kg}$ , the level of exposure to the soil in the mixing pit would be much less than that assumed for light industrial activities at the PSF site. Lead was also detected in the mixing pit at 670  $\text{mg}/\text{kg}$ , below the EPA risk-based guideline of 1,000  $\text{mg}/\text{kg}$  for industrial soil. Arsenic was detected in soil samples at concentrations of 1 to 8  $\text{mg}/\text{kg}$ , which exceed the EPA risk-based guideline of 2.0  $\text{mg}/\text{kg}$ , but were below the SSL of 15  $\text{mg}/\text{kg}$  for transfer to groundwater and within the magnitude of identified background levels (7.1) in the Fort Riley area. The depth to groundwater is about 20 feet at this site, which is over a mile from the nearest drinking water well. Pesticide contamination has not been found in the groundwater at the adjacent PSF site where much larger quantities of pesticides existed the soils, therefore, groundwater contamination is not expected to have occurred at this site. Barium, cadmium, chromium, and mercury were detected at concentrations well below the EPA Region IX Industrial risk-based guidelines. The small amount (less than 1 cubic foot) contaminated soil in the mixing pit has been removed and disposed of as hazardous waste.

Soil samples were collected in the adjacent drainage ditch in 1992 as part of the remedial investigation of the adjacent Pesticide Storage Facility (Remedial Investigation Report for Remedial Investigation/Feasibility Study Pesticide Storage Facility, December 1993). The PSF risk assessment (RI Addendum, June 1997) indicates that risk due to exposure to sediments is negligible ( $10^{-6}$ ).

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to protect human health and the environment. Except for the limited amount of soil in the mixing pit (which has been removed), concentrations of contamination are well below conservative risk-based guidelines. No impact to groundwater is likely and risk due to sediments in an adjacent drainage ditch has been determined to be negligible.



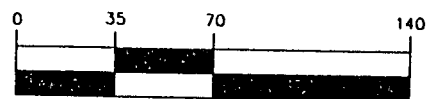
**LEGEND**

- △ SOIL BORING LOCATION (12-14 April 1994) (4'-20')
- SEWER LINES
- MH MANHOLE
- ▭ BUILDINGS
- ══ ROAD



Detections in Soil Samples		
Sample Location/ID	SB-5	EPA Region IX PRGs (Industrial) (Feb 95)
Sample Depth (feet)	4-5	
Analytical Methods	EPA Method 8240 EPA Method 8015 modified	
Volatiles (micrograms per kilogram - µg/kg)		
Tetrachloroethylene	83	25,000
Toluene	33	2,700,000
Trichloroethylene	33	17,000

There were no detections of volatile organic compounds or total petroleum hydrocarbons in the other soil samples.



SCALE IN FEET

**Figure VI-1:  
PRINT AND PUBLICATIONS  
SHOP  
SAMPLING LOCATIONS  
FORT RILEY, KANSAS**

## **VII. SITE: Former Furniture Repair and Small Arms Shop**

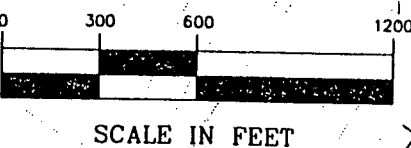
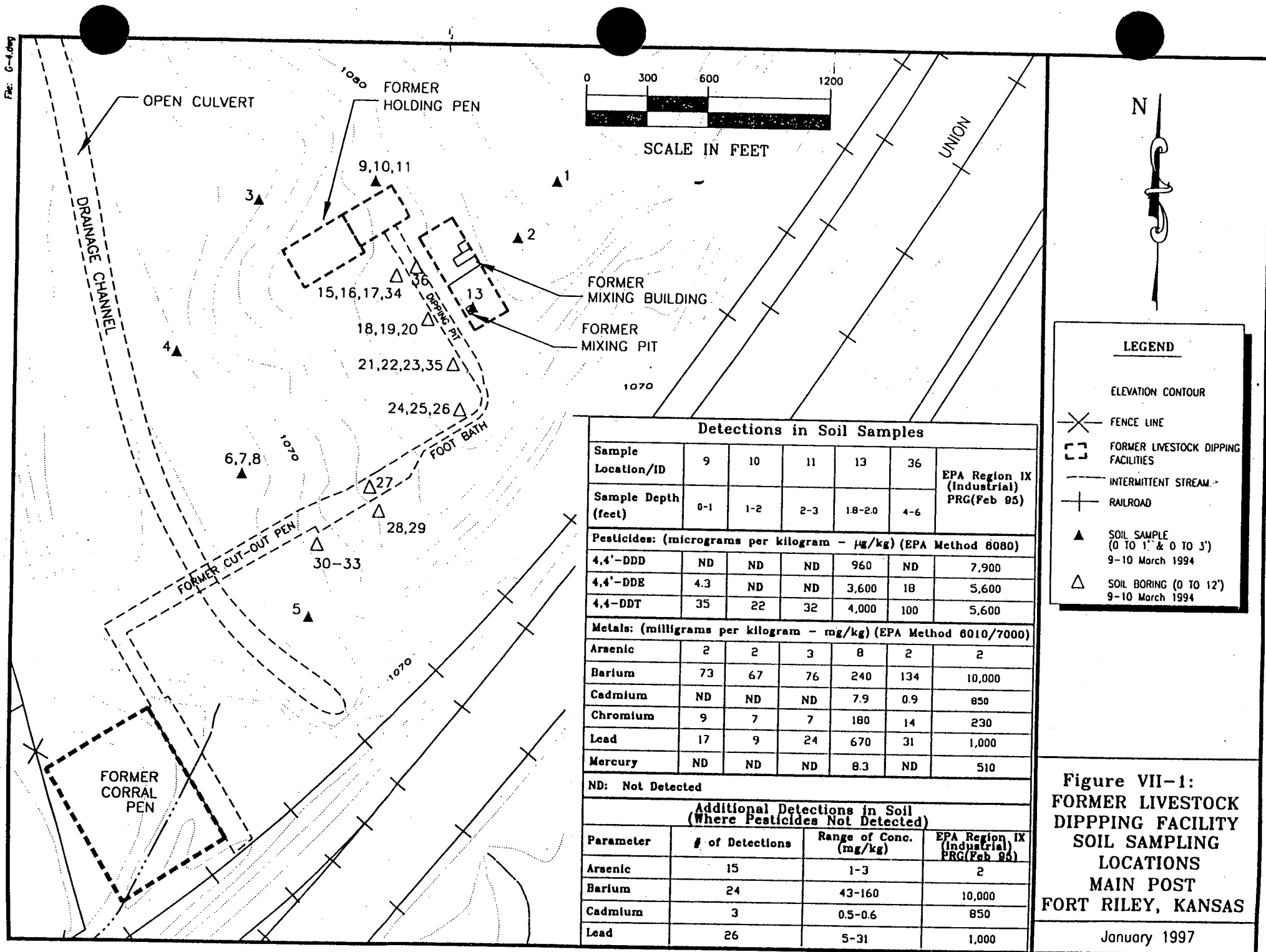
### **1. SITE DESCRIPTION**

The site investigation results for the Former Furniture Repair and Small Arms Shop - Building 319 (Figure VII-1) were reported in the SI report for Other Sites as "Building 319". The nearest residential area is Main Post Family Housing, about one-third mile northwest of the site. The building is currently used for administrative purposes and the adjacent area used for storage and light industrial activity.

The investigation at the Former Furniture Repair and Small Arms Shop focused on identifying whether soil contamination exists around the perimeter of the building from spills or materials handling practices, or around the sanitary sewer line from leaks of hazardous material disposed in the floor drain. Potential contaminants associated with former activities may have included volatile and semi-volatile compounds associated with cleaners, solvents, and paints; as well as lead and copper residues in waste cleaners. Forty soil gas and three groundwater screening samples were collected around the building. Soil gas samples were taken at locations from depths of 4 to 12 feet. The only detections in the soil gas samples were for toluene (2.7  $\mu\text{g/l}$ ) and total hydrocarbons (17  $\mu\text{g/l}$ ) at one location. There were no detections in the groundwater screening samples.

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to protect human health and the environment. Groundwater has not been impacted and a soil gas survey indicated that soil contamination is minimal.



**LEGEND**

- ELEVATION CONTOUR
- FENCE LINE
- FORMER LIVESTOCK DIPPING FACILITIES
- INTERMITTENT STREAM
- RAILROAD
- SOIL SAMPLE (0 TO 1' & 0 TO 3')
- SOIL BORING (0 TO 12')

**Detections in Soil Samples**

Sample Location/ID	9	10	11	13	36	EPA Region IX (Industrial) PRG(Feb 95)
Sample Depth (feet)	0-1	1-2	2-3	1.8-2.0	4-6	
<b>Pesticides: (micrograms per kilogram - µg/kg) (EPA Method 8080)</b>						
4,4'-DDD	ND	ND	ND	960	ND	7,900
4,4'-DDE	4.3	ND	ND	3,600	18	5,600
4,4'-DDT	35	22	32	4,000	100	5,600
<b>Metals: (milligrams per kilogram - mg/kg) (EPA Method 8010/7000)</b>						
Arsenic	2	2	3	8	2	2
Barium	73	67	76	240	134	10,000
Cadmium	ND	ND	ND	7.9	0.9	850
Chromium	9	7	7	180	14	230
Lead	17	9	24	670	31	1,000
Mercury	ND	ND	ND	8.3	ND	510

ND: Not Detected

**Additional Detections in Soil (Where Pesticides Not Detected)**

Parameter	# of Detections	Range of Conc. (mg/kg)	EPA Region IX (Industrial) PRG(Feb 95)
Arsenic	15	1-3	2
Barium	24	43-160	10,000
Cadmium	3	0.5-0.6	850
Lead	26	5-31	1,000

**Figure VII-1:  
FORMER LIVESTOCK  
DIPPING FACILITY  
SOIL SAMPLING  
LOCATIONS  
MAIN POST  
FORT RILEY, KANSAS**

January 1997

## **VIII. SITE: Whitside Former Incinerator**

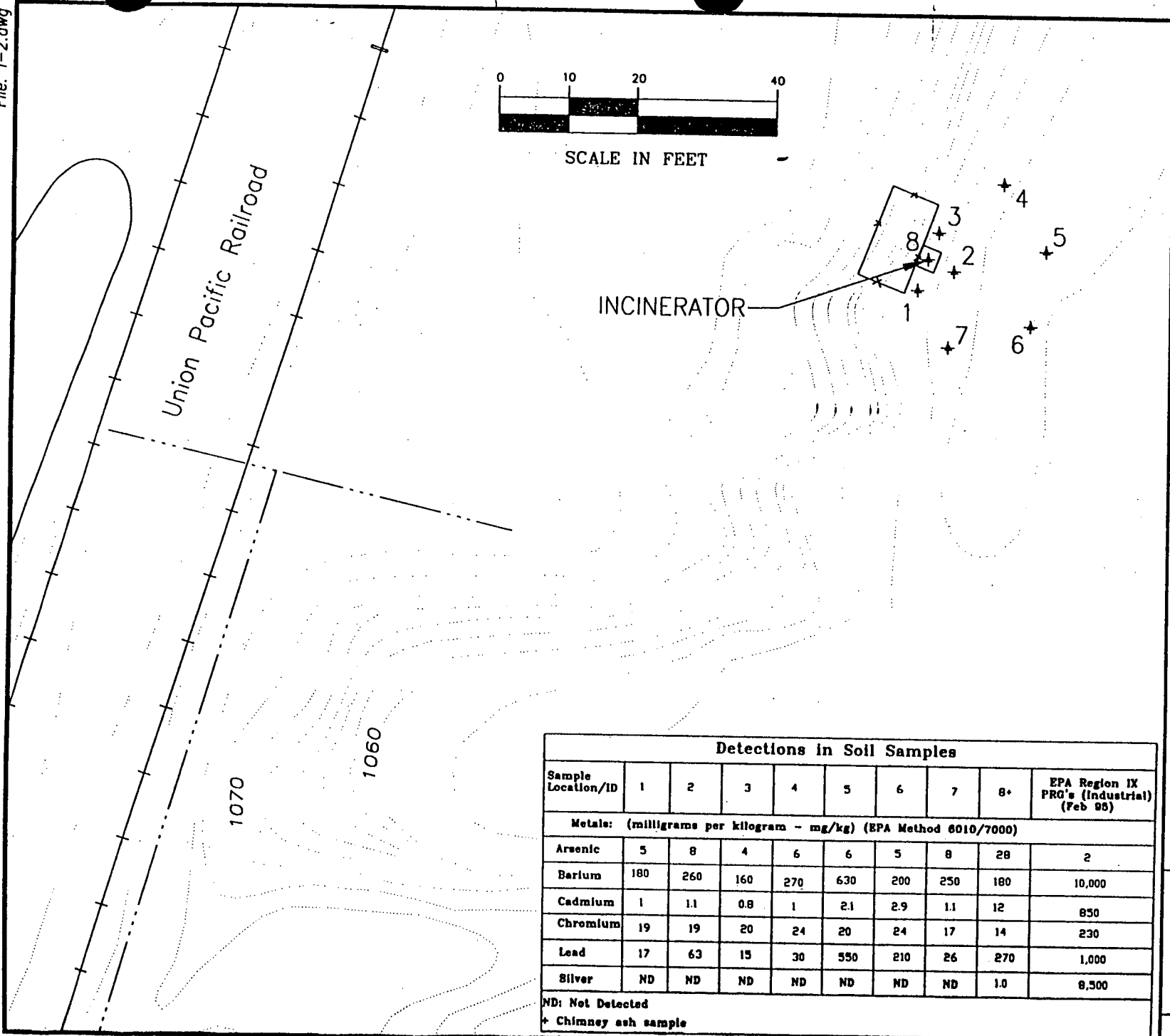
### **1. SITE DESCRIPTION**

The site investigation results for the Whitside Former Incinerator (Figure VIII-1) were reported in the SI report for Other Sites. The nearest residential area is Camp Whitside Family Housing, about one-third mile west of the site. The site is located near a nature trail which traverses through a wooded area along the Kansas River. The soil is covered by vegetation and is not susceptible to erosion.

The investigation at the Whitside Former Incinerator focused on identifying whether soil contamination exists from incinerator ash in the incinerator structure and in the soil adjacent to and downslope from the incinerator. Soil samples were taken both in and around the incinerator. Samples were collected adjacent to the structure on the downhill side, from mounds on either side of the structure, and downhill and downgradient of the incinerator. Lead was detected in all samples at concentrations from 17 to 550 mg/kg. The sample at 550 mg/kg inside the incinerator was below the EPA Region IX risk-based guideline of 1,000 mg/kg for industrial soil. Arsenic was detected at concentrations ranging from 2-28 mg/kg which exceeded the EPA risk-based guideline of 2.0 mg/kg, however the exposure level at this site is much less than in an industrial setting. Frequent or prolonged exposure is not expected. Only one sample exceeded the magnitude of the identified background level (7.1 mg/kg) for the Fort Riley area or the SSL of 15 mg/kg for transfer to groundwater. Barium, cadmium, chromium, and silver were detected at concentrations below the EPA risk-based guidelines. Results from the samples taken furthest downgradient indicated that elevated levels of metals are not migrating to surface water.

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to be protective of human health and the environment. Arsenic was detected in only one soil/ash sample above the area background or the SSL for transfer to groundwater.



SCALE IN FEET



**LEGEND**

- + SOIL SAMPLE AND XRF SAMPLE LOCATION (0.5-2') (6 March 1994)
- ..... ELEVATION CONTOUR
- - - - DRAINAGE
- +— RAIL LINES
- >— FENCE LINES

Detections in Soil Samples									
Sample Location/ID	1	2	3	4	5	6	7	8*	EPA Region IX PRG's (Industrial) (Feb 95)
Metals: (milligrams per kilogram - mg/kg) (EPA Method 8010/7000)									
Arsenic	5	8	4	6	6	5	8	28	2
Barium	180	260	160	270	630	200	250	180	10,000
Cadmium	1	1.1	0.8	1	2.1	2.9	1.1	12	850
Chromium	19	19	20	24	20	24	17	14	230
Lead	17	63	15	30	550	210	26	270	1,000
Silver	ND	ND	ND	ND	ND	ND	ND	1.0	8,500
ND: Not Detected									
+ Chimney ash sample									

**Figure VIII-1  
FORMER CAMP  
WHITESIDE INCINERATOR  
SAMPLING LOCATIONS  
CAMP WHITESIDE  
FORT RILEY, KANSAS**

January 1997

## **IXa. SITE: DRMO Area 2**

### **1. SITE DESCRIPTION**

The site investigation results for the Defense Reutilization and Marketing Office (DRMO) Area 2 which was used from 1975-1978 were reported in the SI report for Other Sites. DRMO Area 2 is located at Twelfth Street and L Street at Camp Funston (Figure IX-1). The buildings have been razed.

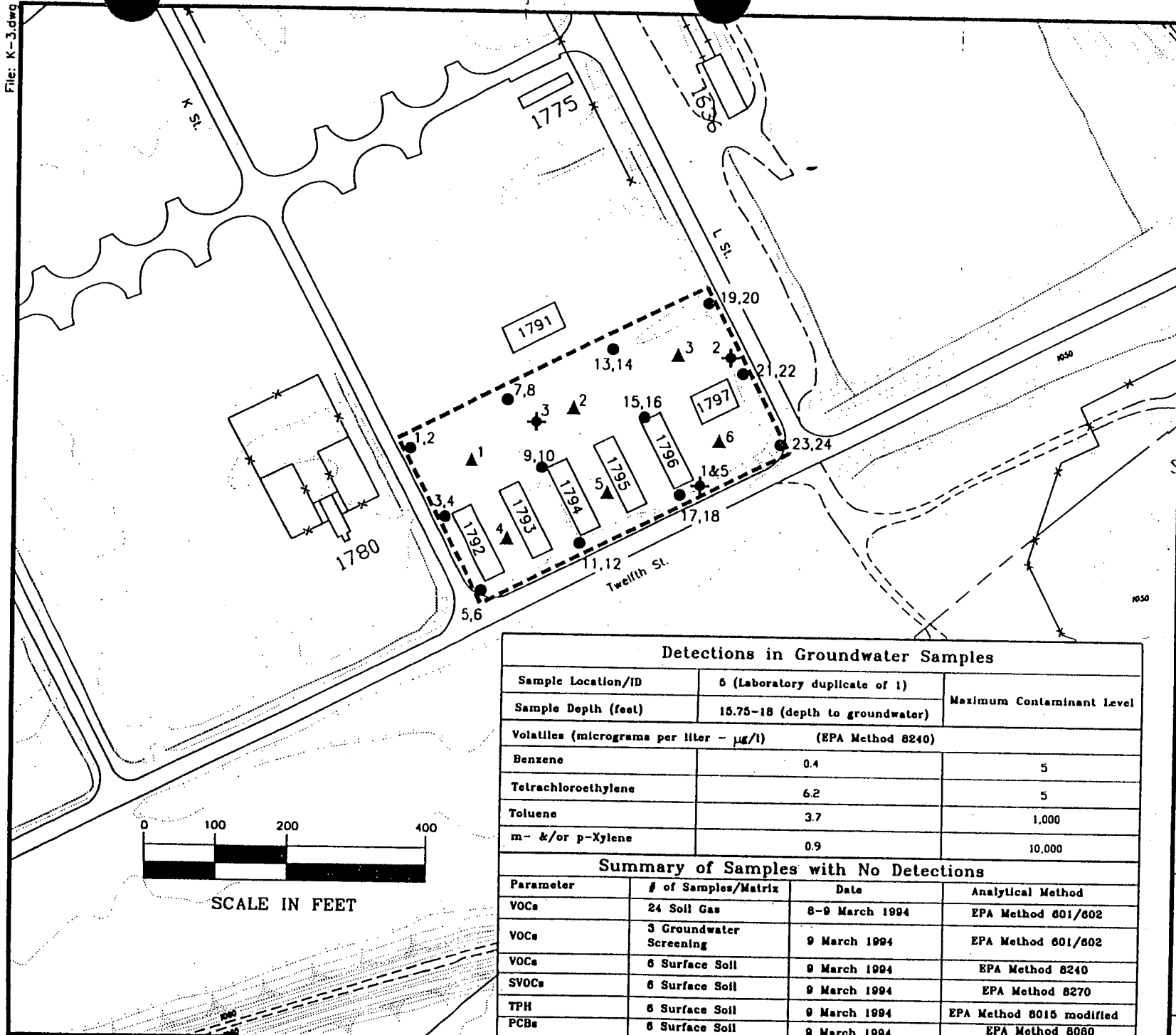
A kennel for Military Police dogs is currently located adjacent to the site. The nearest residential area is in Ogden, Kansas, which is approximately one mile east-northeast. This Decision Document addresses the soil media; groundwater is being addressed by under a separate project.

The investigation at DRMO Area 2 focused on identifying whether soil contamination and groundwater contamination has resulted from site operations. The DRMO is a collection point for used, surplus, or discarded materials that still have economic value. The potential hazardous substances likely to have previously been managed at the site include solvents, fuels, toxic metals, PCBs, and waste oil. Investigation at DRMO Area 2 included collection of 24 soil gas samples at 12 locations, at depths of 4 and 12 feet, three groundwater screening samples, and six soil samples taken from the surface to a depth of 1 foot.

There were no detections of VOCs in the soil gas samples, nor detections of organic compounds or metals in the soil. PCE was detected at 6.2  $\mu\text{g/l}$  in the groundwater screening sample, slightly exceeding the MCL of 5  $\mu\text{g/l}$ . This sample also contained low levels of gasoline components - benzene at 0.4  $\mu\text{g/l}$ , toluene at 3.7  $\mu\text{g/l}$ , and m- and/or p-xylene at 0.9  $\mu\text{g/l}$ , all below the MCLs of 5  $\mu\text{g/l}$ , 1,000  $\mu\text{g/l}$ , and 10,000  $\mu\text{g/l}$ , respectively. The organic compounds detected in the groundwater sample were not found in the soil gas samples, indicating that the soil is not the source of the groundwater contamination. To further evaluate this site, a monitoring well (CF97-301), was installed just southeast of this site in the Spring of 1997 and sampled in June 1997. The analyses did not detect any volatile or semi-volatile organic compounds (with the exception of Dichloromethane which was also present in the blank and is determined to be the result of laboratory contamination).

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

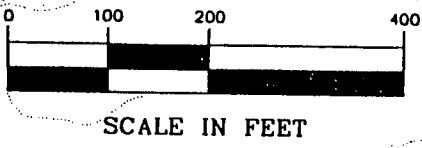
No action is necessary at this site to ensure protection of human health and the environment. No contamination was found in soil gas and soil samples. The contamination identified in the groundwater is not believed to be associated with operations at this site and is being addressed by under a separate project.



N

**LEGEND**

- ◆ GROUNDWATER SCREENING SAMPLES (8-9 March 1994)
- SOIL GAS (4' & 12') (9, 14 March 1994)  
ODD NUMBERS=4' SAMPLE  
EVEN NUMBERS=12' SAMPLE
- ▲ SURFACE SOIL SAMPLES (0-1') (9 March 1994)
- ELEVATION CONTOUR
- - - DRAINAGE
- ▭ BUILDINGS
- [ - - - ] AREA OF INTEREST
- == ROAD
- \* - \* - FENCE LINES
- ⋯ LEVEE



Detections in Groundwater Samples			
Sample Location/ID	6 (Laboratory duplicate of 1)	Maximum Contaminant Level	
Sample Depth (feet)	15.75-18 (depth to groundwater)		
Volatiles (micrograms per liter - µg/l) (EPA Method 8240)			
Benzene	0.4	5	
Tetrachloroethylene	6.2	5	
Toluene	3.7	1,000	
m- &/or p-Xylene	0.9	10,000	
Summary of Samples with No Detections			
Parameter	# of Samples/Matrix	Date	Analytical Method
VOCs	24 Soil Gas	8-9 March 1994	EPA Method 601/602
VOCs	3 Groundwater Screening	9 March 1994	EPA Method 601/602
VOCs	6 Surface Soil	9 March 1994	EPA Method 8240
SVOCs	6 Surface Soil	9 March 1994	EPA Method 8270
TPH	6 Surface Soil	9 March 1994	EPA Method 8015 modified
PCBs	6 Surface Soil	9 March 1994	EPA Method 8080

**Figure IX-1:  
DRMO AREA 2  
(FORMERLY USED)  
SAMPLING LOCATIONS  
CAMP FUNSTON  
FORT RILEY, KANSAS**

January 1997



## **IXb. SITE: DRMO Area 3**

### **1. SITE DESCRIPTION**

The site investigation results for the DRMO Area 3 used from 1972-1975 were reported in the SI report for Other Sites. DRMO Area 3 is located at Fifth Street and K Street at Camp Funston (see Figure IX-2) and is currently used for equipment storage. The nearest residential area is in Ogden, Kansas, approximately one mile to the east.

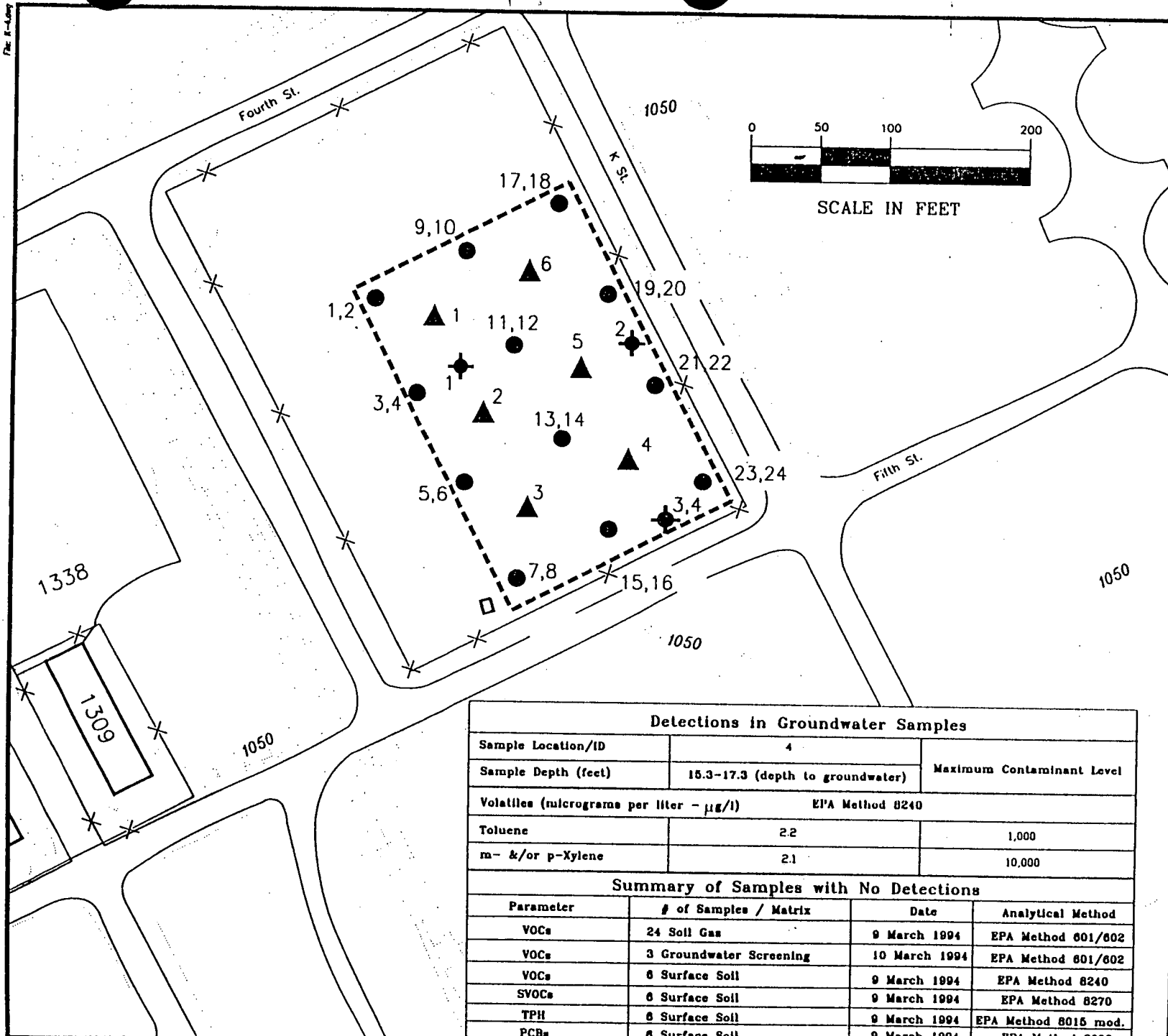
The investigation at DRMO Area 3 focused on identifying whether soil contamination and groundwater contamination has resulted from site operations. The DRMO is a collection point for used, surplus, or discarded materials that still have economic value. Hazardous substances which may have been contained in materials previously been managed at the site include solvents, fuels, toxic metals, PCBs, and waste oil. Investigation at DRMO Area 3 included collection of 24 soil gas samples at 12 locations, at depths of 4 and 12 feet, three groundwater screening samples, and six soil samples taken from the surface to a depth of 1 foot.

There were no detections of VOCs in the soil gas samples, and no detections of organic compounds or metals in the soil. One groundwater screening sample had a detection of toluene at 2.2  $\mu\text{g/l}$ , three orders of magnitude below the MCL of 1,000  $\mu\text{g/l}$  and a detection of m- and/or p-xylene at 2.1  $\mu\text{g/l}$ , which were less than four orders of magnitude below the MCL of 10,000  $\mu\text{g/l}$ .

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

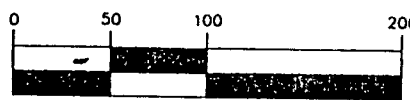
No action is necessary to ensure protection of human health and the environment. Contamination was detected in only one groundwater screening sample at levels significantly less than the MCLs.

Fig. IX-2



**LEGEND**

- ◆ GROUNDWATER SCREENING SAMPLE (10 March 1994)
- SOIL GAS (4&12') (9 March 1994)  
ODD NUMBERS=4' SAMPLE  
EVEN NUMBERS = 12' SAMPLES
- ▲ SURFACE SOIL SAMPLE (0-1 ft.)
- ELEVATION CONTOUR
- BUILDING
- ⊞ AREA OF INTEREST
- ROAD
- ✕ FENCE LINE



SCALE IN FEET

Detections in Groundwater Samples		
Sample Location/ID	4	
Sample Depth (feet)	15.3-17.3 (depth to groundwater)	Maximum Contaminant Level
Volatiles (micrograms per liter - $\mu\text{g/l}$ )	EPA Method 8240	
Toluene	2.2	1,000
m- &/or p-Xylene	2.1	10,000

Summary of Samples with No Detections			
Parameter	# of Samples / Matrix	Date	Analytical Method
VOCs	24 Soil Gas	9 March 1994	EPA Method 801/802
VOCs	3 Groundwater Screening	10 March 1994	EPA Method 801/802
VOCs	6 Surface Soil	9 March 1994	EPA Method 8240
SVOCs	6 Surface Soil	9 March 1994	EPA Method 8270
TPH	6 Surface Soil	9 March 1994	EPA Method 8015 mod.
PCBs	6 Surface Soil	9 March 1994	EPA Method 8080

**Figure IX-2:  
DRMO AREA 3  
(FORMERLY USED)  
SAMPLING LOCATIONS  
CAMP FUNSTON  
FORT RILEY, KANSAS**

January 1997

**X. SITE: Former Milford Lake Recreation Area**

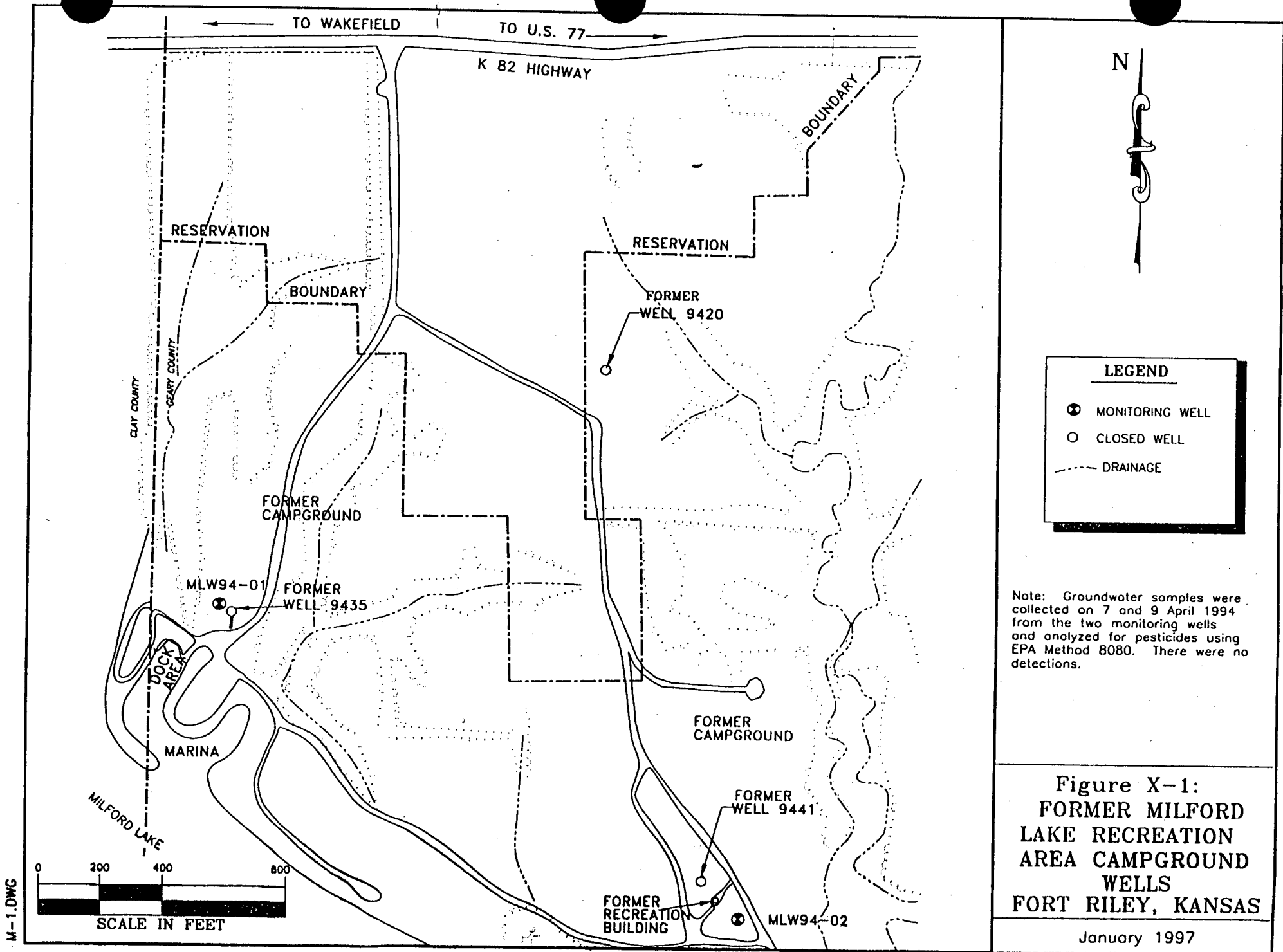
**1. SITE DESCRIPTION**

The site investigation results for the Former Milford Lake Recreation Area ( Figure X-1) were reported in the SI report for Other Sites. This site is located in a remote area on the western part of Fort Riley, where the nearest residential areas are over 5 miles away. The recreation area and the drinking water wells there were closed in 1989.

The investigation at the Former Milford Lake Recreation Area focused on identifying whether lindane or other pesticides had contaminated the groundwater. In 1988, lindane was detected in a sample from one of the three former drinking water wells in the area. The low concentration of lindane was less than the MCL in effect at the time, however, the MCL for lindane was later revised and lowered so that the concentration detected was above the current MCL. Two new monitoring wells were installed in the area in order to assess the previous detection of lindane. There were no detections of any pesticides in the groundwater samples from these new wells.

**2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to ensure protection of human health and the environment as no contamination was identified.



**XI. SITE: Custer Hill Golf Course Pesticide Storage Facility**

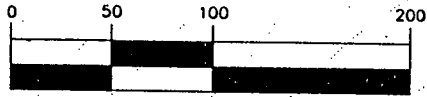
**1. SITE DESCRIPTION**

The site investigation results for the Custer Hill Golf Course Pesticide Storage Facility (Figures XI-1 and XI-2) were reported in the SI report for Other Sites. The nearest residential area is Custer Hill Family Housing, which is about a quarter of a mile to the west.

The investigation at Custer Hill Golf Course Pesticide Storage Facility focused on identifying whether surface soil contamination existed around current and former facilities, including localized drainage pathways. These areas could potentially have been contaminated by pesticide spills or washdown/runoff from equipment rinsing and maintenance. Three soil samples were collected around the footprint of the Former Pesticide Storage Building 6426 (Figure XI-1). Four soil samples were also collected in the area of Building 5207, adjacent to and downgradient from the washdown pad (Figure XI-2). There were no detections of pesticides or herbicides in any of the soil samples.

**2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to ensure protection of human health and the environment as no contamination was identified.



SCALE IN FEET



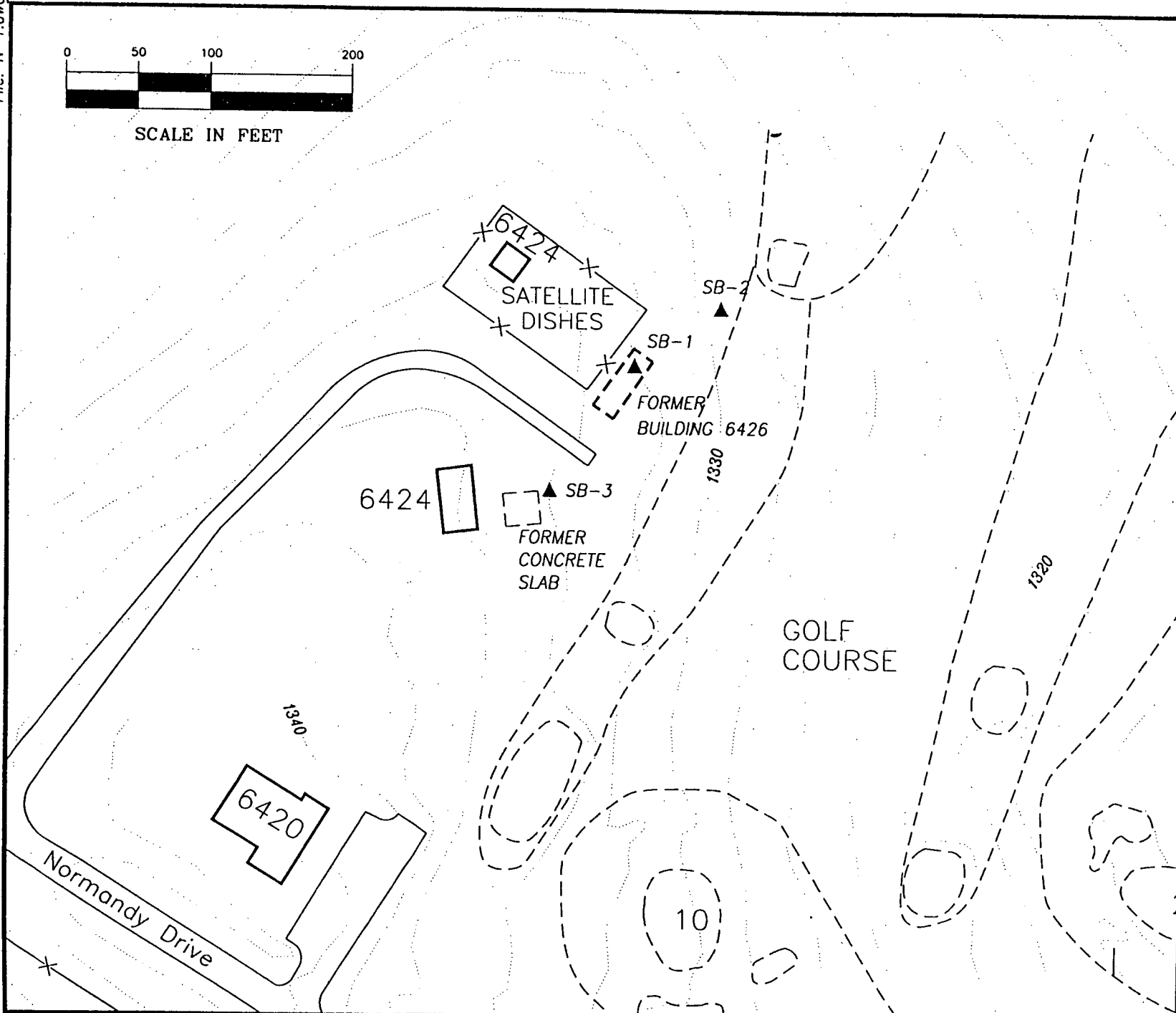
**LEGEND**

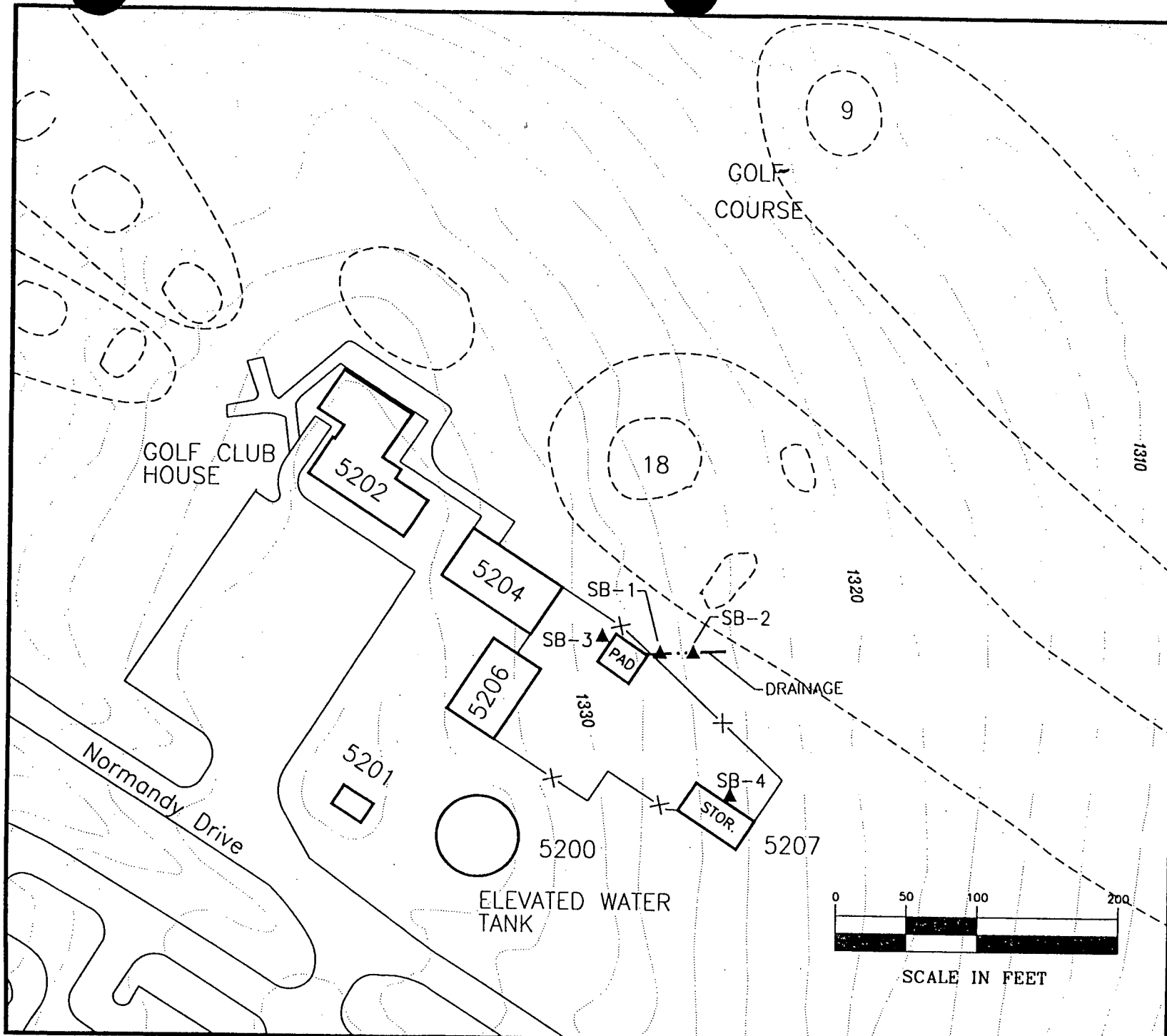
- ▲ SOIL SAMPLE (0-3')  
(1 March 1994)
- ▭ BUILDINGS
- ══ ROAD
- - - - FORMER FEATURE
- \* \* \* \* FENCE LINES
- · · · ELEVATION CONTOURS

Note: Soil samples were collected and analyzed for pesticides and herbicides using EPA Methods 8080 and 8150, respectively. No detections were found.

**Figure XI-1:  
FORMER GOLF COURSE PESTICIDE STORAGE BUILDING SOIL SAMPLING LOCATIONS  
FORT RILEY, KANSAS**

January 1997










N

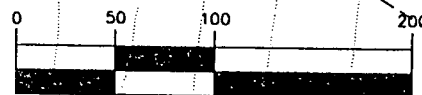


**LEGEND**

-  SOIL SAMPLE (0-3')  
(1 March 1994)
-  BUILDING
-  ROAD
-  ELEVATION CONTOUR
-  FENCE LINE

Note: Soil samples were collected and analyzed for pesticides and herbicides using EPA Methods 8080 and 8150, respectively. No detections were found.

**Figure XI-2:  
GOLF COURSE  
PESTICIDE STORAGE  
BUILDING  
WASHDOWN PAD  
SOIL SAMPLING  
LOCATIONS  
FORT RILEY, KANSAS**



SCALE IN FEET

January 1997

## **XII. SITE: Former Electrical Substations**

### **1. SITE DESCRIPTION**

The site investigation results for the Former Electrical Substations (Camp Funston, Camp Forsyth, Kansas Power & Light [KPL] Laundry, and Camp Whitside) (Figures XII-1 to XII-4) were reported in the SI report for Other Sites. The nearest residential area to the Former Camp Funston Substation is Ogden, Kansas, which is about a mile east; the nearest residential area to the Former Camp Forsyth Substation is the Forsyth Family Housing, which is about a quarter of a mile north; the nearest residential area to the Former KPL Laundry Substation is Main Post Family Housing, which is about a quarter of a mile north; and the nearest residential area to the Former Camp Whitside Substation is the Camp Whitside Family Housing, which is about a half mile west. The site investigation results for the Former Wherry Substation were reported in the Site Investigation Report Addenda dated 5 February 1997. The Wherry Substation was located on the south side of McCormick Road, near the Forsyth Family Housing area.

The investigation at the Former Substations focused on identifying whether soil contamination existed in and around the Former Substations from spills or leaks of PCB-containing dielectric fluids from the transformers. These sites were active when PCBs were widely used and not well characterized, and they had not been previously tested during routine electrical maintenance operations.

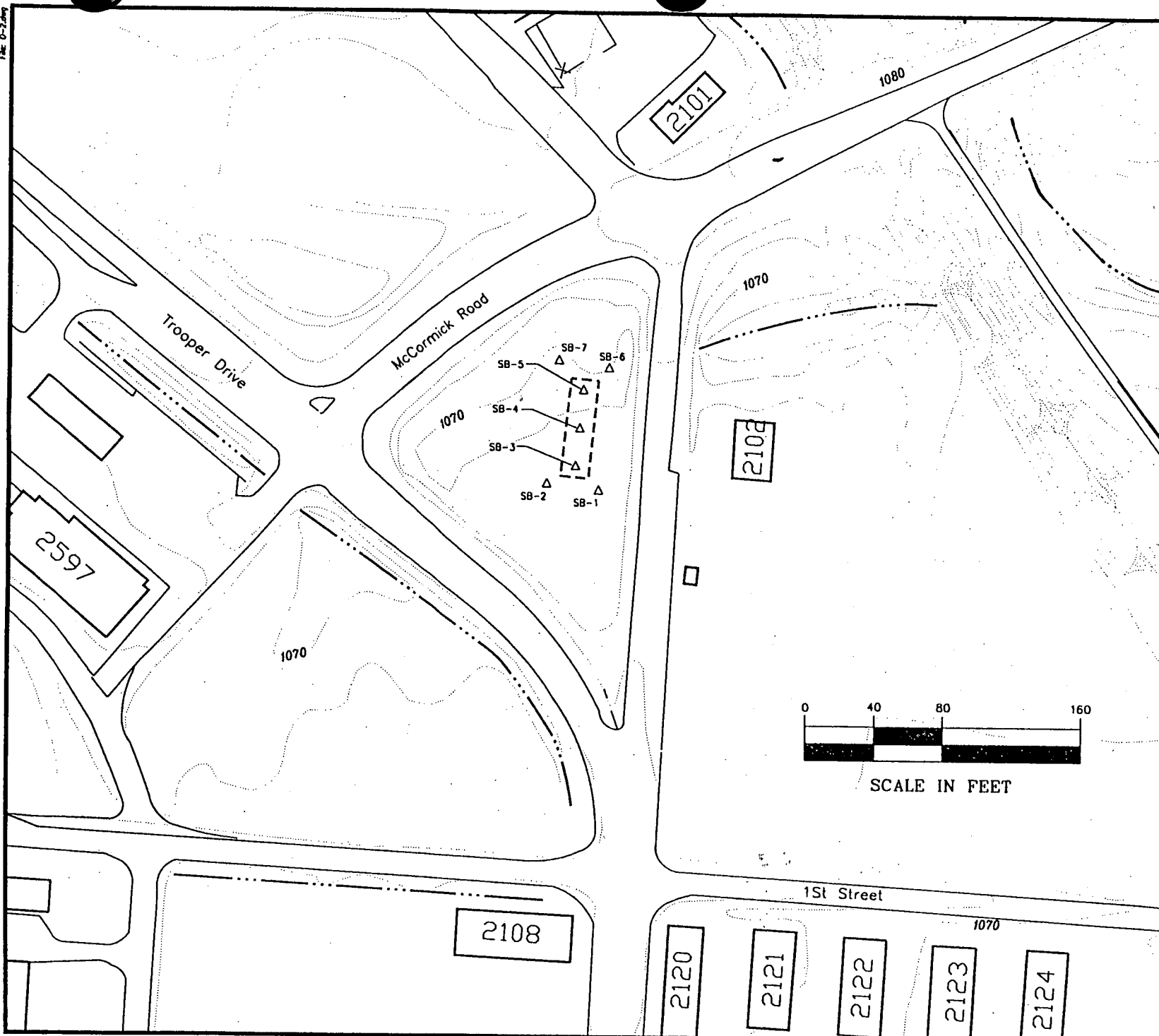
At each site, 10-12 soil samples were collected to depths of 3 feet below the ground surface at locations within and around each site. There were no detections of PCBs in the soil samples from Former Camp Funston (Figure XII-1) and Camp Forsyth Substations (Figure XII-2). One sample from the Former KPL Laundry Substation had a detection of PCBs at 60.6  $\mu\text{g}/\text{kg}$  at a depth of 1-3 feet (Figure XII-3). Samples from two locations at the Former Camp Whitside Substation had detections of PCBs of 70.1 and 73.8  $\mu\text{g}/\text{kg}$  at depths of 0-1 feet (Figure XII-4). These concentrations were below the EPA risk-based guideline of 340  $\mu\text{g}/\text{kg}$ . Samples from six locations at the Former Wherry Substation had detections ranging from 460 to 40,000  $\mu\text{g}/\text{kg}$ . All concentrations were less than the 50,000  $\mu\text{g}/\text{kg}$  level for PCB waste regulation under the EPA Toxic Substances and Control Act (TSCA).

### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to ensure protection of human health and the environment. No PCBs were detected in the soil at two sites, and the PCB detections at two sites were below the EPA risk-based guidelines. Detections exceeded the guidelines at only one site, the Former Wherry Substation. There is no routine human exposure at any of these sites.



Page 0-2-1994



**LEGEND**

- △ SOIL SAMPLES  
(0 to 1' & 1'-3')  
(2 March 1994)
- DRAINAGE
- ▭ BUILDING
- - - AREA OF INTEREST
- == ROAD
- TRAIL
- RAILROAD
- x-x- FENCE LINE
- ... LEVEE
- ... ELEVATION CONTOUR



SCALE IN FEET

Note: Soil samples were collected and analyzed for PCBs using EPA Method 8080. There were no detections.

**Figure XII-2:  
FORMER CAMP  
FORSYTH SUBSTATION  
SOIL SAMPLING  
LOCATIONS  
FORT RILEY, KANSAS**

January 1997

## **XII. SITE: Former Electrical Substations**

### **1. SITE DESCRIPTION**

The site investigation results for the Former Electrical Substations (Camp Funston, Camp Forsyth, Kansas Power & Light [KPL] Laundry, and Camp Whitside) (Figures XII-1 to XII-4) were reported in the SI report for Other Sites. The nearest residential area to the Former Camp Funston Substation is Ogden, Kansas, which is about a mile east; the nearest residential area to the Former Camp Forsyth Substation is the Forsyth Family Housing, which is about a quarter of a mile north; the nearest residential area to the Former KPL Laundry Substation is Main Post Family Housing, which is about a quarter of a mile north; and the nearest residential area to the Former Camp Whitside Substation is the Camp Whitside Family Housing, which is about a half mile west. The site investigation results for the Former Wherry Substation were reported in the Site Investigation Report Addenda dated 5 February 1997. The Wherry Substation was located on the south side of McCormick Road, near the Forsyth Family Housing area.

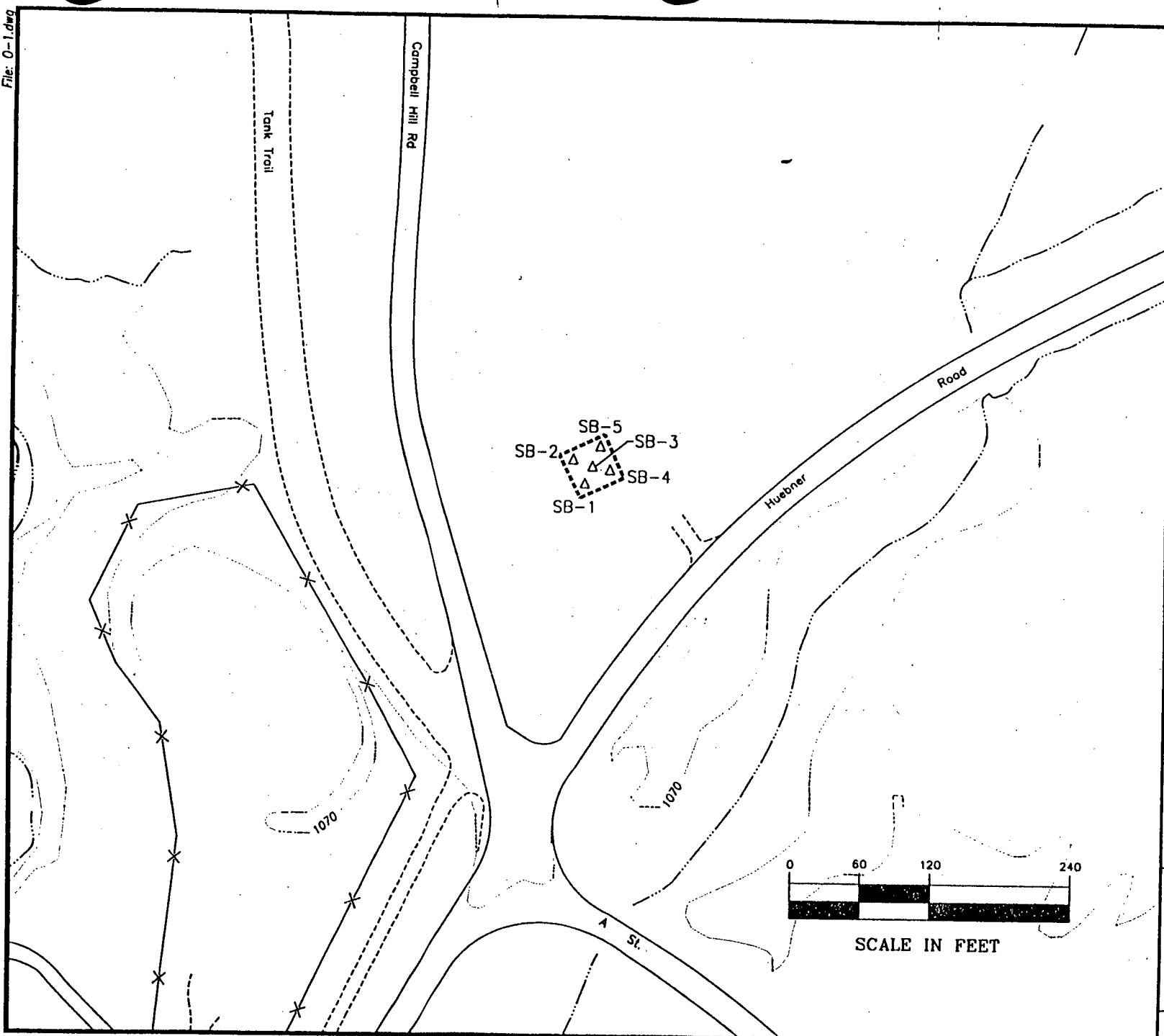
The investigation at the Former Substations focused on identifying whether soil contamination existed in and around the Former Substations from spills or leaks of PCB-containing dielectric fluids from the transformers. These sites were active when PCBs were widely used and not well characterized, and they had not been previously tested during routine electrical maintenance operations.

At each site, 10-12 soil samples were collected to depths of 3 feet below the ground surface at locations within and around each site. There were no detections of PCBs in the soil samples from Former Camp Funston (Figure XII-1) and Camp Forsyth Substations (Figure XII-2). One sample from the Former KPL Laundry Substation had a detection of PCBs at 60.6  $\mu\text{g}/\text{kg}$  at a depth of 1-3 feet (Figure XII-3). Samples from two locations at the Former Camp Whitside Substation had detections of PCBs of 70.1 and 73.8  $\mu\text{g}/\text{kg}$  at depths of 0-1 feet (Figure XII-4). These concentrations were below than the EPA risk-based guideline of 340  $\mu\text{g}/\text{kg}$ . Samples from six locations at the Former Wherry Substation had detections ranging from 460 to 40,000  $\mu\text{g}/\text{kg}$ . All concentrations were less than the 50,000  $\mu\text{g}/\text{kg}$  level for PCB waste regulation under the EPA Toxic Substances and Control Act (TSCA).







### **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to ensure protection of human health and the environment. No PCBs were detected in the soil at two sites, and the PCB detections at two sites were below the EPA risk-based guidelines. Detections exceeded the guidelines at only one site, the Former Wherry Substation. There is no routine human exposure at any of these sites.

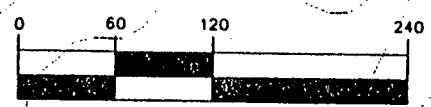
File: 0-1.dwg



### LEGEND

-  SOIL SAMPLES  
(0 to 1' & 1'-3')  
(2 March 1994)
-  ELEVATION CONTOUR
-  DRAINAGE
-  AREA OF INTEREST
-  ROAD
-  FENCE LINES

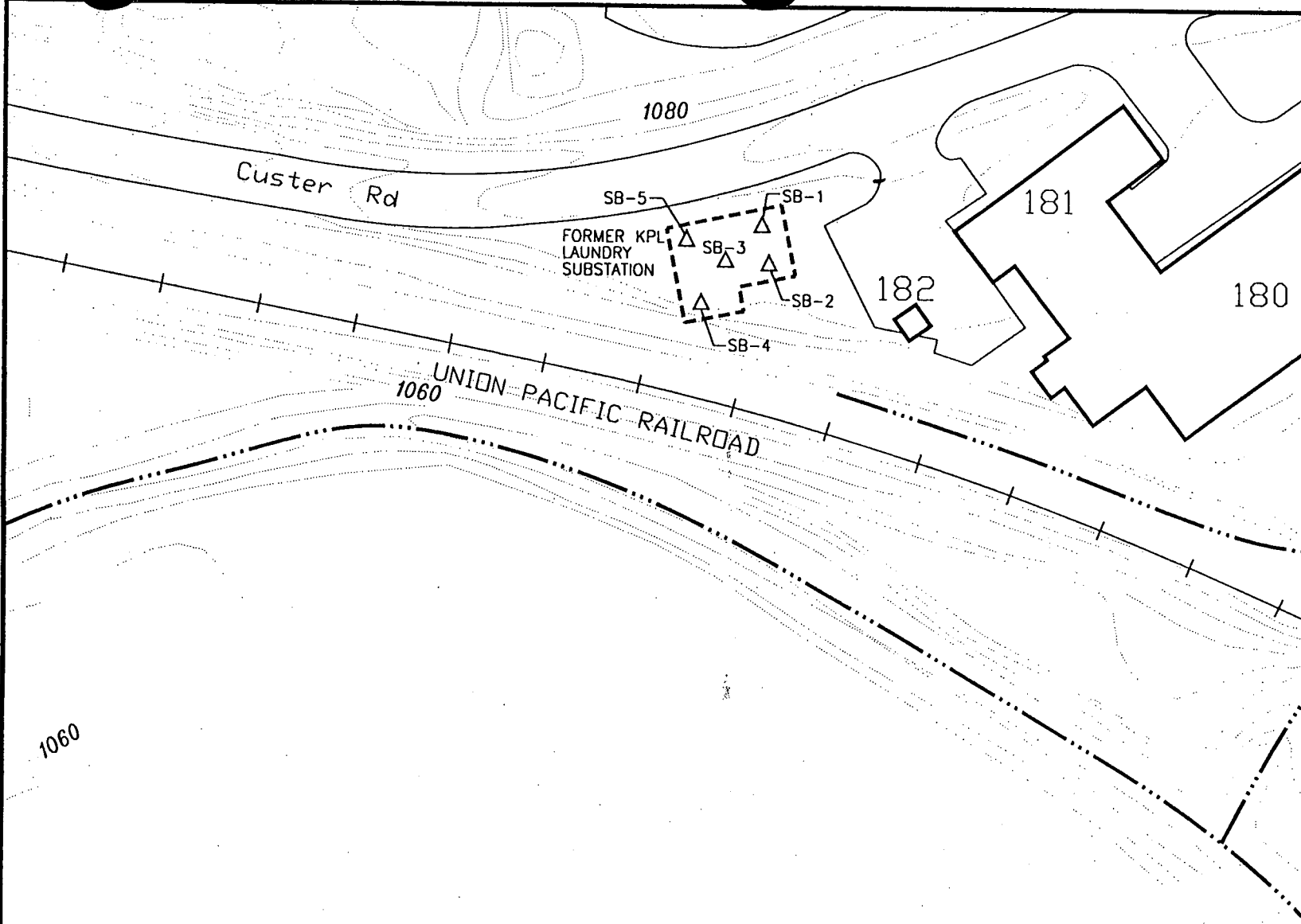
Note: Soil samples were collected and analyzed for PCBs using EPA Method 8080. There were no detections.



SCALE IN FEET

**Figure XII-1:  
FORMER CAMP  
FUNSTON SUBSTATION  
SOIL SAMPLING  
LOCATIONS  
FORT RILEY, KANSAS**

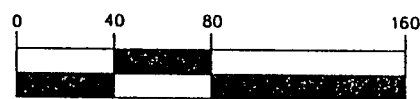
January 1997



**LEGEND**

- SOIL SAMPLES  
(0'-1' & 1'-3')  
(3 March 1994)
- DRAINAGE
- ELEVATION CONTOUR
- AREA OF INTEREST
- BUILDING
- ROAD
- RAILROAD
- FENCE LINE

Detections in Soil Samples		
Sample Location/ID	SB-5	EPA Region IX PRGs (Industrial) (Feb95)
Sample Depth (feet)	1-3	
Organic Compounds (micrograms per kilogram - $\mu\text{g}/\text{kg}$ ) (EPA Method 8080)		
PCBs	80.6	340

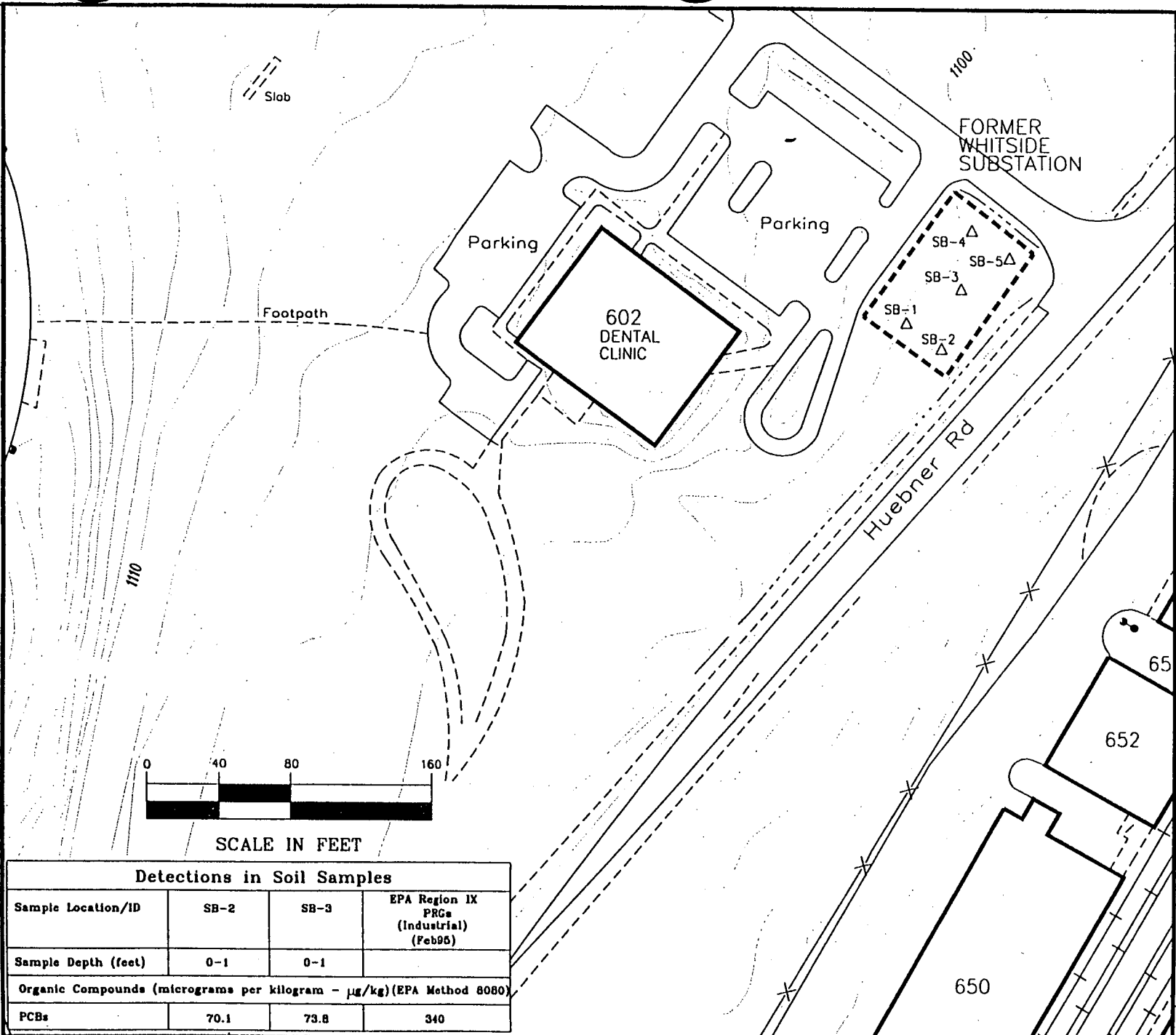


SCALE IN FEET

**Figure XII-3:  
FORMER KPL  
LAUNDRY  
SUBSTATION  
SOIL SAMPLING  
LOCATIONS  
FORT RILEY, KANSAS**

January 1997

Fig. 0-4-4



**LEGEND**

- △ SOIL SAMPLES  
(0-1' & 1'-3')  
(2 March 1994)
- ELEVATION CONTOUR
- DRAINAGE
- BUILDINGS
- AREA OF INTEREST
- == ROAD
- TRAIL
- RAILROAD
- ××× FENCE LINE

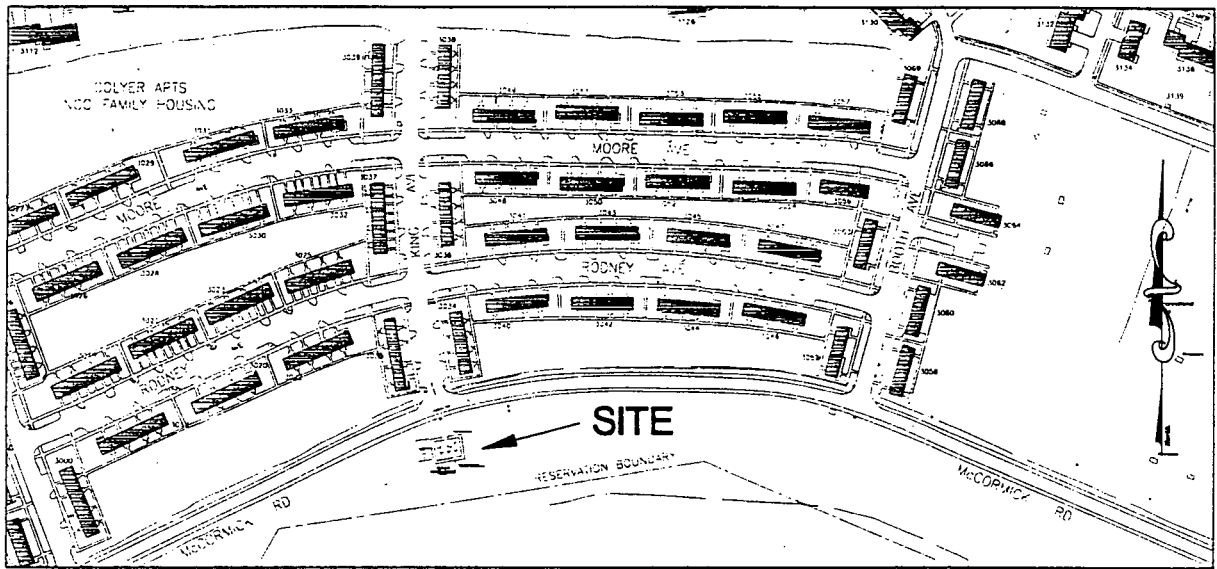


SCALE IN FEET

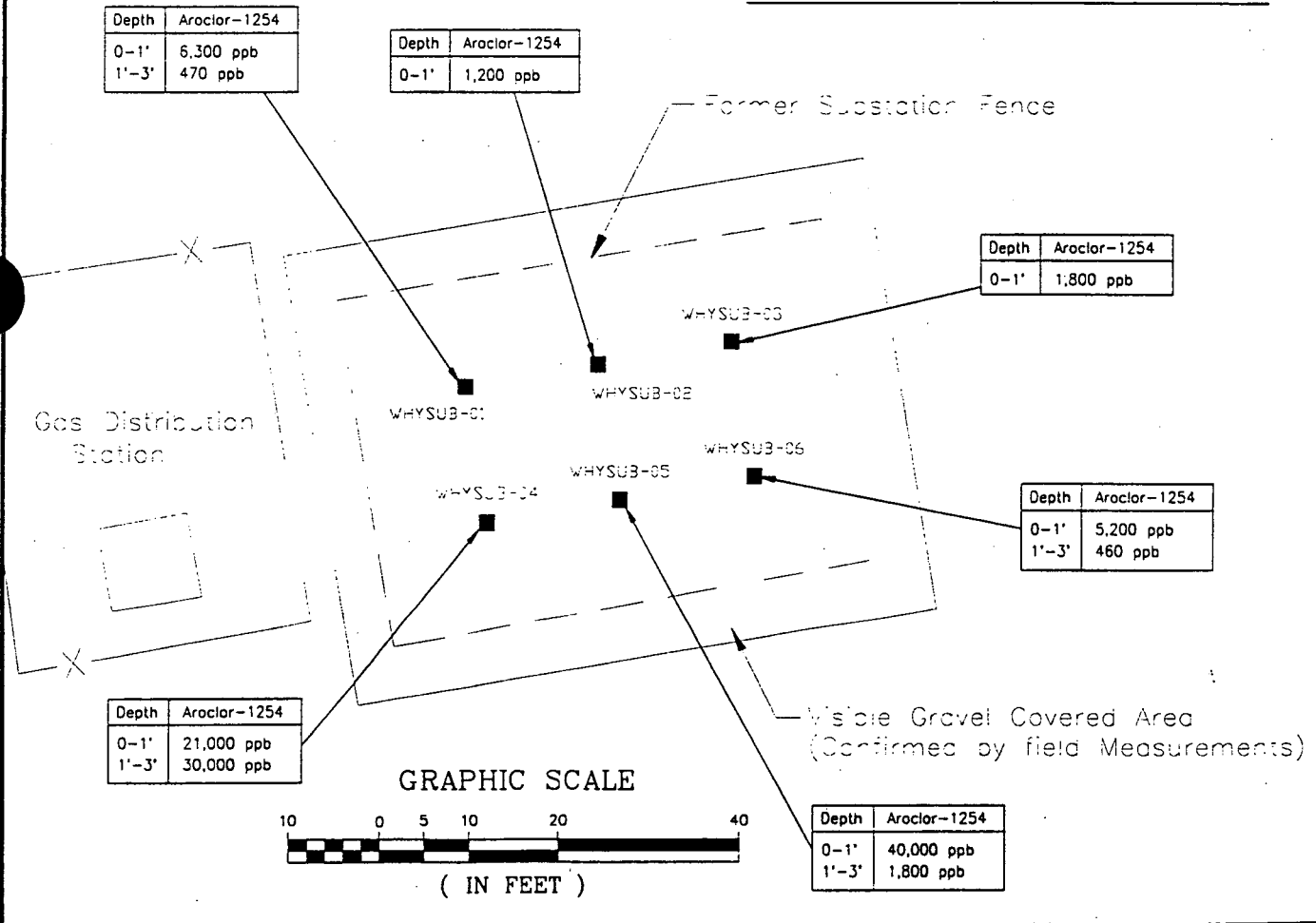
Detections in Soil Samples			
Sample Location/ID	SB-2	SB-3	EPA Region IX PRCs (Industrial) (Feb95)
Sample Depth (feet)	0-1	0-1	
Organic Compounds (micrograms per kilogram - µg/kg) (EPA Method 8080)			
PCBs	70.1	73.8	340

**Figure XII-4:  
FORMER CAMP  
WHITESIDE SUBSTATION  
SOIL SAMPLING  
LOCATIONS  
FORT RILEY, KANSAS**

January 1997



LOCATION MAP - CAMP FORSYTH



- PROPOSED SOIL SAMPLE LOCATION
- BUILDING
- X - FENCE

Figure XII-5  
FORMER WHERRY SUBSTATION  
SOIL SAMPLE  
LOCATIONS AND DETECTIONS

Scale: AS SHOWN

May 1996

1506WHER

### **XIII. SITE: Former Camp Whitside and Construction/Debris Landfills**

The site investigation results for the Former Camp Whitside and Construction/Debris (CD) Landfills ( Figure XIII-1) were reported in the SI report for Other Sites. The nearest residential area is the Camp Whitside Family Housing, which is about a half mile southwest of the Camp Whitside Landfill and approximately a quarter mile southwest of the Construction/Debris Landfill.

The investigation at the Former Camp Whitside Landfill (closed after a fire there in 1988) and the active CD Landfill (opened around 1980) focused on identifying areas of contamination exists in the soil, surface water, groundwater, or seep areas. Although the precise contents of these landfills is not known, the wastes disposed at the CD Landfill consist of construction and demolition debris and rubble. Wastes containing hazardous substances may have been deposited in these landfills. A portion of the landfill has been designated for asbestos-containing debris.

The CD Landfill investigation included six surface water sediment samples from drainage and stream beds (three on the west and three on the east between the landfills), eight soil samples from areas of former seeps, and five monitoring wells (including one upgradient). The Former Whitside Landfill investigation was based on groundwater sampling of three monitoring wells.

#### **CD Landfill**

The soil sampling showed detections at only one location of fluoranthene at 9,300  $\mu\text{g}/\text{kg}$ , 4,4'-DDT at 30  $\mu\text{g}/\text{kg}$ , and dieldrin at 30  $\mu\text{g}/\text{kg}$ , which were all below the EPA Region IX Industrial risk-based levels or the Pesticide Storage Facility Removal Action Goal of 1,730  $\mu\text{g}/\text{kg}$  for 4,4'-DDT. Cadmium, chromium, copper, lead, nickel, and zinc were detected at levels which were below the applicable EPA risk-based guidelines for soil. Arsenic and beryllium were detected in the sediment samples at levels of 3-8  $\mu\text{g}/\text{kg}$  and 0.7-1.5 $\mu\text{g}/\text{kg}$ , which exceeded the EPA risk-based guidelines of 2.0 and 1.1 mg/kg, but were below the SSLs of 15 and 180 mg/kg, respectively, for transfer to groundwater. The arsenic detections were near the background levels (7.1) in the Fort Riley area.

The only detections in the sediment samples were of chlordane at 44  $\mu\text{g}/\text{kg}$ , below the EPA risk-based guideline of 1,500  $\mu\text{g}/\text{kg}$ , and detections of beryllium, cadmium, chromium, copper, lead, nickel, and zinc in most of the samples, all below the applicable EPA risk-based guidelines for soil (see Table 1). Arsenic was detected in the sediment samples at levels of 3-8  $\mu\text{g}/\text{kg}$ , which exceed the EPA Region IX Industrial risk-based guidelines of 2.0 mg/kg, but were below the SSL of 15 mg/kg for transfer to groundwater. The arsenic levels were near the identified background levels (7.1) in the Fort Riley area. Actual exposures are less than those assuming in the industrial guidelines.

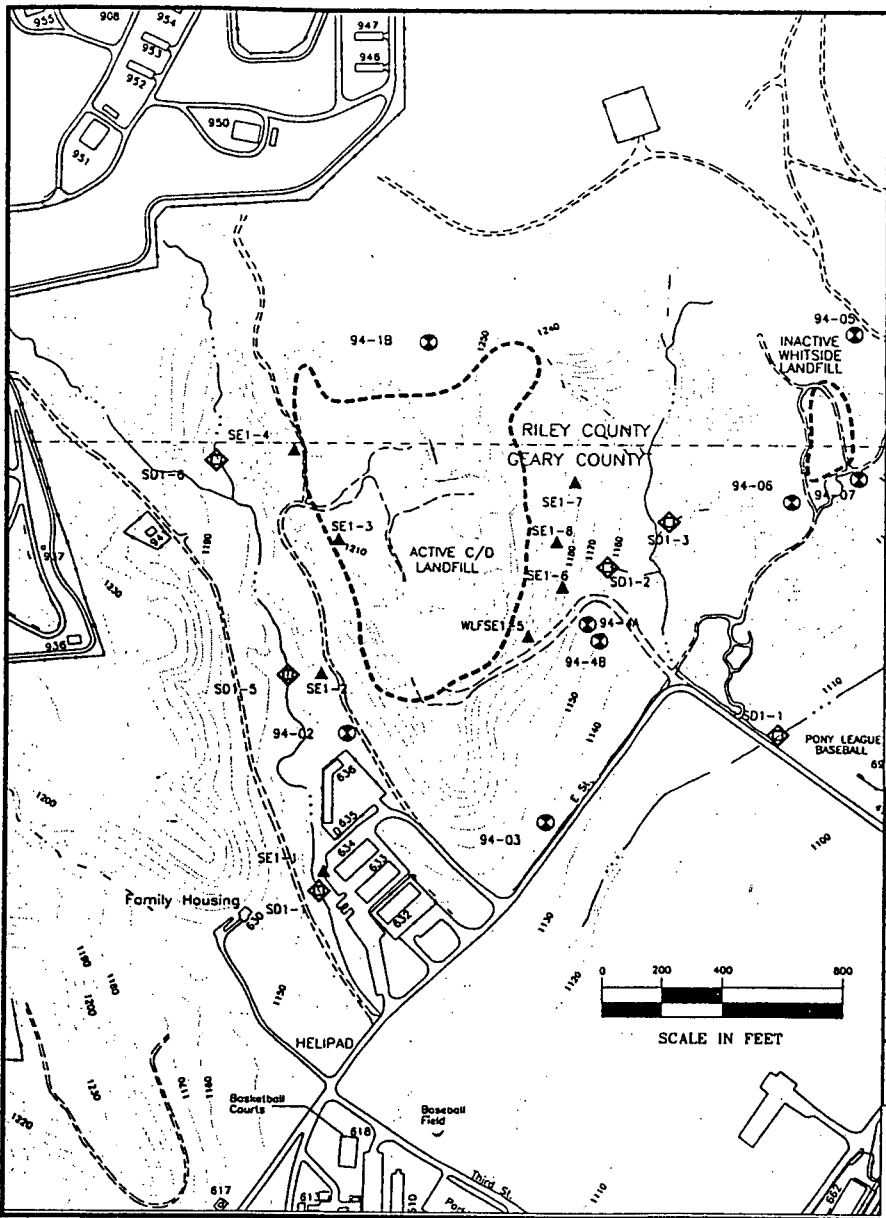
The only detections in the groundwater samples were of PCE in a range of 1.1-3.3  $\mu\text{g}/\text{l}$ , and of chromium at 0.02  $\mu\text{g}/\text{l}$ , lead at 0.005  $\mu\text{g}/\text{l}$ , and zinc at 0.03 $\mu\text{g}/\text{l}$ , which were all below the applicable MCLs (see Table 1).

#### **Former Whitside Landfill**

There were no detections in the three groundwater samples at the Former Whitside Landfill.

## **2. SUMMARY OF SITE RISK AND RATIONALE FOR NO ACTION DECISION**

No action is necessary to protect human health and the environment as no significant contamination was identified. The CD Landfill operates under the State of Kansas Landfill Program.



Detections in Soil Samples

Soil from Seeps		Secondary MCL										
Sample Location/ID	All seep soil samples have prefix SE1 - All sediment samples have prefix S01 -										EPA Region 8 Secondary MCL EPA 93	
	1	2	3	4	5	6	7	8	9	10		
Sample Depth (feet)	1.5 -											
Semi-Volatiles (micrograms per kilogram - $\mu\text{g}/\text{kg}$ ) EPA Method 8270												
Fluoranthene	ND	ND	9,300	ND	<3	ND	<3	<3	<3	<3	<3	27,000
Pesticides/PCBs (micrograms per kilogram - $\mu\text{g}/\text{kg}$ ) EPA Method 8080												
Chlordane	ND	ND	ND	ND	<3	ND	<3	<3	<3	<3	<3	1,500
4,4'-DDT	ND	ND	30	ND	<3	ND	<3	<3	<3	<3	<3	1,500
Dieldrin	ND	ND	30	7.3	<3	<3	<3	<3	<3	<3	<3	25
Metals (milligrams per kilogram - $\text{mg}/\text{kg}$ ) EPA Method 8014/7000												
Arsenic	6	7	6	4	6	3	4	3	3	3	4	2.0
Beryllium	0.7	1.5	ND	0.7	1.0	0.5	1.7	1.7	1.8	<3	<3	1.7
Cadmium	0.8	ND	ND	ND	<3	1.1	<3	<3	1.8	<3	1.8	<3
Chromium	18	35	22	16	27	21	24	27	21	14	17	25
Copper	14	13	14	4	15	2	15	5	9	6	9	8
Lead	40	22	76	28	8	11	13	22	41	22	16	18
Nickel	14	22	16	12	24	11	17	17	7	13	14	13
Zinc	100	75	150	38	32	120	41	38	78	48	52	61

ND: Not Detected  
 N/A: Not Available  
 There were no other detections of volatile organic compounds, semi-volatile organic compounds, metals, pesticides or herbicides in these samples.

Detections in Groundwater samples

Sample Location/ID	All samples have prefix 94-										Maximum Contaminant Level
	18	02	23	44	48	22	36	37			
Screen Interval (feet)	50.7-52.4   42.1-52.1   25.9-42.5   39.6-50.8   32.9-46.6   22.2-32.2   22.8-42.0   45.4-79.4										
Volatiles (micrograms per liter - $\mu\text{g}/\text{l}$ ) EPA Method 8240											
Tetrachloroethane	ND	3.3	1.1	1.5	2.1	ND	ND	ND	5		
Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5		
Metals (milligrams per liter - $\text{mg}/\text{l}$ ) EPA Method 8014/7000											
Chromium	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
Lead	0.003	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Zinc	0.67	ND	ND	ND	1.3	ND	ND	ND	ND	ND	5*

ND: Not Detected  
 N/A: Not Available  
 There were no other detections of volatile organic compounds, semi-volatile organic compounds, metals, pesticides or herbicides in these samples.  
 \* Secondary MCL



LEGEND

- ⊙ GROUNDWATER MONITOR WELL (7 April 1994)
- ◇ SEDIMENT SAMPLE (7 March 1994)
- ▲ SEEP SOIL SAMPLE (8 March 1994)
- ELEVATION CONTOUR
- - - DRAINAGE
- ▭ BUILDING
- - - AREA OF INTEREST
- == ROAD
- FENCE LINE

Figure XIII-1:  
 FORMER CAMP WHITESIDE  
 AND CONSTRUCTION/  
 DEBRIS LANDFILLS  
 SAMPLING LOCATIONS  
 FORT RILEY, KANSAS

File: R-2.dwg