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U.S. Army Environmental Center

Final Health & Safety Plan

Feasibility Study (FS) and Remedial Investigation/Site Inspection (RI/SI) Addendum for Fort George G. Meade, Maryland

Submitted to

U.S. Army Environmental Center (USAEC)
Aberdeen, Maryland

Revision 2
November 19, 1993

Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390

ADL Reference 67069-15

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Delivery Order 0009

AEC Form 45, 1 Feb 93 replaces THAMA Form 45 which is obsolete.

Feasibility Study (FS) and Remedial Investigation/Site Inspection (RI/SI) Addendum for Fort George G. Meade, Maryland

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1.0 Introduction

Personnel involved in remedial investigations and field sampling at sites where hazardous substances (hazardous materials, and wastes) are present may be potentially exposed to a wide variety of chemical, physical, environmental, biological, and ergonomic hazards, including:

- Inhalation of toxic airborne contaminants
- Skin contact with contaminated soil and water
- Presence of flammable/combustible vapors
- Explosives and unexploded ordnance
- Oxygen-deficient atmospheres
- Heat stress due to protective clothing and environmental conditions
- Etiologic agents and biological hazards
- Physical hazards inherent to field operations (e.g., working near heavy equipment, slips, trips, falls)

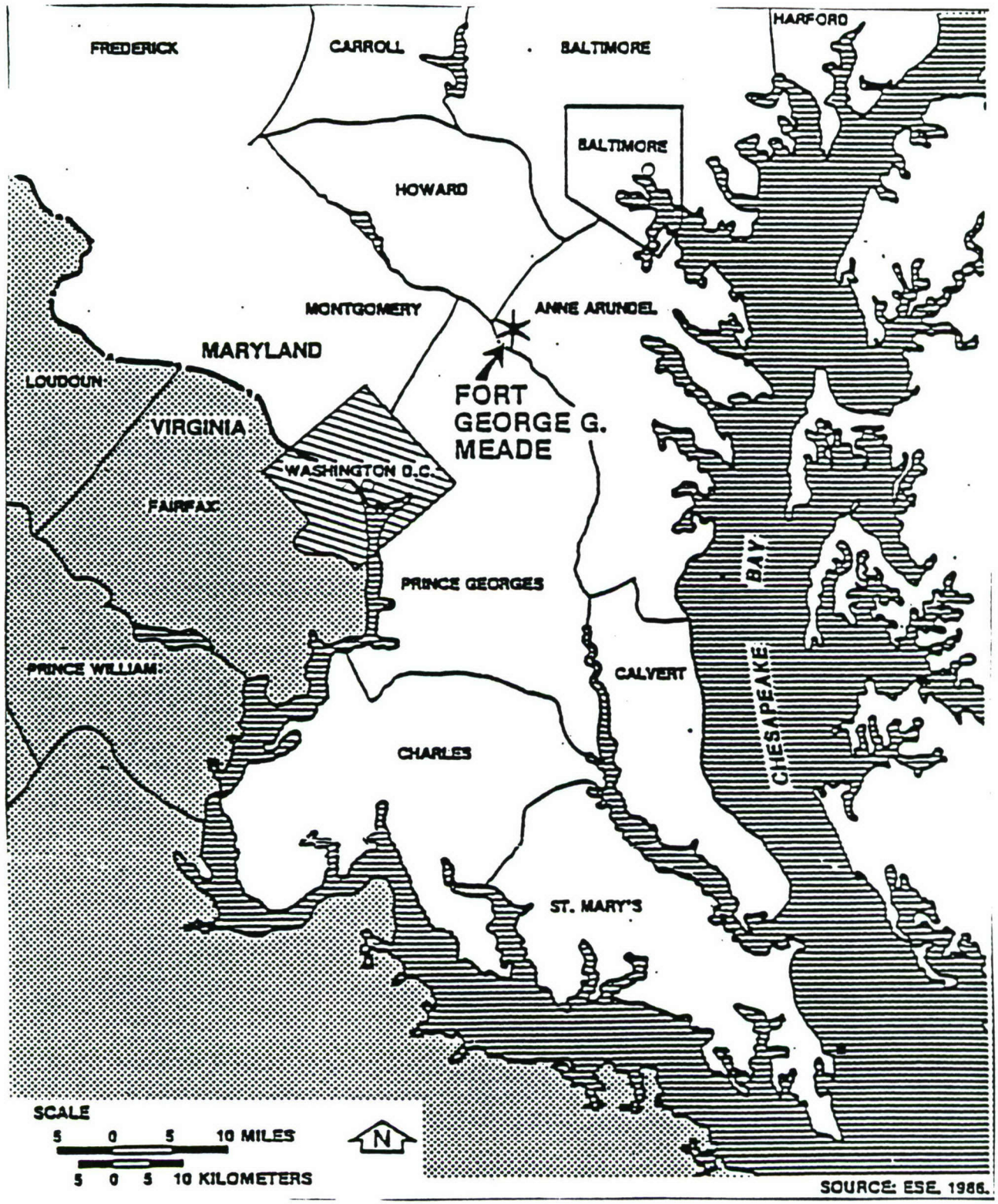
Thus, adequate planning is essential prior to performing work at sites containing hazardous substances in order to minimize the risk of employee injury or illness.

The following site- and task-specific Health and Safety Project Plan (HASP) has been prepared for the U.S. Army Environmental Center (USAEC), formerly the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), for use by Arthur D. Little field personnel during the Feasibility Study (FS) and Remedial Investigation (RI)/Site Inspection (SI) Addendum and a Change Order to Delivery Order No. 0009 dated July 15, 1993 at the U.S. Army's Fort George G. Meade facility from January to March 1993. This HASP also provides minimum requirements for subcontractors employed by Arthur D. Little for site investigation tasks. All personnel covered by this plan shall comply with all the requirements contained within the plan. The overall purpose of this HASP is to provide personnel protection standards and mandatory safety practices, procedures, and contingencies while performing the tasks outlined in the Work Plan. Any discrepancies between the requirements of this HASP and what occurs on site or is scheduled to occur should immediately be brought to the attention of the Site Health and Safety Officer (identified in Section 3.1.2). The Arthur D. Little Health and Safety Officer reserves the right to modify the contents of this HASP at any point during the project and as new information is received.

1.1 Site Background

1.1.1 Site Location and Description

Fort George G. Meade (FGGM) is located in Anne Arundel County, Maryland, between Washington, D.C. and Baltimore, Maryland (Figure 1-1) and includes approximately 13,000-acres. The closest town is Laurel, Maryland, which is located less than five miles to the west.



PREPARED FOR: USATHAMA			
DATE: NOV. 1992	SCALE: AS SHOWN	DWG. NO.: FIG2–1	TITLE: **Figure 1-1: Fort George G. Meade Regional Location Map**

The Baltimore-Washington Parkway and Route 197 are located west and south of FGGM, respectively. Route 198 stretches across the facility east to west and Route 175 cuts across the facility's northeast corner. The Baltimore and Ohio Railroad has tracks across FGGM's northern half and Amtrak rails run along the southeast border. The Universal Transverse Mercator (UTM) coordinates, for zone 18, for the furthest extents of the base are 4332400 north, 0352100 east, 4321900 south, and 0341600 west.

The base has been a permanent U.S. Army installation since 1917. The installation contains administration, recreational, and housing facilities, as well as limited training areas and firing/combat ranges. The FGGM community consists of a residential population and daytime work force of approximately 20,000. The SIA includes five sites and the RIA includes two. Site names, designated codes, and descriptive locations are summarized on Table 1-1. The locations are illustrated on Figure 1-2.

The environmentally significant operations associated with the Fort Meade site include sanitary landfills, training and range areas, ordnance demolition, fire training areas, ammunition supply points, and a storm drainage system.

Based on a review of available information about Fort Meade, including a review of Argonne National Laboratory investigations, historical and current practices at Fort Meade, that may pose a threat to human health and the environment are:

- Waste petroleum, oil, solvents, and other lubricant products; pesticides; heavy metals; polynuclear aromatic hydrocarbons (aerosols); PCBs and potentially other types of hazardous wastes are reported to have been buried in both the active and formerly used landfills at the Fort Meade site. Leachate from these landfills may have contaminated local ground water.

- Unexploded ordnance (UXO) on the surface and beneath the training and range areas pose a potential threat to health and safety because of the risk of inherent explosions. Additionally, the residues or ordnance detonated in demolition areas may break down over time and release contaminants to soils and ground water.

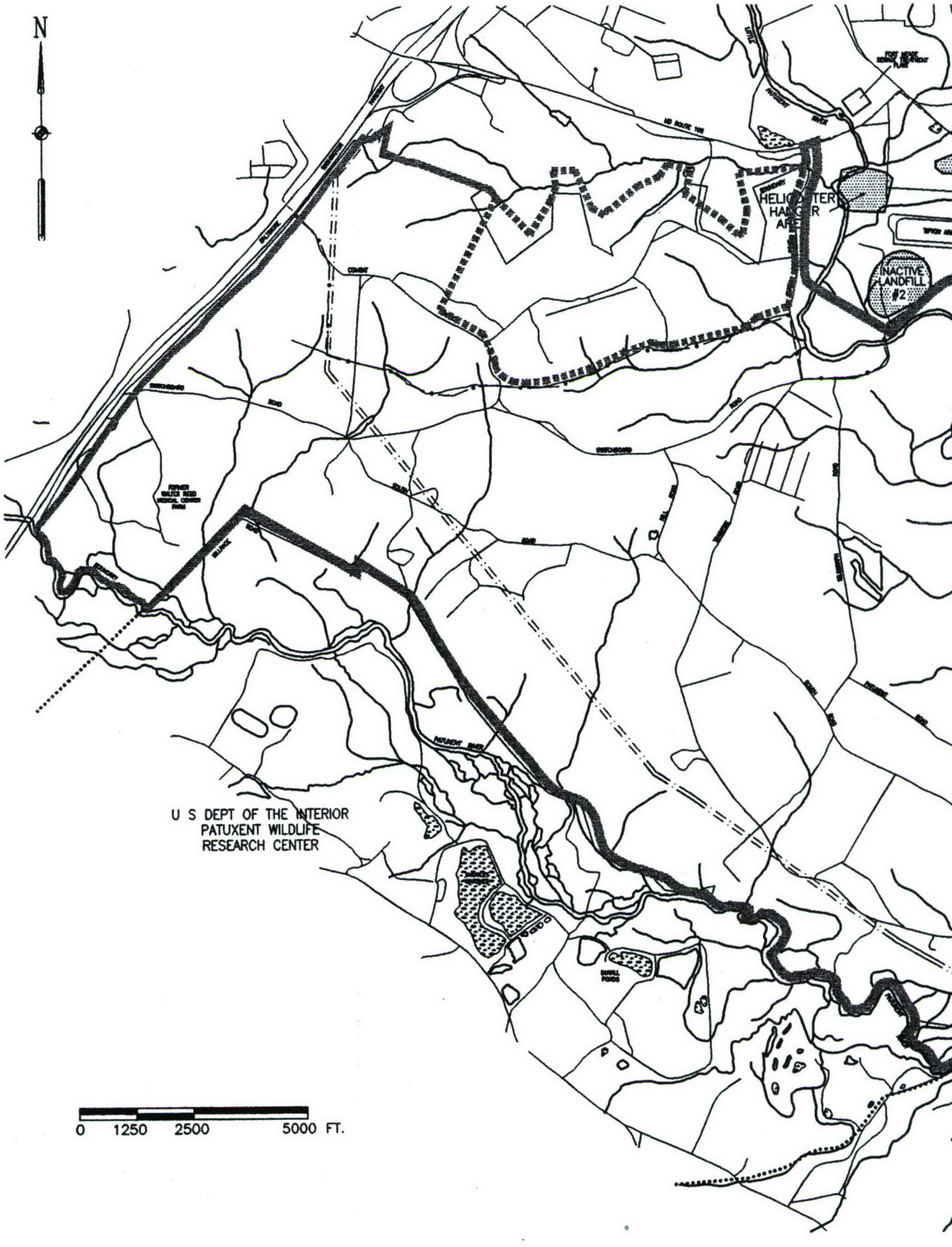
- Discharges from the National Security Agency (NSA) have been known to contain excessive quantities of heavy metals and solvents. Apparently these releases have been identified as possible cause of problems associated with Fort Meade's Sewage Treatment Plant No. 2. The effluent from this plant could potentially contaminate surface water and sediments of the Little Patuxent River.

Seven landfills and disposal areas are known to exist at the Fort Meade site, with no documentation as to the volume or content of wastes present in each landfill. Over the past several decades, all wastes, including toxic and hazardous wastes, generated

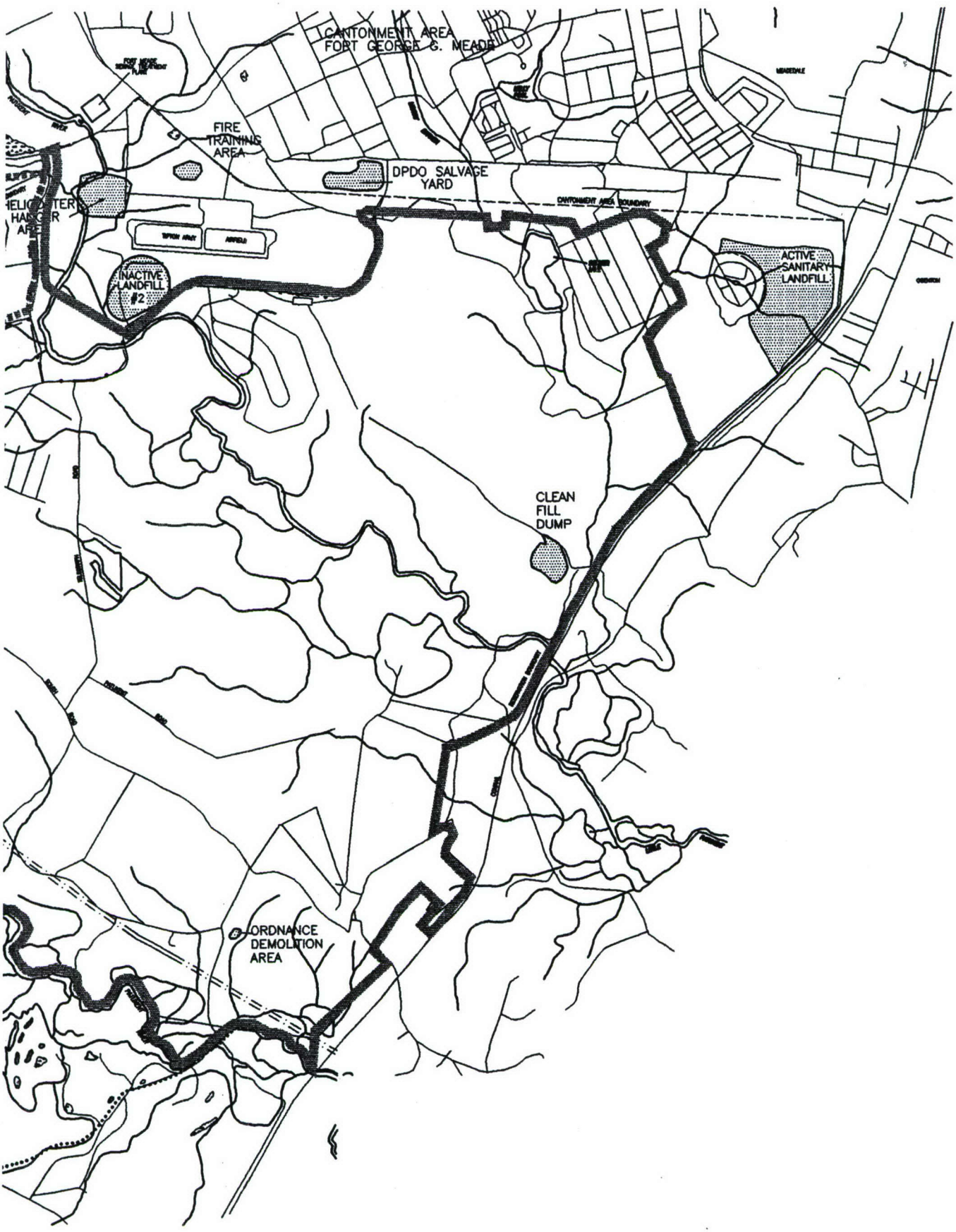
Table 1-1: Locations of RIA and SIA Sites

STUDY	SITE NAME	SITE ABBR.	LOCATION ON BASE
SIA	Inactive Landfill No. 2	IL2	Adjacent to and south of Tipton Airfield and about 450 feet north of Little Patuxent River.
SIA	DPDO Salvage Yard and Transformer Storage	DSY	North of Route 32, northeast of the Tipton Airfield.
SIA	Helicopter Hangar Area	HHA	West of Tipton Airfield and about 8,100 feet west of the Fire Training Area.
SIA	Fire Training Area	FTA	Immediately north of Tipton Airfield.
SIA	Ordnance Demolition	ODA	At Training Range 16, in the Patuxent Wildlife Research Center, and the southwestern area of the Base Closure parcel.
RIA	Active Sanitary Landfill	ASL	Along the eastern border of FGGM, south of Route 32.
RIA	Clean Fill Dump	CFD	Along the eastern border of the Patuxent Wildlife Research Center.

NOTES:
ABBR. - Abbreviation
SIA - Site Inspection Addendum
RIA - Remedial Investigation Addendum



PREPARED FOR: USAEC			SOURCE: USATHAMA, 1992	LEGEND: 500+/- Acre Boundary; 7600+/- Acre Boundary	
DATE: APRIL 1993	SCALE: 1" = 3000 FT.	DWG. NO. FMBM-E			



- Acre Boundary
/- Acre Boundary

Arthur D Little

TITLE: FIGURE 1-2: LOCATION OF SITES AT FORT GEORGE G. MEADE

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by Fort Meade activities were reported to have been disposed on site. Organic compounds and heavy metals have been detected in the surface water and ground water at the active landfill.

Asbestos is known to be present in various quantities and locations in buildings of the Tipton Army Airfield. An ongoing asbestos survey and removal program is currently in place. According to installation personnel, a large amount of asbestos-containing material (ACM), including asbestos siding, roofing, and insulation that has been removed because of demolition activities over the years, has been disposed of in on-site landfills.

1.1.2 Site History and Prior Investigations

In 1988, the U.S. Army Base Realignment and Closure Act (BRAC) recommended that 9,000-acres of the 13,000-acre facility be closed or excessed. The 9,000-acre area encompassed the southernmost two-thirds of the installation (Figure 1-2). On October 1, 1991, the U.S. Army transferred 7,600 of the 9,000-acres to the Department of the Interior, specifically the Patuxent Wildlife Research Center (PWRC). An additional 500-acres are also proposed for transfer to the Department of Interior, PWRC, however this transfer has not yet been completed. No determination has been made about the transfer of the Tipton Army Airfield and additional-acreage. The remaining acres includes some areas to be retained by FGGM and additional areas to be excessed. These 1,400-acres consist of approximately 1,000-acres of woodlands and wetlands and approximately 400-acres associated with the Tipton Army Airfield.

Numerous environmental investigations have been conducted at FGGM since BRAC, including an Enhanced Preliminary Assessment, a study by the Maryland Department of Natural Resources, an Environmental Impact Statement (draft and final), a Wetland Identification Study, a Remedial Investigation, and a Site Inspection Study.

An Enhanced Preliminary Assessment (PA) was conducted by Argonne National Laboratory in 1989. The report includes a review of all available records related to air, soil, surface water, and ground water and identifies six areas of concern at FGGM: active and inactive landfills, underground storage tanks, asbestos, unexploded ordnance, surface water, and burning grounds.

The Maryland Department of Natural Resources (MDNR) conducted an evaluation of the surplus property in January 1990. The study describes the natural features and land uses associated with the 9,000-acres to be excessed from FGGM and contains discussions pertaining to the degree of development of the retained land.

In January 1990, an Environmental Impact Statement (EIS) for FGGM, Fort Holabird, Maryland, and Fort Belvoir, Virginia, was prepared by Rogers, Golden & Halpern, Inc. The EIS focuses on the affected environmental areas of these

installations. The EIS describes the existing conditions of the 9,000-acres slated to be excessed as well as evaluates the consequences of the use/reuse scenarios.

In January 1991, a wetland identification study was prepared by RGH/CH2M Hill, Inc. in order to complete the study of the closure and use/reuse alternatives for the 9,000-acre parcel at FGGM. The report describes the methods used in the identification of wetlands on the parcel and presents a map of wetlands distribution.

A Final Environmental Impact Statement for the comprehensive base realignment and partial closure for FGGM and Fort Holabird was prepared by the U.S. Army Corps of Engineers, Baltimore District, in July 1991. This report focuses on the environmental and socioeconomic impacts associated with the planned base realignment and partial closure at FGGM and Fort Holabird. The Final EIS covers only 1,400-acres of the 9,000-acre parcel at FGGM; the remainder of the parcel was awaiting transferral to the PWRC at the time of the final report.

A Draft Remedial Investigation (RI) report was prepared by EA Engineering, Science and Technology, Inc., in November 1991. The focus of the RI was on the active sanitary landfill (ASL) and the clean fill dump (CFD). The final RI was completed in October 1992.

A Draft Site Inspection (SI) report was submitted by EA Engineering, Science and Technology in January 1992. This report discusses conditions at the helicopter hangar area (HHA), four inactive landfills, the DPDO salvage yard (DSY), the fire training area (FTA), the ordnance demolition area (ODA), underground storage tanks, and asbestos. The final SI was submitted in October 1992.

USAEC estimated a preliminary Hazard Ranking System (HRS) score for the combined ASL and CFD sites. The HRS score for the sites was 50.0, above the 29.5 necessary for inclusion on the National Priorities List (NPL). The ground water pathway had a high numerical score, due to the likelihood of release of hazardous substances into the ground water, the waste characteristics, and the potential receptors within a 4-mile radius. Numerical scores were not estimated for the air, surface water, and soil pathways. USAEC is currently waiting for the results of the official EPA HRS scoring.

1.2 Purpose of Work

The purpose of this delivery order is to conduct a Feasibility Study (FS) of the active sanitary landfill (ASL) and to address data gaps remaining from the Remedial Investigation (RI) and Site Inspection (SI). The purpose of this document is to provide personnel protection standards and mandatory safety practices, procedures, and contingencies while performing the tasks outlined in the Work Plan. Detailed

objectives for each deliverable and activity in the task are included in the Arthur D. Little FGGM Work Plan, which has been provided as a separate document.

The overall purpose of an SI is to evaluate if releases or potential contamination has occurred at suspected sites and to determine if further investigation is warranted. Arthur D. Little's study is an addendum to a previous SI conducted by EA Engineering, Science and Technology (EA) and addresses data gaps remaining from it identified in the previous SI.

The overall purpose of an RI is to evaluate the extent and rate of migration of contamination at sites which, according to historical and site data, may present adverse effects on the environment. This study is an addendum to a previous RI conducted by EA and addresses data gaps remaining from or identified in that document.

The purpose of a FS is to review the applicability of various remedial technologies to determine whether they are appropriate remedies for the site and to evaluate each remedy with regards to effectiveness, implementability, and costs. The FS is only being conducted for the ASL and includes a Proposed Plan, a Responsiveness Summary, and Record of Decision.

Personnel conducting the remedial investigation may encounter various chemical, physical, and environmental hazards. Therefore, this site-specific Health and Safety Project Plan has been prepared for the purpose of establishing necessary work precautions and procedures designed to minimize the anticipated hazards to which site personnel may be exposed.

The overall objective of this Health and Safety Project Plan is to provide on-site personnel with the required procedures that are needed to ensure safe working conditions. The safety organization and procedures contained in this plan have been established based on an analysis of potential site hazards; and personnel protection measures have been selected in response to these hazards.

All work will be conducted in accordance with applicable federal, state, and local regulations, including the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) requirements of 29 CFR 1910 and 1926. This plan is primarily intended to satisfy the requirements set forth by OSHA in the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). Other workplace standards or guidelines shall be used in lieu of OSHA standards when they are more stringent than OSHA standards or when no OSHA standard exists. Examples of such guidelines include recommendations proposed by the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute of Occupational Safety and Health (NIOSH), and existing U.S. Army standards (e.g., EOD). This plan shall also be implemented in accordance with EPA's protocol, *Guidelines for Conducting Remedial Investigations and Feasibility Studies under*

CERCLA (EPA 540/G-85). The most recent copy of the Arthur D. Little Hazardous Waste Site Health and Safety Program Plan (April 6, 1992) shall be the reference document for other Arthur D. Little specific health and safety policies and procedures regarding work at hazardous waste sites.

1.3 Work Tasks

The sites and tasks included in the SI addendum (SIA) are:

- Inactive Landfill No. 2 (IL2)
  - Collect and analyze ground water samples from six existing monitoring wells to evaluate the continued presence of elevated metals in this area.
  - Collect and analyze one seep sample to evaluate source water chemistry.

- DPDO Salvage Yard and Transformer Storage Area (DSY)
  - Install two additional monitoring wells. Collect and analyze seven ground water samples. These data will be used to address the continued presence and extent of contamination by volatile organic compounds.

- Helicopter Hangar Area (HHA)
  - Collect and analyze a total of four sediment samples from two outfalls to the Little Patuxent River to determine if the discharges are affecting the river chemistry.
  - Install one ground water monitoring well and collect samples from the new and existing wells to evaluate ground water contamination.
  - Collect eight soil samples from four locations (two depths per location) to evaluate the oil-water separator. Headspace screening will be conducted for all samples and the highest concentration samples sent for analysis.
  - Collect one subsurface soil sample during advancement of a soil boring to determine soil quality.

- Fire Training Area (FTA)
  - Install three monitoring wells and analyze ground water samples from the three new wells to determine if site activities have resulted in ground water contamination.
  - Collect and analyze one sludge sample from the oil-water separator to evaluate source chemistry.

- Ordnance Demolition Area (ODA)
  - Drill four soil borings and collect three soil samples from each for laboratory analysis. Complete three of the borings as monitoring wells and sample the ground water from each. These data will be used to determine if ordnance demolition has impacted soil or ground water quality.

  - Collect and analyze one surface water and one sediment sample from the seep to evaluate ground water discharge to the ground surface.

- Background Soil Samples
  - Collect 80 surficial soil samples to provide baseline background soil quality data.

- Soldiers Lake
  - Collect two surface water samples to evaluate background water chemistry.

The two sites included in the RI addendum (RIA), and their associated tasks, are:

- Active Sanitary Landfill (ASL)
  - Install eight additional monitoring wells to help delineate the ground water plume.
  - Collect ground water, surface water, sediment, and leachate samples to evaluate changes in environmental quality.
  - Conduct a human health risk assessment and feasibility study.

- Clean Fill Dump (CFD)
  - Collect ground water samples from the existing wells to evaluate the continued presence of contaminants.
  - Collect three surface water samples to further evaluate if ground water is impacting the surface water.
  - Collect one seep sample to evaluate source chemistry.
  - Conduct a human health risk assessment.

A summary of activities at each of the sites is provided in Figure 1-3, and a summary of analytical samples is provided in Table 1-2.

Figure 1-3: Summary of Activities

Site Name	Investigative Activities													
	Site Inspection	Remedial Investigation	Records Search	UXO Survey	Supply Well Survey	Soil Boring Samples	Surface Water and Sediment Samples	Surface soil Samples	Soil Borings	Monitoring Wells	Ground Water Samples	Leachate Samples	Sludge Samples	Seep Samples
SI Addendum														
Inactive Landfill No. 2	●										6			1
DPDO Salvage Yard	●			●						2	8			
Transformer Storage Area	●			●				6						
Helicopter Hangar Area	●						5/5	8			6			
Fire Training Area	●			●						3	3		1	
Ordnance Demolition Area	●			●		12	1/1		4	3	3			
Background	●							30						
Soldiers Lake	●						2/0							
Drilling Water											2			
RI Addendum														
Active Sanitary Landfill		●	●	●	●		6/6			8	34	3		
Clean Fill Dump		●					3/0				6			1
Totals						12	17/12	44	4	16	67	3	1	2

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Table [redacted]: Summary of Analytical Samples

SOIL/SOLID SAMPLES	LOC	FREQ	TCL SVOCs	TCL VOCs	PHC	FILTERED METALS TAL	UNFILTERED METALS TAL	TCLP ORGANICS/ METALS	PCB	EXP	Cl	NO3	TDS	SO4	PEST
SOIL SAMPLES															
DPDO Salvage Area	6	1	0	0	0	0	0	0	6	0	0	0	0	0	0
Ordnance Demolition Area	4	3	0	0	0	0	12	0	0	12	0	0	0	0	0
Helicopter Hangar Area - shallow	4	1	4	4	4	0	4	0	0	0	0	0	0	0	0
Helicopter Hangar Area - deep	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0
Background	30	1	0	0	0	0	30	0	0	0	0	0	0	0	30
SEDIMENT SAMPLES															
Helicopter Hangar Area	5	1	5	5	5	0	5	0	0	0	0	0	0	0	0
Ordnance Demolition Area	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0
Active Sanitary Landfill	6	1	6	6	0	0	6	0	0	0	6	6	0	6	0
SLUDGE SAMPLES															
Fire Training Area	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
INVESTIGATION-DERIVED WASTE	6	1	0	0	0	0	0	6	0	0	0	0	0	0	0
TOTAL SOIL/SEDIMENT SAMPLES			**16**	**18**	**11**	**0**	**57**	**6**	**6**	**13**	**6**	**6**	**0**	**6**	**30**
QUALITY CONTROL SAMPLES															
FIELD QC SAMPLES															
FIELD BLANK			2	2	1	0	3	0	1	1	1	1	0	1	0
RINSATE BLANK			3	3	2	0	4	0	2	2	2	2	0	2	0
TRIP BLANK			0	7	0	0	0	0	0	0	0	0	0	0	0
FIELD COLLOCATE			4	4	3	0	4	0	1	1	1	1	0	1	0
TOTAL SOIL/SEDIMENT QC SAMPLES			**9**	**16**	**6**	**0**	**11**	**0**	**4**	**4**	**4**	**4**	**0**	**4**	**0**
GRAND TOTAL SOIL/SEDIMENT SAMPLES			**25**	**34**	**17**	**0**	**68**	**6**	**10**	**17**	**10**	**10**	**0**	**10**	**30**

Table 1-2: Summary of Analytical Samples (continued)

AQUEOUS SAMPLES	LOC	FREQ	TCL SVOCs	TCL VOCs	PHC	METALS TAL	METALS TAL	ORGANICS/ METALS	PCB	EXP	Cl	NO3	TDS	SO4	PEST
GROUND WATER SAMPLES															
Inactive Landfill #2	6	1	0	0	0	6	6	0	0	0	0	0	0	0	0
DPDO Salvage Yard - Existing Wells	5	1	5	5	0	5	5	0	0	0	0	0	0	0	0
DPDO Salvage Yard - New Wells	2	1	2	2	0	2	2	0	0	0	0	0	0	0	0
Fire Training Area	3	1	3	3	3	3	3	0	0	0	0	0	0	0	0
Helicopter Hangar Area	6	1	6	6	6	6	6	0	0	0	0	0	0	0	0
Ordnance Demolition Area	3	1	3	3	0	3	3	0	0	3	0	0	0	0	0
Active Landfill - Water Supply Well Survey	4	1	4	4	0	4	4	0	0	0	0	0	0	0	0
Active Landfill - Existing Wells	26	1	26	26	0	26	26	0	0	0	26	26	26	26	0
Active Landfill - New Wells	3	1	3	3	0	3	3	0	0	0	3	3	3	3	0
Clean Fill Dump	6	1	6	6	0	6	6	0	0	0	0	0	0	0	0
SURFACE WATER SAMPLES															
Helicopter Hangar Area	5	1	5	5	5	0	5	0	0	0	0	0	0	0	0
Ordnance Demolition Area	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0
Active Landfill	6	1	6	6	0	0	6	0	0	0	6	6	6	6	0
Clean Fill Dump - Existing Location	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0
Clean Fill Dump - New Locations	2	1	2	2	0	0	2	0	0	0	0	0	0	0	0
Soldiers Lake	2	1	0	0	0	2	2	0	0	0	0	0	0	0	2
LEACHATE															
Active Landfill	3	1	3	3	0	0	3	0	0	0	3	3	3	3	0
SEEPS															
Inactive Landfill #2	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0
Clean Fill Dump	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0
DRILLING WATER SUPPLY	1	2	2	2	2	2	2	0	0	2	2	2	2	2	0
INVESTIGATION-DERIVED WASTE	2	1	0	0	0	0	0	2	0	0	0	0	0	0	0
TOTAL AQUEOUS SAMPLES			79	80	16	70	87	2	0	6	40	40	40	40	2
QUALITY CONTROL SAMPLES															
FIELD BLANK			8	8	2	8	8	0	0	3	6	6	6	6	3
FINSATE BLANK			8	8	2	8	8	0	0	3	6	6	6	6	3
TRIP BLANK			0	16	0	0	0	0	0	0	0	0	0	0	0
FIELD DUPLICATE			7	7	1	8	8	0	0	0	6	6	6	6	0
TOTAL AQUEOUS QC SAMPLES			23	39	5	24	24	0	0	6	18	18	18	18	6
GRAND TOTAL AQUEOUS SAMPLES			102	119	21	94	111	2	0	12	58	58	58	58	8

NOTES:

LOC - Locations
FREQ - Frequency
TCL, VOCs - Volatile Organics, Target Compound List
TCL, SEMIVOCs - Semivolatile Organics, Target Compound List

PHC - Petroleum hydrocarbons
TCLP - Toxicity Characteristic Leaching Procedure
PCB - Polychlorinated biphenyls
EXP - Explosives

METALS, TAL - Metals on the Target Analyte List
Analyte lists are provided in the ADL QCP, 1993.

2.0 Site Hazard Summary

Hazards that may be encountered at this site can be classified into four general categories: explosives and unexploded ordnance, chemical and radioactive, physical, and environmental hazards. Chemical and radioactive hazards are site specific and involve the potential exposure to chemical contaminants in soil and ground water. Physical hazards are generally occupationally specific and may involve some type of accident, exposure to noise, electrical hazards, etc. Environmental hazards are created by natural environmental circumstances such as weather, poisonous plants, poisonous animals, insect bites, etc. To minimize the likelihood of an accident, on-site personnel should be familiar with the Accident Prevention Plan in Appendix D.

2.1 Explosives and Unexploded Ordnance

Any work, surface or intrusive, to be performed in suspect or known unexploded ordnance (UXO) areas must be accomplished in accordance with the USAEC UXO contractor requirements. Actual work locations in suspect or known UXO areas and access to them must be surveyed and cleared of UXO hazards before any field work begins.

2.1.1 Unexploded Ordnance

Sites where the UXO survey will need to be performed include:

1. Inactive Landfill
   - Landfill #2
   - Clean Fill Dump
2. DPDO Salvage Yard and Transformer Storage Area
3. Helicopter Hangar Area
4. Fire Training Area
5. Ordnance Demolition Area
6. Active Sanitary Landfill

When performing downhole magnetometry surveys during drilling operations in suspect or known UXO areas, measurements must be taken at intervals of every 4 feet to the depth of concern. The decision to perform downhole magnetometry at intervals other than every 4 feet must be justified by a site-specific analysis that supports that need. Prior to each measurement, the drill rig and equipment must be "backed off" the hole to a distance of approximately 20 feet to eliminate interference to the magnetometry equipment.

The UXO contractor shall prepare and submit to the U.S. government a final report covering all operations and activities conducted under this contract. Of particular interest is reporting the specifics of any anomalies or ferrous items recorded on instrumentation while performing downhole magnetometry.

No UXO operations will be conducted during the hours between sunset to sunrise, or during electric storms or severe weather conditions. Additionally, no UXO operations will be conducted if severe weather conditions are imminent.

Additional details of the UXO surveying program are presented in Attachment E, Standard Operating Procedure from the UXO subcontractor.

2.2 Chemical and Radioactive Hazards

Tables presented in Appendix A list examples of the primary contaminants of concern for ground water, surface water, and soils. Contaminants of concern were selected based on their toxicity and the concentrations that have previously been detected at the site. Several known or suspect carcinogens are included in these tables. The concentration of each chemical listed in Appendix A is available from the FGGM Work Plan dated December 4, 1992. These data provide the highest known concentrations of that chemical in that medium. The concentrations listed do not necessarily reflect current conditions across the site. In addition, it is very likely that not all sources of contamination have been identified at this site.

As part of Arthur D. Little corporate policy, a general radiation survey using a geiger counter will be performed at each work site to determine if radioactive materials are present at levels requiring special health and safety procedures.

Although the potential for acute symptoms of overexposure to site contaminants is considered low, such an occurrence would likely be the result of exposure to VOCs. Common symptoms of overexposure to VOCs include: headaches, dizziness, nausea, eye irritation, fatigue, loss of coordination, visual disturbances, abdominal pains, and cardiac arrythmia.

2.3 Physical Hazards

All Arthur D. Little, subcontractor, and other site personnel may be subject not only to the hazards of contaminant exposure, but also to physical dangers posed by on-site activities.

The physical hazards expected to be present at the sites during investigative activities include:

- Irregular work surfaces (footing)
- Snapping cables, slings, and rope
- Drilling equipment
- Moving equipment and vehicles
- Sharp objects

- Open pits or ditches
- Excessive noise
- Fire
- Buried utility lines and systems
- Slips, trips, falls
- Improper lifting of heavy objectives

2.3.1 Abatement of Physical Hazards

Most of the physical hazards identified above will be abated through the use of safe work practices and common sense. Some of these hazards, however, require special precautionary procedures, which are discussed below.

2.3.2 Fire/Explosion

Whenever site work involves disturbance of hydrocarbon-contaminated soils, the potential for a fire/explosion may be present. The primary sources of flammable gases/vapors are:

- Methane, a by-product of the decay of organic material
- Vapors from volatile organic compounds in the soil

During most operations, periodic monitoring of flammable vapors/gases using a combustible gas indicator/oxygen meter will alert site workers to the presence of dangerous concentrations of these contaminants. Air monitoring requirements for combustible gases are delineated in Section 7.0 of the HASP.

ABC fire extinguishers will be provided to personnel on site. All personnel have been trained in their use. The emergency response aspects of fire suppression are included in Section 9.0 of the HASP.

2.3.3 Buried Utility Lines

Fort Meade Engineering staff members will be contacted prior to any drilling activity to ascertain the presence and location of underground cables, utility lines, pipes and storage vessels at the proposed sites. Utility maps will be reviewed to determine the presence of any of the above-mentioned underground hazards. Drilling locations will also be screened for underground hazards using a pipe and cable locator prior to the commencement of any drilling activity.

2.3.4 Drilling

If the noise levels are likely to exceed 85 dBA for any portion of the drilling, hearing protection will be required to be worn by all personnel working in the area during this operation.

As stated above, the selection of locations for each monitoring well drilling activity site and sampling site will take into account buried utility pipes lines, wires, conduits, and tanks, or other potentially dangerous structures, including UXO and military

supplies. Overhead power lines and obstructions will also be surveyed. Prior to raising the mast, the area overhead and surrounding the rig will be checked by the drilling foreman and the Site Health and Safety Officer (SHSO). No drilling will be conducted within 50 feet of an overhead power line or obstruction.

When rotary drilling/sampling, drill rods will not be racked more than one and a half times the height of the mast. During the drilling operations and rig setup and takedown, all people who enter the Exclusion Zone will wear hard hats, safety shoes/boots, protective coveralls, and safety glasses/face shields to protect themselves from the physical hazards. Respiratory protection may be required based on area and personnel monitoring.

If during drilling there is any indication that underground tanks, drums, or other containers are being encountered, the drilling will be halted immediately and the SHSO notified. Indications that a waste container may have been encountered include (1) change in the speed or momentum of the auger, (2) visual examination of auger cuttings, (3) odor noted in the cuttings, and/or (4) the presence of airborne total volatile organics as measured with a direct-reading instrument.

2.3.5 Sampling

Fixatives will be applied to the samples in the field and the possibility exists for direct contact with potentially hazardous substances; therefore, personal protective equipment (PPE) must be worn as delineated in Section 7.0 of the HASP. Material Safety Data Sheets (MSDSs) will be maintained on site for all hazardous materials utilized.

2.3.6 Aquatic Activities

Since both the Helicopter Hangar Area and Soldier Lake studies will involve personnel conducting sampling on water bodies, USCG-approved personal flotation devices will be utilized by all personnel in boats. Chest waders will be needed for non-boat sampling surface water and sediment activities in brooks, streams, and other tributaries.

2.4 Environmental Hazards

Environmental hazards such as inclement weather, poisonous plants, animals, and insects cannot always be avoided. Based on available information and current site conditions, the Site Health and Safety Officer and field personnel shall use their best judgment to mitigate these potential hazards. Insect/pest and heat stress hazards are the two primary environmental hazards present at the site and are discussed below.

2.4.1 Insect/Pest Hazards

Insects and pests (e.g., ticks, mosquitos, bees, snakes, rats) are potentially present onsite. The following precautionary measures should be taken based on the nature

and severity of the hazard; wear long-sleeved shirts, long pants, and boots that extend above the ankle or socks pulled over the cuffs of pants; tuck pant cuffs into boots; liberally use, per container instructions, any insect repellent containing DEET; wear high, puncture-resistant boots; wear light-weight overclothing such as Tyvek pants, jackets, and hoods in the most extreme cases; and tape-up all clothing interfaces. Individuals should also check one another (particularly in hair and around garment interfaces such as wrists, waist, and ankles) for ticks and other insects periodically during the day, and prior to leaving the site. If the use of DEET containing products is used, special care must be taken to avoid contamination of samples or equipment with DEET. Arthur D. Little personnel will receive Lyme Disease screening at the completion of field activities.

2.4.2 Heat Stress Hazards

Heat stress of employees can easily occur during these on-site activities. Heat stress indices may be monitored by the Wet Bulb Globe Temperature Index (WBGT) technique. This method will require the use of a heat stress monitoring device, such as the Wibget Heat Stress Monitor (Reuter Stokes).

The WBGT shall be compared to the Threshold Limit Valve (TLV) outlines in the ACGIH TLV Manual, and a work-rest regimen will be established, as necessary, according to the WBGT obtained. Note that 5°C must be subtracted from the listed TLV for heat stress to compensate for the wearing of impermeable protective clothing.

Regardless of on-site monitoring, employees are the most knowledgeable regarding the effects of heat on themselves.

One or more of the following control measures need to be used to help control heat stress:

- Provision of adequate liquids to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees shall be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.

- Replacement fluids will be commercial electrolyte supplements, such as Gatorade or Quick Kick, in combination with fresh, cool water.

- Establishment of a work regimen that will provide adequate rest periods in shaded areas for cooling down. This may require additional shifts of workers.

- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.

- All breaks are to be taken in a shaded, cool rest area (77°F is best).

- Employees shall remove impermeable protective garments during rest periods.
- Employees shall not be assigned other tasks during rest periods.
- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

During periods of high temperature and/or humidity, the Site Health and Safety Officer representative will continually observe the workers for symptoms of heat stress, especially in areas where protective clothing is being worn. If the body's physiological processes to maintain a normal body temperature fails, or are overburdened due to excessive heat exposure, a number of physical reactions can occur ranging from mild symptoms such as fatigue, irritability, anxiety, and decreases in concentration and movement, to death. Additional heat-related problems are briefly described below:

- *Heat Rash* - This is caused by continual exposure to heat and humid air, and is aggravated by chafing clothes. Heat rash decreases a person's ability to tolerate heat and become an irritating nuisance.
- *Heat Cramps* - This is caused by profuse perspiration with inadequate water intake and chemical electrolyte imbalance. Heat cramps result in muscle spasm and pain in the extremities and abdomen.
- *Heat Exhaustion* - Increased stress on various organs to meet increasing demands to cool the body will result in signs and symptoms including shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and lassitude.
- *Heat Stroke* - This is the most severe form of heat stress, which must be treated immediately by cooling the body or death may result. Signs and symptoms include red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma.

In the event of a heat stress related injury or illness, on-site personnel will render the appropriate level of first aid, and, if needed, request assistance from on-site emergency medical personnel and the base hospital.

2.4.3 Cold Stress Hazards

Persons working outdoors in temperatures at or below freezing may experience cold stress and frostbite. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, resulting in death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears are most susceptible.

Two factors influence the development of a cold injury: ambient temperature and wind velocity. Wind chill is used to describe the chilling effect (on bare skin) of moving air in combination with low temperature. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- *Frost nip or initial frostbite*: characterized by sudden blanching or whitening of the skin.
- *Superficial frostbite*: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- *Deep frostbite*: tissues are cold, pale and solid; extremely serious injury.

Systematic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: (1) shivering, (2) apathy, listlessness, sleepiness (sometimes rapid cooling of the body to less than 95°F), (3) unconsciousness, glassy state, slow pulse, and slow respiratory rate, (4) freezing of the extremities, and finally (5) death.

Thermal socks, long cotton or thermal underwear, hard hat liners, or other cold weather gear can aid in the prevention of hypothermia. Blankets, warm drinks (other than caffeinated drinks), and warm break areas are essential. The overall goal is to keep from getting wet. A worker who does get wet should dry off and change clothes.

2.5 Initial and Continued Site Evaluation

A preliminary evaluation will be conducted by the Site Health and Safety Officer to ensure that site activities, personnel protection, and emergency response are consistent with the levels of contaminants expected to be encountered.

Additional data obtained during the course of work will be used to update this evaluation.

If other contaminants are encountered on site all personnel will be made fully aware of their hazardous properties and the appropriate procedures that will be utilized to prevent exposure.

3.1 Project Staff and Health and Safety Organization

The personnel and their organizations listed below will be performing various on-site and/or off-site activities (see Figure 3-1). The USAEC Contracting Officer's Representative (COR) will be notified promptly of any potential on-site health and safety problems and changes in the health and safety organization. Telephone numbers are provided in Section 9.0 of this HASP.

3.1.1 USAEC

- Contracting Officer Representative: Scott Hill
- Health and Safety Officer: Vivian Graham

3.1.2 Arthur D. Little, Inc.

- Task Manager: Kathleen Thrun
- Deputy Task Manager: Dorothy Vesper
- Health and Safety Staff:
  - Corporate Director of Health and Safety (CDHS): R.Scott Stricoff, CIH, CSP
  - Project Field Supervisor: Dorothy Vesper
  - Health and Safety Officer (HSO): Corey Briggs, CIH CET
  - Health and Safety Officer Alternate: Peter Roy, CIH
  - Site Health and Safety Officer (SHSO): To be determined
  - Site Health and Safety Officer Alternates: To be determined
  - Task Health and Safety Officer (THSO): To be determined in the field

3.2 Responsibilities

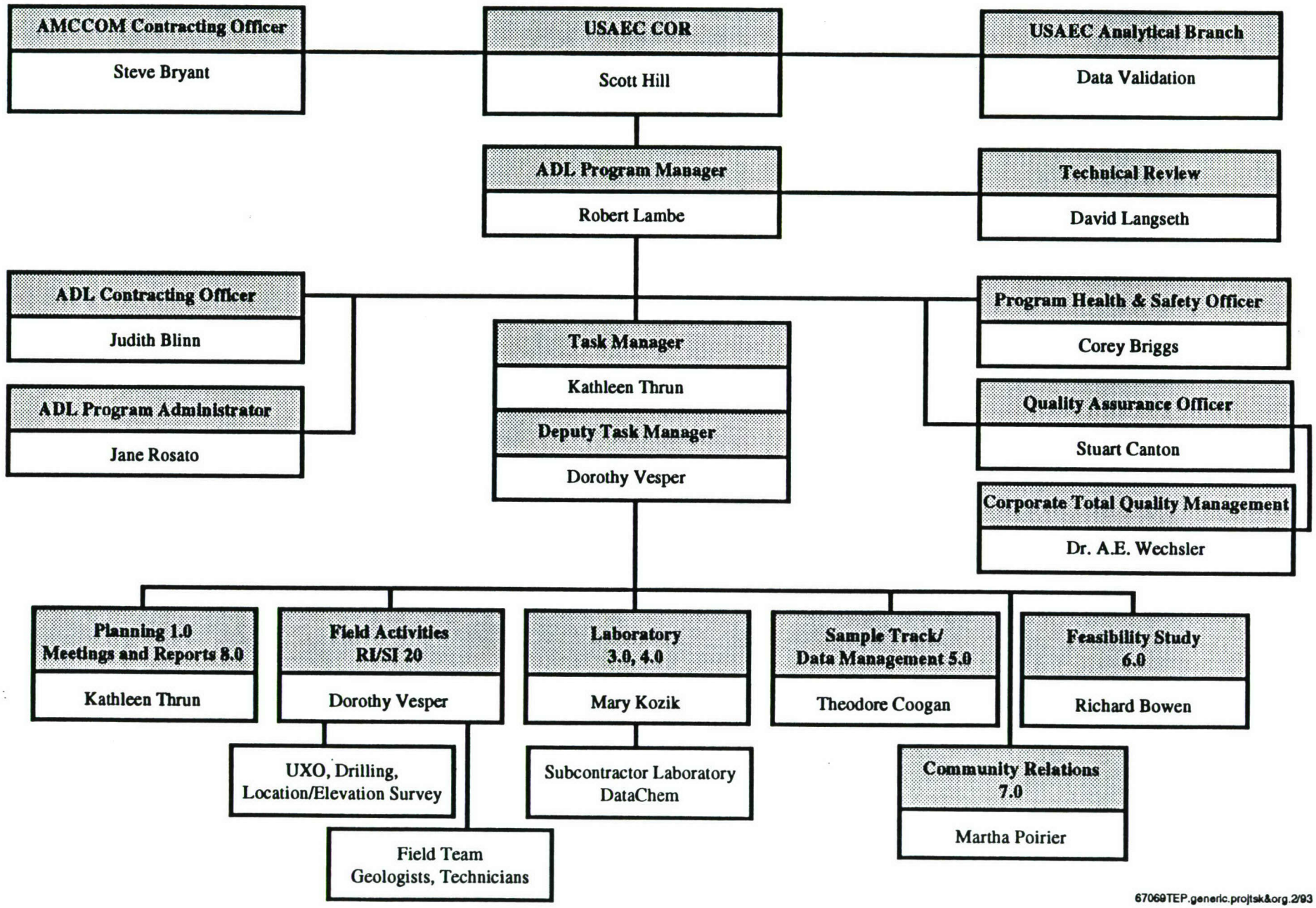
3.2.1 Task Manager/Deputy Task Manager

- Acts as day-to-day liaison with USAEC Project Manager
- Reviews and approves the initial site-specific Health and Safety Project Plan and any future revisions or amendments
- Assures that fieldwork proceeds according to requirements of the Health and Safety Project Plan
- Coordinates with the Health and Safety Officer and the Site Health and Safety Project Officer
- Responsible for onsite implementation and enforcement of the Health and Safety Plan by all project personnel
- Designates field personnel who meet qualification requirements of the site-specific Health and Safety Project Plan
- Coordinates with all Arthur D. Little subcontractors to ensure that they are informed of, agree to, and comply with all requirements of the Health and Safety Project Plan

3.2.2 Project Field Supervisor

- Coordinates and supervises all fieldwork

Figure 3-1
Fort Meade Project Tasks and Organization



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3.2.3 Corporate Director of Health and Safety (CDHS)

- Gives final authority on all health and safety issues, concerns, or conflicts that impact the project
- Exercises supervision and control over company's health and safety program

3.2.4 Health and Safety Staff (HSO and Alternate HSO)

- Prepares the site-specific Health and Safety Project Plan
- Provides ongoing industrial hygiene and safety support to the project
- Acts as the primary health and safety liaison to USAEC
- Conducts health and safety site orientations, training, and periodic safety inspections/audits, as required

3.2.5 Site Health and Safety Officer (SHSO)

- Coordinates all on-site health and safety activities
- Provide health and safety briefings
- Monitors the field investigations to ensure compliance with the Health and Safety Project Plan
- Reports deviations from the Health and Safety Project Plan to the Task Manager and HSO
- Recommends modifications of the Health and Safety Plan to the Task Manager and HSO as soon as practical once it is apparent that the plan should be modified
- Establishes Exclusion Zones
- Oversees the distribution, use, maintenance, and disposal of personal protective equipment and clothing
- Coordinates the prohibition of non-essential personnel outside the Exclusion Zone boundaries
- Uses appropriate portable field instruments and personnel as specified in the HASP (Section 7.0) to monitor site conditions in the Exclusion Zones
- Maintains a log of field activities, monitoring, and site orientations, and submits appropriate summary reports
- Prepares any incident reports
- Stops work when unacceptable health and/or safety risks exists

3.2.6 Site Health and Safety Officer - Alternates(s)

- Assumes all functions and responsibilities of the SHSO in his/her absence

3.2.7 Task Health and Safety Officer

- Designated by the SHSO, a member of each independent team or group of personnel on site conducting field work shall be responsible for the health and safety actions of that team (e.g., air monitoring). Responsibilities include determining if contaminant levels exceed an action level (Section 7.1.3), or assuring that the team maintain communication via predetermined methods - visual, auditory, walkie-talkie, etc.

3.2.8 Field Geologists, Sampling Technicians and Chemists

- Comply with the requirements of the Health and Safety Project Plan
- Immediately notify the SHSO of hazardous or potentially hazardous or unsafe conditions or environments that are not addressed or are not adequately addressed in the plan
- Immediately notify the SHSO and Task Manager of any on site accidents or exposures
- Conduct work consistent with normal safe working procedures for a comparable work site
- Attend all on- and off-site Health and Safety Briefings
- Comply with current training and medical surveillance requirements

4.0 Regulatory Requirements and Personnel Qualifications

In order to be authorized for project fieldwork all Arthur D. Little and subcontractor personnel must be certified as having met the minimum requirements described in the sections below.

4.1 Medical Surveillance

In compliance with OSHA medical surveillance requirements (29 CFR 1910.120), supervisory personnel and field personnel, including subcontractor personnel, shall have received an examination by a licensed physician. The most recent exam shall have been given within the 12-month period proceeding this work, and each employee shall have been determined by the attending physician to be physically able to perform the work and to use respiratory and other protective equipment as typically required for a field investigation of this nature. A summary of a medical monitoring program that meets OSHA regulations and is acceptable to Arthur D. Little is provided in Appendix B. Arthur D. Little's Hazardous Waste Site Medical Surveillance program is coordinated through the Mt. Auburn Hospital Occupational Health Department in Cambridge, Massachusetts. The physician in charge will be notified of Arthur D. Little's on-site activities.

4.2 Health and Safety Training

All on-site management and field personnel, including subcontractor personnel, shall have received training and/or experience that at a minimum satisfies the OSHA regulations for hazardous waste and emergency response (29 CFR 1910.120). Highlights of a training program that meets OSHA regulations and is acceptable to Arthur D. Little are provided in Appendix C. Once basic training has been received, annual refresher training must also be completed in accordance with Arthur D. Little's scheduling requirements. At least one of the field team members should be first aid and/or CPR trained. Due to the on-site hazards, Arthur D. Little field staff and contractors shall attend a special training session on explosives and ordnance safety conducted by the UXO subcontractors.

4.3 Respirator Training

All personnel, including subcontractor personnel, who will be within any established Exclusion Zone shall have completed a respiratory protection program that at a minimum satisfies the OSHA regulations (29 CFR 1910.134). This program shall include: (1) instruction in the proper use, limitations, and care of respirators; (2) proper fitting of personnel for a respirator, using either a qualitative or quantitative fit test method; and (3) teaching personnel how to conduct either a positive and/or negative pressure fit test. Personnel shall be fit tested and assigned a respirator model and size that will be available to them for site work.

4.4 Health and Safety Site Orientation Meeting

All site personnel shall be required to read this HASP and attend the initial Health and Safety Site Orientation (Section 6.1) and all site Health and Safety Briefings (Section 6.2) relevant to their site work.

All subcontractors shall conduct their work in accordance with the policies and procedures outlined in this Health and Safety Plan, or provide to the HSO a health and safety plan that meets or exceeds the requirements of this plan.

4.5 Documentation of Personnel Training and Medical Surveillance

Records of training and medical surveillance are maintained at Arthur D. Little's Cambridge, Massachusetts, corporate office. Field documentation will be maintained utilizing Attachment A, Training and Physical Examination Record. This form shall be completed by the SHSO or his/her alternate for all Arthur D. Little personnel, and subcontractor personnel.

Site visitors and other individuals who enter the Exclusion Zone must attend a pre-entry briefing where they will be briefed about site operations, potential hazards, and the necessary precautions. All visitors must be accompanied by an Arthur D. Little escort at the site.

5.0 Site Control

The purpose of the site control measures discussed in this section are to maintain order at the site and to minimize chemical and physical hazards to on-site personnel, visitors, and the public. Only personnel identified as "authorized" will be permitted to enter the site. A master list of authorized personnel will be available and will only include personnel who have received the appropriate training and medical certification required by this HASP and OSHA requirements.

5.1 Work Zones

Work zones are designed to prevent employees, visitors, and the surrounding environment from exposure to contamination during all aspects of site investigation activities. All work zones and support areas will be established by Arthur D. Little. Movement of personnel and equipment between zones and on and off the site will be controlled by means of designated access points. Minimum personal protective equipment (PPE) for work in each zone is described in Section 7.0.

5.2 Exclusion Zones

During select on-site operations, the SHSO may determine that it is necessary to establish and maintain Exclusion Zones. The Exclusion Zones may be marked using plastic caution tape supported by metal or wood stanchions, safety cones and flagging tape, or other equivalent demarcation methods. The Exclusion Zone encompasses the surface areas within a 50-foot radius around the location of drilling operations. A formal exclusion zone may not need to be established for other planned operations; however, steps must be taken to ensure that personnel and equipment are properly decontaminated (See Section 7.0) and that contaminated materials are not removed from the work area.

The SHSO will be responsible for coordinating the prohibition of non-essential personnel within the Exclusion Zone boundaries. Prior to entering the Exclusion Zone, site personnel shall have donned the proper PPE for expected site conditions and the particular operation, as determined by the SHSO (see Section 7.0).

5.3 Contamination Reduction/Decontamination Zones

The Contamination Reduction Zone will be established as a buffer zone between the Exclusion Zone and the Support Zone of each drilling site. All personnel and equipment leaving the Exclusion Zone will do so through the Contamination Reduction Zone. The personnel and equipment decontamination stations, described in Section 7.0, will be located in this zone.

Contamination Reduction Zones, or decontamination zones, shall be established adjacent to the Exclusion Zones. Personnel exiting the Exclusion Zones shall undergo

appropriate decontamination activities as directed by task-specific procedures in Section 7.0.

5.4 Support Zone

The Support Zone will be established near the site entrance. No special clothing or protective equipment, except hard hats and leather or chemically resistant boots with steel toes, is required in this area. Operational and support facilities (supplies, equipment, storage, and maintenance areas) will be located in this area.

5.5 Site Entry and Exit

All persons entering an Exclusion Zone will be required to wear the personal protective equipment specified in Section 7.0.

The following protocols will be followed when leaving the Exclusion Zone and Contamination Reduction Zone:

- All personnel will exit through the designated exit points.
- All personnel will proceed through appropriate decontamination, as specified in Section 7.0.

All protective equipment will be removed in the Contamination Reduction Zone.

5.6 Site Access and Parking

No personal vehicles are to travel beyond the van used as the base of operations to help accomplish work tasks. Other vehicles should not be driven on the site unless necessary and approved by the Project Field Supervisor.

5.7 Communications

Communication on site, including into or out of the Exclusion Zone, will generally be accomplished by voice; however, walkie-talkie devices and cellular phones will be available during on-site activities. If more than two people require or request the use of the walkie-talkies for the same day then the site supervisor shall resolve who has priority, provide additional communication devices, reschedule one or more tasks, or otherwise resolve this situation to the satisfaction of interested parties and the SHSO. Prior to conducting work in a particular area, the Project Field Supervisor will locate the nearest telephone and instruct all personnel regarding its location. A cellular

telephone(s) will also be available on site for the sole purpose of emergency notification.

5.8 Buddy System

All work operations will be scheduled so that no employee works alone on site at any time. Each worker will maintain visual contact with another specified worker at all times. The buddy system will ensure against an employee becoming stressed, ill, or injured without a co-worker being aware of his or her condition. Workers must watch out for each other while working close to potential chemical and physical hazards.

6.1 Health and Safety Site Orientation

The SHSO shall conduct a health and safety site orientation prior to the initiation of field activities. The orientation will cover all aspects of the site-specific Health and Safety Project Plan with special emphasis on explosives and ordnance safety. This session will also serve as a formal review of site hazards and potential health effects, the Accident Prevention Plan (Appendix D), safe work procedures and precautionary measures, use of personal protective equipment, decontamination procedures and emergency response procedures. All field staff are required to attend these briefings. This orientation, in addition to periodic Health and Safety Briefings, shall act as the informational programs in accordance with OSHA 1910.120. Material Safety Data Sheets (MSDSs) for chemicals used on site shall be maintained by the SHSO and will be accessible to all personnel upon request. All site personnel will be required to sign off in the HASP Review Record (Attachment B) prior to conducting on-site activities. This form shall become part of the site records.

6.2 Health and Safety Briefings

The SHSO will conduct a daily Health and Safety Briefing. Topics to be covered, as needed, include personal protective equipment, personnel and equipment decontamination procedures, accident prevention, emergency notification, and any modifications or amendments to the Health and Safety Project Plan. On-site field staff are required to attend the briefing and attendance will be documented in the field log book.

6.3 Field Station

A field station shall be established at the site in a space provided by Fort Meade. Fort Meade will provide all power and office facilities.

6.4 Accident Prevention Plan

Arthur D. Little's Accident Prevention Plan is provided in Appendix D. This plan addresses several aspects of general site safety, including training, sanitation, fire prevention, housekeeping, protective equipment, equipment maintenance, and site inspections. The provisions of this plan must be adhered to by all on-site personnel and subcontractors.

6.5 Safe Work Practices

6.5.1 General

Safe work practices, which must be followed by all site workers, include, but are not limited to, the following:

- Eating, drinking, chewing gum or tobacco, and smoking are strictly prohibited in the Exclusion and Contamination Reduction Zones and in the vicinity of all work operations. Break areas will be designated by the SHSO for these activities.
- Do not sit or kneel in areas of potential contamination.
- Hands and face must be thoroughly washed upon leaving the work area. Good personal hygiene is imperative.
- Immediately repair or replace any defective PPE.
- Prescription drugs must not be taken by personnel unless specifically approved by a qualified physician.
- Personnel on site must use the buddy system; visual contact must be maintained between team members at all times.
- Report any unsafe conditions and accidents immediately to the SHSO.

6.5.2 Daily Start-up and Shutdown Procedures

The following protocols will be followed daily prior to start of work activities:

- The SHSO will review site conditions to determine if modification of work and safety plans are needed.
- Personnel will be briefed and updated on any new health and safety procedures as well as emergency information.
- All safety equipment will be checked for proper function.
- The SHSO will ensure that first aid equipment is readily available.
- The SHSO will initiate appropriate monitoring.

The following protocol will be followed at the end of daily operations and before breaks:

- All personnel will proceed through decontamination procedures and facilities, as appropriate.

6.6 Confined Space Entry

Confined space entry will be prohibited during this project.

6.7 Tanks, Drums, and Barrels

It is possible that buried tanks, drums, or barrels could be discovered. However, should the field investigations discover or detect unknown tanks, drums, barrels or other containers that are suspected of containing hazardous waste, the following procedures will be followed. Field personnel should mark this location with flagging tape or some similar means and should also mark this location on the site plans. Field personnel should not stay in the immediate area (100-foot radius) any longer than is needed to flag the location of the discovered object. Tanks, drums, and barrels are to be left undisturbed until an action plan and an addendum to the HASP have been approved by the ADL Task Manager, the Health and Safety Officer, and the USAEC Contracting Officer Representative. If a leaking container is discovered, follow the procedures outlined in Section 9.6. If a spill absorbent/containment materials are available, and it is safe to do so, deploy them accordingly.

6.8 Respiratory Protective Equipment

The following is a list of general provisions regarding the use of respiratory protective equipment. Authorized respirator users must have completed 40-hour (and/or 8-hour refresher) HAZWOPER training, since respiratory protection training (per 29 CFR 1910.134) is an integral part of this training program.

- Only properly cleaned, inspected and maintained, NIOSH/MSHA approved respirators shall be used on site.

- Selection of respirators as well as any decisions regarding upgrading or downgrading of respiratory protection will be made by the SHSO in conjunction with the HSO.

- Air purifying cartridges shall be replaced when "loadup" or "breakthrough" occurs, unless otherwise recommended by the SHSO.

- Only employees who have had pre-issue and annual qualitative fit tests thereafter, shall be allowed to work in atmospheres where respirators are required.

- If an employee has demonstrated difficulty in breathing during the fitting test or during use, he or she shall have their physical condition re-evaluated to determine whether the employee can wear a respirator while performing the required duty.

- No employee shall be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the employee will be unable to function normally wearing a respirator or that the safety or health of the employee or other employees will be impaired by use of respirator.

- Contact lenses are not permitted on site and are not to be worn while using any type of respiratory protection.

- If needed, air supplied respirators shall be assembled per manufacturer's specifications regarding hose length, couplings, valves, regulators, manifolds, etc.

- All air utilized for air supplied respirators will meet the requirements for at least Grade D breathing as specified by the Compressed Gas Association.

- Excessive facial hair (e.g., beards and large moustaches) prohibits proper face fit and effectiveness of air purifying respirators. Persons required to wear respiratory protection must not have any facial hair that interferes with the respirator seal.

- Regular eyeglasses cannot be worn with full face respirators (breaks the facepiece seal). Special eyeglass inserts must be utilized.

- The respiratory protection utilized on site will be in compliance with OSHA in 29 CFR 1910.134 and the Arthur D. Little Respiratory Protection Program.

- Respirators are to be cleaned daily per 1910.134. If respirators are not dedicated to individuals, disinfection is also required.

- Where air-purifying respirators are designated for protection against on-site contaminants, the employee shall be permitted to change canisters or cartridges whenever an increase in breathing resistance is detected.

6.9 Illumination

All on-site activities are to be conducted during daylight hours. If work conditions change activities shall be conducted in accordance with the provisions of 29 CFR 1910.120(m), Table H-120.1 (e.g., 5 foot candles [general site areas] to 30 foot candles [offices]).

6.10 Sanitation

A portable toilet has been placed adjacent to the Arthur D. Little office trailer. This portable toilet is being periodically serviced by an outside company. Arthur D. Little subcontractors will utilize our sanitation system.

A bottled spring water dispenser is located in the Arthur D. Little office trailer for use by Arthur D. Little personnel and subcontractors.

Personnel are to utilize base facilities for day-to-day washing of their hands and face.

7.0 Task-Specific Health and Safety Procedures

As stated in Section 1.0 tasks scheduled for this project include mobilization, monitoring well installation and sampling, soil sampling, site reconnaissance, and boring. Health and safety procedures for each of these tasks are presented in the following subsections.

7.1 Invasive and Non-Invasive Site Tasks

7.1.1 Personnel

Personnel requirements for these procedures typically require a minimum of two persons, with each person maintaining visual and/or auditory contact. Any changes to this format shall be agreed upon by the Project Manager, the HSO, and the SHSO.

7.1.2 Site Monitoring

7.1.2.1 General. The SHSO shall designate one of the two team members as the Task Health and Safety Officer and this person shall use a properly calibrated HNu PI-101 photoionization detector (PID), or equivalent instrument, equipped with the appropriate lamp, to:

A. Monitor organic vapors at several on-site areas at the beginning of each day to establish a background reading.

B. Monitor organic vapors at the worker's breathing zone, hand auger spoils, and above ground water wells.

C. If elevated levels of organic vapors are detected, the worker's breathing zone will be monitored continuously while in the area, or for 15-minute periods every half-hour.

D. Traditional industrial hygiene air monitoring for organic vapors and dusts may also be performed during potential high exposure activities, and at the discretion of the HSO.

E. Monitor when work begins on a different portion of the site.

F. Monitor when contaminants other than those previously identified are being handled.

G. Monitor when a different type of operation is initiated.

H. Monitor if personnel are working in areas with obvious liquid contamination.

I. Monitor if a sufficient reasonable interval has passed so that exposures may have significantly increased.

Measurements shall be taken at the anticipated source and in the breathing zone of site personnel during all invasive operations. Response action levels are presented in Table 7-1.

Instruments shall only be used by employees who have been trained in the proper operation, use, limitations, and calibration of the monitoring instrument and who have demonstrated the skills necessary to operate the instrument.

The monitoring program may be expanded, reduced, or modified by the Arthur D. Little Health and Safety Officer (HSO) with concurrence of the Task Manager, based on site conditions and monitoring results. All monitoring will be accomplished under the direction of the SHSO, who will interpret the results with the guidance of the HSO.

7.1.2.2 Real Time Air Monitoring. The air monitoring program will include sufficient monitoring of air quality in work zones and other on-site areas to assess levels of potential employee exposure, establish work zones, determine that the work zone designations are valid, and verify that the respiratory protection being worn by personnel is adequate. The air monitoring program is also designed to ensure that contaminants are not migrating off site in order to minimize exposure of nearby populations, work areas and/or workers.

7.1.2.3 Perimeter Monitoring. If detectable concentrations are measured during the on-site activities, monitoring shall also be conducted at least two times each day with a total volatile organics direct-reading instrument at the perimeter of each site. If airborne levels of contaminants exceed background levels at the perimeter of any site, the work will be stopped and the suspected source of the contamination (e.g., borehole or monitoring well) will be covered to eliminate emissions. If the emissions are not reduced in a reasonable period of time (e.g., 15 minutes), the Arthur D. Little HSO and the Task Manager will be notified. A decision will then be made as to how to proceed with the work and how to more fully characterize the airborne emissions.

7.1.2.4 Flammable/Combustible Gases. Monitoring at potential sources of combustible gases shall be conducted periodically during operations involving penetration of soils. If instrument readings indicate 10 percent of the lower explosive limit (LEL) or less, work shall continue with increased monitoring. If readings exceed 10 percent of the LEL, operations shall cease and personnel will withdraw until levels subside (at least 15 minutes). If levels do not subside, special arrangements for on-site portable ventilation systems may be needed.

7.1.2.5 Oxygen Deficiency. Oxygen levels will be periodically monitored using a direct reading combustible gas/oxygen meter. This would be especially true in low lying areas and during activities on and around the landfill (e.g., from methane). If monitoring indicates less than 19.5 percent oxygen, activities in the area will be stopped until the source causing the oxygen deficiency is identified and controlled. In

Summary Table 7-1: Action Levels and Emergency Information

Chemical Vapors	
Action Levels	**Emergency Action**
Background or below sustained for 5 minutes	Continue at modified level D.
Background to <5 ppm sustained for 5 minutes	Upgrade to level C and continuous monitoring.
Greater than 5 (>5) ppm above background sustained for 5 minutes or a peak reading of 30 ppm or greater	Discontinue operations in immediate area. Characterize airborne contaminates via personnel and area monitoring including contaminants that could be present which are not detected by PID equipment. Contact the HSO or SHSO for advice on how to proceed. Level B protection may be needed.
Explosive Limit Detection	
Action Level	**Emergency Action**
10% of lower explosive limit	All workers in the area should retreat immediately and evaluate the situation. Report observations and instrument readings to the SHSO. Ventilation may be required to resume work in this area.
Radiation Detection - ADL Policy	
Action Levels	**Emergency Action**
X < 50 µR/hr	Level D normal monitoring during sampling procedures.
50 µR/hr<x<200 µR/hr	Level D periodic monitoring (every 30 minutes).
200 µR/hr<x<2 mR/hr	Level D continuous monitoring - worker exposures assessed.
x > 2 mR/hr	Work site evacuated. Contact HSO or RSO.

addition, methane concentrations may be periodically monitored during the landfill activities using Draeger colorimetric indicator tubes. If available, an OVA could also be utilized to detect low levels of methane on site.

7.1.2.6 Respirable Dust. Monitoring for respirable dust may be necessary to estimate employee exposure to heavy metals and semivolatile organic compounds that may comprise part of or be adhered to dust particles generated during site operations. Continuous monitoring of the site workers' breathing zone may be performed during all drilling operations using a direct-reading respirable dust monitor where the generation of dust is likely.

7.1.2.7 Calibration and Maintenance. All direct-reading instruments must be calibrated on a daily basis. A known concentration of a specific gas (isobutylene for PID) will be used. Instructions in the manufacturers' operations manuals regarding cleaning and maintenance of the instruments shall be followed.

The Quality Control Plan (QCP) provides detailed information on the calibration and maintenance of field sampling and monitoring equipment. SOPs for select air monitoring devices (e.g., CGI/O_2 meter, Draeger kit, Rad Meter) are referenced in the QCP. Manufacturers' operation and calibration instructions will be available on site for all equipment for which an SOP is not available.

7.1.2.8 Recordkeeping Requirements. The results of air monitoring readings shall be recorded on air monitoring data forms, as illustrated by Attachment C, or in the field logbook. A calibration and maintenance log for each instrument shall also be maintained. See Section 8.0 for more information on recordkeeping.

7.1.2.9 Heat Stress. Ambient temperatures at the site combined with the requirements for personal protective equipment (PPE) use may contribute to heat stress. While using nonpermeable PPE when ambient temperatures reach or exceed 70°F, work-rest regimens will be adjusted accordingly.

7.1.3 Action Levels

Action levels and the appropriate emergency action are summarized in Table 7-1 and discussed in detail below.

7.1.3.1 Chemical Vapors. All field work covered in Section 7.1 will commence with Modified Level D personal protection (see Section 7.1.4).

Based on positive direct reading instrument levels in the breathing zone or site conditions, the SHSO shall upgrade personal protection equipment requirements as described below.

The following action levels are based on PID *breathing zone readings* and observations of site conditions:

- Background or below: *Continue at Modified Level D.*
- Background to 5 ppm sustained for five minutes: *Upgrade to Level C and Continue Monitoring.*
- Greater than 5 ppm above background sustained for five minutes or a peak reading of 30 ppm or greater: *discontinue operations in that immediate area. Make arrangements to further characterize airborne contaminants via personal and area monitoring including contaminants that could be present which are not detected by PID equipment. Contact the HSO for advice on how to proceed. Level B protection may be needed for work to continue.*

7.1.3.2 Explosive Limit Detection. Based on a positive reading on the combustible gas indicator of 10 percent of the lower explosive limit (LEL), all workers shall not enter, but shall retreat immediately from the area and evaluate the situation. Report observations and instrument readings to the SHSO, who will advise workers on safety measures necessary before returning to work in the area. A means of ventilation may be required in order to resume work in this area.

7.1.3.3 Radiation Detection. To our knowledge, no radiation monitoring has been conducted in the areas of concern. From our initial review of site documentation, radioactive areas are not anticipated to be encountered. However, prior to initiating work, a general survey will be conducted in each of the study areas in conformance with Arthur D. Little corporate policy. If it is determined that a radiation monitoring plan is required, contact the HSO or Arthur D. Little's RSO. Site personnel must then comply with the following action levels when the radiation monitoring program is in effect:

Total External Exposure

x < 100 µR/hr	Level D	Normal monitoring during sampling procedures
100 µR/hr < x < 200 µR/hr	Level D	Periodic monitoring (every 30 minutes)
200 µR/hr < x < 2 mR/hr	Level D	Continuous monitoring - worker exposures assessed
x > 2 mR/hr		Work area evacuated and the HSO or Arthur D. Little Radiation Safety Officer (RSO) contacted

7.1.4 Personal Protective Equipment (PPE)

This section contains specific provisions for the use of personal protective equipment (PPE). Based on site conditions and action levels (Sections 7.1.3.1 to 7.1.3.3) the SHSO shall confer with the HSO regarding the upgrading or downgrading of personal protection.

Modified Level D protection shall be used at the start of field work. Modified Level D protection shall include use of the following items:

- Standard work clothes or coveralls
- Disposable white Tyvek coveralls or equivalent
- Hard hat
- Steel toe/steel shank PVC boots, or similar leather boot with an impervious boot cover
- Safety glasses with side shields (all sunglasses and prescription glasses used on site must also be impact resistant and fitted with side shields)
- Chemical protective gloves (e.g., nitrile) and Silvershield or 4H undergloves shall be worn when collecting surface water, sediments or soil samples or when sampling, bailing or developing wells

Contact lenses may not be worn by workers at this site.

Upgrade to Level C may be required if the level of VOCs detected in the worker's breathing zone exceeds the Action Level of 5 (see Section 7.1.3.1). Level C protection will include all of the PPE required for Modified Level D plus the following:

- Replace white Tyvek with Saranex Tyvek coveralls
- Use disposable outer boots and an appropriate full face air purifying respirator

The specific respirator for Level C protection shall be the MSA Ultra Twin full-face respirator (APR) with GMC-H combination cartridges (MSA Part No. 460844), or equivalent. The GMC-H cartridge is approved for organic vapors and acid gases (not more than 1,000 ppm), dusts, fumes and mists having a time weighted average less than 0.05 mg/m^3, radionuclides, and asbestos (TC 23C-153). Respirator cartridges will be changed at the first sign of breakthrough or loadup, or at the discretion of the SHSO.

Provisions shall be made for drill rig operators to upgrade to Level B protection if conditions warrant during drilling and other potentially high exposure activities. Level B protection will include all of the PPE required for Level C plus the following:

- Replace the APR with either a pressure-demand SCBA or a pressure-demand airline respirator with an in-line five minute escape bottle.

It shall be the responsibility of the SHSO, in coordination with the HSO, to make the determination of the level of PPE to be used by personnel within the particular Exclusion Zones. The decision of the SHSO will be based on site monitoring and action levels (see Section 7.1.3) and associated hazards, knowledge of the site, observed site conditions, and applicability of the Arthur D. Little Health and Safety Program for Hazardous Waste Site Activities Program Plan.

7.1.4.1 Maintenance and In-use Inspection of Protective Equipment. Effective use of protective equipment requires that the equipment be properly used, maintained, and inspected periodically during the day. Site-specific issues and standard procedures will be reiterated during pre-entry training.

Gloves and coveralls will be regularly inspected and replaced promptly if torn. Disposable coveralls will be replaced whenever personnel leave the Exclusion Zone, daily at a minimum. Reusable gloves will be decontaminated whenever exiting the Exclusion Zone or Contamination Reduction Zone. Non-disposable coveralls must be laundered daily at a minimum.

Respirators will be inspected and checked daily for leaks both visually and with negative or positive pressure checks on the wearer. Respirator cartridges will be replaced daily or more frequently if excessive resistance develops or if breakthrough occurs. All respirator maintenance will be performed by the SHSO.

Respirators shall be cleaned on a daily basis.

7.1.5 Exclusion and Decontamination Zones

In recognition of the increased risk to workers of physical injury and exposure to chemical contaminants, Exclusion Zones may need to be established and maintained. Non-essential personnel shall be prohibited from entering these Exclusion Zones. All personnel entering the Exclusion Zones will be required to wear appropriate personal protective equipment in accordance with Section 7.1.4 and as approved by the SHSO for the particular task.

A Decontamination Zone shall be established adjacent to the Exclusion Zones, and shall consist of wash tubs, a garden-type, pressurized water sprayer, soap, and brushes to be used for removing soils and other contamination from gloves and boots.

7.1.6 Decontamination

Upon leaving the designated Exclusion Zones, all personnel must undergo appropriate decontamination. The nature of the decontamination requirements will depend on whether immediate re-entry into the Exclusion Zone is planned, or if complete egress from the Exclusion Zone is intended. The extent of decontamination will be decided by the SHSO. The decontamination requirements will also depend on the level of protection used within the Exclusion Zone and the degree of contamination. Contamination avoidance procedures shall be practiced at all times. The Decontamination Zone will be located immediately outside the access opening of the Exclusion Zones on its apparent upwind side, and will be delineated using caution tape and/or stakes, metal stanchions, or traffic cones. This zone shall contain the decontamination stations necessary to allow rest and beverage breaks and respirator cartridge changes, as well as complete decontamination as required to exit the work area. Beverages (e.g., bottled water) will be provided to personnel adjacent to this area during rest breaks.

The decontamination area will consist of outer glove and boot wash and rinse stations, and a disposal drum. Decontamination wash will be accomplished by dispensing a detergent and water solution from a garden-type pump-spray can, or similar device. The wash shall be followed by a rinse with clean water. Brushes will be supplied for assisting in the removal of solids.

Partial Decontamination

Workers must observe the following personnel decontamination procedures prior to respirator cartridge changes or rest breaks in the decontamination area:

For Modified Level D and Level C

1. Wash outer gloves.

2. Remove wrist tape (as applicable) and dispose into a plastic-lined disposal drum.

3. Remove outer gloves and dispose into a plastic-lined disposal drum. Continue procedures below, as appropriate.

To change respirator cartridges only

4. Remove respirator, change cartridges, clean respirator with respirator wipe, and put respirator back on.

5. Make sure cartridges are properly seated against the gaskets. Fit check the respirator by holding palms over the cartridges and inhaling (negative pressure fit check). If the respirator is properly seated, air cannot be drawn through the respirator in this fashion.

6. Put on clean outer gloves.

7. Tape wrists with duct tape.

8. Re-enter Exclusion Zone.

For rest breaks

1. Wash outer gloves.

2. Remove wrist tape and dispose into a plastic-lined disposal drum.

3. Remove outer gloves and dispose into a plastic-lined disposal drum. Continue procedures below, as appropriate.

4. If respirator is being used, remove respirator and place in a clean area.

5. Remove inner gloves, dispose into disposal drum.

6. Wash hands and face at wash station. Dry hands and face with paper towels.

7. Take rest break, drink water from disposable paper cups.

8. Put on glove liners.

9. If respirators are being used put on respirator.

10. Don outer gloves.

11. Tape wrists.

12. Re-enter Exclusion Zone.

If, in the opinion of the SHSO, Tyvek jumpsuits or outer boots are severely contaminated, then full decontamination must be performed for rest and beverage breaks. The SHSO will determine the necessary decontamination status.

Complete Decontamination

For complete decontamination prior to leaving the site, all personnel must observe the following procedures upon leaving the Exclusion Zone:

1. Get hands and feet screened with a radioactive detector if radiation monitoring program is in effect (see Section 7.1.3.3).

2. Place contaminated sampling and other associated equipment into plastic bag(s) and seal with duct tape.

3. Wash and rinse outer boots and outer gloves.

4. Remove ankle and wrist tape and dispose of in a plastic-lined disposal drum.

5. Remove outer boots. Boots used on site are not to be taken off site. All footwear will be dedicated to site work only.

6. Remove outer gloves and dispose of in a plastic-lined drum.

7. Remove Tyvek suit and dispose of in a plastic-lined drum (if applicable).

8. If using a respirator, remove respirator, dispose of cartridges, wash, disinfect, dry and place respirator in a clean plastic bag.

9. Remove and dispose of under gloves.

10. Exit the Decontamination Zone.

7.1.6.1 Decontamination Notice to Emergency Personnel. Base emergency medical personnel and ambulance crews will be notified by Arthur D. Little before operations begin. They will be advised and warned of the possibility of having to handle contaminated clothes and/or injured workers, and they will be advised of appropriate decontamination procedures.

7.1.6.2 Equipment Decontamination. All equipment being used in the Exclusion Zone will be subject to complete decontamination procedures before the equipment is removed from these work areas.

Equipment and vehicles that contact potentially contaminated soil will be decontaminated using a detergent solution and a steam cleaner or hot water pressure washer. All contaminated items will be carefully inspected and/or decontaminated to the satisfaction of the SHSO before being taken off site.

7.1.6.3 Disposal of Wastes During Investigative Activities. Waste solids generated by the investigative activities (including used respirator cartridges and disposable protective coveralls) will be drummed, labeled, and stored on site for disposal as hazardous wastes. Suspect hazardous waste fluids generated during drilling activities will also be containerized in 55-gallon drums and stored in the Contamination Reduction Zone for pick-up and disposal by Fort Meade personnel.

8.0 Recordkeeping

8.1 Records and Communication

Records required by the state and federal government will be kept current. Records of health and safety activity at the site will be maintained, including records of health hazard surveys, evaluation of potential hazards, and control measures taken. These records will document representative exposure levels during waste handling and sampling and the degree of hazard. Site employees will be continually informed of exposure levels and the degree of safety measures required for protection from the hazards present. The documented exposure monitoring will serve as a record of assessment of the respiratory hazards at the particular operation of the project and will include the following:

- Determination of personnel activity in the working area:
  - Job routines
  - Work locations
  - Time spent in work areas

- Determination of any potential respiratory or dermal hazards:
  - Chemical composition
  - Type of air contamination
  - Toxicity at various concentrations (acute versus chronic)
  - Established concentration limits for inhalation and/or skin contact

- Determination of whether to improve the administrative controls.

Applicable data will be available to on-site personnel throughout the project. Records of all sampling methodology, calculations, results, reports, and recommendations will be kept for a period of at least three years after completion of the project.

A daily health and safety log must be maintained by the site safety officer. This log shall include, at a minimum, the following information:

- Description of the field work being conducted
- Any changes in the operation, names of all personnel working at the site
- Types of air monitoring results
- Level of personal protective equipment being worn
- Accidents and injuries
- A description of any unusual occurrences or physical complaints

Copies of the logs must be provided to USAEC, Safety and Environmental Services (SES) Branch, weekly during field activities. It is acceptable to fax copies to the SES Branch at (410) 671-1680.

Attachment D (Daily Site Health and Safety Activity Report) can be utilized to accomplish this task as well.

9.0 Emergency Action Plan

On-site emergencies will ultimately be handled by installation emergency support personnel. The initial aspects of an emergency response and first-aid treatment, however, will only be performed by qualified Arthur D. Little personnel.

9.1 Pre-Emergency Planning

Prior to the start of work, Arthur D. Little will work with Fort Meade representatives to contact applicable local authorities and inform them of the start date and anticipated scope of work.

First-aid kits and at least one Arthur D. Little employee trained in first aid and cardiopulmonary resuscitation (CPR) will be on site at all times during investigative activities.

9.2 Emergency Recognition and Prevention

Emergency conditions that may be anticipated at the site include:

- Medical emergency
- Heavy equipment accidents
- Discovery of unanticipated buried hazards
- Explosions and fires
- Heat stress/cold stress

To ensure that hazard recognition and accident prevention protocols are being maintained, personnel must follow the requirements of the HASP.

9.3 Emergency Equipment

Select prices of equipment will be provided by Arthur D. Little. Emergency equipment for the Exclusion Zone will be kept in the Contamination Reduction Zone or the Support Zone. At a minimum, the equipment must include:

- Portable emergency eye wash system(s)
- Multipurpose (ABC-rated) fire extinguishers
- Adequately stocked first-aid kits
- Air horns
- Mini-spill containment kits

9.4 Operations Shutdown

The SHSO has the authority to shut down work operations if, in his or her professional judgment, significant health and safety issues arise. Operations shutdown may also be mandated by the Task Manager or the Project Field Supervisor on recommendation from the SHSO. Conditions warranting work stoppage will include:

- Uncontrolled fire
- Uncovering potentially dangerous buried material, including chemical agents or explosives
- Heat stress illness exhibited by the crew
- Personal exposures or accidents
- Air containment concentrations in excess of the protection factors afforded by the respirators in use

When any of these conditions exist, operations will be stopped and the site secured. All personnel will leave the work area until the Emergency Coordinator and the SHSO have determined that operations may resume.

9.5 Fire and Explosion Response Procedures

Fires on site can be started by natural events, work activities, or the activities of others. In the event of a fire or explosion, the base fire department shall be immediately notified. All personnel shall move to a safe distance based on the severity of the fire. Fires shall not be fought by Arthur D. Little personnel if an explosion hazard is present. Personnel should not attempt to fight large fires at the site. In lieu of small fires that could possibly occur, Arthur D. Little will have multipurpose (ABC-rated) fire extinguishers on hand at all times. Personnel have been previously instructed in the use of these fire extinguishers and will attempt control of only very small fires (e.g., ones requiring one extinguisher). The procedure for using a fire extinguisher is to pull the safety pin, point the extinguisher at the base of the flames, and discharge the extinguisher by sweeping the flames from a distance of about 6 feet. The extinguisher operator should move in as the flames are being put out. In the event of a larger or uncontrolled fire, all personnel will immediately evacuate the area and the Emergency Coordinator or the SHSO will notify and work with the base fire department.

9.6 Spills, Releases, Leaks of Hazardous Materials

In case of a hazardous materials emergency, the Project Field Supervisor will assume full control and direction of the emergency as the Emergency Coordinator. The Emergency Coordinator will work with the SHSO to identify and evaluate the hazards. All emergency responders and communications will be coordinated and

controlled through the Emergency Coordinator. When installation emergency response personnel arrive on site, the Emergency Coordinator shall brief responding installation personnel (e.g., fire department) and relinquish control of the scene to the chief or designated Incident Commander.

The Arthur D. Little staff will not be organized as a formal Emergency Response Team per HAZWOPER and will only perform defensive containment measures and activities that do not pose a threat to their own health and safety (e.g., incidental releases only). Situations that pose a serious threat to the public health or the environment will be dealt with by notifying the Fort Meade Post Fire Department, the USAEC Contracting Officer Representative, the Arthur D. Little Task Manager, the Arthur D. Little HSO, and the appropriate state and local authorities. All spills, regardless of size, should be reported to the SHSO.

9.7 Evacuation from Work Zones

Based on the specific work area, the evacuation site will be chosen (i.e., based on wind direction, severity and type of incident) by the SHSO in concert with Fort Meade emergency representatives and made known to all site workers during the daily pre-entry briefing.

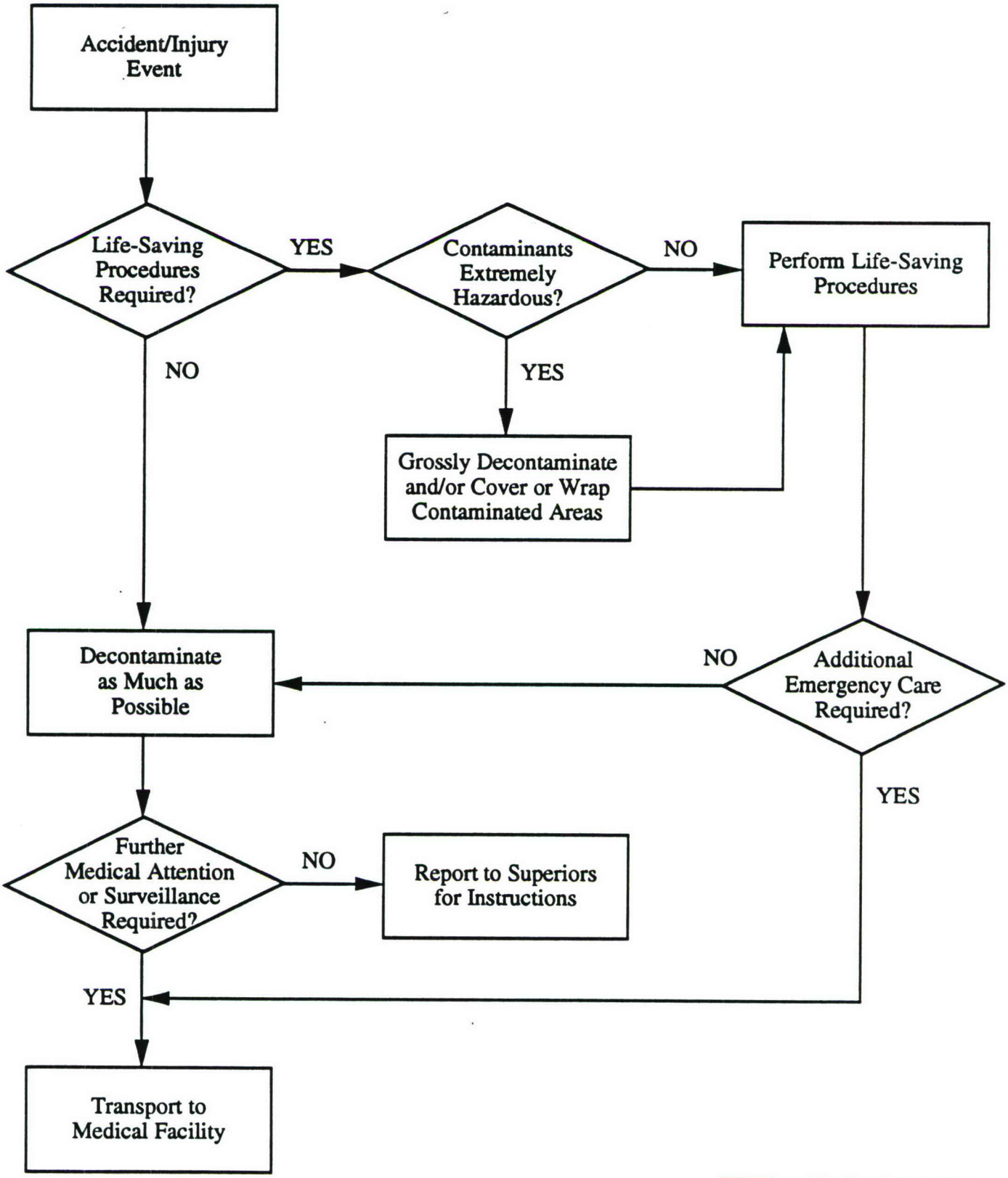
In the event of an emergency that requires workers to evacuate the site or an area of the site, at least one of the following signals will be given -- verbal communication, communication via cellular phone or walkie-talkie, or three blasts on an air horn or vehicle horn. If there is imminent danger anyone may give the evacuation signal. When a site emergency occurs and the evacuation signal is given, the work will be shut down, and all employees will leave the work area. It is the responsibility of individuals to evacuate in a calm, controlled fashion. Use the evacuation route that affords the most direct route away from the site area while avoiding the emergency area. Any changes to suggested evacuation routes (see Figure 9-1) will require the SHSO to hold a Health and Safety Briefing to advise all site personnel of the change. An updated evacuation map will be posted at the field station and in other areas as appropriate.

In case of emergency, evacuated employees may be decontaminated rapidly by removing exterior clothing. If a worker is critically injured in the Exclusion Zone, the worker may be removed immediately from the area; seek medical attention immediately. A decision aid for emergency decontamination is provided in Figure 9-2.

Figure 9-1: Map - Evacuation Routes

See Pocket at End of Health and Safety Plan.

Figure 9-2: Decision Aid for Emergency Decontamination



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The Field Supervisor's log of on-site personnel will be used to ensure that all individuals are present (e.g., head count). If someone is missing, the SHSO will alert the appropriate emergency personnel listed below. Control of personnel at the rendezvous point is the responsibility of the Field Supervisor or his/her designated assistant.

The name and phone numbers of all personnel and agencies that could be involved in emergency response will be posted by the telephone in the field office. The following phone list contains the agencies and individuals to be notified in an emergency.

Fire

Post Fire Department
(301) 677-2117 (Fire/HazMat Response)
(301) 677-4735 (Non-emergency)

Police

Provost Marshall's Office
(301) 677-5083

Military Police
(301) 677-6622

Ambulance/Hospital

Kimbrough Army Hospital
(301) 677-8570

Other Important Numbers

Fort Meade EOD Unit - (301) 677-9770 [Off Hours (301) 621-7289]
Fort Meade Environmental Coordinator - Mr. Paul Robert - (301) 677-9648
Fort Meade Health and Safety - Ms. Cheryl Riordan - (301) 677-6241
USAEC Contracting Officer/Representative - Scott Hill - (410) 671-1607
USAEC Safety Officer - Ms. Vivian Graham - (410) 671-4811
Maryland Department of the Environment/DNR Police - (410) 974-3551
USEPA Region III, Oil and Hazardous Material Spills - (215) 597-9800
NSA Range Control - (301) 688-4776

Arthur D. Little, Inc.
(617) 498-5000 (Main Number)
Kathleen Thrun (Task Manager) x5357
Corey Briggs, CIH (HSO) x6106
Peter Roy, CIH (AHHSO) x6112
Chris Martel, CHP (RSO-Radiation) x6103
R.S. Stricoff, CIH, CSP (COHS) x5884

Written directions from the various work sites to the hospital are provided in Table 9-1. A map will be posted on site that indicates the location of the base hospital (Kimbrough Army Hospital) with respect to the various site work areas.

9.8 Reporting Incidents

9.8.1 Large-Scale Incidents

In the event of an environmental incident, installation emergency response personnel at the Post Fire Department shall be notified immediately. If UXO or chemical agents are discovered, immediately contact the 144th Explosive Ordnance Disposal (EOD) Unit (Fort Meade) at (410) 677-5770. Initial evacuation of the area in question should be accomplished by the Field Supervisor and the SHSO. Additionally, Arthur D. Little's HSO and Health and Safety Officer (COHS), and the USAEC Safety Officer should be notified as soon as possible. Emergency first aid shall be applied onsite as deemed necessary. The injured/ill individual will then be decontaminated (if necessary) and transported to the base hospital, if needed. The hospital ambulance personnel will be contacted for transport as necessary in an emergency.

9.8.2 Accidents, Injuries, Illnesses

In the event of an accident involving personal injury or illness the SHSO or Field Supervisor will contact the base hospital immediately. The SHSO or the Field Supervisor will arrange for administration of appropriate first aid, and arrange transportation for injured personnel to the hospital. The SHSO will evaluate the site conditions to determine if the causal hazard still exists. Site personnel shall not reenter the Exclusion Zone until the cause of the injury is determined and the Exclusion Zone is designated safe to re-enter by the SHSO.

As soon as practical after an emergency response, the SHSO or the Field Supervisor shall brief the Task Manager, and the HSO as to the nature of the incident and response actions taken. The SHSO, with the assistance of the HSO and Arthur D. Little's health and safety support staff, shall evaluate the site conditions and make a determination regarding any measures that could be taken to prevent incidents of this nature from being repeated.

Table 9-1: Site-Specific Directions to Kimbrough Army Hospital

Inactive Landfill Site 2	Exit site to South North on New Tank Rd. around airfield to Airfield Rd. Right on Airfield Rd. across bridge to O'Brian Road Right on Mapes Rd. to Cooper Ave. Right on Cooper Ave. to Llewellyn Ave. Left on Llewellyn Ave. for approx. 1/4 mile. Hospital on Right
Sanitary Landfill	North on Magazine Rd. to Rock Ave. Left on Rock Ave. to Wilson St. Right on Wilson St. Hospital on Right approx. 1/2 mile.
Clean Fill Dump	Exit site to the East Left on Boundary Rd. to Magazine Rd. Left on Magazine Rd. to Pepper Rd. Left on Pepper Rd. across bridge to Rock Ave. Left on Rock Ave. to Wilson St. Right on Wilson St. Hospital on Right approx. 1/2 mile.
Ordnance Demolition Area	Exit Site to the West to Lemon's Bridge Rd. Right on Lemon's Bridge Rd. to South Rd. Right on South Rd. Left on hair-pin turn continuing on South Rd. to Boundary Rd. Right on Boundary Rd. to Magazine Rd. Left on Magazine Rd. to Pepper Rd. Left on Pepper Rd. across bridge at Rock Ave. Left on Rock Ave. to Wilson St. Right on Wilson St. Hospital on Right approx. 1/2 mile.
DPDO Salvage Yard and Transformer Storage Area	Redmount Rd. to Rock Ave. Right on Rock Ave. to Wilson St. Left on Wilson St. to 5th St. Right on 5th St. Hospital on left.
Helicopter Hangar Area and the Fire Training Area	Airfield Rd. to O'Brian Rd. Left on O'Brian Rd. to Mapes Rd. Right on Mapes Rd. to Ernie Pyle Rd. Right on Ernie Pyle Rd. Hospital at intersection of Ernie Pyle and Llewellyn Ave.
Clean Fill Dump	Left on Pepper Rd. to Ernie Pyle (deadends) Ernie Pyle to 5th St. Left on 5th St. Hospital on Right

All incidents shall be reported on the appropriate Arthur D. Little Accident Investigation Report form. The Field Supervisor must ensure that a copy of the Accident Investigation Report is submitted to the Cambridge office within 24 hours of the incident.

Accidents/incidents resulting in a fatality, lost-time injury or illness, hospitalization of five or more personnel, or property damage to government or contractor property (which occurred during the performance of the contract) equal to or exceeding $2,000.00 must be telephonically reported to USAEC, SES Branch, (410) 671-4811, as soon as possible, but not later than two hours after occurrence and reported in writing within five days of occurrence on DA Form 285. All other accidents/incidents must be telephonically reported to USAEC, SES Branch, (410) 671-4811, within eight hours of occurrence.

9.9 First Aid Emergency Procedures

9.9.1 Chemical Exposures

Inhalation

1. If site personnel experience symptoms suggesting overexposure to toxic chemicals (lightheadedness, dizziness, headache, nausea, shortness of breath, burning sensation in the mouth, throat, or lungs), the person should be escorted from the contaminated environment to fresh air immediately.

2. If unconscious, the victim should be removed from the contaminated area immediately and brought to the nearest hospital. Rescuers shall wear appropriate personal protective equipment during rescue.

3. If the victim is no longer breathing, he or she shall be moved away from the contaminated area. Mouth-to-mouth resuscitation or some alternate from of effective artificial respiration shall begin immediately.

4. If the victim has no pulse he or she shall be moved away from the contaminated area, and cardio-pulmonary resuscitation (CPR) should begin immediately. It may be necessary for the victim to receive artificial resuscitation and CPR simultaneously.

Should any of the above scenarios be encountered, emergency medical attention and advice must be immediately sought by contacting the Kimbrough Army Hospital.

Skin Exposure

If there is skin contact with toxic or potentially toxic chemicals, the skin should be washed with copious amounts of clean water for at least 15 minutes. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water.

All contaminated parts of the body, including the hair, should be thoroughly washed. It may be necessary to wash repeatedly. Seek medical attention as appropriate.

Ingestion

If site personnel should ingest toxic or possible toxic chemicals, obtain medical attention immediately.

Eyes

If a substance should get into the eyes, they should be washed with generous amounts of water. The eye should be flooded with water so that all surfaces are washed thoroughly. Washing should be continued for at least 15 minutes. Medical attention should be obtained immediately thereafter.

Appendix A: Examples Of Hazardous Substances Detected at Fort George G. Meade

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Acetone	750 ppm	Inh, Ing, Derm	Eyes, nose and throat irritation; headache, dizziness; dermatitis
Antimony	0.5 mg/m^3	Inh, Derm.	Irritation of nose, throat, mouth; cough; dizziness; headache; nausea; vomit; diarrhea; cramps; insomnia; irritated skin; unable to smell; cardiac
Arsenic	10 µg/m3	Inh, Abs, Derm, Ing	Carcinogen, GI disturbance; peripheral neuropathy; respiratory irritation
Asbestos	0.2 $fibers/cm^3$	Inh	Carcinogen, restricted pumonary function; interstitial fibrosis
Atrazine	5 mg/m^3	Inh, Abs, Derm, Ing	
Benzene	1 ppm	Ing, Inh, Derm	Irritation of eyes, nose, respiratory system; giddy; headache; nausea; staggered gait; fatigue; anorexia; lassitude; dermatitis; bone marrow depressant; abdominal pain; carcinogenic

Appendix A: Examples Of Hazardous Substances Detected at Fort George G. Meade

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Beryllium	2 $\mu g/m^3$	Inh	Respiratory symptoms, weakness, fatigue; weight loss; carcinogen
Bis (Ethylhexyl)phthalate	5 mg/m^3	Inh, Derm, Ing	Irritated eyes, muscles, mucous membranes, nausea, diarrhea; carcinogen
2-Butanol (sec. butyl alcohol)	100 ppm	Inh, Ing Derm	Eye irritation; narcosis; dry skin
2-Butanone	200 ppm	Inh, Ing Derm	Irritation of eyes, nose, and throat; headaches, dermatitis; dizziness
Cadmium	0.05 mg/m^3	Inh, Ing	Carcinogen; pulmonary edema; tight chest; headaches; chills; nausea; mild anemia
Chlorobenzene	75 ppm	Inh, Ing, Derm	Irritated skin, eyes, nose; drowsiness; liver damage
Chloroethane (ethyl chloride)	1,000 ppm	Inh, Abs, Ing, Derm	Inebriation; abdom. cramps; cardiac arrhythmia & arrest; liver and kidney damage

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Chromium	0.5 mg/m^3 0.05 (Cr^{6+})	Inh, Ing	Fibrosis of lungs; carcinogen
Copper	1 mg/m^3	Inh, Derm, Ing	Irritation of mucous membrane, pharynx; nasal perforation; eye irritation; metal taste; dermatitis
Cresci	5 ppm	Inh, Abs, Ing, Derm	CNS effects; depression; respiratory failure; weak pulse; skin, eye burns
1,2-Dichlorobenzene	50 ppm (ceil)	Inh, Abs, Ing, Derm	Irritable nose, eyes; liver, kideny damage; skin blister
1,4-Dichlorobenzene	75 ppm	Inh, Ing, Derm	Headache; eye irritation; swell periorbital; profuse rhinitis; anorexia, nausea, vomit; low-weight; jaundice, cir
1,1-Dichlorbethane	100 ppm	Inh, Ing, Derm	CNS depression; skin irritant; drowsiness; unconsciousness; liver, kideny damage
1,2-Dichloroethane (ethylene dichloride)	1 ppm	Inh, Abs, Ing, Derm	Irritation of the respiratory tract; narcosis; conjunctivitis

Appendix A: Examples Of Hazardous Substances Detected at Fort George G. Meade

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Diethylphthalate	5 mg/m^3	Inh, Ing, Derm	Irritation of mucous membranes; stomach pain
2,4-Dimethylphenol	NA	NA	NA
Di-N-Octyl-Phthalate	NA	NA	NA
Ethylbenzene (styrene)	100 ppm	Inh, Ing, Derm	Irritation of eyes and mucous membranes; headaches; dermatitis; narcosis; coma
2-Hexanone	5 ppm	Inh, Ing, Derm	Eye & nose irritant; peripheral neuropathy; headache
Iron Oxide Dust	$10mg.m^3$	Inh	Benign pneumonconiosis with x-ray shadows indistinguishable from firbrotic pneumoconiosis; resp. system
Lead	0.05 mg/m^3	Inh, Ing, Derm	Insomia; low weight; malnutrition; constipation; abdominal pain; anemia
Mercury	0.01 mg/m^3 (alkyl) 0.05 mg/m^3 (other)	Inh, Ing, Derm	Cough; bronchial pneumonia; insomnia; irritability; headache; fatigue; low weight; skin and eye irritant

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Methane	--	Inh	Simple asphyxiant, rapid respiration and air hunger, diminished mental alterness, impaired muscular coordination
3-Methyl-2-butanone (methyl isopropyl ketone)	200 ppm	Inh	Eye and mucous membrane irritation; headache; dermatitis; narcosis
Methylene chloride	100 ppm	Inh, Ing, Derm	Weakness, light-headedness; numbness of the limbs; nausea; skin and eye irritation; vertigo; suspect carcinogen
Methyl isobutly carbinol (4-methyl-2-pentanol)	25 ppm	Inh, Ing, Derm	Eye irritant; headache; drowsiness
4-Methyl-2-pentanone (hexanone)	50 ppm	Inh, Ing, Derm	Eye and mucous membrane irritation; headache; narcosis; coma; dermatitis
Naphthalene	10 ppm	Inh, Ing, Derm	Eye irritant; headache excitement; nausea; vomitting; profuse perspiration

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Nickel	1 mg/m^3	Inh, Derm, Ing	Sensitization dermatitis; allergic asthma; nasal cavities, pneumonitis; (carcinogenic)
Nitrogen dioxide	3 ppm	Inh, Ing, Derm	Cough; chest pain; cyanosis; pulmonary edmea; eye irritant
2-Pentanone	200 ppm	Inh, Ing, Derm	Eye, nose, and throat irritation
Phenol	5 ppm	Inh, Ing, Derm	Eye, nose, and throat irritant; muscle ache; liver and kideny damage
Polychlorinated biphenyl (PCB)	0.5 mg/m^3	Ing, Inh, Derm	Carcinogen, liver pathology, eye irritant
Pyridine	5 ppm	Inh, Ing, Derm	Headache; insomnia; nauseau; frequent urination; eye irritation; kidney and liver damage
Silver	0.1 mg/m^3 (metal) 0.01 mg/m^3 (soluble)	Inh, Ing, Derm	Blue-grey eyes; throat and skin irritant; GI ulceration

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Tetrachloroethylene	50 ppm	Inh, Ing, Derm	Eye, nose, and throat irritation; nausea; flush face and neck; dizziness; headache; suspect carcinogen
Toluene	100 ppm	Inh, Ing, Derm	Mycrocytic anemia; narcotic in high concentrations
1,1,1-Trichloroethane	350 ppm	Inh, Ing, Derm	Headache; lassitude; CNS depression; poor equilibrium; irritated eyes; dermatitis; cardiac arrhythmia
Trichloroethylene	50 ppm	Inh, Ing, Derm	Headaches; nausea, vomiting; vertigo, eye irritation, cardiac arrythmia; tremors; dermatitis
Vinyl Chloride	1 ppm	Inh	Weakness, abdominal pain; GI bleeding; hemtomegaly, pallor or cyanosis of the extremities; carcinogen

Contaminant	PEL/TLV(a)	Routes of Exposure	Signs and Symptoms of Exposure
Xylene	100 ppm	Inh, Ing, Abs, Derm	Dizziness, excitement, drowsiness, incoordination, staggering gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia, vomiting, abdominal pain; dermatitis
Zinc	10 mg/m^3	Inh, Derm	Metal fume fever; nausea, chills; shortness of breath; chest pain

(a) Permissible Exposure Level (OSHA) or Threshold Limit Value (ACGIH) for time-weighted average exposure for an 8-hour workday or 40-hour workweek. The most conservative value is listed in this column.

Inh = Inhalation
Ing = Ingestion
Derm = Dermal Contact
Abs = Skin Absorption
NA = Not Available

Appendix B: Medical Monitoring Requirements

Arthur D. Little personnel engaged in on-site activities are participants in a Medical Monitoring Program that meets the requirements set forth in 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response). Participants in the medical monitoring program are required to have initial and annual physical examinations. The Arthur D. Little Medical Monitoring Program is coordinated through the Mount Auburn Hospital Occupational Health Department in Cambridge, Massachusetts. Dr. Robert Ullian is the assigned physician who supports and oversees the medical monitoring program. Subcontractors are required to have a medical monitoring program similar to Arthur D. Little's.

The primary goal of a Medical Monitoring Program is to provide evaluation and ongoing surveillance of the health status of employees potentially exposed to toxic substances as a result of their work-related activities. It is recognized that an active health monitoring program for those employees potentially at risk is an important tool in evaluating the effects of chronic low-level exposures or acute exposures related to operations at hazardous waste sites. The effects of low-level exposures may not become apparent until years after the initial exposure.

The Arthur D. Little program is a typical Medical Monitoring Program that meets 29 CFR 1910.120 requirements and includes laboratory testing, personnel medical history evaluation, physical examination, and specific systemic testing. Each participant undergoes an occupational history evaluation and physical examination, including such parameters as:

- Pulmonary Function Tests
- Complete Blood Count
- SMA 20 (Multiphasic Blood Chemistries)
- Urinalysis
- Chest X-Ray (if indicated)
- Electrocardiogram (if indicated)
- Vision Test
- General Physical Examination
- Specialized tests, as required (e.g., lead, arsenic, PCBs screening)

Following the establishment of each participant's baseline values for the above parameters, an annual re-evaluation is conducted to monitor potential changes due to work with hazardous materials.

In addition to this annual re-examination, provisions are made for specific post-exposure examinations in the event of a suspected exposure during a particular field event. The maximum allowable time lapse between the most recent examination and the initiation of field activities at the site for field personnel is one year.

After each examination, a determination is made by the attending physician regarding the ability of the employee to carry out his or her work assignments, including the use of respirators and other personal protective equipment. Any restrictions recommended by the physician are communicated to the employee and the HSO. An examination is also offered when an employee leaves the company or is reassigned to work that does not involve hazardous wastes.

Appendix C: Health and Safety Training Requirements

Supervisory and field personnel have had prior classroom and hands-on training and/or relevant (documented) health and safety experience that satisfies the training requirements of OSHA's regulation for Hazardous Waste Operations and Emergency Response (29 CFR 1910.120).

For site activities, a minimum of twenty-four (24) hours of training and relevant field experience, covering, but not limited to, the following topics, has been obtained:

- General site safety
- Toxicology
- Hazard recognition
- Site investigation
- Use and limitations of personal protective equipment
- Respiratory protection
- Hazardous waste management
- Use of monitoring instrumentation
- Decontamination

It is important to remember that the level of training is consistent with the employee's site and job function and responsibilities. Thus, many individuals will have received the full 40-hours of training appropriate to "site workers." Under all site conditions, individuals with only 24 hours of OSHA training shall be under the direct supervision of someone with 40 hours of OSHA training. If site conditions warrant Level C protection (due to levels of airborne contaminants), then 40 hours of OSHA training will be required for all workers in the Exclusion and Decontamination Zones. Personnel with 24-hour training will be limited to tasks that do not require the use of respiratory protection.

On-site management and supervisors directly responsible for, or who supervise, employees working within the Exclusion and Decontamination Zones, shall have received at least eight additional hours of specialized training on managing safety at hazardous waste site operations.

Site personnel who can show, by appropriate documentation from their employer, that their previous work experience and/or training was equivalent to the training requirements for this project, shall be considered as meeting those requirements. Equivalent training includes the training that might have been received from actual on-site training for previous projects. After their initial training, Arthur D. Little personnel are required to have annual health and safety refresher training. The Arthur D. Little HSO reserves the right to determine training eligibility for Arthur D. Little and subcontractor site workers.

Appendix D: Accident Prevention Plan

The purpose of this general plan is to assert positive actions to be taken in the recognition, evaluation, and control of safety hazards for the purpose of preventing accidents that may cause personal injury or illness, property damage, or interruption of work.

1.0 Responsibilities

Management - Under the Federal Occupational Safety & Health Act Title 29 CFR, Arthur D. Little management is responsible for planning deliberate accident prevention measures, providing safe equipment and working conditions, training a competent and safety-minded staff, and maintaining prescribed records of accidents, illnesses, and injuries.

Supervisors - Responsible for observation, evaluation and correction of deficiencies of unsafe conditions, or defective equipment when detected or reported by employees or government representatives.

Staff - Responsible for use of safety equipment, performing all work in a safe manner, working with deliberate thought of the effects of their actions on others, reporting all unsafe conditions, defective equipment, and injuries immediately to the Supervisor.

Subcontractors - Responsible for full provisions of this HASP.

2.0 Training

Each worker on the site will have been trained in conformance with the provisions of Appendix C. Each employee will also be instructed in the company safety policy, and this Accident Prevention Plan. Additional training will consist of briefings on site-specific toxic or hazardous chemicals, safety hazards, and associated safe work procedures and precautions.

3.0 General Safety Precautions

Buddy System - During site-invasive activities, field personnel shall be in visual or audio contact with at least one other field worker. When respiratory protective equipment is employed within an Exclusion Zone, no fewer than two workers shall be in close proximity within the work area.

An approved first aid kit will be maintained at the site. All injuries, no matter how slight, will be reported to the SHSO for treatment. First aid will be provided at the project site only by those who are qualified through training by the Red Cross. No others will treat any injuries at the project.

No person will be permitted to operate machinery or work in elevated locations while taking antihistamines or other prescription or non-prescription drugs that can adversely affect their mental judgement or physical abilities.

Instruction will be given in identifying, avoiding, and providing first aid for stinging insects, cold or heat exposure, or poison ivy if encountered on the work.

The use of contact lenses is not allowed onsite when required personal protection is Level Modified D, Level C, or Level B. Under these conditions, prescription safety glasses with side shields must be used.

Consumption of alcoholic beverages prior to and during the work shift is strictly prohibited.

4.0 Sanitation

Eating, drinking, smoking, chewing gum or tobacco, or other similar practices are prohibited within the Exclusion Zone during invasive site activities.

Hands and face must be thoroughly washed before breaks and prior to leaving the work area.

5.0 Fire Prevention

Fire extinguishers (CO_2, ABC or other approved types) will be maintained and stationed at the field vehicles.

No brush or debris will be burned at the project site.

Gasoline will be handled only in OSHA approved safety cans. Engines will be shut off while fueling, with no smoking allowed.

Oily rags and waste will be kept in covered metal containers. All trash and waste will be disposed of daily.

6.0 Housekeeping

Tripping hazards will be eliminated by removal of hoses, cables, and ropes from walkways, by proper storage of materials, and by disposal of waste material.

All debris shall be removed daily.

Drill rods, pipe casing, and other such equipment will be secured such that they do not roll or fall.

7.0 Individual Protective Equipment

Only workers who are trained in the proper use of personal protective equipment will be employed at the work site.

All personnel will wear hard hats and eye protection throughout the project.

Ear protection will be worn by drillers, drillers' helpers, and other field personnel exposed to high-level sound intensity.

Heavy reinforced gloves will be worn when handling wire rope, pipe and rods, and hoist.

Steel toe/steel shank work boots shall be worn by all field personnel.

8.0 Tools

All tools shall be in good condition (without mushroomed heads, split handles or other defects); damaged tools will be repaired promptly or removed from service. This includes privately owned equipment of the workers.

Tools shall not be left overhead to fall. Throwing tools is prohibited.

9.0 Powered Equipment

All machines will be examined daily for safety appliances and condition, and all defects repaired promptly. Periodic maintenance schedules will be followed as recommended by the manufacturer.

All machines will be shut down for adjustment or oiling. During repair of all machines, blocks or stops will be set to prevent falling or moving of parts should any hydraulic line or control device fail.

Workers will climb carefully with handholds and grab irons, not jumping on or off any machine, and in no case while the machine is in motion.

All repairs of hydraulic systems will be with new, manufacturers' parts.

Firm and level standing will be prepared for drills and pumps on land.

10.0 Toxic Materials

All work is to be conducted in accordance with the provisions of the site-specific Health and Safety Project Plan.

Workers are to be prepared for working safely in the event toxic materials are known to be on site, or are disclosed during the work.

Workers will be protected from possible contamination by toxic materials by wearing appropriate personal protective equipment.

Water, soap and clean towels are to be used instantly in the event splashing, dripping, or settling of dust allows suspected concentrations of toxic materials in contact with the body. Persons developing skin rash, burning, or discoloration of skin, or other indications of chemical exposure, are to receive immediate medical attention. If possible, a sample of the material encountered should accompany the victim to assist in treatment. Full precautions are to be taken in collecting and transporting any sample.

11.0 Emergencies

In the event of warning for severe storm, personnel will be evacuated and equipment secured as directed by the Site Health and Safety Officer to prevent loss or damage.

If thunderstorms are predicted, all work will be suspended.

For tornado watch, equipment will be removed from exposed positions and personnel will be protected. Crane booms will be laid down.

In the event of fire, explosion, chemical exposure, personnel accident or similar emergency, the provisions of the plan shall be observed.

12.0 Accident Reporting, Analysis and Prevention

Every accident will be reported immediately to the Arthur D. Little Site Health and Safety Officer, the Fort Meade Safety Coordinator, and subsequently to the Task Manager.

The Task Manager and SHSO will investigate unsafe conditions, defective equipment, failure of maintenance or improper acts, then initiate appropriate corrective actions including comprehensive training to prevent recurrence.

Supervisory personnel at all levels will followup by training and observation directed to prevent repetition. Daily Health and Safety/Accident Prevention meetings will review accidents and discuss remedial action by all workers.

13.0 Site Safety Inspections

Site safety inspections shall be conducted as needed by Arthur D. Little's Health and Safety staff to ensure compliance with the plan in the field. A complete record and account of each inspection shall be maintained. Attachment D *Daily Site Health and Safety Activity Report* will be utilized by the SHSO to conduct daily safety inspections of the various work areas at Fort Meade.

Attachment A

Personnel Training and Physical Examination Record

Site: Fort George G. Meade

Name	Date Training Completed Initial	Date Training Completed Annual	Date of Last Physical Examination

Attachment B

Site Health and Safety Plan Review Record

Site: Fort George G. Meade

I have read the Health and Safety Plan (HASP) for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project as well as the various procedures and policies which must be followed to minimize protential exposure. I agree to conform to all the requirements of the HASP.

Name	Signature	Affiliation	Date

Attachment C

Environmental Monitoring Record

Site: Fort George G. Meade			
Instrument: 1) OVA, 2) HNu/Microtip 3) CGI/O_2; 4) Draeger Tube			
Instrument No.	**Time**	**Description of Location**	**Reading**

Technician: _____ **Date:** _____

Attachment D

Daily Site Health and Safety Activity Report

Site: Fort George G. Meade

DATE:_____ **LOCATION:**_____

NAME:_____ **SIGNATURE:**_____

START OF DAY: _____ **END OF DAY:**_____

WEATHER:_____

ADL Site Personnel **Subcontractors, Visitors, Etc.**

_____

_____

_____

Site Operation(s) **Level of PPE (initial/changes)**

_____

_____

_____

RECORD OF MONITORING (also see ___ field notes, ___ boring log, ___other [_____]).

Instrument	**Time**	**Location**	**Reading**

COMMENTS AND OBSERVATIONS (include: elevated readings and response, H&S violations, deviations from the H&S report, corrective actions specified and conducted):

ENCLOSURE 1

UXO SURVEY SITE WORK/SAFETY PLAN
FORT GEORGE G. MEADE

Provided by
Environmental Hazards Specialists International, Inc.

SURVEYING BORINGS AND MONITORING WELL LOCATIONS

1. The Environmental Hazards Specialists, Int. Inc. (EHS) SOP, the client Health & Safety and Sampling Plans will be the guidelines for reference, the following will be the EOD procedures that will be followed to insure that the boring/monitoring wells located in an area suspected of having UXOs, CSM, or other hazardous waste are surveyed in a correct and safe manner.

2. A static walk through will be done during the EHS mobilization period to get a baseline on the material being used and to familiarize all field personnel on the procedures to be used and answer any questions that may arise.

3. The following steps may not be all inclusive as situations will change at each work site (i.e., types and sizes of suspected ordnance, impact range, demolition range, demolition range with shots that were buried), but these steps will help the team get off on the right foot with the capability to adjust the procedure without compromising safety. Remove all magnetic materials.

4. Remove the MK 26 from its carrying case and using the MK 26 manual (if required) assemble the unit in the bore hole configuration. Insure all threaded connections are clean and all covers or plugs are in place, the assembly should be accomplished in a clean area not out in the field. Be sure that the batteries are up at a minimum of 95 percent and the safety line is attached correctly.

5. During all downhole operations the correct size PVC will be on-site and immediately available, under no circumstances will the probe be lowered into the Monitoring Well/Boring/Hollow Stem Auger with out PVC. The following procedures will be followed when using the hollow stem auger.

WARNING

NEVER LOWER THE PROBE WITHOUT PVC INSTALLED

NEVER LOWER THE PROBE USING ONLY THE CONTROL WIRE

IF THE HOLLOW STEM AUGER CANNOT BE REMOVED, HAVE AT LEAST FIVE FEET FROM THE CENTER OF THE PROBE TO THE BOTTOM OF THE AUGER

USE A MINIMUM OF TWO MEN TO CONDUCT THIS OPERATION

A. Survey the surface location as required by the SOP.

A1. Survey depths will be dictated by the client.

B. At four feet, install the PVC till it bottoms out and record this depth, bring the auger to the surface, move the drill rig a minimum of 20 feet, one technician will lower the probe using the safety line the other technician will watch the meter. If clear remove the probe and PVC and continue the drilling.

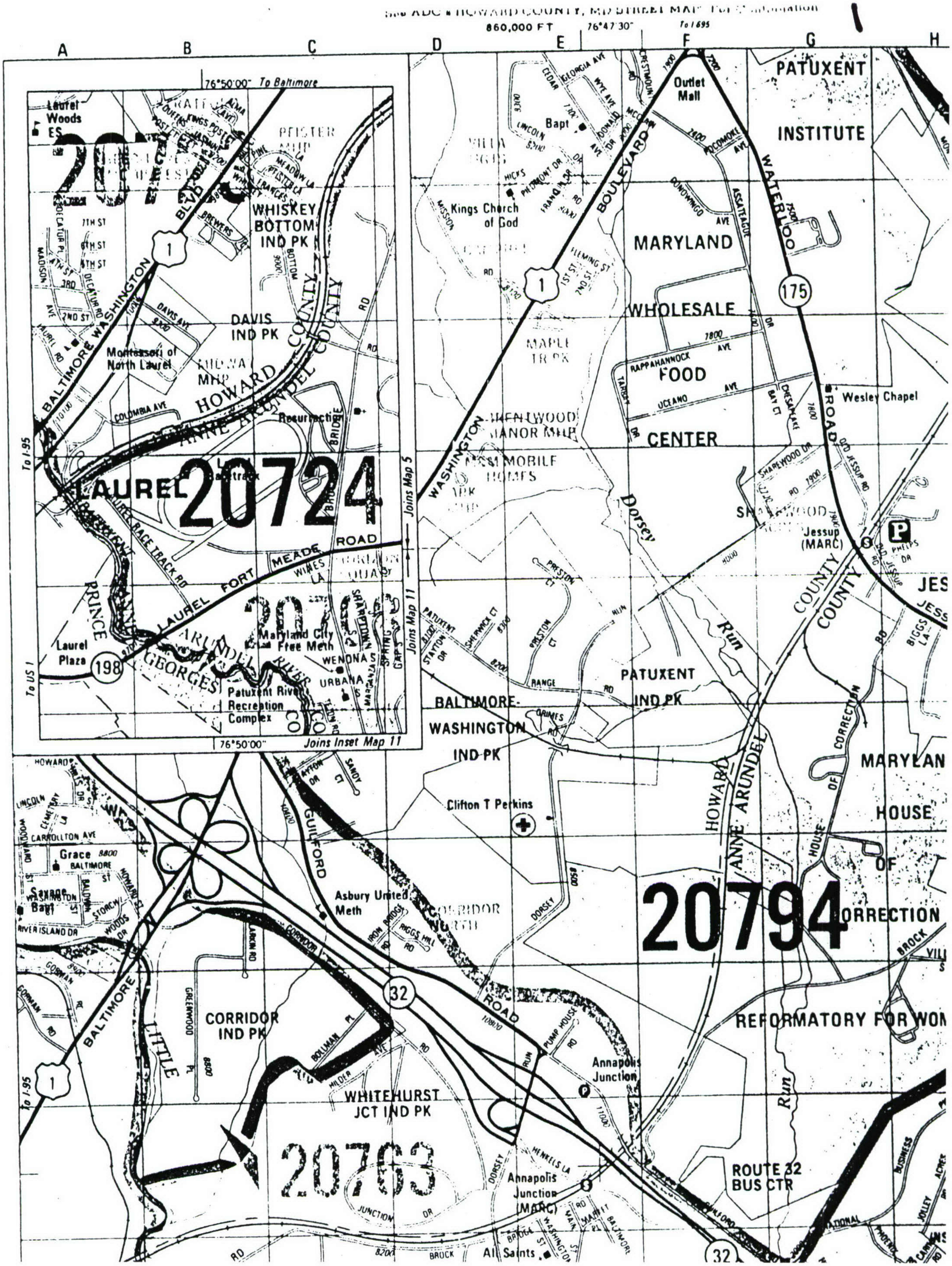
C. At eight feet, install the PVC till it bottoms out and record this depth, bring the auger up and out and move the drill rig a minimum of 20 feet, repeat the same procedures as in "B", if clear continue drilling.

D. At 12, 16, and 20 feet, the same procedures will be followed, if the range has a history as described in paragraph (3) of being used as a bombing range or a heavy impact range the above procedures will be used down to a minimum of 20 feet. (NOTE: There will be times when our last check will be at the 12 foot depth and even sooner, [i.e., undisturbed soil] this will be verified by the rig geologist and the EHS Supervisor.)

E. There will be times that common sense will dictate some of the actions (i.e., normally the derrick can remain up, but if its on the side of a hill or uneven terrain it should be lowered), all situations are not exact, stop and address each condition as it arises, remember this is a team, utilize all the expertise available, if a contact is encountered notify the Site geologist and recommend moving the location.

F. If the ground is soft or on an incline some sort of track to get the drill rig repositioned will be required, most installations have marshall matting around, a couple of sections under the wheels will give the drill rig a temporary road bed for repositioning. If the site has heavy contamination a back hoe may have to be used to install a PVC stick up. You may have to explain this to the FOL.

NOTE: an access and Egress route will be surveyed for all surface OEW, a 90 foot diameter working area will be surveyed at the Boring/Monitoring well location this may have to be larger if the drillers need some decon space, all attempts shall be made to put these work areas upwind. Pin flags will be used to show the areas that have been surveyed to work in.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Laurel Woods ES
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DAVIS IND PK
Montessori of North Laurel
HOWARD COUNTY
ANNE ARUNDEL COUNTY
LAUREL
20724
LAUREL FORT MEADE ROAD
Maryland City Free Meth
Patuxent River Recreation Complex
Laurel Plaza
PRINCE GEORGES
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Outlet Mall
PATUXENT INSTITUTE
Kings Church of God
MARYLAND WHOLESALE FOOD CENTER
WASHINGTON BOULEVARD
WATERLOO ROAD
Wesley Chapel
Jessup (MARC)
Dorsey Run
PATUXENT IND PK
BALTIMORE-WASHINGTON IND PK
Clifton T Perkins
HOWARD ANNE ARUNDEL COUNTY COUNTY
MARYLAND HOUSE OF CORRECTION
HOUSE OF CORRECTION
20794
Grace
Asbury United Meth
GUILFORD ROAD
CORRIDOR IND PK
WHITEHURST JCT IND PK
Annapolis Junction
Annapolis Junction (MARC)
20763
REFORMATORY FOR WOM
ROUTE 32 BUS CTR
BALTIMORE
LITTLE
All Saints
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175
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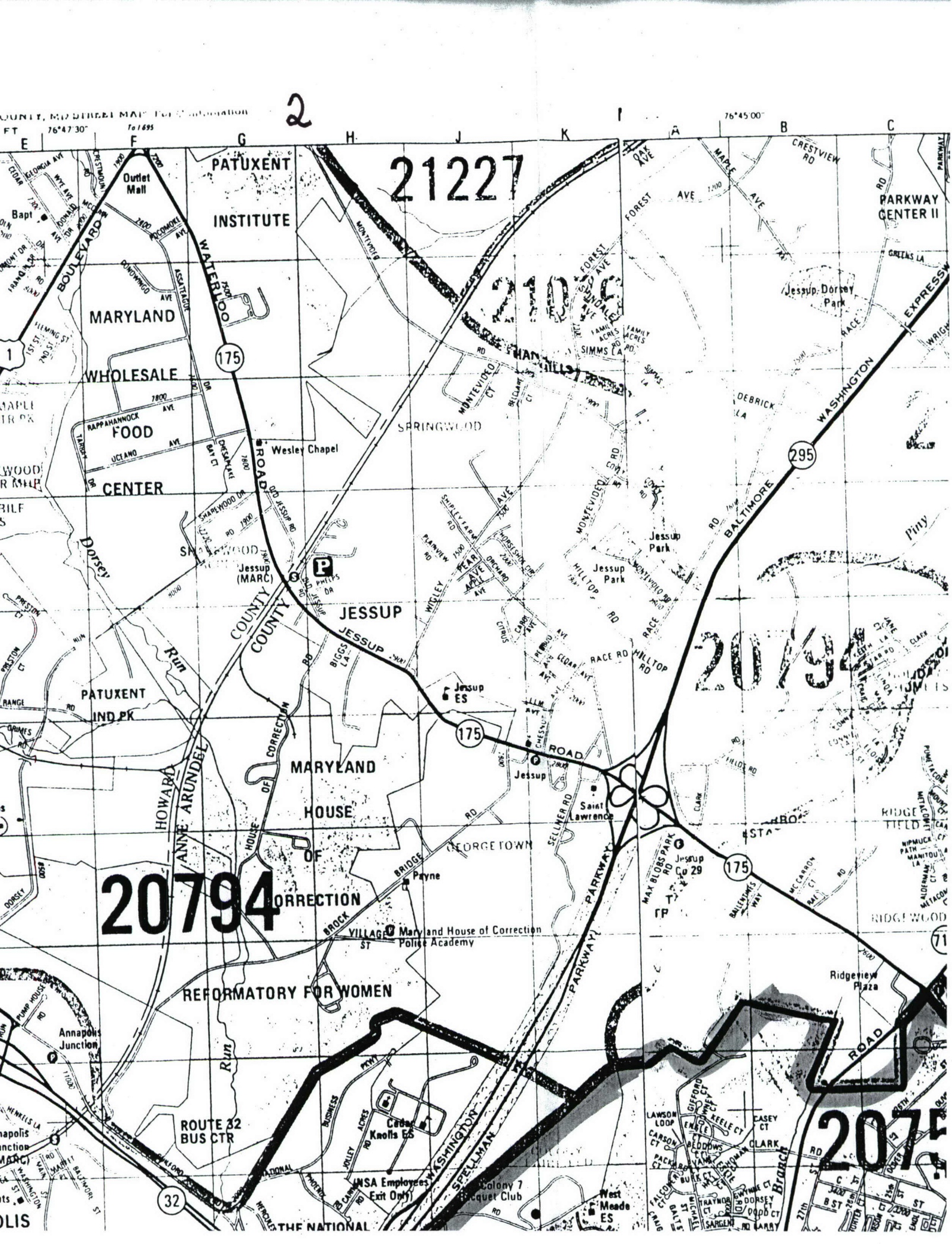
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21227
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PATUXENT
INSTITUTE
Outlet Mall
MARYLAND
WHOLESALE
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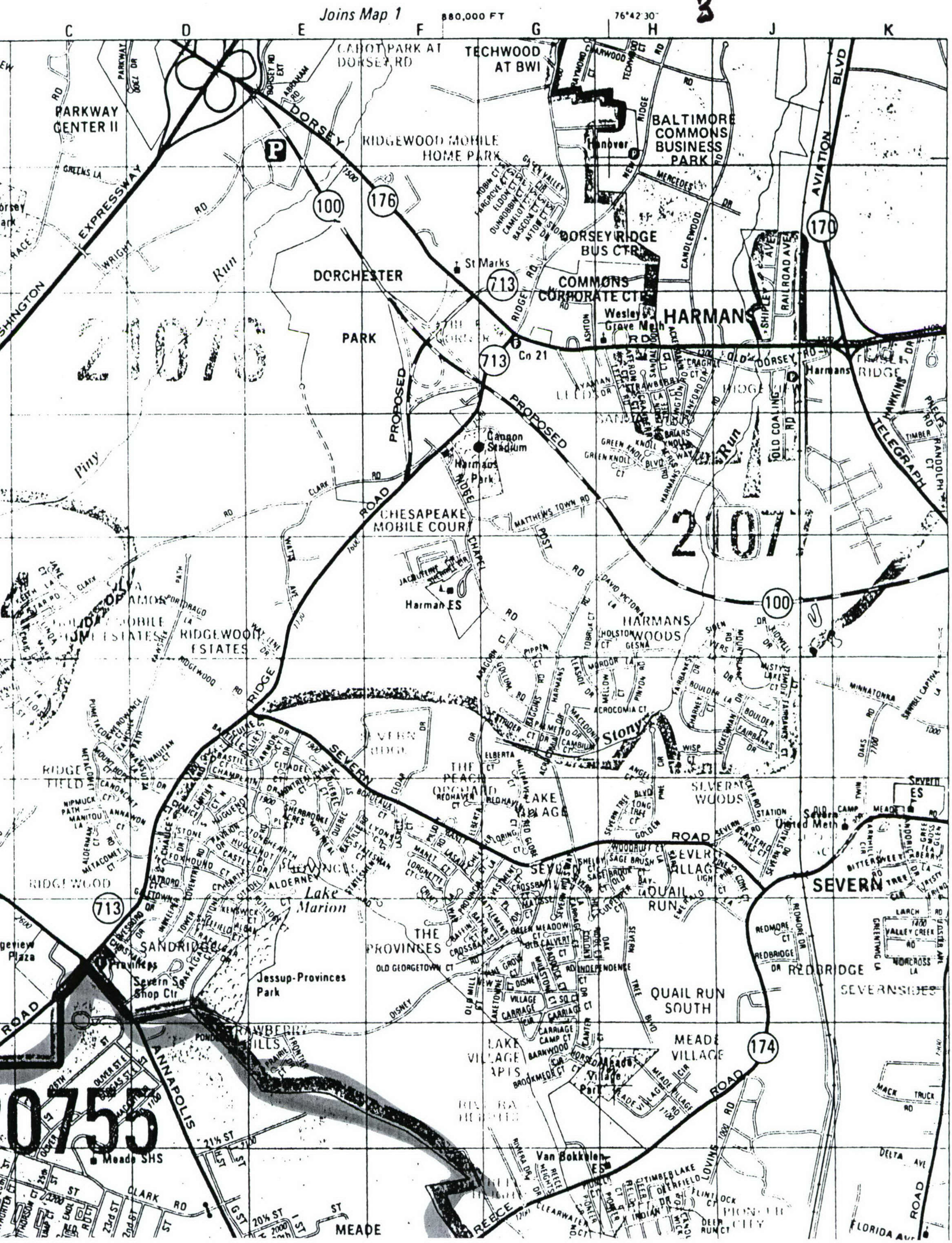
CENTER
Wesley Chapel
SPRINGWOOD
Jessup (MARC)
JESSUP
PATUXENT IND PK
MARYLAND HOUSE OF CORRECTION
Jessup ES
Jessup
Saint Lawrence
GEORGETOWN
Payne
Maryland House of Correction
Police Academy
REFORMATORY FOR WOMEN
Annapolis Junction
ROUTE 32 BUS CTR
Cedar Knolls ES
UNSA Employees Exit Only
Colony 7 Racquet Club
West Meade ES
THE NATIONAL
Jessup Park
Jessup Dorsey Park
PARKWAY CENTER II
Jessup Co 29
Ridgeview Plaza
RIDGEWOOD
RIDGEFIELD
BALTIMORE WASHINGTON EXPRESSWAY
ANNE ARUNDEL COUNTY
HOWARD COUNTY
Dorsey Run
Patuxent Branch
BOULEVARD
WATERLOO ROAD
OLD JESSUP ROAD
RACE ROAD
HILLTOP ROAD
SELLNER ROAD
BRIDGE PARKWAY
WASHINGTON BLVD
SPELLMAN ROAD
175
295
32
71

3



Joins Map 1
880,000 FT
76°42'30"
C
D
E
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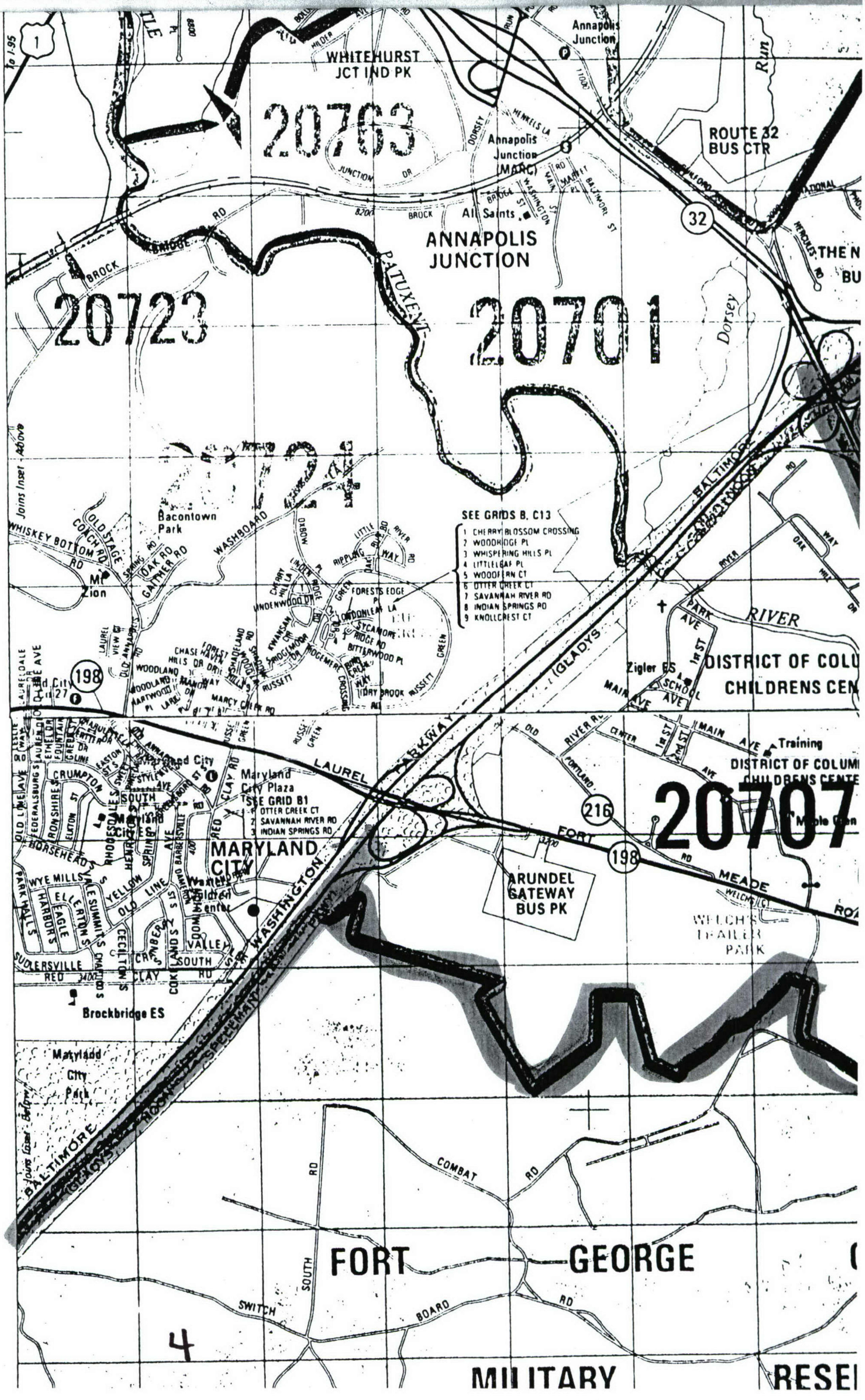
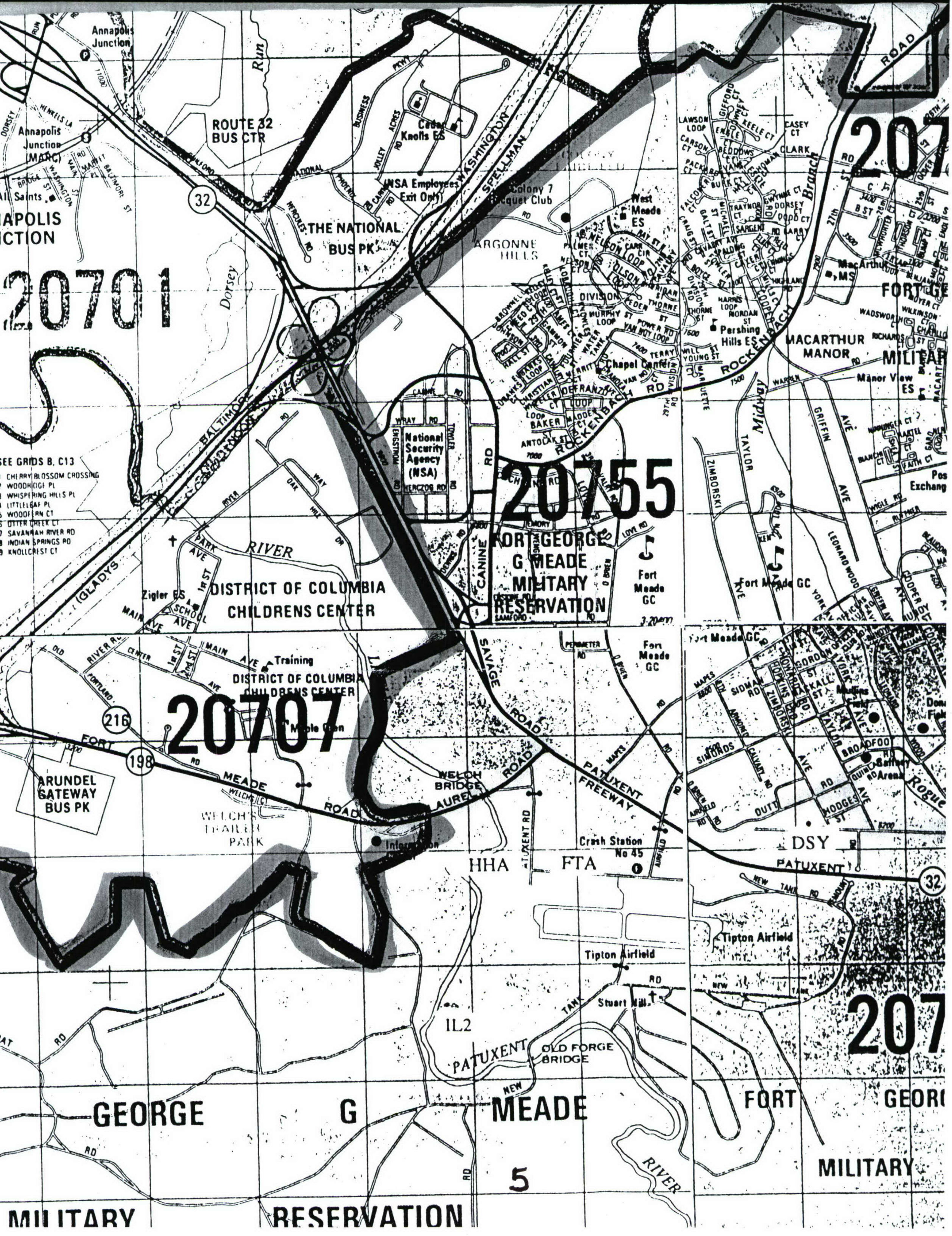
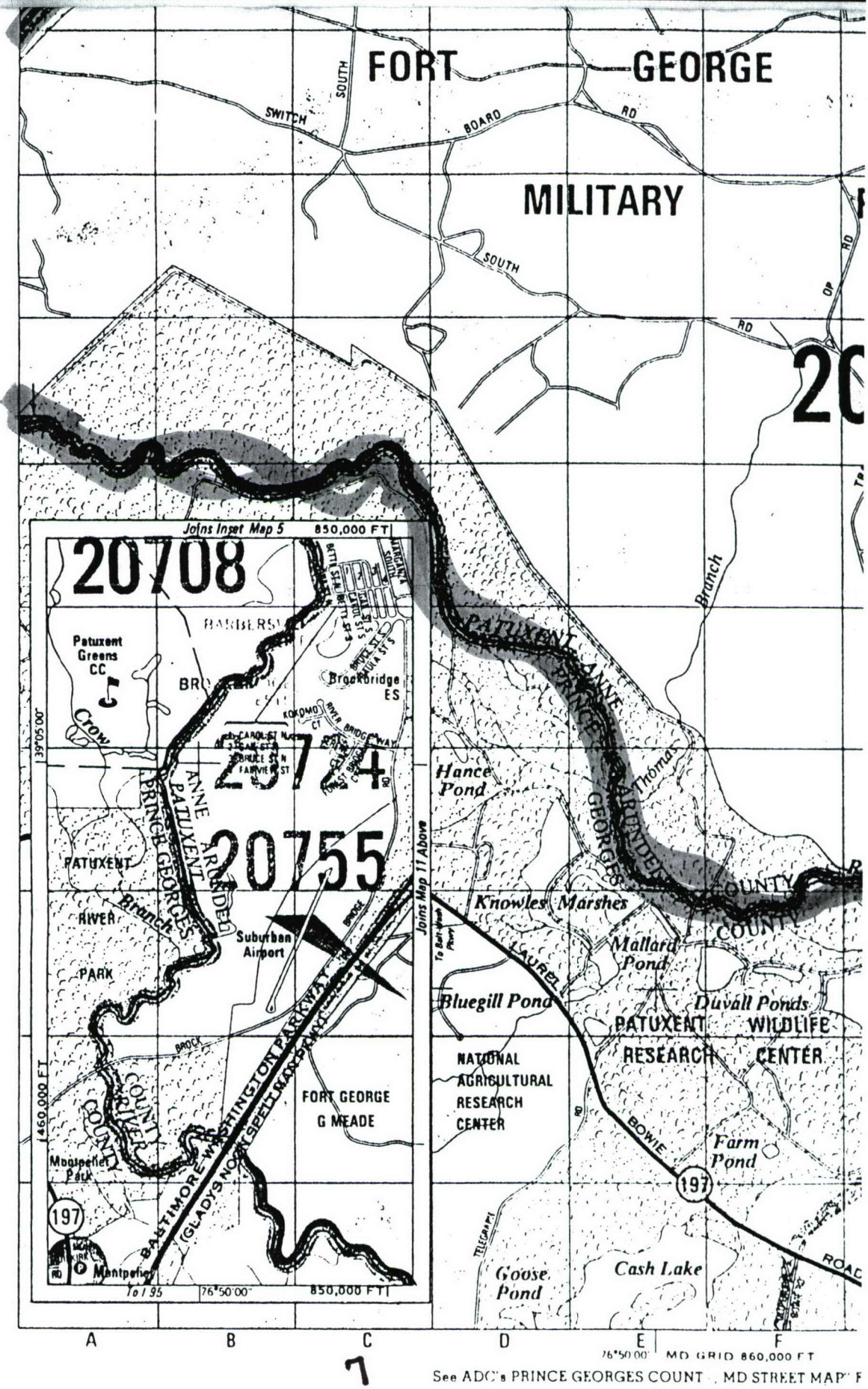
G
H
J
K
CABOT PARK AT DORSEY RD
TECHWOOD AT BWI
PARKWAY CENTER II
BALTIMORE COMMONS BUSINESS PARK
RIDGEWOOD MOBILE HOME PARK
DORSEY
EXPRESSWAY
AVIATION BLVD
100
176
170
713
DORSEY RIDGE BUS CTR
DORCHESTER
PARK
COMMONS CORPORATE CTR
HARMANS
St Marks
Wesley Grove Meth
Co 21
Harmans
OLD DORSEY RD
RIDGEVIEW
PROPOSED
Cannon Stadium
Harmans Park
TELEGRAPH
2076
2107
RIDGE ROAD
CHESAPEAKE MOBILE COURT
MATTHEWS TOWN RD
Harman ES
HARMANS WOODS
RIDGEWOOD ESTATES
Piny Run
Stony Run
SEVERN RIDGE
THE PEACH ORCHARD
LAKE VILLAGE
SEVERN WOODS
SEVERN ROAD
Severn United Meth
Severn ES
SEVERN
SEVERN VILLAGE
QUAIL RUN
RIDGE FIELD
RIDGEWOOD
PROVINCES
Lake Marion
THE PROVINCES
SANDRIDGE
Provinces
Severn Sq Shop Ctr
Jessup-Provinces Park
QUAIL RUN SOUTH
REDBRIDGE
SEVERNSIDES
MEADE VILLAGE
174
LAKE VILLAGE APTS
Meade Village Park
STRAWBERRY HILLS
ANNAPOLIS
20755
Meade SHS
Van Bokkelen ES
REECE ROAD
LOVINGS RD
PIONEER CITY
MEADE
CLARK RD
ROAD
FLORIDA AVE


WHITEHURST JCT IND PK
20763
Annapolis Junction
Annapolis Junction (MARC)
ROUTE 32 BUS CTR
32
All Saints
ANNAPOLIS JUNCTION
BROCK BRIDGE RD
PATUXENT
20723
20701
Dorsey
Bacontown Park
WASHBOARD RD
WHISKEY BOTTOM RD
Mt Zion
SEE GRIDS B, C13
1 CHERRY BLOSSOM CROSSING
2 WOODRIDGE PL
3 WHISPERING HILLS PL
4 LITTLELEAF PL
5 WOODFERN CT
6 OTTER CREEK CT
7 SAVANNAH RIVER RD
8 INDIAN SPRINGS RD
9 KNOLLCREST CT
198
BALTIMORE WASHINGTON PKWY
Zigler ES
DISTRICT OF COLU CHILDRENS CEN
LAUREL
Maryland City Plaza
SEE GRID B1
1 OTTER CREEK CT
2 SAVANNAH RIVER RD
3 INDIAN SPRINGS RD
MARYLAND CITY
216
20707
FORT MEADE ROAD
DISTRICT OF COLUMBIA CHILDRENS CENTER
Training
ARUNDEL GATEWAY BUS PK
WELCH'S TRAILER PARK
Brockbridge ES
Maryland City Park
COMBAT RD
FORT GEORGE
SWITCH BOARD RD
4
MILITARY RESE

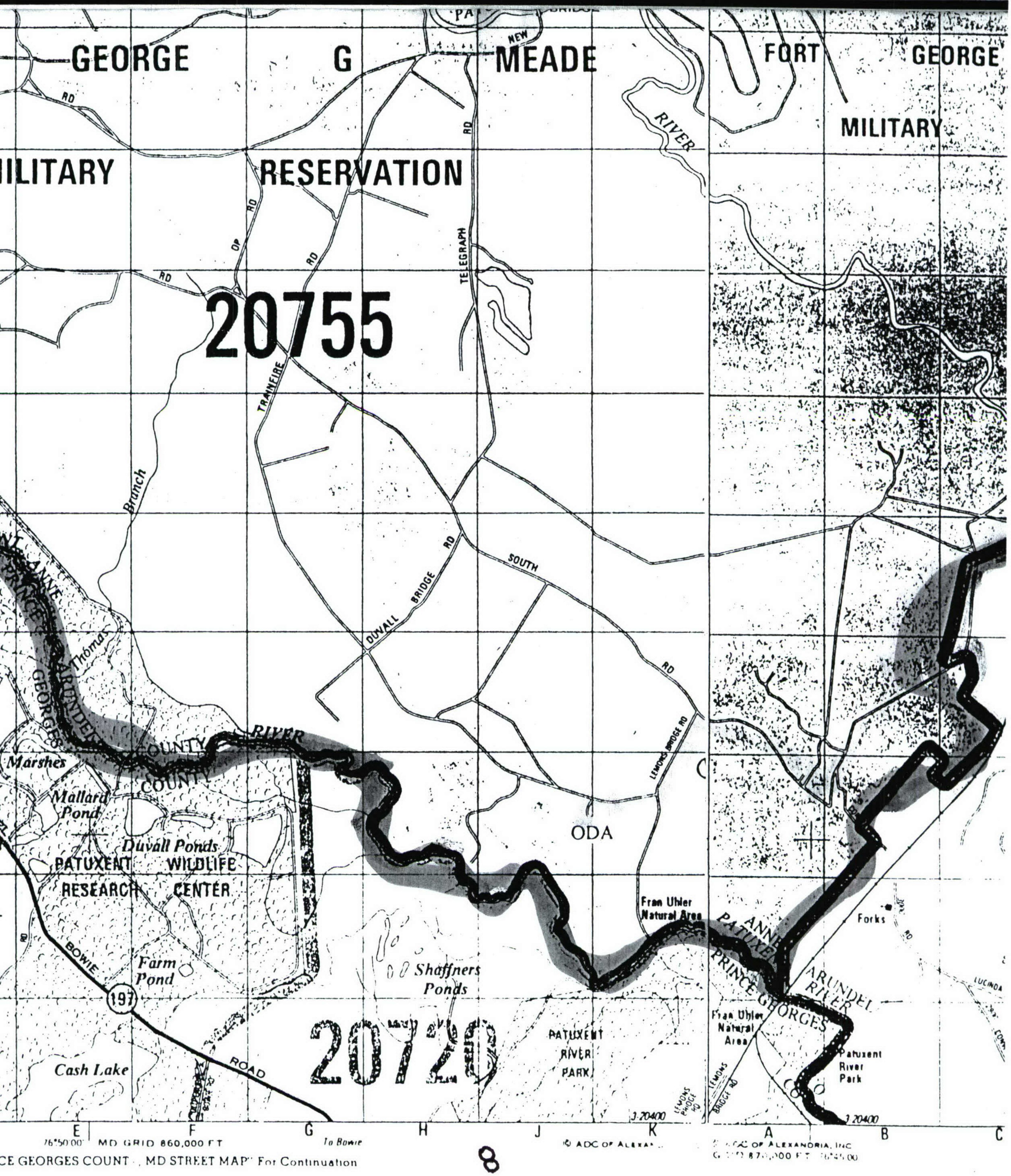


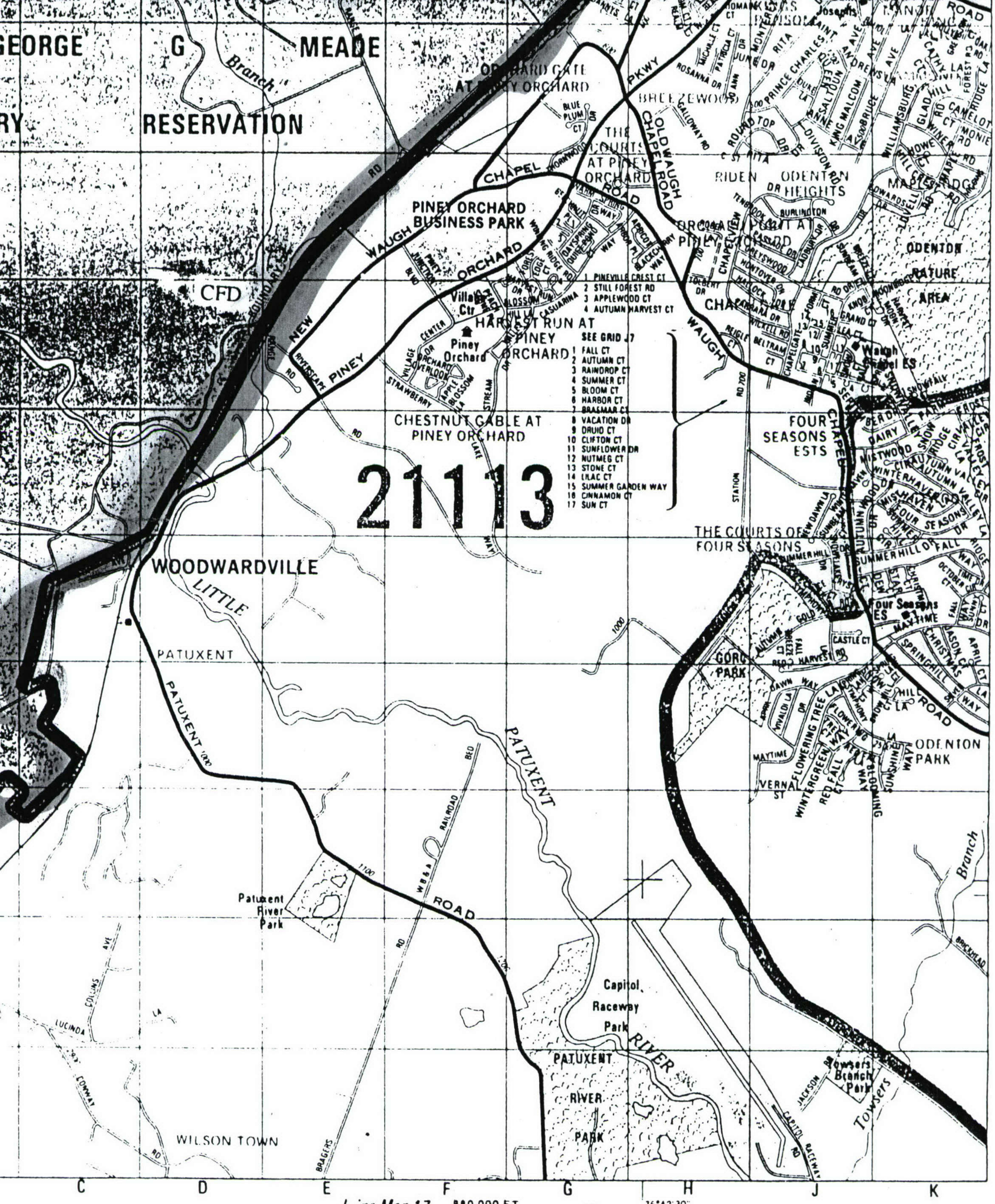
Annapolis Junction
ROUTE 32 BUS CTR
Cedar Knolls ES
NSA Employees Exit Only
Colony 7 Racquet Club
West Meade ES
THE NATIONAL BUS PK
ARGONNE HILLS
APOLIS
NCTION
20701
Dorsey
MacArthur MS
FORT GE
Pershing Hills ES
MACARTHUR MANOR
MILITAR
Manor View ES
National Security Agency (NSA)
Chapel Center
20755
SEE GRIDS B, C13
CHERRY BLOSSOM CROSSING
WOODRIDGE PL
WHISPERING HILLS PL
LITTLELEAF PL
WOODFERN CT
OTTER CREEK CT
SAVANNAH RIVER RD
INDIAN SPRINGS RD
KNOLLCREST CT
FORT GEORGE G MEADE MILITARY RESERVATION
Fort Meade GC
Fort Meade GC
Zigler ES
DISTRICT OF COLUMBIA CHILDRENS CENTER
Training
DISTRICT OF COLUMBIA CHILDRENS CENTER
20707
Maple Glen
ARUNDEL GATEWAY BUS PK
WELCH'S TRAILER PARK
WELCH BRIDGE
Crash Station No 45
DSY
HHA
FTA
Tipton Airfield
Tipton Airfield
Stuart Hill
IL2
OLD FORGE BRIDGE
PATUXENT
207
207
GEORGE
G
MEADE
FORT
GEORG
MILITARY
MILITARY
RESERVATION
RIVER
5

20755
FORT GEORGE G MEADE
MILITARY RESERVATION
MEADE HEIGHTS
Meade Heights ES
Meade SHS
ANNAPOLIS ROAD
QUAIL RUN SOUTH
MEADE VILLAGE
LAKE VILLAGE APTS
174
REECE ROAD
Van Bokkelen ES
PIONEER CITY
TELEGRAPH ROAD
170
MIDWAY IND PK
SEVEN OAKS
175
Post Exchange
Fort George G Meade
Kimbrough Hospital
Burba Lake
MAYFIELD INDUSTRIAL PARK
MAYFIELD
ACADEMY JUNCTION
ARUNDEL CROSSING EAST IND PK
ARUNDEL CROSSING WEST IND PK
32
FREEWAY
ODENTON
Odenton (MARC)
Soldiers Lake
Landfill
20755
GEORGE G MEADE
RESERVATION
STONEY HILL
BREEZEWOOD
ODENTON HEIGHTS
CONSTRUCTION



See ADC's PRINCE GEORGES COUNTY, MD STREET MAP F


GEORGE
G
MEADE
FORT
GEORGE
MILITARY
MILITARY
RESERVATION
20755
RIVER
TELEGRAPH RD
TRAINEIRE
DUVALL BRIDGE RD
SOUTH
RD
LEMONS BRIDGE RD
ODA
Branch
Thomas
ANNE ARUNDEL COUNTY
PRINCE GEORGES COUNTY
RIVER
Marshes
Mallard Pond
Duvall Ponds
PATUXENT WILDLIFE RESEARCH CENTER
Farm Pond
BOWIE ROAD
197
Cash Lake
Shaffners Ponds
20720
PATUXENT RIVER PARK
Fran Uhler Natural Area
PATUXENT RIVER
ANNE ARUNDEL
PRINCE GEORGES
Fran Uhler Natural Area
Patuxent River Park
Forks
LUCINDA
E
F
G
H
J
K
A
B
C
MD GRID 860,000 FT
To Bowie
© ADC OF ALEXA
© ADC OF ALEXANDRIA, INC
CE GEORGES COUNT , MD STREET MAP For Continuation


GEORGE G MEADE
RESERVATION
ORCHARD GATE AT PINEY ORCHARD
BREEZEWOOD
THE COURTS AT PINEY ORCHARD
RIDEN
ODENTON HEIGHTS
PINEY ORCHARD BUSINESS PARK
ODENTON NATURE AREA
CFD
HARVEST RUN AT PINEY ORCHARD
SEE GRID J7
1 PINEVILLE CREST CT
2 STILL FOREST RD
3 APPLEWOOD CT
4 AUTUMN HARVEST CT
1 FALL CT
2 AUTUMN CT
3 RAINDROP CT
4 SUMMER CT
5 BLOOM CT
6 HARBOR CT
7 BRASMAR CT
8 VACATION DR
9 DRUID CT
10 CLIFTON CT
11 SUNFLOWER DR
12 NUTMEG CT
13 STONE CT
14 LILAC CT
15 SUMMER GARDEN WAY
16 CINNAMON CT
17 SUN CT
Piney Orchard
Village Ctr
Waugh Chapel ES
CHESTNUT GABLE AT PINEY ORCHARD
FOUR SEASONS ESTS
21113
THE COURTS OF FOUR SEASONS
WOODWARDVILLE
LITTLE PATUXENT
Four Seasons ES
GORG PARK
ODENTON PARK
PATUXENT ROAD
Patuxent River Park
Capitol Raceway Park
PATUXENT RIVER PARK
Towsers Branch Park
WILSON TOWN
C D E F G H J K
Joins Map 17
880,000 FT
76°42'30"

9