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TECHNICAL MEMORANDUM REGARDING ADDITIONAL SAMPLING FOR SOUTHSIDE LANDFILL SOLID WASTE MANAGEMENT 2 MILLINGTON SUPPACT TN

8/24/1999

ENSAFE

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ENSAFE INC. ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

5724 Summer Trees Drive • Memphis, Tennessee 38134 • Telephone 901-372-7962 • Facsimile 901-372-2454 • www.ensafe.com

TECHNICAL MEMORANDUM

To: NSA Mid-South BRAC Cleanup Team

From: Robert Smith, EnSafe Inc.

Date: August 24, 1999

Re: Additional Sampling — Southside Landfill (SWMU 2), NSA Mid-South, Millington, Tennessee — Revision 1 — CTO 0106

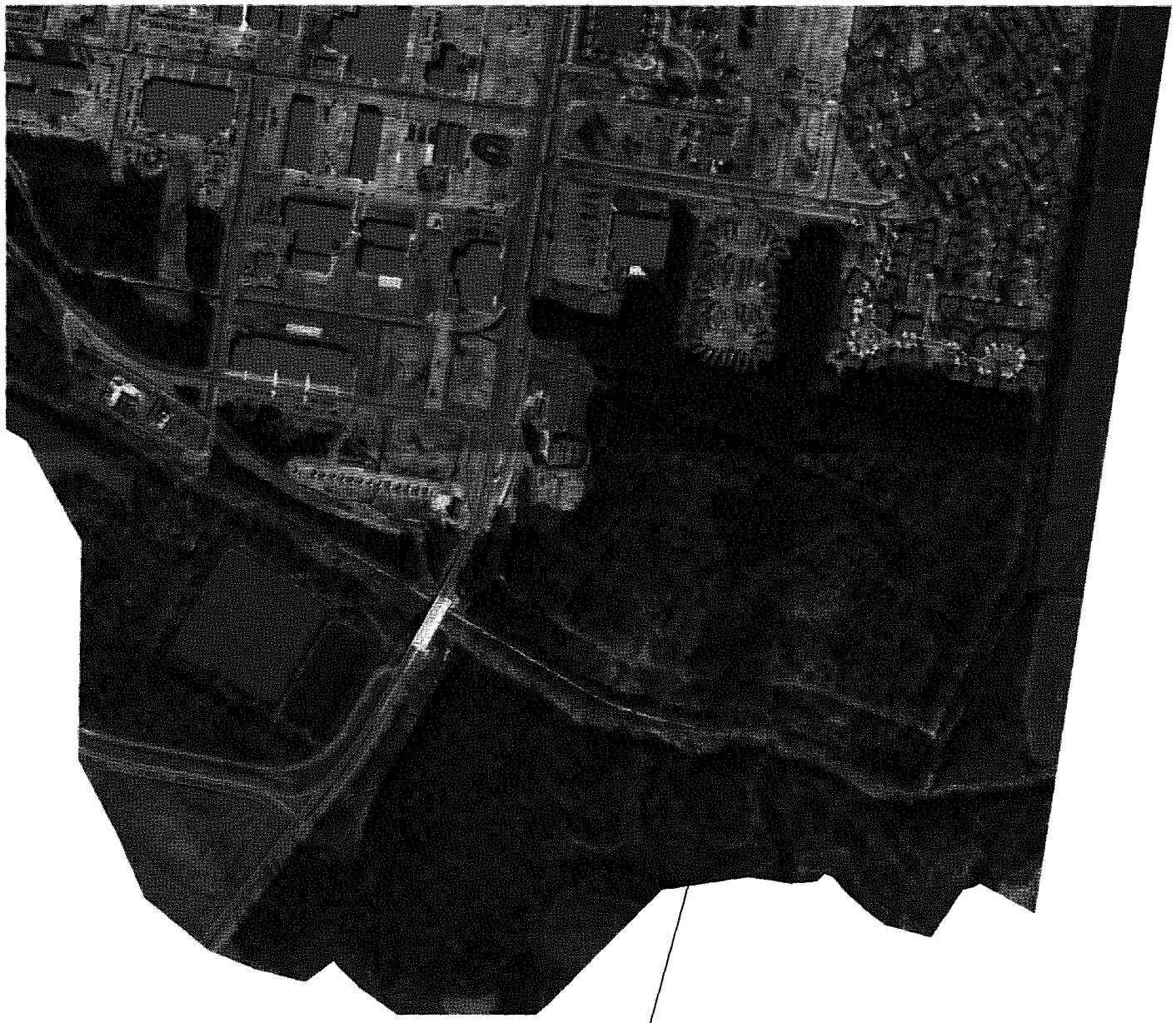
Introduction

The objective of this abbreviated work plan is to outline the approach and procedures to further delineate the known groundwater contamination identified at the Southside Landfill (SWMU 2) at Naval Support Activity (NAVSUPPACT or NSA) Mid-South, Millington, Tennessee.

Site Description

The Southside Landfill covers 42 acres of the southeast quadrant of NSA Mid-South (Figure 1). It is bounded on the east by Perimeter Road, and a wooded area. South of the landfill lies Big Creek Drainage Canal (Big Creek) which flows to the west. South of Big Creek lies the southern boundary of NSA Mid-South and undeveloped land. West of the landfill lies Singleton Parkway (formerly Seventh Avenue) and the NSA Mid-South South Gate. The NSA Mid-South shooting range is near the landfill's northwest corner. A wooded lot and a residential neighborhood are approximately 1,000 feet north of the landfill.

The landfill is covered with mature hardwood and pine trees and dense undergrowth, as documented in the *Visual Site Inspection (VSI) Report* (ERC/EDGe, 1990a). Topography at the landfill is relatively flat, subtly sloping downward to the south toward Big Creek.



SWMU 2
Southside Landfill

1000 0 1000 Feet

Big Creek
Drainage Canal
Roads
Buildings

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NSA Mid-South
Millington
Tennessee

Figure 1
Site Location Map
SWMU 2
Southside Landfill

The landfill receives surface drainage from the north, which apparently discharges generally to the west, eventually discharging to Big Creek. During the Assembly E investigation, no visual evidence of surface-water discharge into Big Creek was identified, although topographic features were noted where runoff from the landfill may be concentrated. During current and previous site investigations, several areas of standing water, up to several inches deep, have been noted at various locations in the area. These areas are believed to have resulted from a combination of precipitation and blocked surface drainage pathways, and not from upward groundwater movement. The drainage pathways have not been maintained since the landfill closed in 1970, and dense undergrowth and plant debris may have filled areas which once drained low-lying areas of the landfill.

According to the *RCRA Facility Assessment (RFA)* (ERC/EDGe, 1990b), the Southside Landfill reportedly received solid waste generated from both the Northside and Southside from 1942 until 1970. Disposed waste included residential waste generated by onsite housing, office solid waste, aircraft parts, wastewater-treatment plant sludge generated by the trickling filter plant, incinerator ash, waste oil, oily sludge, and solvents generated from industrial operations. An estimated one ton per year of oily waste and sludge (possibly containing polychlorinated biphenyls [PCBs]) and approximately two tons per year of wastewater-treatment plant sludge were disposed of by trench-and-cover in the landfill. Combustible materials were reportedly burned with waste oil to aid in the burning process and to reduce the waste volume in the landfill.

As part of the RCRA Facility Investigation (RFI), SWMU 2 has been subjected to an extensive groundwater investigation, which includes the installation and monitoring of 38 monitoring wells set in the alluvial deposits of the SWMU 2 area.

The primary focus of this phase of the investigation is the southeast corner of the landfill, near monitoring well 002G03DA. The objectives are as follows:

- Determine if chlorinated solvent contamination detected in well 007G03DA is discharging to Big Creek from the alluvial deposits.

- Determine if chlorinated solvent contamination detected in well 007G03DA is discharging to the small tributary stream east of SWMU 2.

- Determine the down gradient extent of the groundwater contamination detected in well 007G03DA.

- Test the hypothesis that dissolved phase solvent contamination is undergoing natural attenuation before discharging to the creek.

Big Creek Drainage Canal

Big Creek will be sampled to determine if groundwater contamination detected in well 002G03DA is discharging to the surface water. Previous sampling efforts have included surface water samples collected from the bank of the creek, as well as passive soil gas samplers installed in the sediment of the creek at various locations. Samples collected during both events did not indicate the presence of chlorinated solvent; however, due to the locations sampled and methodologies used, the results may be 'false negatives.'

Diffusion samplers, similar to those used for groundwater sampling, will be used to collect surface water samples from various depths in Big Creek. In the area of 002G03DA, the depth to the bottom of the creek is assumed to be approximately 10 feet. Two samplers will be deployed at discrete intervals at each of four locations along the centerline of Big Creek (Figure 2). The deeper of the two samplers at each location will be deployed in such a manner that it will be completely submersed in the sediment of the creek, theoretically exposed to any groundwater that

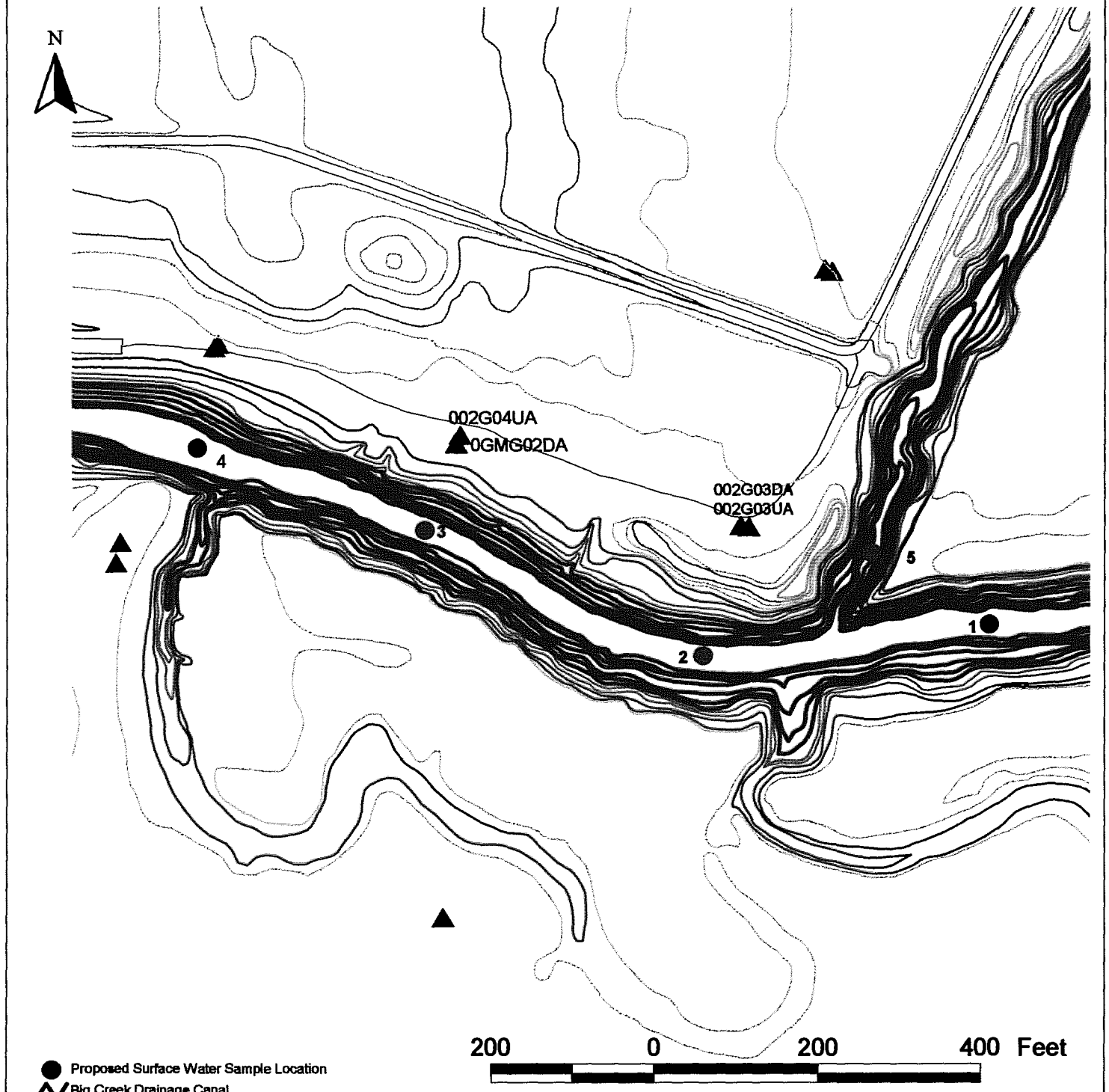

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Figure 2
Proposed Surface Water Sample Location Map
SWMU 2

may be discharging to the creek, as well as to any dense non-aqueous phase liquids (DNAPLs) which may be present in the bottom of the creek. The shallower of two samplers will be to assess the primary flow path. The rationale for the locations selected are as follows:

- Location #1 — Upstream; to establish the level of contaminants, if any, migrating onsite from an offsite source.

- Location #2 — Source Location; to determine the theoretical 'worst case' scenario in terms of contaminant levels in Big Creek. By collecting a sample immediately downstream of the area of highest known groundwater contamination (002G03DA), the groundwater discharging to the creek should contain the highest concentration of chlorinated solvents.

- Location #3 — Downstream; to determine downstream concentrations of chlorinated solvents in Big Creek.

- Location #4 — Downstream of location #3; to determine downstream concentrations of chlorinated solvents in Big Creek.

- Location #5 — Tributary; to determine if chlorinated solvent contamination detected in 002G03DA is charging to the small tributary of Big Creek.

Diffusion samplers consist of polyethylene bags filled with deionized water which will be placed at the desired sample interval (creek bottom and 'mid-depth') in the creek. The concentration gradient between VOCs in the surface water and the water-filled bag creates an osmotic pressure on the polyethylene membrane and eventually the diffusion of contaminants into the sampler. Studies have shown that samples obtained using diffusion samplers contained similar VOC

concentrations to those collected through traditional sampling techniques (D.A. Vroblesky and W.T. Hyde, 1997).

Although flow rates in Big Creek are minimal during the dry portion of the season, a significant rainfall event can cause the flow rates and water level to increase. Water levels have risen as much as 8 feet during heavy rainfall events. Due to this potential for high flow levels in Big Creek, and the potential for debris to damage the diffusion samplers, they will be placed within a section PVC well screen (0.010 and/or 0.050 inch slot). This will allow water to contact the samplers, while keeping debris from damaging the bag (Figure 3).

The deeper diffusion samplers will be placed on the bottom of the creek via a weighted line. The weight will cause the sampler to sink several inches into the soft mud creek bottom, ensuring that the sample is more representative of the water discharging into the creek, rather than water that is flowing downstream. The upper interval sample will be more representative of the water flowing downstream. The samplers will be left in place for no less than 2 weeks, to ensure that equilibrium with the surrounding water has been reached.

Groundwater Sampling

Groundwater samples collected from well 002G03DA in February 1999 from SWMU 2 indicated the presence of chlorinated solvents in the deeper portion of the alluvial deposits. Trichloroethylene concentrations ranged from 360 μg/L to 980 μg/L, with concentrations increasing with depth (depths ranged from 41 to 49 feet below land surface [bls]). However, samples collected from well 002G18DA, located 600 feet south of 002G03DA, were non-detect for chlorinated solvents. The groundwater flow direction, shown in Figure 4 shows a flow pattern which diverges into Big Creek, indicating that the alluvial deposits groundwater may possibly be discharging to (or gaining from) Big Creek.

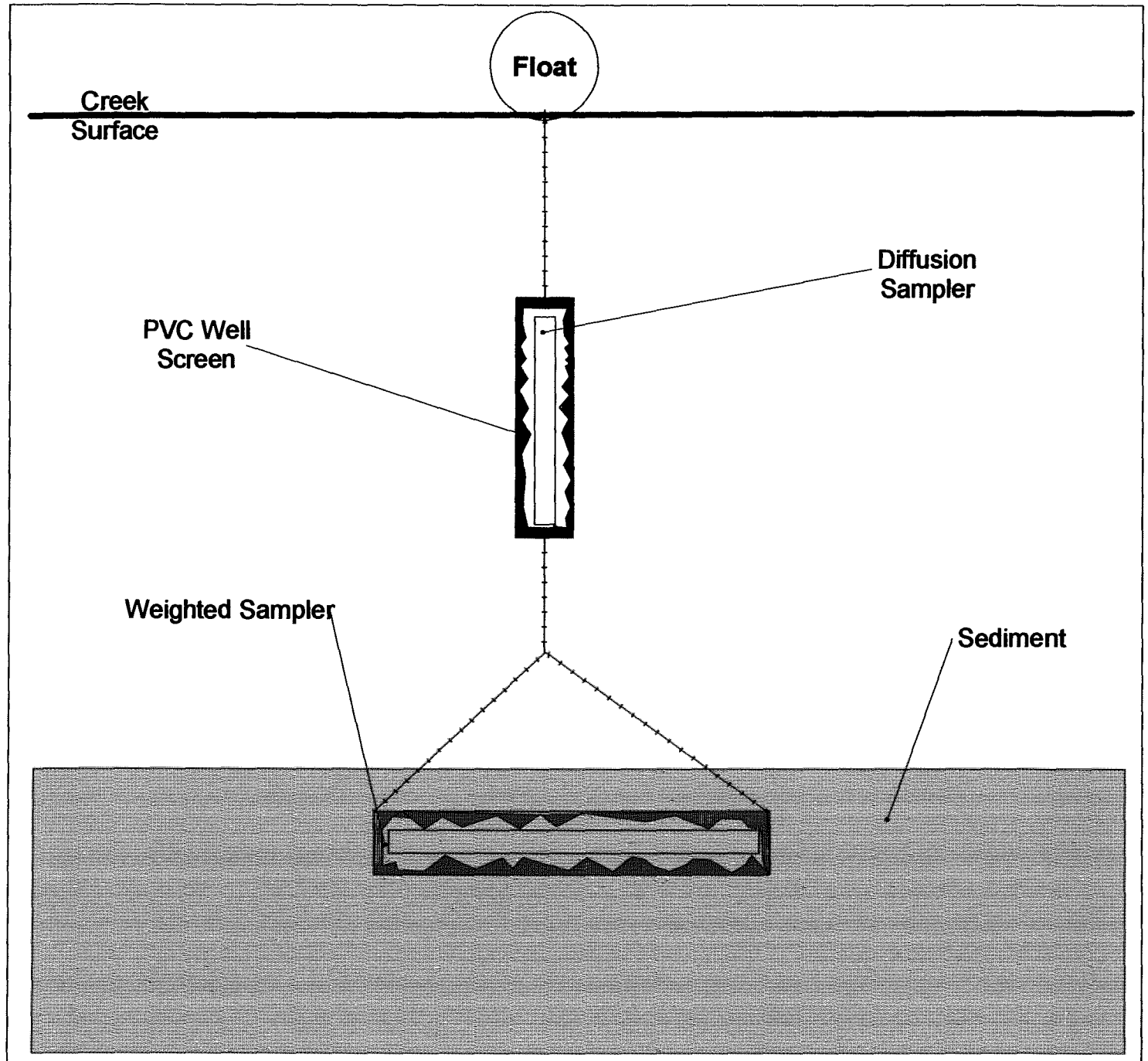

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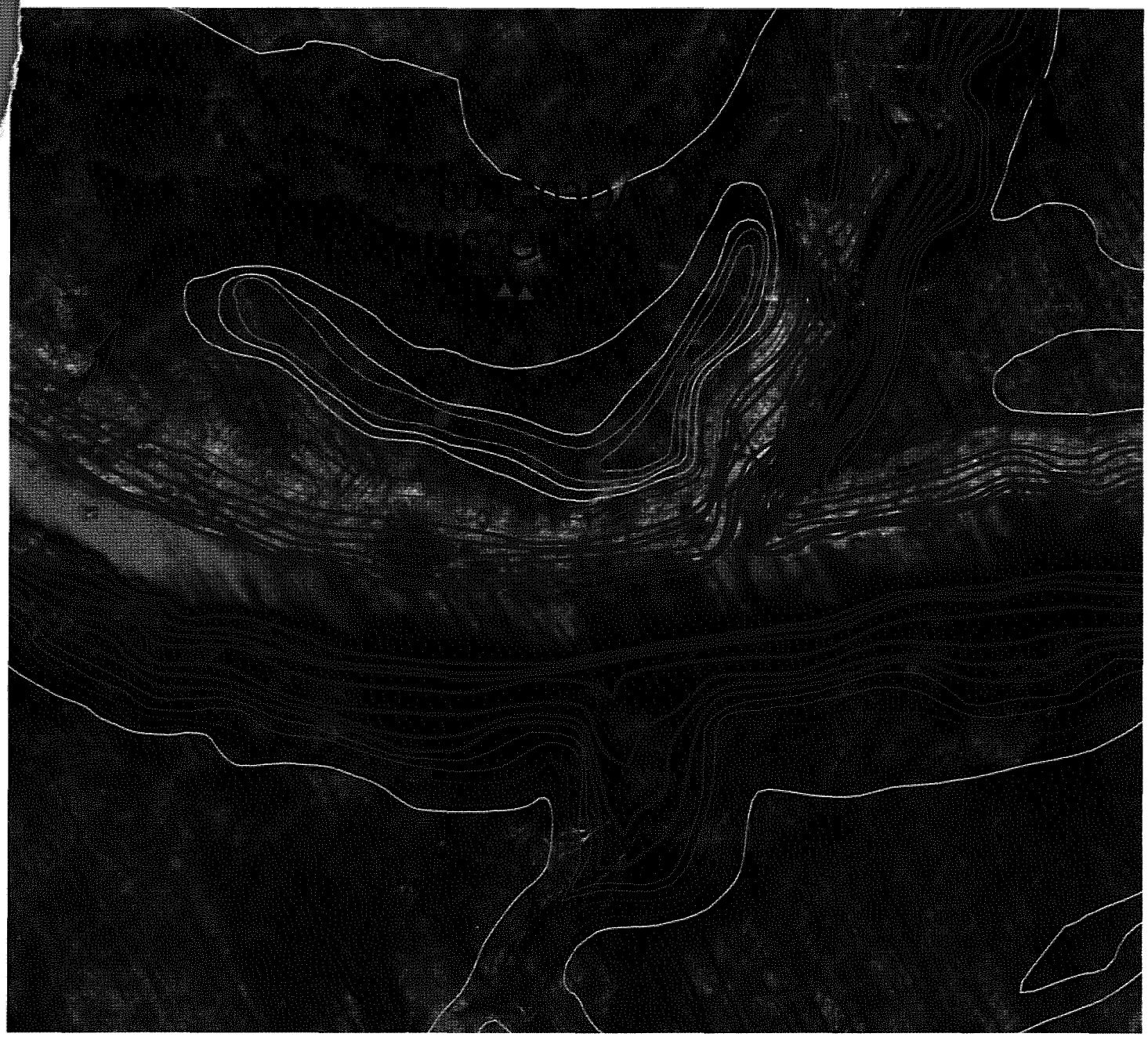
Figure 3
Diffusion Sampler
Schematic



100 0 100 200 Feet

- Proposed Geoprobe Sample Locations
- Big Creek Drainage Canal

Surface Elevation Contours

- 276 - 280
- 272 - 275
- 268 - 271
- 264 - 267
- 260 - 263
- 255 - 259
- 251 - 254
- 247 - 250
- 243 - 246
- 238 - 242
- Roads
- SWMU 2 Monitoring Wells
- Buildings

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Figure 4
Proposed Geoprobe Sample Locations
SWMU 2

In an effort to further delineate the extent of the groundwater contamination, additional samples will be collected from the area between 002G03DA and Big Creek. Three groundwater samples will be collected from a depth of 49 feet bls (or refusal). Samples will be collected using a Geoprobe Model 5400 (or equivalent), mounted on a 4-wheel drive pickup truck. An area south of 002G03DA will be cleared to allow access with the Geoprobe rig.

Analytical Requirements

Previous sampling events have indicated the presence of chlorinated solvents in the alluvial deposits groundwater. Therefore, the samples to be analyzed during this phase of the investigation will be submitted of an offsite laboratory for volatile organic compound (VOC) analysis by USEPA Method 8260. Level III (or equivalent) data packages will be submitted to EnSafe by the laboratory to facilitate the data validation process. Duplicate samples will be collected from each media (surface water vs groundwater) as part of the overall QA/QC process for the RFI. Table 1 presents the number and type of samples to be collected.

Table 1
Analytical Requirements
SWMU 2 — Southside Landfill

Media	No. of Samples	Analytical Method
Surface Water	9 + 1 duplicate	8260
Groundwater	12 + 1 duplicate	8260

All sample management, to include labeling, packing, and shipping, will be done in accordance with the approved *NAS Memphis Comprehensive RFI Work Plan* (EnSafe/Allen & Hoshall, October 1994).

Documentation

EnSafe will present the data generated during this investigation to the NSA Mid-South BRAC Cleanup Team for discussion. The data will also be used to determine the overall conceptual model of the Southside Landfill, and will be incorporated into the SWMU 2 RFI Report.

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