

11 November 1991

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P.O. Box 201088
Austin, TX 78720-1088
(512)454-4797

833 CSG/DEV
ATTN: Ms. Sharon Moore
Building 55
Holloman AFB, NM 88330-5000

Re: **Revised Conceptual Plan for Sludge and Soil Sampling
Holloman Air Force Base, NM**

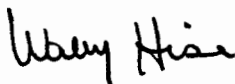
Dear Sharon:

Enclosed are three copies of the above-referenced document, incorporating comments received from EPA Region VI and NMED personnel during our conference call and follow-up correspondence last week. Also attached are notes from the telephone calls detailing concerns of the regulators and our response to those particular items.

At this point we have received a verbal commitment from both EPA and NMED to provide a written approval of the proposed project after receiving the revised conceptual plan. Following receipt of approvals, the Corps of Engineers and Radian will proceed with contract negotiations, and begin preparation of more detailed plans and scheduling of field activities. The estimated completion date for this project is 1 May 1992.

Please feel free to call me at 512/454-4797 if you have any further questions or comments.

Sincerely,



Wallace Hise
Project Director

Enclosure

cc: R. Stirling/USACE (3 copies)
B. Johnson/HQ TAC (1 copy)
C. Adams/HQ TAC (1 copy)
B. Swanton/NMED (1 copy)
M. Potts/EPA Region VI (2 copies)
M. Peycke/EPA Region VI (1 copy)
E. Graber/EPA Region VI (1 copy)
J. Resnick/BLM (1 copy)
R. Roy/FWS (1 copy)
R. Churan/DOI (1 copy)
E. Lopez/AFRCE (2 copies)
N. Lund/Radian (1 copy)

**RESULTS OF CONFERENCE CALL FOR
SEWAGE LAGOON SAMPLING
HOLLOMAN AFB, NEW MEXICO**

6 November 1991

Participants:

Mr. Barry Feldman - EPA Region VI, 214/655-2192
Mr. Dave Vogler - "
Mr. Ron Stirling - U.S. Army Corps of Engineers, 402/221-3761
Mr. Del Connealy - " 402/221-7692
Ms. Sandra Frye - " 402/221-7642
Mr. Brent Johnson - USAF/HQ Tactical Air Command, 804/764-4430
Mr. Cedrick Adams - " 804/764-3108
Mr. Roger Wilkson - USAF/Holloman AFB, 505/479-3931
Mr. Wally Hise - Radian Corporation, 512/454-4797
Ms. Jane Hixson - "

EPA Comment #1

The number of samples in the northern portion of Pond C is inadequate. Specifically, a sample should be located at each of the overflow points from Ponds A and B.

USAF Response to Comment #1

Although historical data exist for sampling in this area, two sampling points will be added, one at each of the overflow points. One sample point will consist of a boring to 2 feet bgl and the other to 4 feet bgl (total of five additional samples for Appendix IX analysis).

EPA Comment #2

The number of samples in Pond E is inadequate. Specifically, one sample should be located at the overflow point from Pond D, and one at the overflow point to Pond G.

USAF Response to Comment #2

One sample point will be added at the overflow point from Pond D, consisting of a boring to 4 feet bgl, and one of the existing sample points in Pond E will be repositioned near the overflow to Pond G (total of three additional samples for Appendix IX analysis).

EPA Comment #3

The number of samples in the ditch from Pond G to Lake Holloman is inadequate. Specifically, a sample should be located in the portion of the ditch flowing along the western side of Pond G.

USAF Response to Comment #3

A valve box is located between Ponds E and G to control the overflow and ensure that wastewater effluent does not bypass Pond G into the ditch. The portion of the ditch under consideration handles storm water runoff from the Base. A sample point will be located in the ditch "downstream" of the valve box to ensure that this device has functioned properly in the past. The sample point will consist of a boring to 2 feet bgl (total of 2 additional samples for Appendix IX analysis).

EPA Comment #4

The number of samples in Lakes Holloman and Stinky is inadequate.

USAF Response to Comment #4

Considering the relative size of the lakes with respect to the rest of the sewage lagoon system, the number of samples may appear inadequate. However, the proposed investigation is recognized to be an interim measure providing data to allow the lagoons to operate during the delay-of-closure period, and is not intended as a demonstration of clean closure. In addition, these impoundments are not covered under the Federal Facilities Compliance Agreement (FFCA), and samples are being collected to comply with requirements of the Bureau of Land Management (BLM) and the Fish & Wildlife Service (FWS). Therefore, no additional samples will be collected from the lakes during this phase of investigation.

EPA Comment #5

The schedule appears to be overly conservative, especially with respect to analytical turnaround time and data validation.

USAF Response to Comment #6

The number of samples and difficult sludge matrix (known from experience) necessitate a slightly longer turnaround time than that required for a more typical water sample. In addition, the large volume of data that will be generated from this effort will require time to validate, followed by data analysis (using statistical methods) and reporting. It is felt that the schedule is reasonable given the size of this project. Note that the schedule provided is in cumulative weeks from the time of plan approval.

EPA Comment #6

EPA prefers to have the data analysis and validation tasks conducted by separate organizations.

USAF Response to Comment #6

Lacking any clear regulatory guidance or requirements to this effect, the project will be set up similar to past efforts where Radian Corporation has provided analytical services as well as technical input for data validation. This matter will be discussed further if necessary.

RESULTS OF FOLLOW-UP CALL TO MS. ELLEN GRABER

6 November 1991

Radian personnel conducted a follow-up telephone call to Ms. Ellen Graber (EPA Region VI) to discuss the comments outlined above. Ms. Graber subsequently agreed to the responses proposed by the USAF, and agreed to follow up with EPA Region VI personnel in Dallas regarding Comment #6 (data analysis and validation).

RESULTS OF FOLLOW-UP CALL TO MR. BRUCE SWANTON

7 November 1991

USAF/HQ Tactical Air Command personnel conducted a follow-up telephone call to Mr. Bruce Swanton (New Mexico Environment Department) to discuss the comments outlined above. Mr. Swanton subsequently agreed to the responses proposed by the USAF. An additional concern was raised regarding QA/QC procedures, and guidance (i.e., State of New Mexico requirements) were forwarded to Radian Corporation. The QA/QC requirements will be incorporated into a detailed sampling and analysis plan to be prepared for this work effort.



LIBRARY COPY

833d CSG/DEV
Holloman Air Force Base,
New Mexico

*Conceptual Plan for
Sludge and Soil Sampling
Sewage Lagoon Investigation*

November 1991



*Prepared Under Contract With:
US Army Corps of Engineers,
Omaha District*

HAAFB

03

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RADIAN
CORPORATION



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(512)454-4797

**CONCEPTUAL PLAN FOR SLUDGE AND SOIL
SAMPLING AT THE SEWAGE LAGOONS
HOLLOMAN AIR FORCE BASE, NM**

Prepared for:

833 CSG/DEV
Holloman Air Force Base, NM

and

HQ TAC/DEVC
Langley Air Force Base, VA

Prepared by:

Radian Corporation
Austin, TX

Under Contract with:

U.S. Army Corps of Engineers
Omaha District
Omaha, NE

28 October 1991
Revised 11 November 1991

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1.0 INTRODUCTION

Radian Corporation, under contract with the Omaha District U.S. Army Corps of Engineers (USACE), has prepared this plan for sampling sludge and soil from the sewage lagoons at Holloman Air Force Base (AFB), NM in support of the lagoon closure project. The remaining portions of this introductory section present the background and scope of the sampling program. Section 2 of this plan outlines the proposed sampling locations and techniques. A summary of the analytical methods is presented in Section 3. Section 4 contains a schedule for completion of the sampling program and submittal of analytical data.

1.1 Background

Holloman AFB submitted a Post-Closure Care Permit (PCCP) Application for the sewage lagoons in June 1991 to allow operation of the lagoons for wastewater treatment prior to final closure as hazardous waste management units. The application addresses Ponds A, B, C, D, E, F, and G, and includes a Delay-of-Closure Plan for these surface impoundments. As a condition for review of the PCCP application, the New Mexico Environment Department (NMED) is requiring a sampling and analysis program to be conducted in all impoundments downstream of Pond C, including Lakes Holloman and Stinky. These requirements, contained in a letter dated 22 May 1991, are intended to demonstrate that hazardous constituents are not present in the sludge and underlying soil at levels that would adversely impact human health and the environment.

Additional requirements were imposed on Holloman AFB by EPA Region VI in a letter dated 20 June 1991 which requested that data be collected on the total organic carbon (TOC) content of soils from borings completed adjacent to the sewage lagoons. EPA intends to use these data for fate and transport modeling to determine permissible levels of contamination in the sewage lagoons during the delay-of-closure period.

In order to adequately address the NMED and EPA requirements and to prepare an approach that can be approved without significant modifications for unknown field conditions, a preliminary investigation was conducted by Radian in October 1991 to determine the water depths and sludge thicknesses in the sewage lagoons. Results are summarized in Table 1-1. The work focused on Ponds C, D, E, F, and G, as well as Lakes Holloman and Stinky. At the time of the investigation, Lake Stinky was dry. Attachment 1 contains figures of the sewage lagoons showing each sampling location, and associated water depth and sludge thickness.

The following observations were made during the preliminary investigation:

- Sludge generally occurs in a layered fashion of brownish-red material (flocculent at the surface and more coarse with depth) grading to a soft black material high in organic matter. In all lagoons, the sludge is underlain by a grey clay (considered the natural bottom surface of the lagoons).
- There is no apparent mounding of sludge near the influent point to any lagoon, unlike the situation previously observed in Ponds A and B.

1.2 Scope and Objectives

The proposed sampling and analytical program will be structured to meet the requirements of the NMED and EPA, taking into consideration known field conditions at the present time. The sampling described in Sections 2 and 3 exceeds NMED requirements in both the number of samples and proposed analyses since results from this program will be used in part as a step toward final closure of the sewage lagoons. Specifically, the program is designed to meet the following objectives:

- Generate data needed to support review of the PCCP application; and

Table 1-1**Summary of Preliminary Investigation Results**

Pond	No. of Sample Locations	Water Depth (ft)			Sludge Thickness (in)		
		Minimum	Maximum	Average	Minimum	Maximum	Average
C	6	<2	7	4.5	Trace	10	6.5
D	8	4.5	6	5.5	0	1	Trace
E	9	4.5	6	5	4	13	10.25
F	4			5.5	6	10	7.5
G	12	1	4	3	3	8	5.5
Lake Holloman	11	1	8	5.5	4	20	6.25

- **Generate data to characterize the lagoons and provide a preliminary estimate of the nature and extent of contamination, if any, and the resulting impact on final closure scenarios.**

This conceptual plan is intended for review and approval by NMED and EPA Region VI personnel, after which time a more detailed sampling and analytical plan will be prepared to guide field activities.

2.0 PROPOSED FIELD METHODS

This section presents a brief summary of the proposed sample locations and field procedures.

2.1 Sample Locations and Depths

Based on results of the preliminary investigation summarized in Section 1.1, it is anticipated that sludge and underlying soil (0 to 2-foot below ground level [BGL] interval) will be sampled in Ponds C, E, F, G, and Lake Holloman. Although historical analytical data are available for the upper portion of Pond C, the previous work was not adequate to characterize the impoundment with respect to both the number of samples and required analyses. Therefore, this lagoon will be included in the proposed investigation. In Pond D and Lake Stinky, two successive soil samples will be collected at intervals of 0 (bottom surface) to 2 feet BGL, and 2 to 4 feet BGL. In addition, samples will be collected from a former overflow from Pond D, and the ditch leading from the Pond G outfall to Lake Holloman.

Table 2-1 shows the number and depths of samples for each lagoon and ditch. Sample locations are shown on Figures 2-1, 2-2, and 2-3. As requested by EPA Region VI, two soil borings will be completed adjacent to the sewage lagoons, one at an upgradient location near MW-1 and one downgradient near MW-3.

Sample locations are not all concentrated around the overflows (i.e., influent points) to the lagoons as previously suggested by NMED. Instead, the sample distribution within each lagoon was chosen such that a sample will be collected near each overflow to an adjacent lagoon, and the remaining samples will be distributed across the impoundment to provide the maximum information possible given 1) the limited number of samples collected and 2) the relative size of the impoundments. This strategy is considered

Table 2-1

Sludge/Soil Sample Numbers and Depths

Pond	Surface Area (ac)	No. of Samples			
		Sludge	Surface - 2 ft BGL	2 - 4 ft BGL	5-ft. Intervals to 25 ft BGL
C	21	6	6	3	
D	29	NA	6	3	
E	13	5	5	3	
F	2	2	2	1	
G	65	6	6	2	
Lake Holloman	120	7	7	2	
Lake Stinky	45	NA	3	3	
Former Overflow from Pond D	---	NA	1	1	
Ditch (Pond G to Lake Holloman)	---	3	3	---	
Upgradient Soil Boring	---				5
Downgradient Soil Boring	---				5
Total		29	39	18	10

NA - Not applicable; no sludge present.

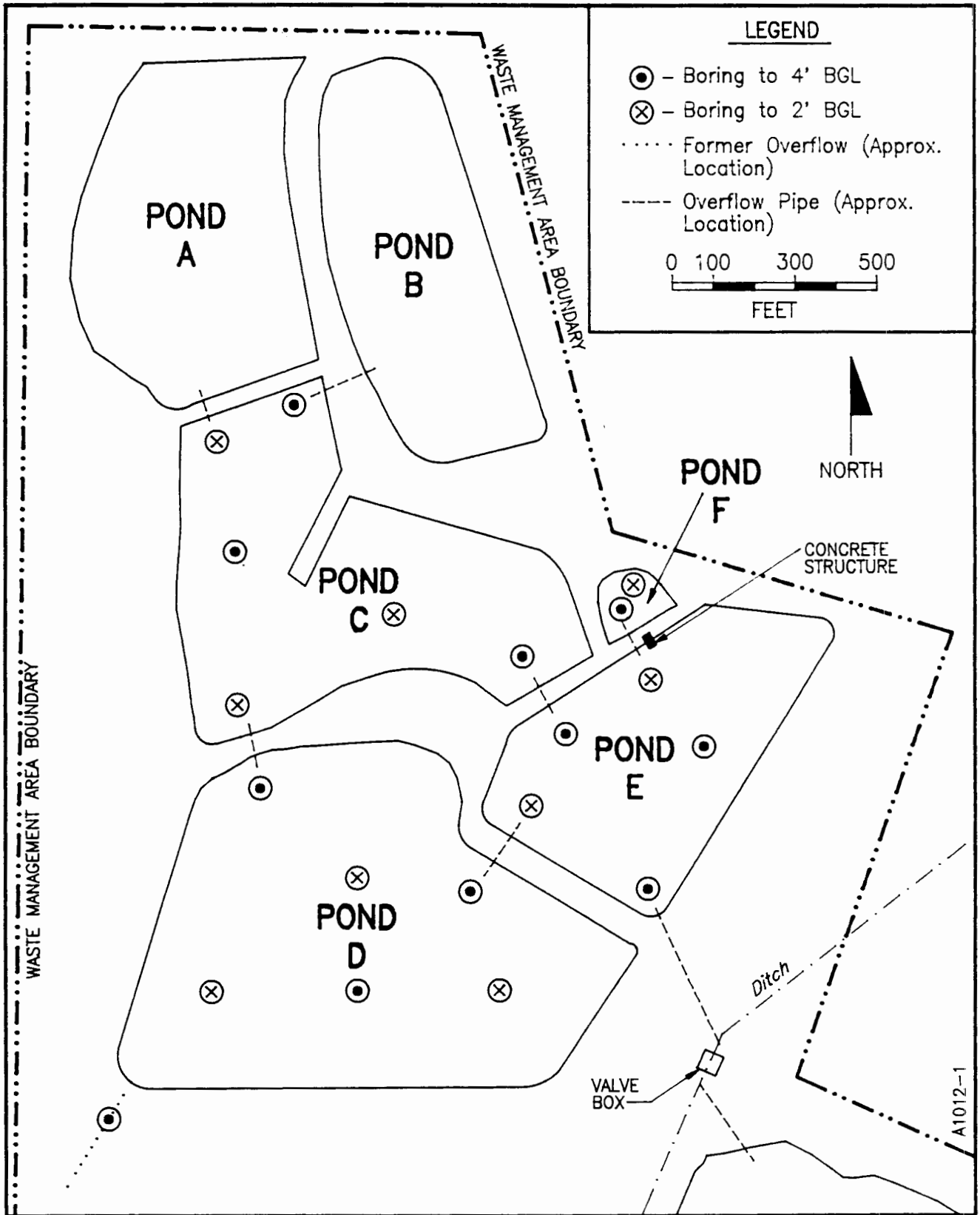


Figure 2-1. Sample Locations--Ponds C, D, E, and F

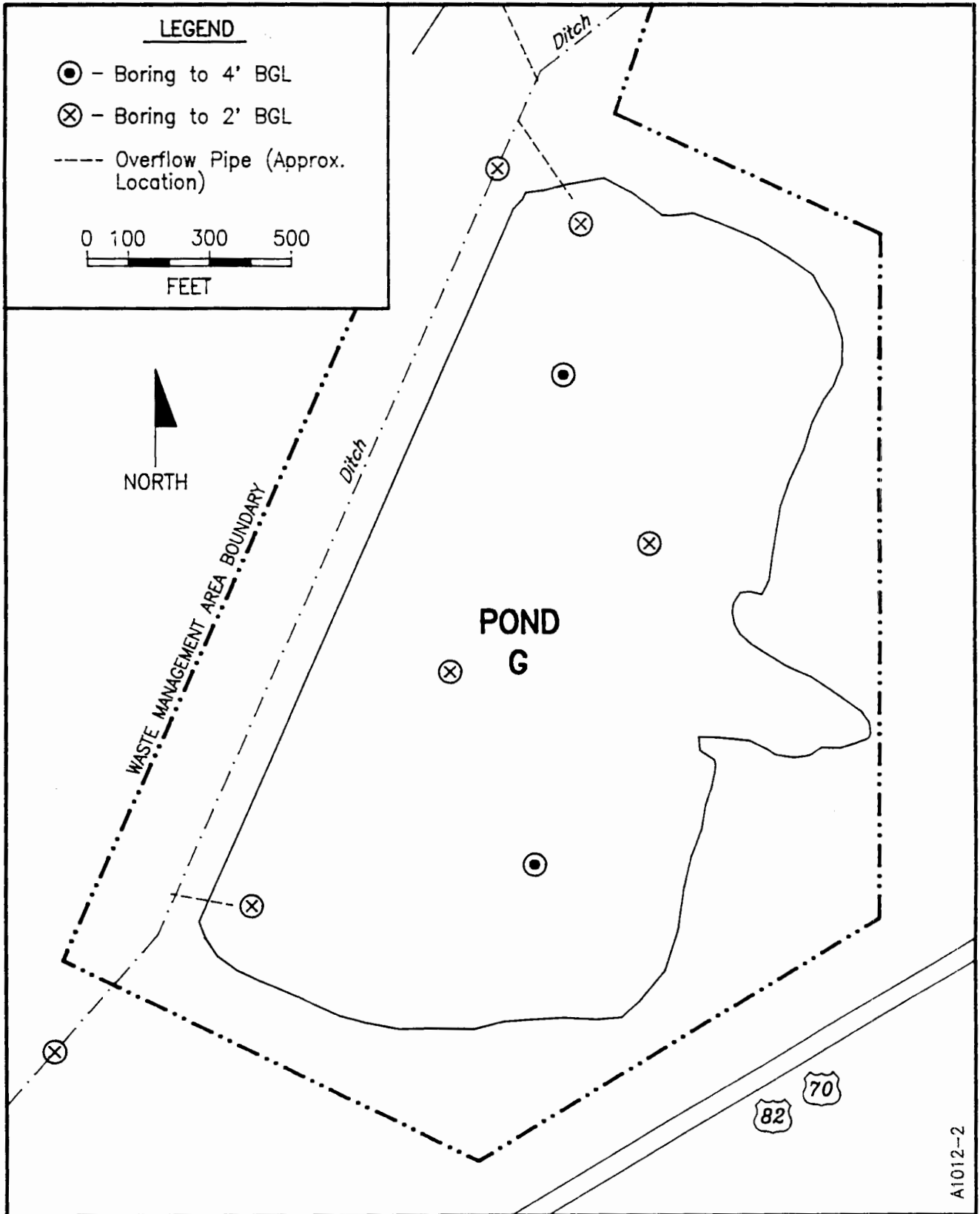


Figure 2-2. Sample Locations--Pond G

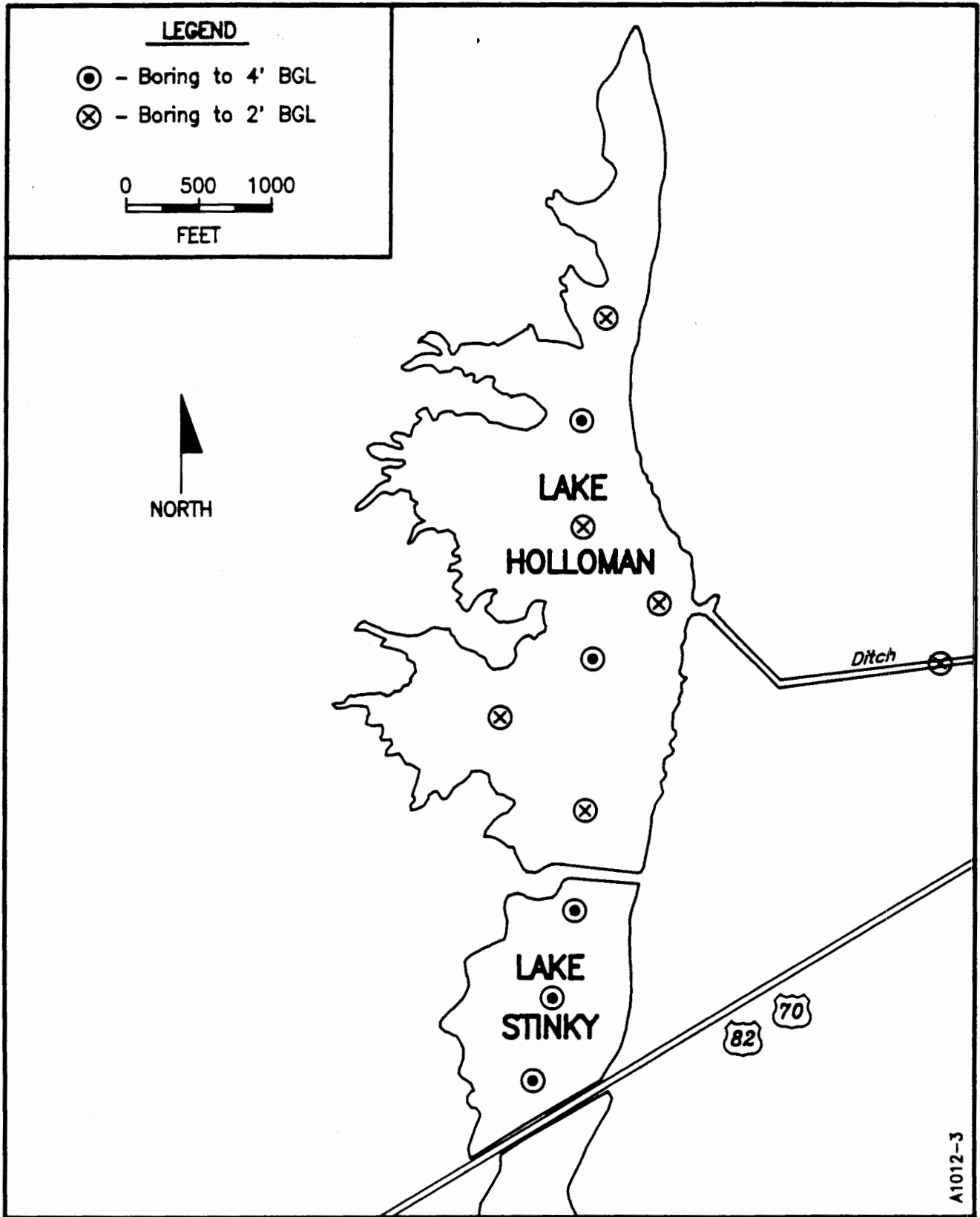


Figure 2-3. Sample Locations--Lakes Holloman and Stinky

a reasonable approach since it is not anticipated that there will be any sludge mounds or hot spots encountered in lagoons downstream of Ponds A and B.

2.2 Sample Collection Techniques

Sludge and underlying soil samples will be collected from a floating raft. Two techniques are available to obtain shallow cores from the lagoons: standard split-spoon sampling using ASTM Method D-1586, and "vibracoring." The Vibracore® technique can obtain a continuous undisturbed core (consisting of sludge and underlying soil) to depths up to 20 feet BGL. Firms identified with the Vibracore® technique experience use either a thin-walled aluminum or lexan sampling tube.

Samples will be containerized in pre-cleaned bottles. Samples for volatile organic compounds will be collected immediately upon opening each core. Samples for remaining analyses will be prepared from sludge and soil homogenized from the entire sample interval. At some sample locations, more than one sludge "core" may need to be collected to provide sufficient volume for all analyses required.

In the area adjacent to the sewage lagoons, soil borings will be completed using the hollow stem auger drilling method. Samples will be collected with a split-spoon sampler at 5-foot intervals to a depth of 25 feet BGL. All borings will be grouted after completion using a cement-bentonite mixture.

3.0 ANALYTICAL METHODS AND QUALITY CONTROL

Table 3-1 presents a summary of the analyses to be conducted on sludge and soil samples. All samples will be analyzed for Appendix IX constituents (reference 40 CFR, Part 264). Selected soil samples from the lagoons will also be analyzed for total organic carbon (TOC). Sample preparation and chemical analysis will be performed according to procedures published in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846 (USEPA, 3rd edition, September 1986).

A quality control (QC) program will be used to ensure that data quality objectives are met. Sample collection error will be controlled through the use of standard sample collection methods and field logbooks. Sample analysis error will be controlled through the use of standard analytical methods and SOPs, performed on a capable analytical system, with QC efforts as directed in the respective methods. Natural matrix errors will be estimated by standard QC methods such as matrix spikes, field duplicates, and field and trip blanks. Quality control procedures to control the analytical system will include the following:

- Analysis of method blanks;
- Calibration checks;
- Analysis of surrogate standards; and
- Analysis of standard reference materials.

The following procedures will be used to estimate the precision and accuracy of the methods used for the sample matrices being analyzed:

- Analysis of duplicate samples; and
- Analysis of samples spiked with a known concentration of analyte.

Table 3-1

Sludge/Soil Samples and Corresponding Analyses

Location and Sample Interval	Analyses/No. of Samples	
	Appendix IX ¹	TOC ²
Pond C		
Sludge	6	---
Soil, 0-2 ft BGL	6	1
Soil, 2-4 ft BGL	3	1
Pond D		
Soil, 0-2 ft BGL	6	1
Soil, 2-4 ft BGL	3	1
Pond E		
Sludge	5	---
Soil, 0-2 ft BGL	5	1
Soil, 2-4 ft BGL	3	1
Pond F		
Sludge	2	---
Soil, 0-2 ft BGL	2	1
Soil, 2-4 ft BGL	1	1
Pond G		
Sludge	6	---
Soil, 0-2 ft BGL	6	1
Soil, 2-4 ft BGL	2	1
Lake Holloman		
Sludge	7	---
Soil, 0-2 ft BGL	7	1
Soil, 2-4 ft BGL	2	1

Table 3-1
(Continued)

Location and Sample Interval	Analyses/No. of Samples	
	Appendix IX ¹	TOC ²
Lake Stinky		
Soil, 0-2 ft BGL	3	1
Soil, 2-4 ft BGL	3	1
Former Overflow from Pond D		
Soil, 0-2 ft BGL	1	---
Soil, 2-4 ft BGL	1	---
Ditch (Pond G to Lake Holloman)		
Sludge	3	---
Soil, 0-2 ft BGL	3	---
Soil Borings	2	10
Total	88	24

¹ Reference 40 CFR, Part 264.

² Total organic carbon.

The QA/QC program will follow procedures established in SW-846, applicable laboratory Standard Operating Procedures (SOPs), and requirements of the State of New Mexico Hazardous and Radioactive Materials Bureau (reference "Components of an Adequate Laboratory Quality Assurance/Quality Control Plan").

4.0 DATA REPORTING AND SCHEDULE

While the number of samples proposed in this plan does not represent a "statistically valid" sampling scheme, the resulting data will meet the objectives of this project and will provide an indication of the level of contamination present in the lagoons. Several data analysis methods (e.g., SW-846 Chapter 9 or geostatistics) are available to determine whether additional sampling will be required.

The following preliminary schedule is proposed for this work. The estimated six month project duration does not account for delays and/or contingencies.

Activity	Cumulative Duration (weeks)
Approval of conceptual plan by NMED/EPA Region VI	--
Finalize project scope and contract negotiations	3
Prepare detailed project plans (sampling and analysis health and safety) and NMED/EPA Region VI approval of plans	8
Field work	11
Analytical turnaround time	17
Data validation and reporting	23
Submit data to NMED/EPA Region VI	24

ATTACHMENT 1

**Water Depths and Sludge Thicknesses
in Sewage Lagoons
(Measured October 1991)**

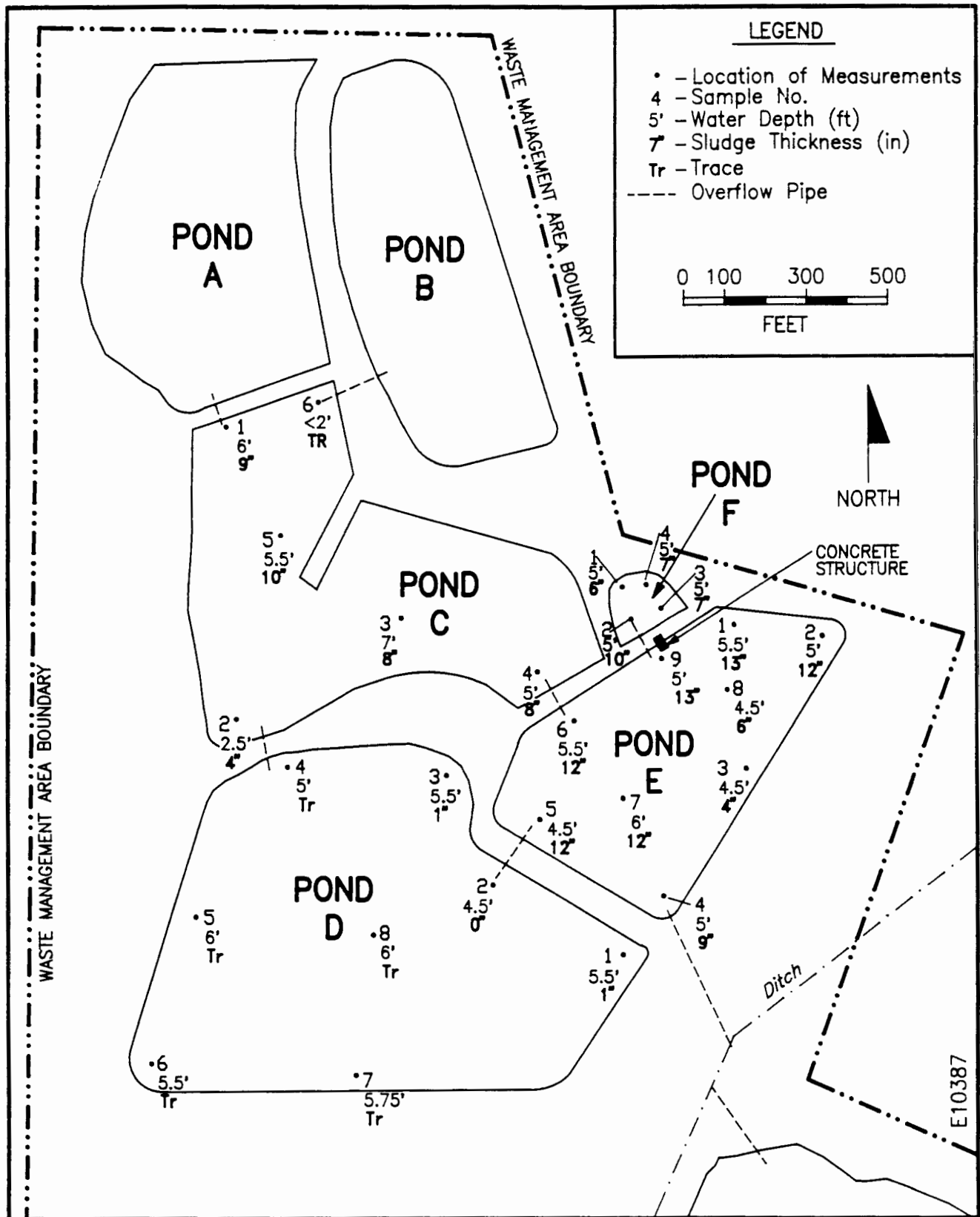


Figure 1. Sample Locations--Ponds C, D, E, and F

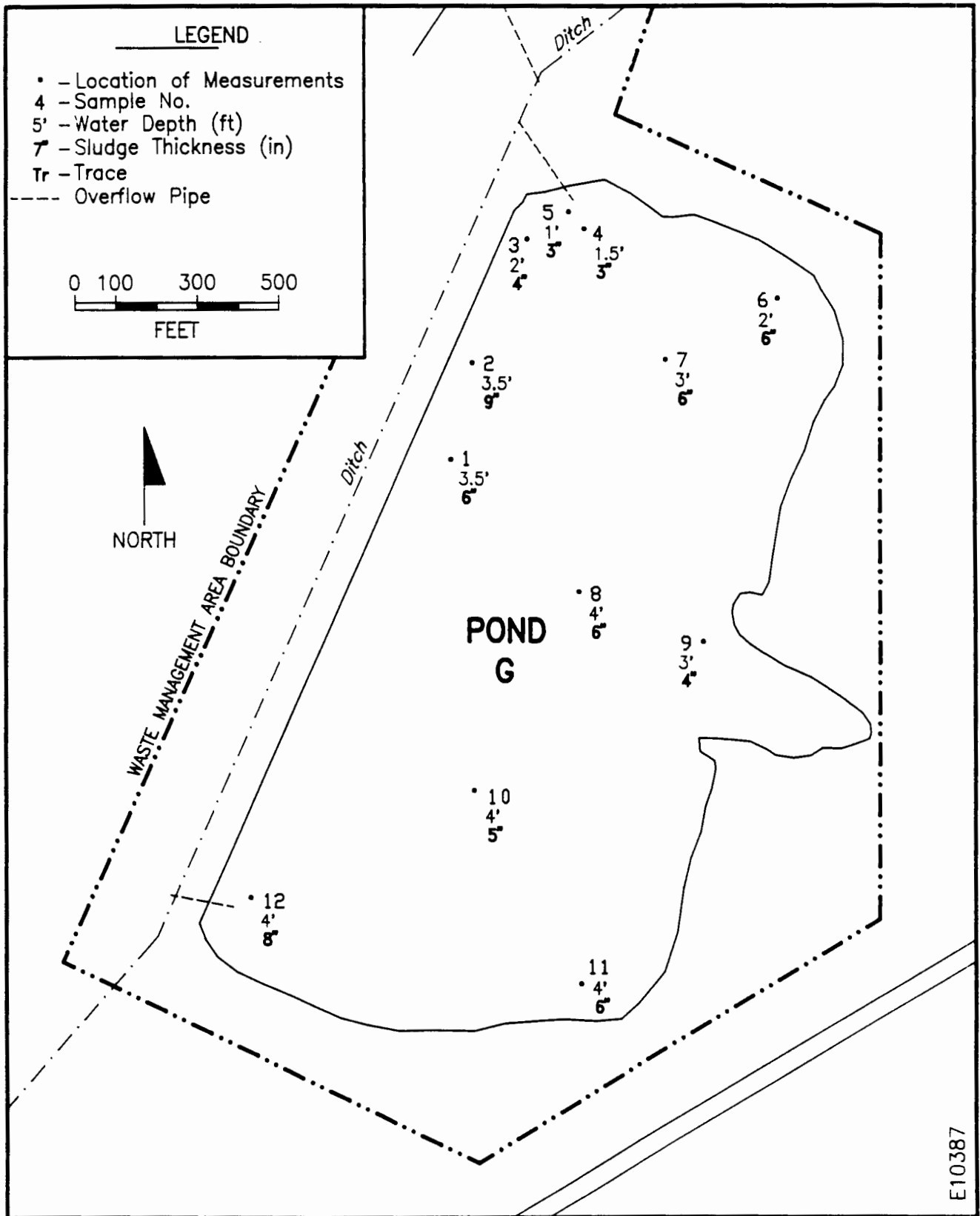


Figure 2. Sample Locations--Pond G

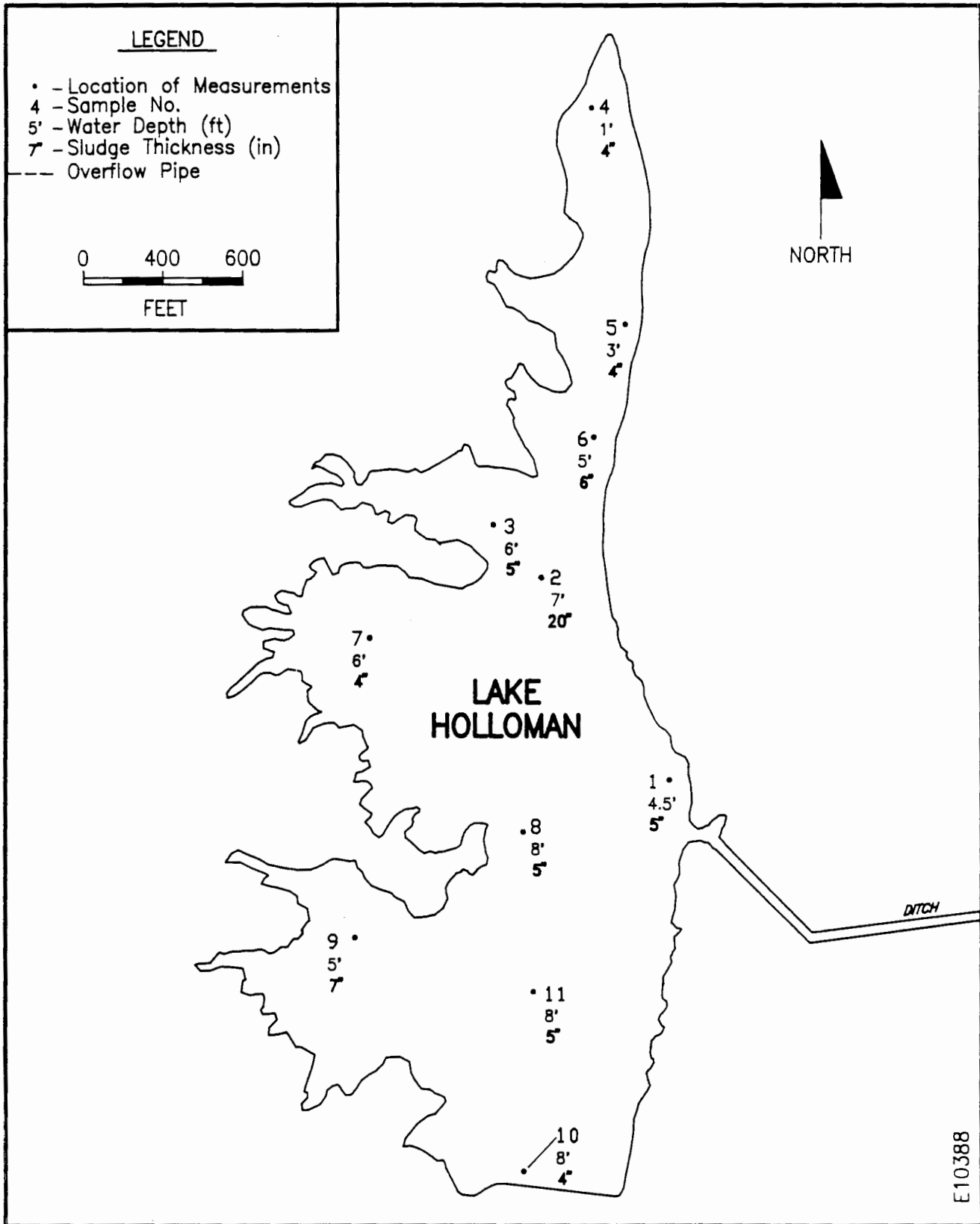


Figure 3. Sample Locations--Lake Holloman