RMT
Integrated Environmental Solutions

100 Verdae Blvd. 29607-3825
P.O. Box 16778 29606-6778
Greenville, SC
Telephone: 864-281-0030
Fax: 864-281-0288

Carmen Johnson
Fac/Perm/Co ID# 94-01 Date 5/14/12 Doc ID# DIN

May 2, 2000

Ms. Cheryl Marks
NC DENR-Division of Waste Management
Solid Waste Section
Mail Service Center 1646
Raleigh, NC 27699-1646

MAY 2000 Solid Waste Section

Subject: Response to NC DENR's April 6, 2000, Comment to the Weyerhaeuser No. 3 Landfill Permit Application

Dear Ms. Marks:

Enclosed is RMT North Carolina, Inc.'s (RMT) and Weyerhaeuser Company's (Weyerhaeuser) response to the questions that you submitted in your April 6, 2000 letter to Wynne Shaw. Your questions and our responses are as follows:

- **Page 1 of Section 1 in Appendix B refers to the Department as "the Department of Human Resources".**

  The text on page 1 of Section 1 in Appendix B has been revised. The Department is now referred to as "North Carolina Department of Environment and Natural Resources". A replacement for page 1 is enclosed.

- **The historical water level summary has been updated, however; the identifiers of the observation points do not match the identifiers on the drawings. Please provide a key to place in front of the updated table so that the LFO and LF can be readily correlated to the drawings.**

  A cover sheet providing a key to the well names, along with a copy of the table, is enclosed.

- **Copies of boring logs for monitoring well 6A and observation wells 8, 9, 10, 11, 12, 13, 14, and 15 were omitted from the response.**

  Boring logs for these wells are enclosed.

- **Appendix C includes two borings B-201 and B-202. Where are these boring locations?**

  Enclosed is revised Drawing 510101-C02, Construction Plan Application – Landfill No. 3, Data Point Location Map. The two borings are shown near the east central portion of the site.

- **Page one, Appendix O, states that on a field collection sheet, the following will be included; the project, date, time, sampler's initials, site contact, conductivity, well depth, temperature, water level, and gallons purged. Please update this statement to include pH.**

  Appendix O has been modified. A revised Appendix O is enclosed. The statement has been updated to include pH.

- **Appendix O states "Dedicated tubing will be placed in a separate, clean bag with a well number written on the outside. The tubing will be stored and reused for each specific well during the next sampling event." Will this tubing be decontaminated prior to the next sampling event?**

  It has been decided that the monitoring wells will be sampled using dedicated QED low flow purge system bladder pumps (or equivalent). Therefore, dedicated tubing will not be removed from the well between sampling events. Appendix O has been revised to reflect this change in the sampling procedures. The revised Appendix O is enclosed.

- **Since the response states that the pumps and water level meters will remain in the wells, the statement on page 2, Appendix O needs to be corrected. It states "Any dedicated equipment hanging in the well will be removed and placed on a clean surface and covered with clean plastic."**

  Appendix O has been revised and the referenced statement has been removed. The revised Appendix O is enclosed.

- **If water level meters will remain in the wells, explain the necessity of the electronic water level indicator for the wells fitted with the pumps and water level meters.**

  The text has been revised to state that the dedicated water level indicators will be used to measure water levels. The text also allows for the use of non-dedicated water level indicators and pressure transducers as an alternative when the dedicated water level indicators are not available. The revised Appendix O is enclosed.

- **Please note that North Carolina does not allow filtering of water samples.**

  Comment noted.

- **Which monitoring wells will be fitted with the QED brand environmental low flow purge system dedicated bladder pumps and water level meters? Include this information in the Sampling and Analysis Procedures for Groundwater.**

  Monitoring wells MW-1, MW-1A, MW-2, MW-3, MW-4, MW-5, MW-6, MW-6A, MW-7, MW-8, MW-9, MW-10, MW-11, and MW-12 will be equipped with the dedicated QED sampling pump (or equivalent) and water level indicator. Appendix O has been revised to reflect this. The revised Appendix O is enclosed.

We hope that this provides the information needed. If you have questions or comments, please contact this office.

Sincerely,

RMT North Carolina, Inc.

for R. Kent Nilsson, PE
Project Manager

RMT, Inc.

Dan O. Madison, Jr., PG
Consulting Hydrogeologist

Enclosures

cc: Andy Sweatt, Tracy Coleman, Joe Kloeker, John Gray, Bill Morris – Weyerhaeuser
Kathy Huibregtse – RMT
RMT Central Files – 00-05101.01

Replacement Page 1 to Appendix B

Section 1

INTRODUCTION

1.1 Background

The Weyerhaeuser Company Plymouth Mill maintains a State-permitted landfill for the disposal of boiler ash and process wastes. The landfill is located on Weyerhaeuser-owned property adjacent to the mill in Plymouth, North Carolina, as shown on Figure 1. A five-year permit to complete a vertical expansion for the existing landfill was recently obtained.

Weyerhaeuser is currently developing plans for a new landfill that will be located adjacent to the existing facility, as shown on Plate 1. The first step in the permitting process, approval of the site for use as a landfill, was granted by the North Carolina Department of Environment and Natural Resources (NCDENR) as part of Solid Waste Management, Permit No. 94-01. Weyerhaeuser is in the process of preparing the second part of a North Carolina landfill permit which is the construction plan application.

RMT, Inc., has been retained by Weyerhaeuser to investigate subsurface conditions on the site to provide baseline data for use in the development of the construction plan application. A Preliminary Site Characterization was conducted during the summer of 1989. In April 1990, Phase 2 of the Site Characterization was conducted to provide the subsurface data needed to design the new landfill.

1.2 Objectives of Investigation

The objectives of the field investigation were as follows:

- Characterize the geologic and hydrologic conditions of the proposed landfill site to provide engineering design criteria and to meet the requirements of NCAC 10G.0504(1)(c), and
- Determine the following on-site soils characteristics:
  - Permeability,
  - Settlement,
  - Construction/compaction properties, and
  - Borrow potential for liner and cover material.

Cover Page and Water Level Tables

Historical Water Level Tables
No. 2 and Proposed No. 3 Landfills
Weyerhaeuser Company, Plymouth, North Carolina

The attached tables summarize historical groundwater elevations for monitoring wells MW-1, MW-1A, MW-2, MW-3, MW-4, MW-5, MW-6, MW-6A, MW-7, and MW-8, and for observation wells OW-1 through OW-15. These wells are located at the Weyerhaeuser No. 2 Landfill and the proposed location for the No. 3 Landfill.

Please note that the tables identify the wells as LF and LFO. LF refers to landfill wells and are the same as MW (monitoring well) identified on drawings and in text in the Permit Application for the proposed No. 3 Landfill. LFO refers to landfill observation wells and are the same as OW (observation well) identified in the Permit Application.

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 8/16/89	Water Level Elevation[2] 8/16/89	Depth to Water[1] 1/14/90	Water Level Elevation[2] 1/14/90	Depth to Water[1] 8/16/90	Water Level Elevation[2] 8/16/90	Depth to Water[1] 11/20/90	Water Level Elevation[2] 11/20/90
LF-01	37.59	4	33.59	NM	NM	7.91	29.68	11.42	26.17
LF-01A	37.62	NM	NM	NM	NM	NM	NM	31.54	6.08
LF-02	27.68	20.33	7.35	NM	NM	21.79	5.89	21.58	6.1
LF-03	10.7	5.92	4.78	NM	NM	6.12	4.58	6.12	4.58
LF-04	12.09	7.79	4.3	NM	NM	8.75	3.34	8.13	3.96
LF-05	39.16	12.17	26.99	NM	NM	13.2	25.96	13.46	25.7
LF-06	14.02	10	4.02	NM	NM	11.5	2.52	10.58	3.44
LF-06A	14.05	NM	NM	NM	NM	NM	NM	10.08	3.97
LF-07	36.33	6.96	29.37	NM	NM	10.83	25.5	11.17	25.16
LF-08	36.19	NM	NM	NM	NM	NM	NM	29.71	6.48
LFO-01	36.98	NM	NM	NM	NM	NM	NM	NM	NM
LFO-02	33.83	NM	NM	NM	NM	NM	NM	NM	NM
LFO-03	45.58	NM	NM	NM	NM	NM	NM	NM	NM
LFO-04	36.95	NM	NM	NM	NM	NM	NM	NM	NM
LFO-05	34.1	NM	NM	NM	NM	NM	NM	NM	NM
LFO-06	34.27	NM	NM	23.75	10.52	NM	NM	NM	NM
LFO-07	24.47	NM	NM	NM	NM	NM	NM	NM	NM
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

(1) - Measured in feet below top of casing

(2) -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 12/14/90	Water Level Elevation[2] 12/14/90	Depth to Water[1] 1/14/91	Water Level Elevation[2] 1/14/91	Depth to Water[1] 2/14/91	Water Level Elevation[2] 2/14/91	Depth to Water[1] 3/20/91	Water Level Elevation[2] 3/20/91
LF-01	37.59	8.88	28.71	8.17	29.42	6.21	31.38	5.42	32.17
LF-01A	37.62	28.5	9.12	28.42	9.2	28	9.62	27.67	9.95
LF-02	27.68	21.71	5.97	21.5	6.18	21.21	6.47	21.13	6.55
LF-03	10.7	6.21	4.49	5.92	4.78	5.96	4.74	5.83	4.87
LF-04	12.09	8.17	3.92	7.75	4.34	7.5	4.59	7.33	4.76
LF-05	39.16	13.67	25.49	13.33	25.83	13.25	25.91	14.25	24.91
LF-06	14.02	10.58	3.44	10.17	3.85	10	4.02	10	4.02
LF-06A	14.05	10.08	3.97	9.83	4.22	9.58	4.47	9.51	4.54
LF-07	36.33	11.17	25.16	10.75	25.58	9.75	26.58	9.92	26.41
LF-08	36.19	29.46	6.73	29.67	6.52	29.33	6.86	29.25	6.94
LFO-01	36.98	29.13	7.85	29.08	7.9	28.75	8.23	28.5	8.48
LFO-02	33.83	Dry	Dry	Dry	Dry	11.04	22.79	11.25	22.58
LFO-03	45.58	20.79	24.79	21.08	24.5	21.25	24.33	21.33	24.25
LFO-04	36.95	15	21.95	15	21.95	14.71	22.24	14.67	22.28
LFO-05	34.1	16.5	17.6	14.42	19.68	13.83	20.27	Dry	Dry
LFO-06	34.27	23.75	10.52	NM	NM	NM	NM	20.33	13.94
LFO-07	24.47	19.21	5.26	19	5.47	18.92	5.55	18.88	5.59
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 4/2/93	Water Level Elevation[2] 4/2/93	Depth to Water[1] 6/4/93	Water Level Elevation[2] 6/4/93	Depth to Water[1] 8/17/93	Water Level Elevation[2] 8/17/93	Depth to Water[1] 9/20/93	Water Level Elevation[2] 9/20/93
LF-01	37.59	2.92	34.67	6.21	31.38	8.29	29.3	8.88	28.71
LF-01A	37.62	23.79	13.83	25.54	12.08	27.54	10.08	28.25	9.37
LF-02	27.68	18.88	8.8	20.12	7.56	21.46	6.22	21.79	5.89
LF-03	10.7	5.78	4.92	5.79	4.91	6.29	4.41	6.33	4.37
LF-04	12.09	6.85	5.24	7.46	4.63	8.15	3.94	8.29	3.8
LF-05	39.16	10.54	28.62	11.46	27.7	12.67	26.49	13.17	25.99
LF-06	14.02	8.08	5.94	10.21	3.81	10.94	3.08	11	3.02
LF-06A	14.05	8.37	5.68	9.54	4.51	10.38	3.67	10.37	3.68
LF-07	36.33	5.92	30.41	9.38	26.95	11.58	24.75	11.75	24.58
LF-08	36.19	26.83	9.36	27.88	8.31	29.25	6.94	29.67	6.52
LFO-01	36.98	25.5	11.48	26.65	10.33	28.33	8.65	28.92	8.06
LFO-02	33.83	3.73	30.1	7.92	25.91	Dry	Dry	Dry	Dry
LFO-03	45.58	Dry	Dry	NM	NM	19.83	25.75	20.44	25.14
LFO-04	36.95	12.12	24.83	13.6	23.35	14.33	22.62	14.67	22.28
LFO-05	34.1	12.92	21.18	13.9	20.2	14.38	19.72	Dry	Dry
LFO-06	34.27	18.35	15.92	17.67	16.6	18.75	15.52	19.08	15.19
LFO-07	24.47	17.71	6.76	18.42	6.05	18.96	5.51	19.17	5.3
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 10/14/93	Water Level Elevation[2] 10/14/93	Depth to Water[1] 11/29/93	Water Level Elevation[2] 11/29/93	Depth to Water[1] 12/22/93	Water Level Elevation[2] 12/22/93	Depth to Water[1] 1/10/94	Water Level Elevation[2] 1/10/94
LF-01	37.59	9.25	28.34	9	28.59	8.27	29.32	8.12	29.47
LF-01A	37.62	28.5	9.12	28.45	9.17	28.33	9.29	28.69	8.93
LF-02	27.68	21.83	5.85	21.66	6.02	NM	NM	22.04	5.64
LF-03	10.7	6.38	4.32	6.17	4.53	NM	NM	6.5	4.2
LF-04	12.09	8.5	3.59	8.08	4.01	NM	NM	8.38	3.71
LF-05	39.16	13.33	25.83	13.42	25.74	NM	NM	14.11	25.05
LF-06	14.02	10.88	3.14	10.5	3.52	NM	NM	10.63	3.39
LF-06A	14.05	10.33	3.72	10	4.05	NM	NM	10.25	3.8
LF-07	36.33	12.12	24.21	11.96	24.37	11.54	24.79	12.02	24.31
LF-08	36.19	29.83	6.36	29.69	6.5	29.54	6.65	30.07	6.12
LFO-01	36.98	29.12	7.86	29.04	7.94	28.94	8.04	29.38	7.6
LFO-02	33.83	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
LFO-03	45.58	20.75	24.83	21.27	24.31	21.27	24.31	22.25	23.33
LFO-04	36.95	14.88	22.07	14.88	22.07	9.79	27.16	15.25	21.7
LFO-05	34.1	14.88	19.22	13.88	20.22	13.6	20.5	14.01	20.09
LFO-06	34.27	19.29	14.98	19.46	14.81	19.44	14.83	19.81	14.46
LFO-07	24.47	19.29	5.18	19.04	5.43	19.83	4.64	19.38	5.09
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 2/22/94	Water Level Elevation[2] 2/22/94	Depth to Water[1] 5/23/94	Water Level Elevation[2] 5/23/94	Depth to Water[1] 6/21/94	Water Level Elevation[2] 6/21/94	Depth to Water[1] 7/27/94	Water Level Elevation[2] 7/27/94
LF-01	37.59	5.53	32.06	7.05	30.54	7.96	29.63	9	28.59
LF-01A	37.62	27.8	9.82	27.3	10.32	27.93	9.69	28.57	9.05
LF-02	27.68	21.35	6.33	21.62	6.06	22	5.68	22.49	5.19
LF-03	10.7	6.4	4.3	6.75	3.95	6.9	3.8	7.12	3.58
LF-04	12.09	8.05	4.04	8.71	3.38	8.71	3.38	8.99	3.1
LF-05	39.16	13.12	26.04	13.41	25.75	13.72	25.44	14.15	25.01
LF-06	14.02	10.6	3.42	11.22	2.8	11.5	2.52	11.85	2.17
LF-06A	14.05	10.08	3.97	10.55	3.5	10.9	3.15	11.27	2.78
LF-07	36.33	11.05	25.28	11.93	24.4	11.74	24.59	14.49	21.84
LF-08	36.19	29.5	6.69	29.43	6.76	29.44	6.75	30.25	5.94
LFO-01	36.98	28.8	8.18	28.45	8.53	28.45	8.53	29.41	7.57
LFO-02	33.83	13.45	20.38	14.75	19.08	Dry	Dry	Dry	Dry
LFO-03	45.58	22.37	23.21	21.75	23.83	21.34	24.24	21.71	23.87
LFO-04	36.95	14.75	22.2	14.85	22.1	15.14	21.81	14.42	22.53
LFO-05	34.1	14.05	20.05	14.8	19.3	14.72	19.38	15	19.1
LFO-06	34.27	18.83	15.44	19.12	15.15	19.5	14.77	19.93	14.34
LFO-07	24.47	19.2	5.27	19.3	5.17	19.58	4.89	19.87	4.6
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

(1) - Measured in feet below top of casing

(2) -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 10/20/94	Water Level Elevation[2] 10/20/94	Depth to Water[1] 2/28/95	Water Level Elevation[2] 2/28/95	Depth to Water[1] 1/26/96	Water Level Elevation[2] 1/26/96	Depth to Water[1] 10/7/96	Water Level Elevation[2] 10/7/96
LF-01	37.59	7.95	29.64	4.92	32.67	7.05	30.54	5.9	31.69
LF-01A	37.62	28.72	8.9	27.26	10.36	28.1	9.52	26.55	11.07
LF-02	27.68	22.39	5.29	21.08	6.6	21.84	5.84	20.94	6.74
LF-03	10.7	6.95	3.75	6.32	4.38	NM	NM	6.2	4.5
LF-04	12.09	8.72	3.37	7.96	4.13	8.24	3.85	7.79	4.3
LF-05	39.16	14.04	25.12	13.44	25.72	13.75	25.41	12.85	26.31
LF-06	14.02	11.14	2.88	10.33	3.69	10.67	3.35	10.32	3.7
LF-06A	14.05	10.69	3.36	9.78	4.27	10.29	3.76	9.8	4.25
LF-07	36.33	12.7	23.63	11.05	25.28	12.37	23.96	10.91	25.42
LF-08	36.19	29.81	6.38	28.82	7.37	29.66	6.53	28.55	7.64
LFO-01	36.98	29.55	7.43	28.63	8.35	29.08	7.9	28.92	8.06
LFO-02	33.83	Dry	Dry	12.23	21.6	13.92	19.91	14.3	19.53
LFO-03	45.58	22.5	23.08	22.74	22.84	20.62	24.96	21.38	24.2
LFO-04	36.95	15.75	21.2	15.12	21.83	16.27	20.68	NM	NM
LFO-05	34.1	14.12	19.98	13.72	20.38	14.3	19.8	14.35	19.75
LFO-06	34.27	19.55	14.72	18.48	15.79	18.14	16.13	18.08	16.19
LFO-07	24.47	19.69	4.78	19.15	5.32	13	11.47	19.08	5.39
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 11/5/96	Water Level Elevation[2] 11/5/96	Depth to Water[1] 12/4/96	Water Level Elevation[2] 12/4/96	Depth to Water[1] 1/8/97	Water Level Elevation[2] 1/8/97	Depth to Water[1] 2/5/97	Water Level Elevation[2] 2/5/97
LF-01	37.59	4.65	32.94	5.96	31.63	4.25	33.34	4.38	33.21
LF-01A	37.62	26.06	11.56	26.47	11.15	26.13	11.49	25.9	11.72
LF-02	27.68	20.73	6.95	21	6.68	19.69	7.99	20.61	7.07
LF-03	10.7	6.12	4.58	6.22	4.48	6.04	4.66	6.02	4.68
LF-04	12.09	7.85	4.24	7.85	4.24	7.73	4.36	7.74	4.35
LF-05	39.16	12.65	26.51	12.58	26.58	12.25	26.91	12.28	26.88
LF-06	14.02	10.32	3.7	10.53	3.49	10.3	3.72	10.38	3.64
LF-06A	14.05	9.73	4.32	9.94	4.11	9.71	4.34	9.72	4.33
LF-07	36.33	10	26.33	10.03	26.3	9.3	27.03	9.03	27.3
LF-08	36.19	28.29	7.9	28.5	7.69	28.26	7.93	28.07	8.12
LFO-01	36.98	27.51	9.47	27.82	9.16	27.52	9.46	27.3	9.68
LFO-02	33.83	NM	NM	12.77	21.06	11.52	22.31	11.08	22.75
LFO-03	45.58	NM	NM	20.56	25.02	20.72	24.86	20.39	25.19
LFO-04	36.95	14.87	22.08	14.97	21.98	14.74	22.21	14.63	22.32
LFO-05	34.1	14.29	19.81	14.58	19.52	14.26	19.84	14.47	19.63
LFO-06	34.27	18.39	15.88	19.14	15.13	19.27	15	19.3	14.97
LFO-07	24.47	18.97	5.5	19.02	5.45	18.88	5.59	18.87	5.6
LFO-08	36.63	NM	NM	NM	NM	NM	NM	NM	NM
LFO-09	33.67	NM	NM	NM	NM	NM	NM	NM	NM
LFO-10	38.88	NM	NM	NM	NM	NM	NM	NM	NM
LFO-11	39.52	NM	NM	NM	NM	NM	NM	NM	NM
LFO-12	39.44	NM	NM	NM	NM	NM	NM	NM	NM
LFO-13	38.96	NM	NM	NM	NM	NM	NM	NM	NM
LFO-14	39.89	NM	NM	NM	NM	NM	NM	NM	NM
LFO-15	41.61	NM	NM	NM	NM	NM	NM	NM	NM

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 3/6/97	Water Level Elevation[2] 3/6/97	Depth to Water[1] 4/4/97	Water Level Elevation[2] 4/4/97	Depth to Water[1] 5/9/97	Water Level Elevation[2] 5/9/97	Depth to Water[1] 6/5/97	Water Level Elevation[2] 6/5/97
LF-01	37.59	4.31	33.28	4.71	32.88	5.21	32.38	6.54	31.05
LF-01A	37.62	25.91	11.71	25.9	11.72	26.08	11.54	26.74	10.88
LF-02	27.68	20.57	7.11	20.51	7.17	20.59	7.09	21.13	6.55
LF-03	10.7	5.96	4.74	5.99	4.71	6.03	4.67	6.34	4.36
LF-04	12.09	7.65	4.44	7.68	4.41	7.68	4.41	8.07	4.02
LF-05	39.16	12.2	26.96	12.19	26.97	12.29	26.87	12.8	26.36
LF-06	14.02	10.4	3.62	10.35	3.67	10.43	3.59	10.78	3.24
LF-06A	14.05	9.73	4.32	9.72	4.33	9.81	4.24	10.17	3.88
LF-07	36.33	8.65	27.68	5.83	30.5	9.01	27.32	9.82	26.51
LF-08	36.19	28.08	8.11	28.02	8.17	28.05	8.14	28.57	7.62
LFO-01	36.98	27.31	9.67	27.25	9.73	NM	NM	27.86	9.12
LFO-02	33.83	11.28	22.55	11.92	21.91	NM	NM	Dry	Dry
LFO-03	45.58	20.15	25.43	20.14	25.44	NM	NM	20.66	24.92
LFO-04	36.95	14.51	22.44	14.43	22.52	NM	NM	14.68	22.27
LFO-05	34.1	14.31	19.79	14.29	19.81	NM	NM	14.3	19.8
LFO-06	34.27	19.44	14.83	19.23	15.04	NM	NM	19.38	14.89
LFO-07	24.47	18.83	5.64	18.8	5.67	NM	NM	19.04	5.43
LFO-08	36.63	NM	NM	NM	NM	7.33	29.3	9.18	27.45
LFO-09	33.67	NM	NM	NM	NM	3.93	29.74	4.57	29.1
LFO-10	38.88	NM	NM	NM	NM	5.65	33.23	7.1	31.78
LFO-11	39.52	NM	NM	NM	NM	6.74	32.78	8.31	31.21
LFO-12	39.44	NM	NM	NM	NM	7.79	31.65	9.41	30.03
LFO-13	38.96	NM	NM	NM	NM	8.24	30.72	9.51	29.45
LFO-14	39.89	NM	NM	NM	NM	10.57	29.32	11.41	28.48
LFO-15	41.61	NM	NM	NM	NM	15.25	26.36	15.57	26.04

(1) - Measured in feet below top of casing

(2) -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 7/8/97	Water Level Elevation[2] 7/8/97	Depth to Water[1] 8/5/97	Water Level Elevation[2] 8/5/97	Depth to Water[1] 9/9/97	Water Level Elevation[2] 9/9/97	Depth to Water[1] 10/7/97	Water Level Elevation[2] 10/7/97
LF-01	37.59	8.1	29.49	8.28	29.31	9.07	28.52	8.93	28.66
LF-01A	37.62	27.58	10.04	27.99	9.63	28.46	9.16	28.55	9.07
LF-02	27.68	21.73	5.95	21.98	5.7	22.22	5.46	22.08	5.6
LF-03	10.7	6.71	3.99	6.76	3.94	6.92	3.78	6.9	3.8
LF-04	12.09	8.44	3.65	8.55	3.54	8.71	3.38	8.57	3.52
LF-05	39.16	13.43	25.73	13.64	25.52	13.78	25.38	13.82	25.34
LF-06	14.02	11.36	2.66	11.44	2.58	11.53	2.49	11.21	2.81
LF-06A	14.05	10.77	3.28	10.84	3.21	10.99	3.06	10.69	3.36
LF-07	36.33	10.52	25.81	11.03	25.3	11.69	24.64	11.86	24.47
LF-08	36.19	29.1	7.09	29.33	6.86	29.65	6.54	29.62	6.57
LFO-01	36.98	28.51	8.47	28.82	8.16	29.22	7.76	29.25	7.73
LFO-02	33.83	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
LFO-03	45.58	20.93	24.65	21.23	24.35	21.61	23.97	21.87	23.71
LFO-04	36.95	15.09	21.86	15.27	21.68	15.47	21.48	15.48	21.47
LFO-05	34.1	14.97	19.13	15.06	19.04	15.22	18.88	14.89	19.21
LFO-06	34.27	20.07	14.2	20.39	13.88	20.58	13.69	20.48	13.79
LFO-07	24.47	19.32	5.15	19.39	5.08	19.58	4.89	14.47	10
LFO-08	36.63	10.43	26.2	10.8	25.83	11.53	25.1	11.6	25.03
LFO-09	33.67	5.82	27.85	6.1	27.57	7.14	26.53	4.07	29.6
LFO-10	38.88	8.58	30.3	8.81	30.07	8.76	30.12	8.32	30.56
LFO-11	39.52	10.3	29.22	10.98	28.54	11.41	28.11	11.47	28.05
LFO-12	39.44	10.8	28.64	11.45	27.99	12.03	27.41	12.26	27.18
LFO-13	38.96	10.93	28.03	11.78	27.18	12.47	26.49	12.64	26.32
LFO-14	39.89	12.53	27.36	13.18	26.71	13.77	26.12	13.98	25.91
LFO-15	41.61	16.06	25.55	16.48	25.13	16.97	24.64	17.22	24.39

(1) - Measured in feet below top of casing

(2) -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 11/4/97	Water Level Elevation[2] 11/4/97	Depth to Water[1] 12/10/98	Water Level Elevation[2] 12/10/98	Depth to Water[1] 4/17/98	Water Level Elevation[2] 4/17/98	Depth to Water[1] 9/11/98	Water Level Elevation[2] 9/11/98
LF-01	37.59	8.83	28.76	8.05	29.54	4.38	33.21	NM	NM
LF-01A	37.62	28.74	8.88	28.32	9.3	25.04	12.58	NM	NM
LF-02	27.68	22.08	5.6	21.8	5.88	19.89	7.79	NM	NM
LF-03	10.7	6.7	4	6.48	4.22	5.75	4.95	NM	NM
LF-04	12.09	8.42	3.67	8.2	3.89	7.41	4.68	NM	NM
LF-05	39.16	13.74	25.42	13.42	25.74	12.23	26.93	NM	NM
LF-06	14.02	11.06	2.96	7.26	6.76	9.93	4.09	NM	NM
LF-06A	14.05	10.57	3.48	10.27	3.78	9.22	4.83	NM	NM
LF-07	36.33	11.77	24.56	11.86	24.47	9.43	26.9	NM	NM
LF-08	36.19	29.62	6.57	29.37	6.82	27.5	8.69	NM	NM
LFO-01	36.98	29.36	7.62	29.04	7.94	26.58	10.4	28.55	8.43
LFO-02	33.83	Dry	Dry	Dry	Dry	NM	NM	NM	NM
LFO-03	45.58	22.06	23.52	22.26	23.32	18.91	26.67	21.4	24.18
LFO-04	36.95	15.41	21.54	5.41	31.54	14.28	22.67	14.59	22.36
LFO-05	34.1	14.32	19.78	14.81	19.29	14.93	19.17	14.93	19.17
LFO-06	34.27	20.49	13.78	20.38	13.89	19.98	14.29	23.2	11.07
LFO-07	24.47	19.35	5.12	19.47	5	NM	NM	NM	NM
LFO-08	36.63	11.35	25.28	11.05	25.58	7.62	29.01	11.42	25.21
LFO-09	33.67	6.46	27.21	6.06	27.61	3.35	30.32	7.25	26.42
LFO-10	38.88	8.44	30.44	7.53	31.35	4.02	34.86	8.02	30.86
LFO-11	39.52	11.57	27.95	11.08	28.44	4.07	35.45	11.3	28.22
LFO-12	39.44	12.54	26.9	12.47	26.97	5.83	33.61	11.9	27.54
LFO-13	38.96	12.82	26.14	12.51	26.45	6.59	32.37	12.43	26.53
LFO-14	39.89	14.2	25.69	14.32	25.57	9.21	30.68	13.31	26.58
LFO-15	41.61	17.45	24.16	NM	NM	13.43	28.18	15.63	25.98

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 10/6/98	Water Level Elevation[2] 10/6/98	Depth to Water[1] 11/10/98	Water Level Elevation[2] 11/10/98	Depth to Water[1] 1/14/99	Water Level Elevation[2] 1/14/99	Depth to Water[1] 2/3/99	Water Level Elevation[2] 2/3/99
LF-01	37.59	NM	NM	NM	NM	NM	NM	10.04	27.55
LF-01A	37.62	NM	NM	NM	NM	NM	NM	27.45	10.17
LF-02	27.68	NM	NM	NM	NM	NM	NM	21.02	6.66
LF-03	10.7	NM	NM	NM	NM	NM	NM	6.2	4.5
LF-04	12.09	NM	NM	NM	NM	NM	NM	7.89	4.2
LF-05	39.16	NM	NM	NM	NM	NM	NM	12.39	26.77
LF-06	14.02	NM	NM	NM	NM	NM	NM	10.3	3.72
LF-06A	14.05	NM	NM	NM	NM	NM	NM	9.73	4.32
LF-07	36.33	NM	NM	NM	NM	NM	NM	10.85	25.48
LF-08	36.19	NM	NM	NM	NM	NM	NM	28.82	7.37
LFO-01	36.98	28.95	8.03	29.18	7.8	28.75	8.23	NM	NM
LFO-02	33.83	NM	NM	NM	NM	NM	NM	NM	NM
LFO-03	45.58	20.47	25.11	20.98	24.6	21.31	24.27	NM	NM
LFO-04	36.95	14.88	22.07	14.95	22	14.68	22.27	NM	NM
LFO-05	34.1	16.04	18.06	16.57	17.53	14.39	19.71	NM	NM
LFO-06	34.27	21.27	13	21.58	12.69	19.91	14.36	NM	NM
LFO-07	24.47	11.57	12.9	NM	NM	NM	NM	NM	NM
LFO-08	36.63	NM	NM	NM	NM	11.58	25.05	NM	NM
LFO-09	33.67	7.99	25.68	NM	NM	7.68	25.99	NM	NM
LFO-10	38.88	9.17	29.71	NM	NM	7.51	31.37	NM	NM
LFO-11	39.52	11.56	27.96	NM	NM	11.54	27.98	NM	NM
LFO-12	39.44	12.32	27.12	NM	NM	NM	NM	NM	NM
LFO-13	38.96	12.83	26.13	NM	NM	13.08	25.88	NM	NM
LFO-14	39.89	13.66	26.23	NM	NM	14.09	25.8	NM	NM
LFO-15	41.61	16	25.61	NM	NM	17.02	24.59	NM	NM

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 2/26/99	Water Level Elevation[2] 2/26/99	Depth to Water[1] 3/29/99	Water Level Elevation[2] 3/29/99	Depth to Water[1] 4/26/99	Water Level Elevation[2] 4/26/99	Depth to Water[1] 5/18/99	Water Level Elevation[2] 5/18/99
LF-01	37.59	10.03	27.56	NM	NM	10.28	27.31	NM	NM
LF-01A	37.62	27.25	10.37	NM	NM	27.36	10.26	NM	NM
LF-02	27.68	21.06	6.62	NM	NM	21.32	6.36	NM	NM
LF-03	10.7	6.24	4.46	NM	NM	6.48	4.22	NM	NM
LF-04	12.09	7.98	4.11	NM	NM	8.23	3.86	NM	NM
LF-05	39.16	12.48	26.68	NM	NM	NM	NM	NM	NM
LF-06	14.02	10.45	3.57	NM	NM	10.77	3.25	NM	NM
LF-06A	14.05	9.87	4.18	NM	NM	10.14	3.91	NM	NM
LF-07	36.33	10.66	25.67	NM	NM	10.72	25.61	NM	NM
LF-08	36.19	28.76	7.43	NM	NM	NM	NM	NM	NM
LFO-01	36.98	28.28	8.7	28.26	8.72	28.35	8.63	28.55	8.43
LFO-02	33.83	NM	NM	NM	NM	NM	NM	NM	NM
LFO-03	45.58	20.87	24.71	21.06	24.52	21.11	24.47	21.23	24.35
LFO-04	36.95	14.35	22.6	14.35	22.6	NM	NM	14.6	22.35
LFO-05	34.1	14.62	19.48	14.02	20.08	NM	NM	15.91	18.19
LFO-06	34.27	19.97	14.3	20.13	14.14	NM	NM	21.14	13.13
LFO-07	24.47	NM	NM	NM	NM	NM	NM	NM	NM
LFO-08	36.63	10.97	25.66	10.74	25.89	10.98	25.65	11.13	25.5
LFO-09	33.67	7.37	26.3	7.09	26.58	7.77	25.9	7.6	26.07
LFO-10	38.88	6.43	32.45	6.76	32.12	7.58	31.3	7.99	30.89
LFO-11	39.52	10.01	29.51	9.69	29.83	10.07	29.45	10.58	28.94
LFO-12	39.44	12.28	27.16	12.22	27.22	12.25	27.19	12.43	27.01
LFO-13	38.96	12.41	26.55	12.41	26.55	12.54	26.42	12.85	26.11
LFO-14	39.89	13.45	26.44	13.4	26.49	13.4	26.49	13.63	26.26
LFO-15	41.61	16.52	25.09	16.63	24.98	16.78	24.83	16.88	24.73

[1] - Measured in feet below top of casing

[2] -Relative to mean sea level

Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 6/21/99	Water Level Elevation[2] 6/21/99	Depth to Water[1] 7/3/99	Water Level Elevation[2] 7/3/99	Depth to Water[1] 8/30/99	Water Level Elevation[2] 8/30/99
LF-01	37.59	10.78	26.81	NM	NM	NM	NM
LF-01A	37.62	28.12	9.5	NM	NM	NM	NM
LF-02	27.68	21.88	5.8	NM	NM	NM	NM
LF-03	10.7	6.65	4.05	NM	NM	NM	NM
LF-04	12.09	8.54	3.55	NM	NM	NM	NM
LF-05	39.16	13.18	25.98	NM	NM	NM	NM
LF-06	14.02	11.1	2.92	NM	NM	NM	NM
LF-06A	14.05	10.53	3.52	NM	NM	NM	NM
LF-07	36.33	11.42	24.91	NM	NM	NM	NM
LF-08	36.19	29.43	6.76	NM	NM	NM	NM
LFO-01	36.98	28.96	8.02	29.5	7.48	29.6	7.38
LFO-02	33.83	NM	NM	NM	NM	NM	NM
LFO-03	45.58	21.55	24.03	21.81	23.77	22.07	23.51
LFO-04	36.95	14.92	22.03	15.17	21.78	15.27	21.68
LFO-05	34.1	16.09	18.01	16.73	17.37	16.7	17.4
LFO-06	34.27	21.48	12.79	21.78	12.49	21.87	12.4
LFO-07	24.47	NM	NM	NM	NM	NM	NM
LFO-08	36.63	11.98	24.65	12.61	24.02	12.81	23.82
LFO-09	33.67	8.32	25.35	8.76	24.91	8.85	24.82
LFO-10	38.88	9.14	29.74	9.99	28.89	9.25	29.63
LFO-11	39.52	11.4	28.12	11.09	28.43	12.35	27.17
LFO-12	39.44	13.03	26.41	14.11	25.33	13.68	25.76
LFO-13	38.96	13.26	25.7	14.34	24.62	14.18	24.78
LFO-14	39.89	14.18	25.71	14.63	25.26	14.9	24.99
LFO-15	41.61	17.22	24.39	17.52	24.09	17.76	23.85

(1) - Measured in feet below top of casing

(2) -Relative to mean sea level

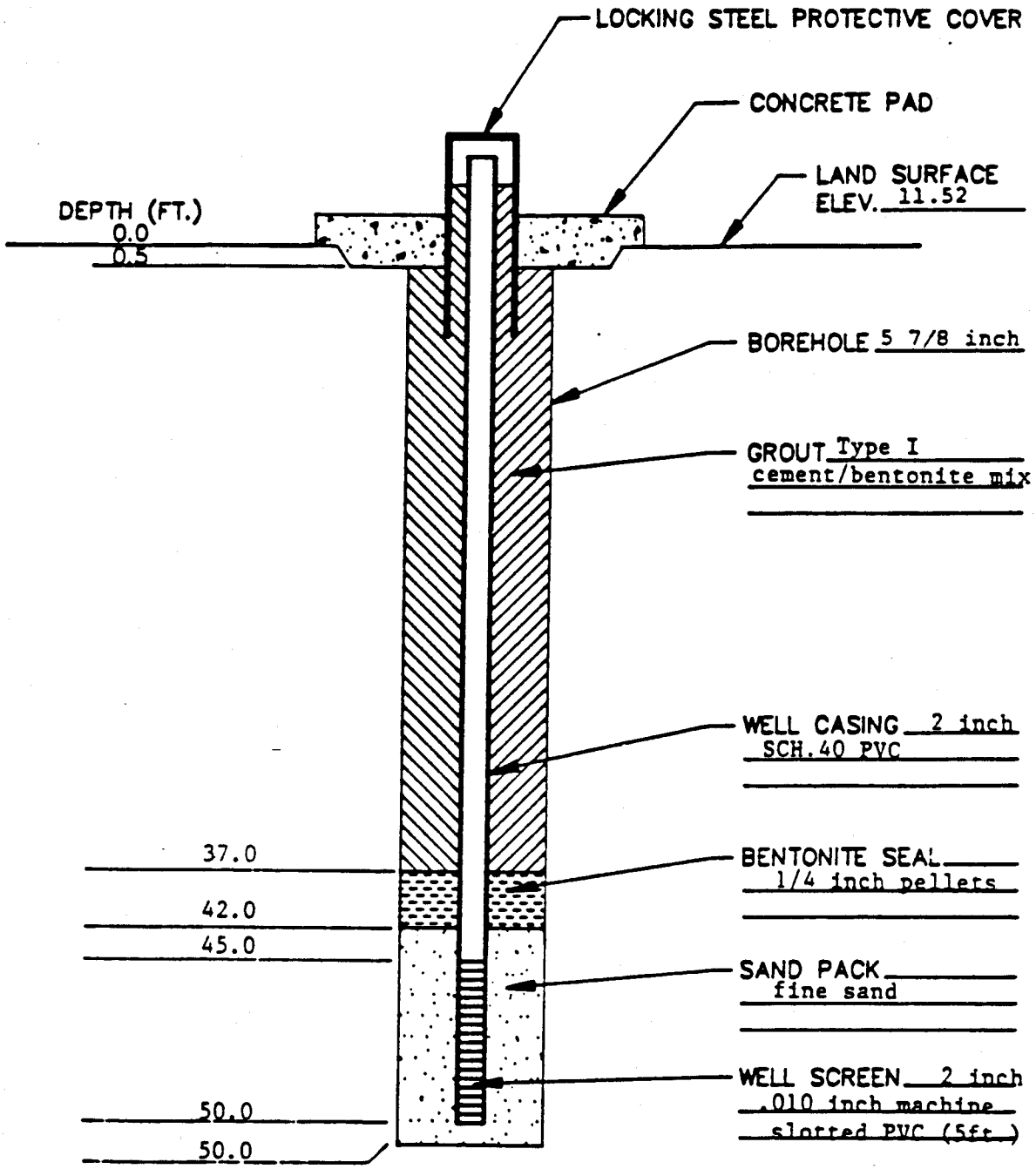
Historical Water Level Elevation Summary
Weyerhaeuser - Plymouth, NC

Station ID	Top of Casing Elevation[2]	Depth to Water[1] 10/21/99	Water Level Elevation[2] 10/21/99	Depth to Water[1] 12/21/99	Water Level Elevation[2] 12/21/99
LF-01	37.59	NM	NM	9.37	28.22
LF-01A	37.62	NM	NM	26.32	11.3
LF-02	27.68	NM	NM	20.64	7.04
LF-03	10.7	NM	NM	6.02	4.68
LF-04	12.09	NM	NM	7.88	4.21
LF-05	39.16	NM	NM	11.94	27.22
LF-06	14.02	NM	NM	10.32	3.7
LF-06A	14.05	NM	NM	9.67	4.38
LF-07	36.33	NM	NM	8.22	28.11
LF-08	36.19	NM	NM	28.22	7.97
LFO-01	36.98	26.33	10.65	27.53	9.45
LFO-02	33.83	NM	NM	NM	NM
LFO-03	45.58	17.88	27.7	17.83	27.75
LFO-04	36.95	13.1	23.85	14.04	22.91
LFO-05	34.1	13.16	20.94	15.06	19.04
LFO-06	34.27	18.05	16.22	21.05	13.22
LFO-07	24.47	NM	NM	NM	NM
LFO-08	36.63	4.4	32.23	7.38	29.25
LFO-09	33.67	2.8	30.87	5.37	28.3
LFO-10	38.88	2.11	36.77	6.24	32.64
LFO-11	39.52	2.18	37.34	5.72	33.8
LFO-12	39.44	3.01	36.43	7.34	32.1
LFO-13	38.96	3.22	35.74	8.02	30.94
LFO-14	39.89	7.58	32.31	9.47	30.42
LFO-15	41.61	11.39	30.22	12.54	29.07

(1) - Measured in feet below top of casing

(2) -Relative to mean sea level

Boring Logs
Monitoring Well MW-6A and
Observation Wells 8, 9, 10, 11, 12, 13, 14 and 15



WELL CONSTRUCTION DIAGRAM

Not To Scale

PROJECT Weyerhaeuser

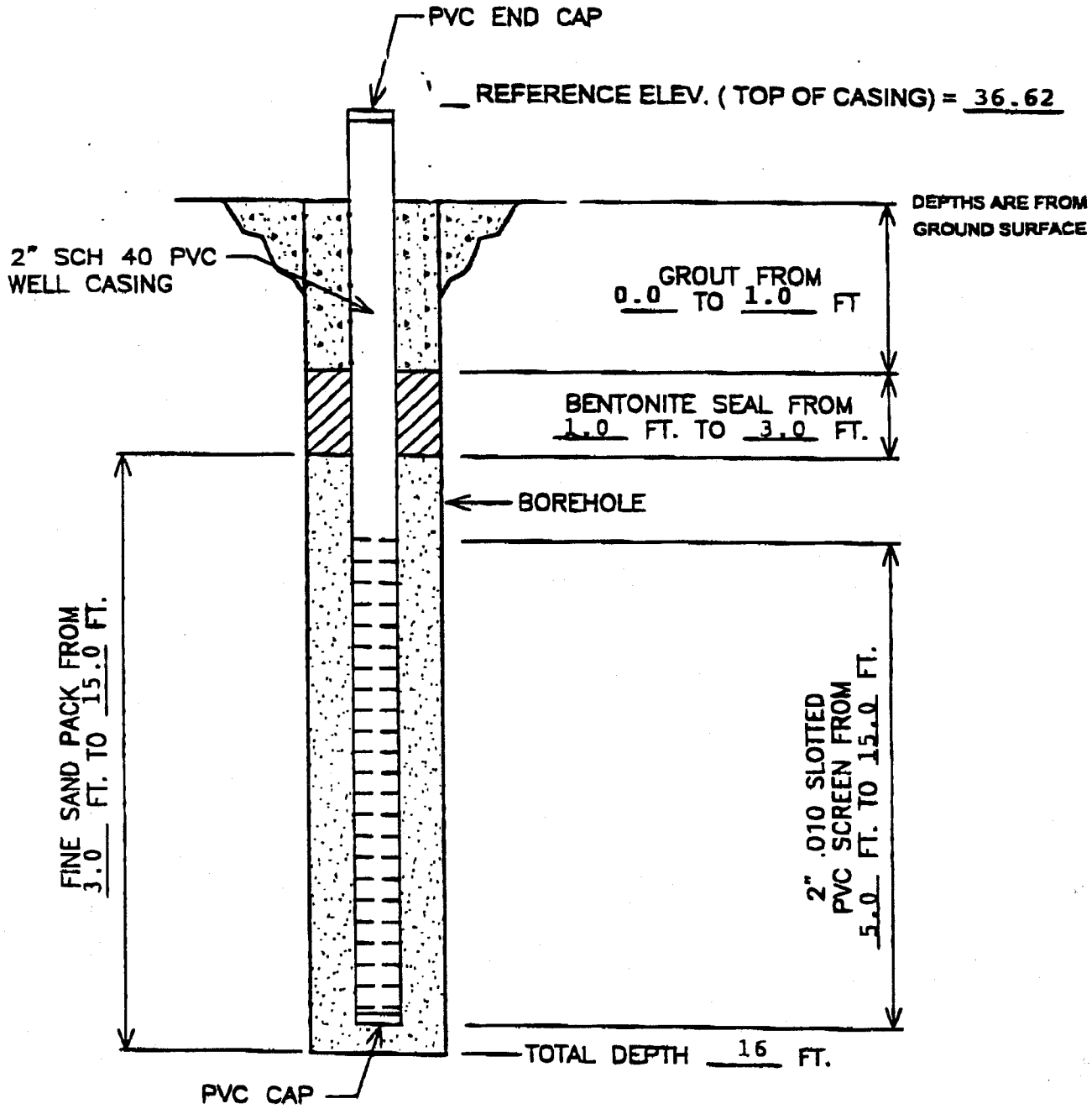
PROJECT NO. 467.42

WELL NO. MW-6A DATE INSTALLED 4/19/90

DRILLING CONTRACTOR Law Engineering

RMT GEOLOGIST B. Grothaus

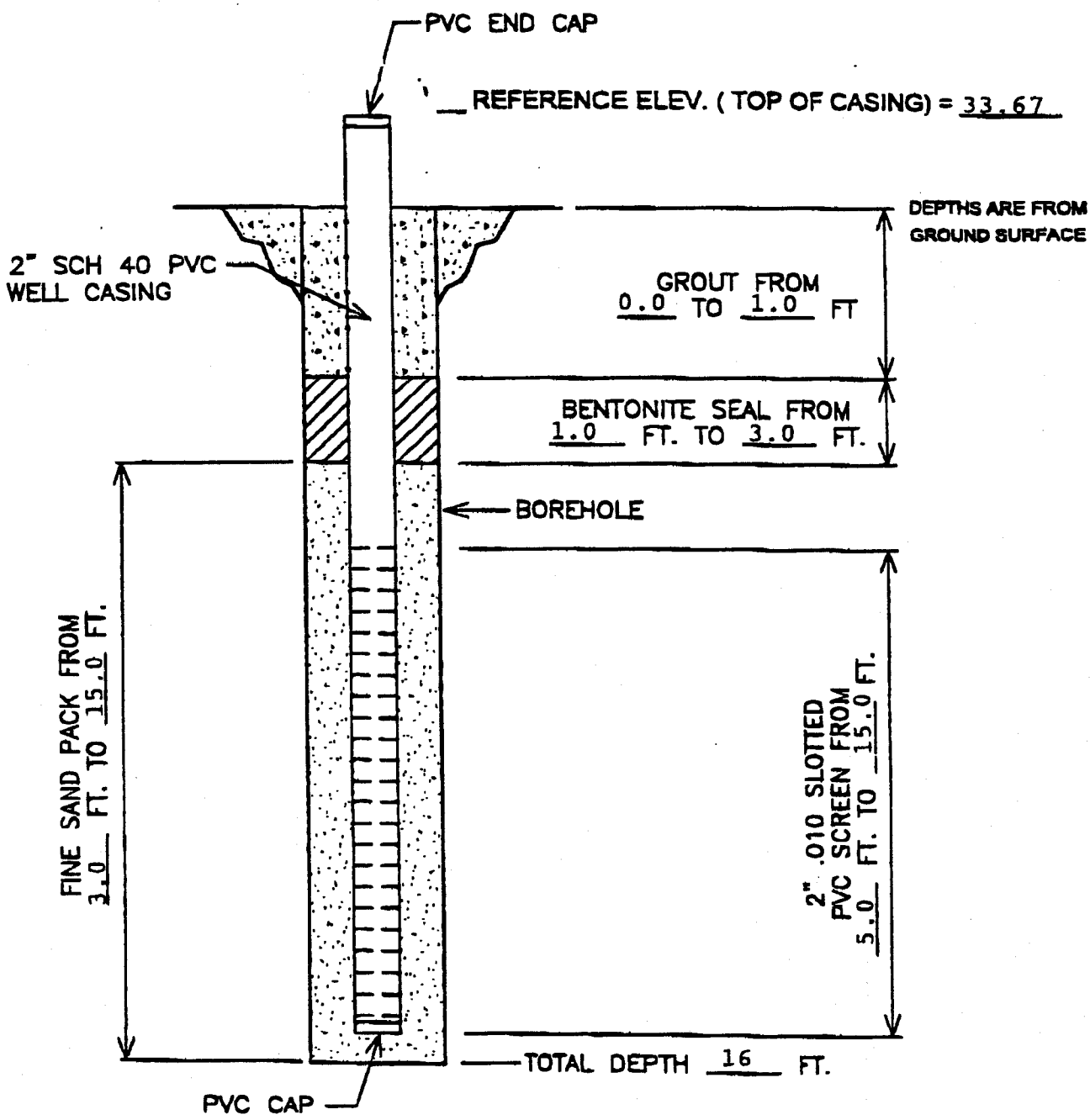
RMT



PIEZOMETER WELL DETAIL
NOT TO SCALE

Initial Water Level 5.0' on 3/13/97

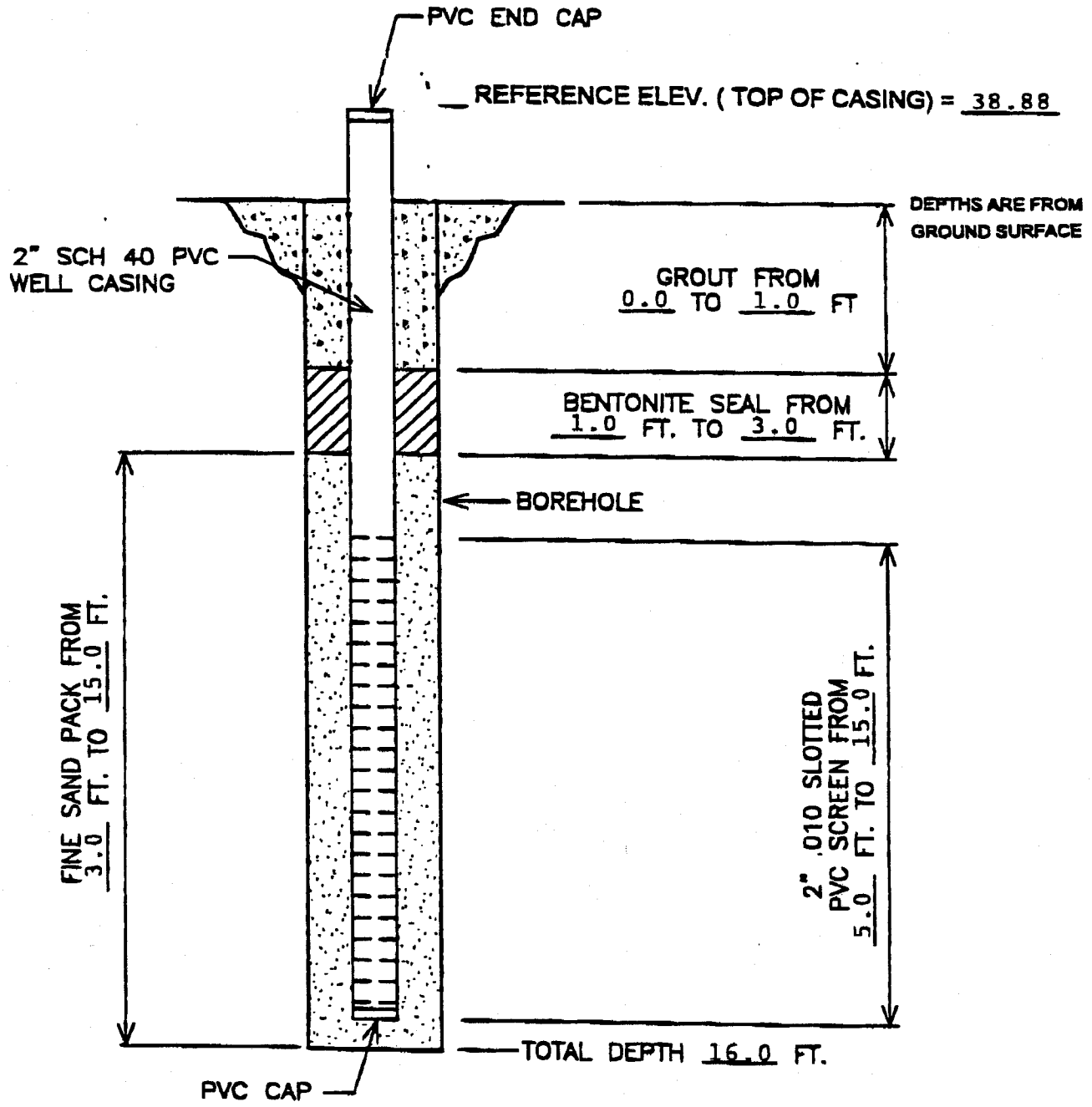
WELL CONSTRUCTION OW-8 N 766170.29, e 2659080.13	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 3



PIEZOMETER WELL DETAIL
NOT TO SCALE

Initial Water Level 2.2' on 3/13/97

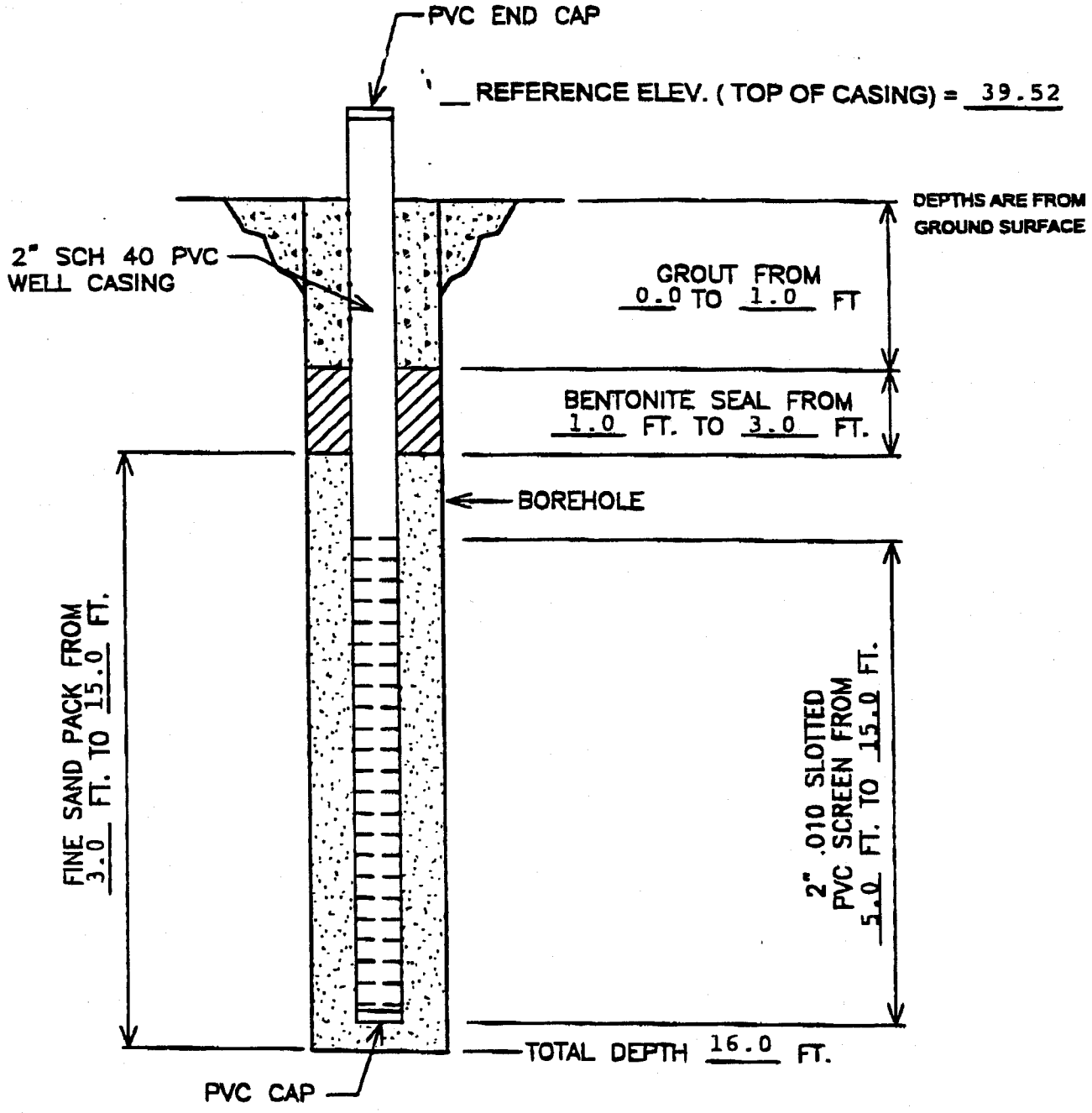
WELL CONSTRUCTION OW-9 N 766678.17, E 2659004.47	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 4



PIEZOMETER WELL DETAIL
NOT TO SCALE

Initial Water Level 3.4' on 3/13/97

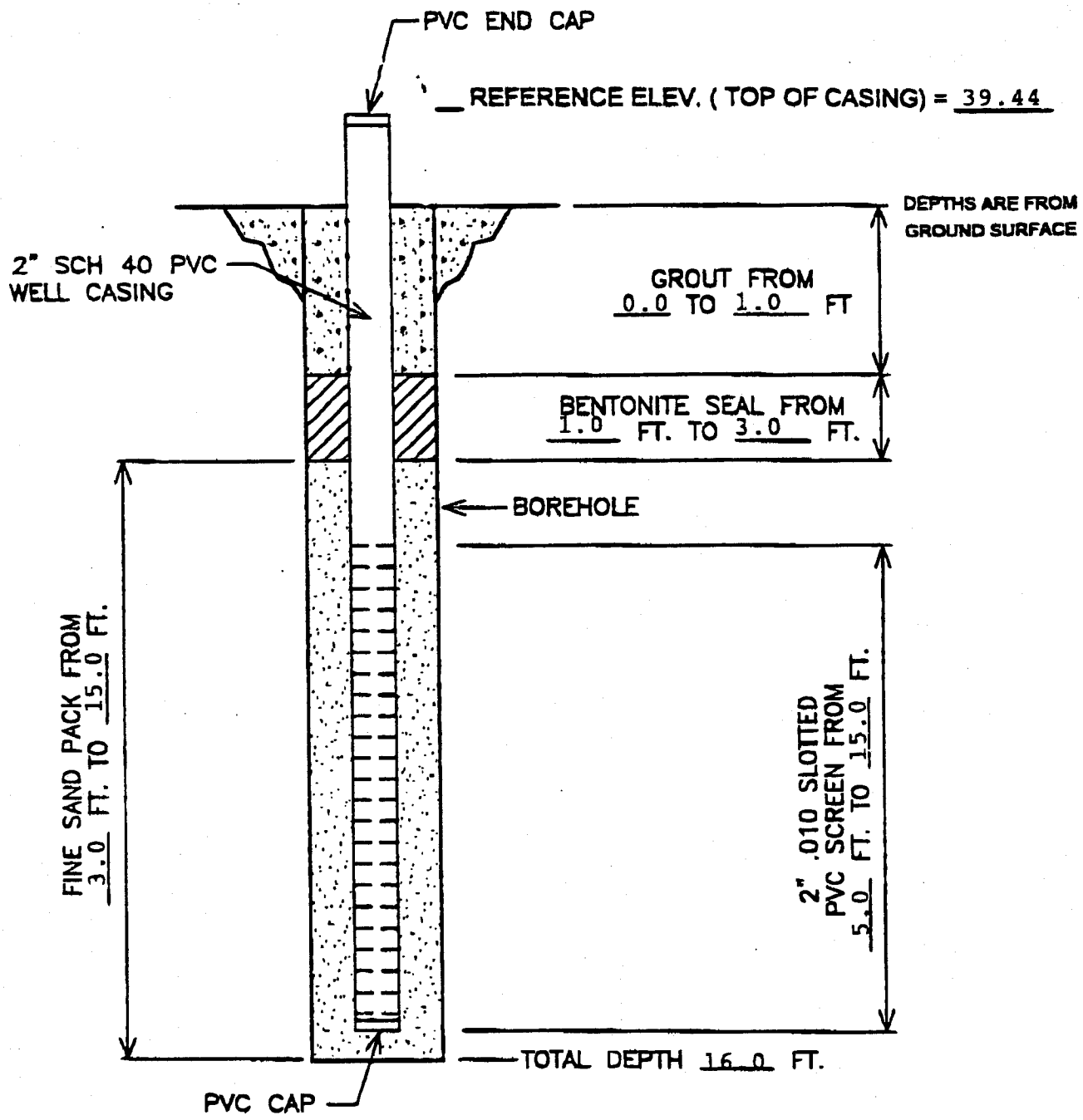
WELL CONSTRUCTION OW-10 N 766042.04, E 2658308.98	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 5



PIEZOMETER WELL DETAIL
NOT TO SCALE

Initial Water Level 4.1' on 3/13/97

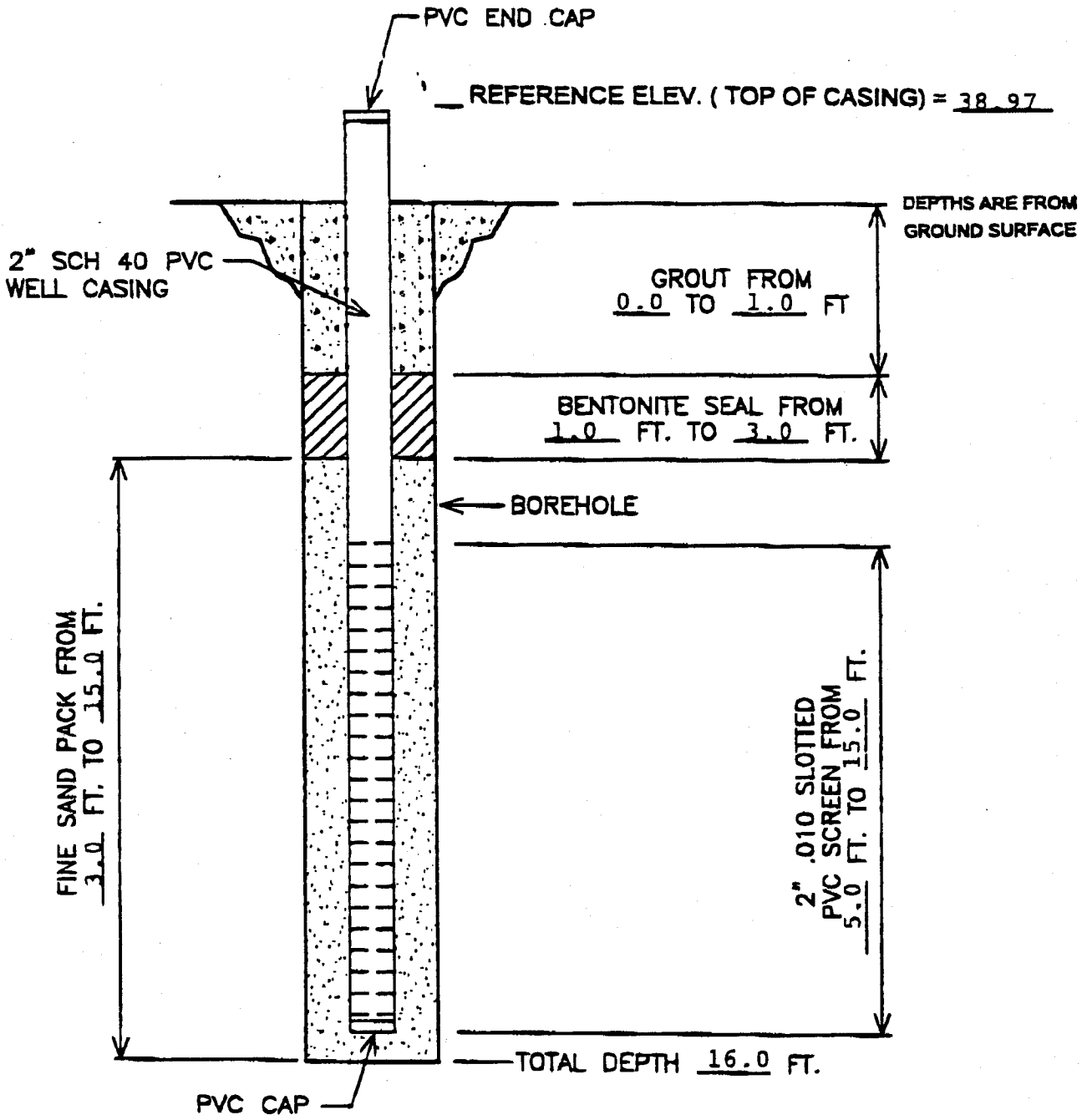
WELL CONSTRUCTION OW-11 N 766407.32, E 2658164.49	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 6



PIEZOMETER WELL DETAIL
NOT TO SCALE

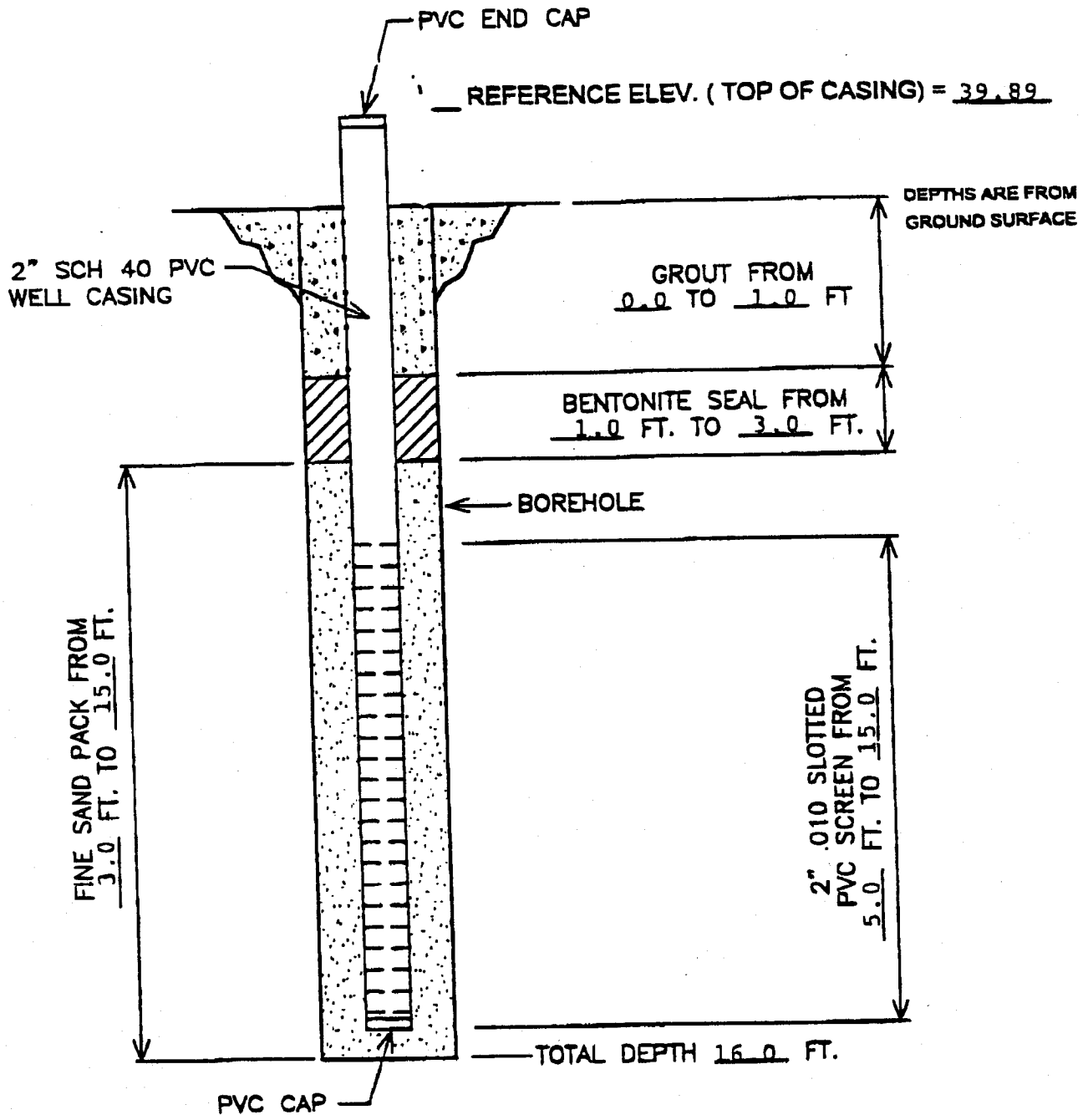
Initial Water Level 5.0' on 3/13/97

WELL CONSTRUCTION OW-12 N 766749.87, E 2658358.40	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 7



PIEZOMETER WELL DETAIL
NOT TO SCALE

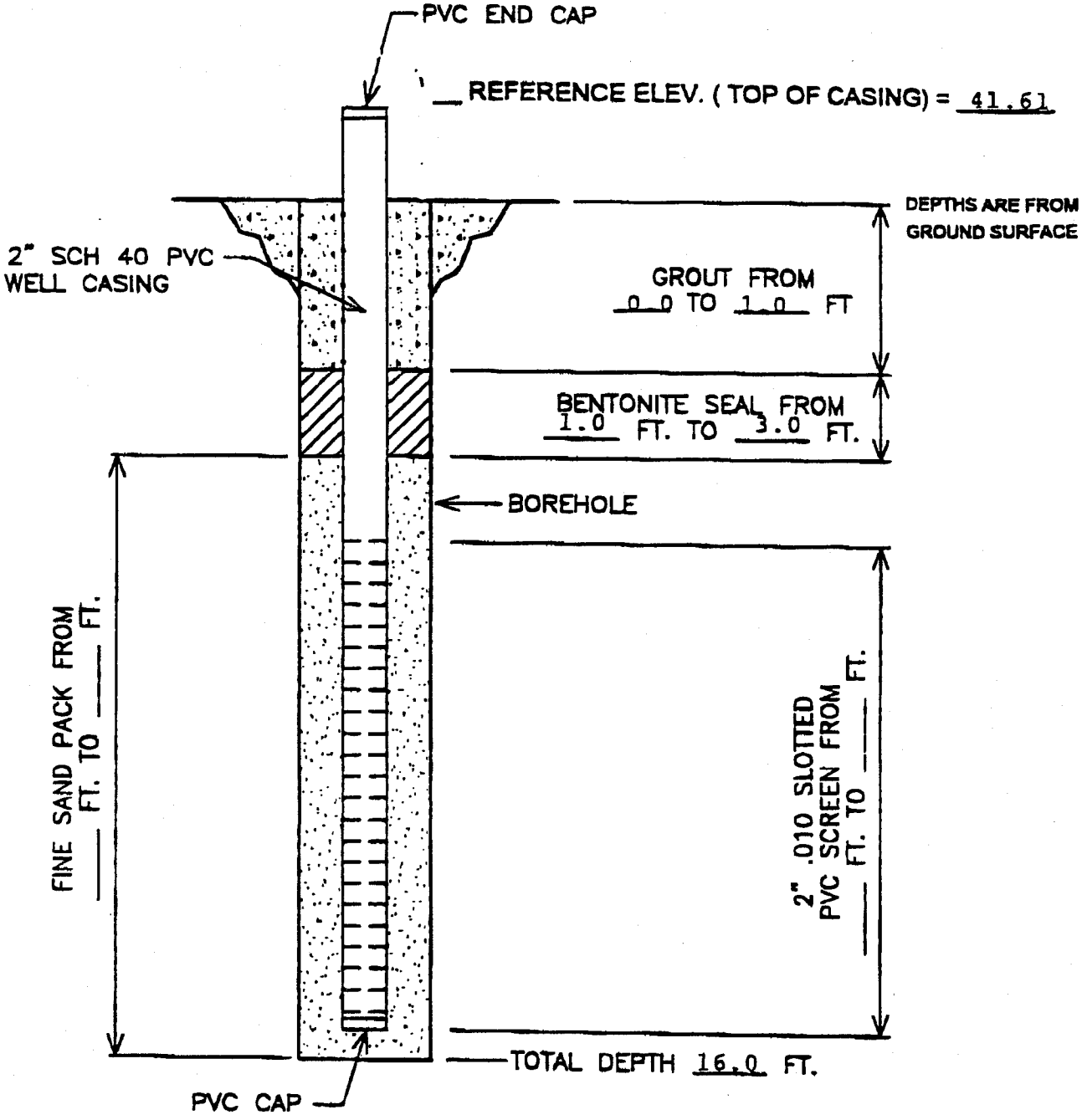
WELL CONSTRUCTION OW-13 N 766915.83, E 2658627.55	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 8



PIEZOMETER WELL DETAIL
NOT TO SCALE

Initial Water Level 8.6' on 3/13/97

WELL CONSTRUCTION OW-14 N 767452.55, E 2658543.20	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 9



PIEZOMETER WELL DETAIL
NOT TO SCALE

Initial Water Level 9.1' on 3/13/97

WELL CONSTRUCTION OW-15 N 767198.88, E 2657919.98	S&ME ENVIRONMENTAL SERVICES ENGINEERING · TESTING	Job No. 1051-97-051 Scale: NONE Fig No. 10

Drawing 510101-C02

Revised Appendix O

Appendix O
Sampling and Analysis Procedures for Groundwater

Sampling and Analysis Procedures for Groundwater

General Information

Sample bottles will be shipped to the site in sturdy, durable shipping coolers.

Type 1 reagent grade water will be used that meets ASTM, CAP, and NCCLS standards.

Field activities will be documented in a bound field book or on a field collection sheet. The following information will appear on each page: project, date, time, sampler's initials, site contact, conductivity, well depth, temperature, water level, gallons purged, and pH.

Monitoring wells will be fitted with dedicated QED low flow purge system bladder sampling pumps and water level meters (or equivalent). The dedicated pumps will be used to purge well volumes and collect groundwater samples. The following wells will be fitted with dedicated QED sampling pumps (or equivalent) and electric water level meters: MW-1, MW-1A, MW-2, MW-3, MW-4, MW-5, MW-6, MW-6A, MW-7, MW-8, MW-9, MW-10, MW-11, and MW-12.

In most cases, a field team will consist of two technicians. The field team will check equipment before departing for the site. Water extracted from the wells that is not used for sample volume will be discarded on the land surface in the vicinity of the well.

Equipment Decontamination

Dedicated QED sampling pumps and water level meters (or equivalent) will remain in the wells. No equipment will require removal prior to measuring water levels and sampling. This equipment will be shipped to the site pre-cleaned. Therefore, decontamination of pump equipment at the site will not be necessary.

Though the wells are to be equipped with dedicated pumps, it may be necessary at times to use nondedicated equipment (for example, dedicated pumps out of service) to purge and sample wells. Such groundwater sampling equipment that will come into contact with the sample will be cleaned according to a specific procedure. Equipment will be washed with laboratory detergent and water, followed by a tap water rinse. Stiff brushes may be used to remove gross debris. Cleaning procedures may be augmented with the use of a high-pressure sprayer to remove debris, assist with the detergent wash, and perform the tap water rinse. The equipment will then be rinsed three times with deionized, organic free (*i.e.*, Type 1 reagent grade) water, and allowed to air dry. After rinses with deionized, organic free water, equipment will be rinsed with isopropanol, and allowed to air dry. The isopropanol application will be followed by a final deionized, organic-free water rinse. The equipment will again be allowed to air dry.

Any equipment that is not to be used immediately after decontamination will be wrapped in aluminum foil, then stored in a manner and location that minimizes the risk of contamination.

Teflon Bailer Cleaning Procedure

(This procedure is approved for use under both Solid Waste Section and Groundwater Section rules.)

1. Disassemble the bailers, and tap water rinse the parts. Place the end caps and ball in a phosphate-free soap solution to soak.
2. Wash the bailer tubes with phosphate-free soap. Use a brush to scrub the insides of each tube.
3. Rinse all bailer parts with deionized water and reassemble.
4. Rinse the inside and outside of each bailer with a 10 percent solution of hydrochloric acid in deionized water.
5. Rinse bailers with deionized water.
6. Rinse the inside and outside of each bailer with methanol.
7. Let bailers air dry for 24 hours on shelf.
8. Rinse again the inside and outside of each bailer with methanol.
9. Rinse bailers with deionized water and air dry for 24 hours on shelf.
10. Wrap completely in aluminum foil (shiny side out).
11. Place foil-wrapped bailer in plastic sleeve, and seal with tape.

Water Levels

A procedure for obtaining water levels that maximizes accuracy of measurement, reduces the risk of exposure to potentially contaminated groundwater, and reduces the potential for cross contamination will be used. The well cap will be removed and the well allowed to vent. Tightly sealed wells will not respond well to variation in the water table due to a "straw effect" caused by air trapped in the well casing. Venting the well will allow the water level in the well to equilibrate and become representative of the piezometric surface. Measurements will be made to the nearest hundredth of a foot.

The wells will be equipped with dedicated water level indicators. In the event that the dedicated water level indicator can not be used, a portable water level indicator will be used. The operation of the portable electric water level indicator will be checked before introducing it into the well. The probe will be lowered slowly into the well until the buzzer sounds or a light illuminates to indicate the probe is in the water. Depth to water will be measured from the point on the cable touching the surveyed measuring point at the top of the well casing.

To reduce the possibility of cross contamination, the portable water level indicator probe and any cable that entered the well must be decontaminated as indicated by site specific requirements before the next water level will be taken.

Pressure transducers and data loggers may also be used to record water levels over extended periods of time.

Purging Wells

Water that has remained in a well casing for a period of time may not be representative of the water contained in the surrounding formation that the well is intended to sample. In order to obtain samples that are representative of water in the formation, wells will be purged of the water in the casing and surrounding sand pack to allow water from the formation to enter the well casing for sampling. The wells will be purged slowly to reduce turbidity and the potential for suspended sediment in the sample.

Water will be purged slowly from a well until specific conductance, pH and temperature stabilize. A minimum of three well volumes will be purged from the well unless the well is bailed dry. In the latter case, no further purging is necessary. A "well volume" is the volume of water contained in the well at the time of sampling. A well volume will be purged using the dedicated sampling pump. As an alternative, the wells may be purged using a peristaltic pump with flexible tubing, or Groundfos® sampling pump (or equivalent), or using a clean bailer and cord. Unless otherwise specified, dedicated QED sampling pumps (or equivalent) will be used. The pump will be started at a low flow rate and the outflow will be directed into a bucket of known volume. The purpose of the low flow rate during well purging is to reduce turbidity resulting from disturbing sediment that may be present in the bottom of the well. Purge water will be measured based on the known volume of the bailer used or by pouring the contents into a container of known volume. Purge water will be discarded on the ground adjacent to the well.

As a second alternative to purging with the dedicated sampling pump, a bottom-filling Teflon bailer may be used to purge the well. The bailer and cord should only touch the inside of the well or a clean surface provided specifically for that bailer and cord. Bailers will be gently lowered to the top of the water column and then gently removed to reduce turbidity.

The color, odor, turbidity, and any other comments pertaining to the purge water will be documented in the field log. After each well volume of water has been removed from the well, specific conductance, pH, and temperature of the water will be determined and recorded in the field log. After specific conductance, pH and temperature have stabilized, sample collection may begin.

Sampling of Wells

Existing monitoring wells MW-1, MW-1A, and MW-8 and new monitoring wells MW-9, MW-10, MW-11 and MW-12 will be sampled quarterly for four consecutive quarters beginning after the new wells have been installed. Following the fourth quarter, these wells will be sampled semiannually. Monitoring wells MW-2 through MW-6 and MW-6A and MW-7 will continue to be sampled at the frequency established for the Landfill No. 2.

Wells will be sampled using dedicated QED sampling pumps (or equivalent). The samples will be discharged directly to the sample containers. The sample bottles will be labeled with sample identification, date, and project number. Preservative will be added to the bottle prior to collecting the sample. Samples will be collected in the following order unless otherwise specified: volatile and organics; metals; sulfate and chloride; turbidity; and nitrate. This sequence is based on the preferred collection order listed in RCRA Groundwater Monitoring Technical Enforcement Guidance Document, September, 1986.

In bottles where caustic preservative will be required (*i.e.*, samples for cyanide analysis), pH will be verified in the field by pouring some of the preserved sample over pH paper. If the proper pH has not been attained, more preservative will be added in the field. Samples requiring acid preservative will be checked with pH paper to determine if sufficient preservative has been added. More preservative will be added to the sample if necessary.

Well sampling sequence will be determined based upon available information about the site. The sequence will generally begin with background wells and wells upgradient of active and completed landfill phases, followed by wells downgradient of active or completed phases.

Sample Handling and Shipping

Immediately after sample collection, the sampler will check the label for completeness. Glass sample bottles will be wrapped in bubble wrap packaging to minimize the possibility of breakage. Samples will then be placed into a cooler containing ice. The chain of custody form will then be completed and stored with the samples inside the cooler in a plastic bag. Custody will be maintained by the sampler until the coolers are prepared for transport. The cooler will be filled with ice, sealed with tape, and shipped via overnight air freight or courier, or it will be delivered to the lab by field technicians.

References

Bouwer, H. and Rice, R. C., 1988, A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells, Water Resources Research, vol. 12, no. 3, pages 423-428.

National Water Well Association. "RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD): September, 1986."

U.S. Environmental Protection Agency, Office of Research and Development. "Groundwater Handbook," EPA/625/6-87/016, March, 1987.

U.S. Environmental Protection Agency, Region IV. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (ECBSOPQAM): February 1, 1991."

Drawing Under Seperate Cover

Construction Plan Application - Data Point Location Map (NOT FOR CONSTRUCTION)