

D. E. R.

FEB - 5 1991

SOUTHWEST DISTRICT
TAMPA

INSTALLATION OF SURFICIAL
AQUIFER PIEZOMETERS AT
"LENA ROAD LANDFILL,
MANATEE COUNTY, FLORIDA"



Ardaman & Associates, Inc.

OFFICES

Orlando, 8008 S. Orange Avenue, P.O. Box 32859-13003, Orlando, Florida 32809, Phone (305) 855-3860

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Miami, 7476-7478 N.W. 8th Street, Miami, Florida 33126, Phone (305) 261-1682

Sarasota, 2500 Bee Ridge Road, P.O. Box 34277-15008, Sarasota, Florida 34239, Phone (813) 922-3526

Tallahassee, 3175 West Tharpe Street, Tallahassee, Florida 32303, Phone (904) 576-6131

MEMBERS:

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American Society for Testing and Materials
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Ardaman & Associates, Inc.

Consultants in Soils, Hydrogeology,
Foundations and Materials Testing

January 14, 1991
File No. 90-8073

TO: Manatee County Public Works Department
Caller Service 25010
Bradenton, FL 34206

Attention: Mr. Greg F. Yekaitis

SUBJECT: Installation of Surficial Aquifer Piezometers per FDER-
Approved Groundwater Monitoring Plan at "Lena Road
Landfill, Manatee County, Florida" (BRO-RO No. 90466-
19631)

Gentlemen:

As requested by Mr. Greg Yekaitis, we have completed the installation of thirteen (13) surficial aquifer piezometers and the plugging of one (1) existing monitor well at the site referenced above. The piezometers are designated PZ-1 to PZ-7 and PZ-12 to PZ-17, and the plugged well is CW-3,, the locations of which are shown on the attached Figure 1.

Piezometers PZ-8 to PZ-11 are also to be installed along the Stage 2 portion of the landfill. As requested by the client, the installation of these piezometers will be postponed until the completion of other construction in the area, in order to minimize the risk of damage to the piezometers.

The piezometer installation logs are presented on Plates 1 to 13 of the Appendix of this report. The construction (or plugging) permit numbers for the piezometers and CW-3, and the latitude/longitude of each piezometer location are listed in the following table.

Piezometer No.	Permit No.*	Latitude	Longitude
PZ-1	90-680	27°28'06"	82°26'46"
PZ-2	90-681	27°27'57"	82°26'46"
PZ-3	90-682	27°27'54"	82°26'41"
PZ-4	90-683	27°27'54"	82°26'35"
PZ-5	90-684	27°27'54"	82°26'22"
PZ-6	90-685	27°28'08"	82°26'22"
PZ-7	90-686	27°28'20"	82°26'22"
PZ-12	90-687	27°28'19"	82°26'54"
PZ-13	90-688	27°28'19"	82°27'07"
PZ-14	90-689	27°28'18"	82°27'11"
PZ-15	90-690	27°28'14"	82°27'09"
PZ-16	90-691	27°28'07"	82°27'05"
PZ-17	90-692	27°28'07"	82°26'51"
CW-3	90-069P (plugged)		

* by Manatee County Public Health Unit

Our scope of work included performing an auger boring at each piezometer location, installing the piezometers according to specifications, developing the piezometers and preparing a report presenting pertinent installation data as required per the groundwater monitoring plan for the subject site. The soil samples obtained from the borings were returned to our laboratory for visual inspection and classification in general compliance with the Unified Soil Classification System (ASTM D-2487) by a geotechnical engineer. The results of the borings were used to select the final depth and collection zone length for each piezometer. The soil profiles are shown on the respective Plate in the Appendix of this report.

The six-inch diameter bore holes for the piezometers were advanced by hollow-stem auger. After reaching the final depth, the piezometers were constructed by inserting a length of two-inch

diameter slotted PVC pipe connected to a two-inch diameter solid PVC riser. The annular space was backfilled with 20/30 silica sand to above the slotted PVC. A minimum thickness of six inches of bentonite pellets were placed above the 20/30 sand to form a seal, and the remaining annular space was backfilled to ground surface with clayey sand. At the surface, a four-inch by four-inch steel casing with lockable steel cap was placed around the riser pipe and embedded in concrete to protect the piezometer. The piezometers were developed by the over-pumping method until the casing was essentially free of sand and the turbidity of the pumped water stabilized.

The latitude and longitude of each piezometer location were determined by plotting the location onto the U.S.G.S. Quadrangle Map (7.5 minute series) for the site area. These should be considered accurate only to the degree implied by the method used.


The existing monitor well CW-3 was abandoned on December 5, 1990 by grouting from bottom to top (tremie method). Prior to grouting, the total well depth was measured to be 16.1 feet below the ground surface and the existing water level to be 5.3 feet below the ground surface. Three (3) bags of portland cement were used in grouting of the well.

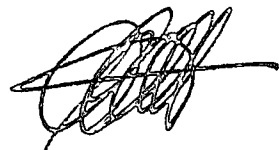
The elevation of the ground surface and top of casing (PVC) for each piezometer should be determined by a registered land surveyor. This data should be forwarded to our office, when available. This well completion report and the elevations should also be submitted to the Florida Department of Environmental Regulation (FDER).

We appreciate the opportunity to be of your service on this project. Please contact us when we may be of further service, or if you should have any questions concerning this report.

Very truly yours,

ARDAMAN & ASSOCIATES, INC.

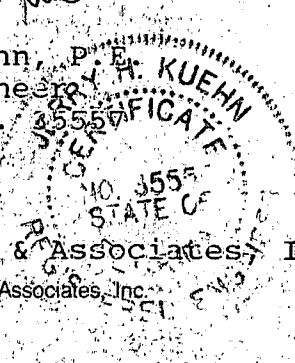

Jerry H. Kuehn, P.E.
Project Engineer
Eng. Reg. No. 35557


Gary H. Schmidt, P.E.
Executive Vice President
Eng. Reg. No. 12305

JHK/GHS:drs

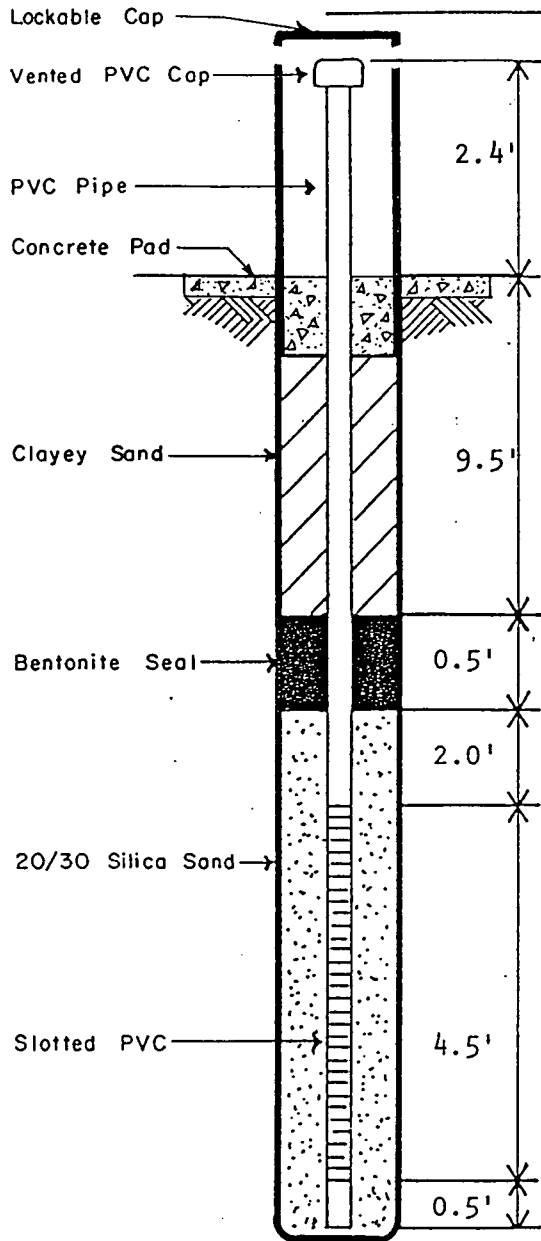
cc: Ardaman & Associates, Inc. (Orlando)

Ardaman & Associates, Inc.



APPENDIX

PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
0	BROWN FINE SAND & REFUSE
5	BROWN FINE SAND
10	BROWN FINE SAND WITH SILT
15	BROWN FINE SAND
17.5	DARK BROWN FINE SAND WITH SILT
20	BROWN SILTY FINE SAND WITH PHOSPHATE & GRAVEL
22.5	GRAY CLAY

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	12.25'	

NO. PZ-1

PROTECTIVE CASING SIZE & TYPE 4" x 4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 11/26/90

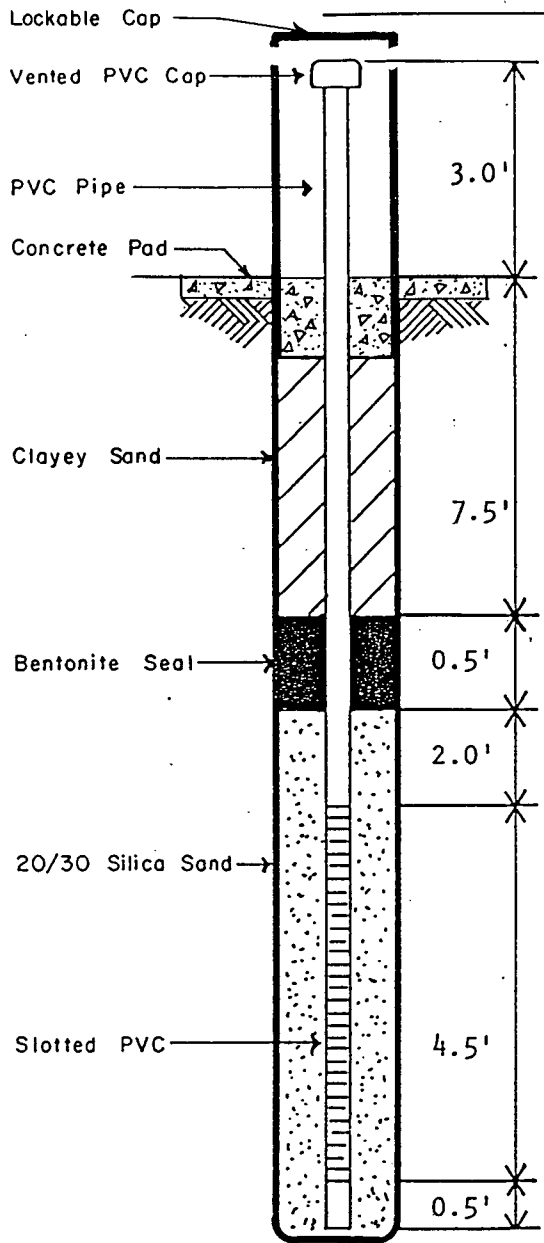
LOCATION SEE FIGURE 1

Ardaman & Associates, Inc.
Consulting Engineers in Soil Mechanics,
Foundations, and Material Testing

LENA ROAD LANDFILL
FILE No. 90-8073

DRAWN BY: <u>sunrls</u>	CHECKED BY:	DATE:
FILE NO.	APPROVED BY: <i>John A. Thiel</i>	

PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
0	DARK GRAY FINE SAND WITH SILT
5	BROWN FINE SAND
10	DARK BROWN FINE SAND WITH SILT
15	BROWN FINE SAND
20	DARK BROWN FINE SAND WITH SILT
25	GRAY CLAYEY FINE SAND WITH PHOSPHATE
30	GRAY CLAY

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	12.50'	

NO. PZ-2

PROTECTIVE CASING SIZE & TYPE 4" x 4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 11/27/90

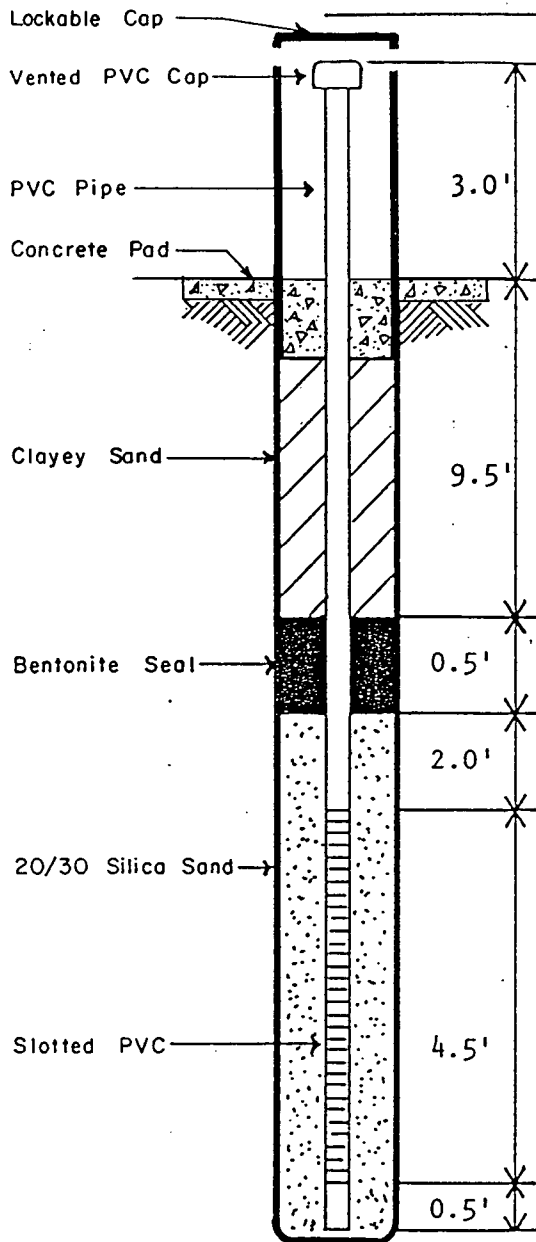
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
 FILE No. 90-8073

DRAWN BY: sunrise CHECKED BY: _____ DATE: _____
 FILE NO. APPROVED BY: *[Signature]*

PIEZOMETER INSTALLATION RECORD



DEPTH
(feet)

SOIL DESCRIPTION

5	BROWN FINE SAND DARK GRAY FINE SAND WITH SILT
10	GRAY FINE SAND BROWN SILTY FINE SAND
15	BROWN FINE SAND GRAY CLAYEY FINE SAND WITH PHOSPHATE
20	GRAY CLAY

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	15.33'	

NO. PZ-3

PROTECTIVE CASING SIZE & TYPE 4" x 4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 11/27/90

LOCATION SEE FIGURE 1

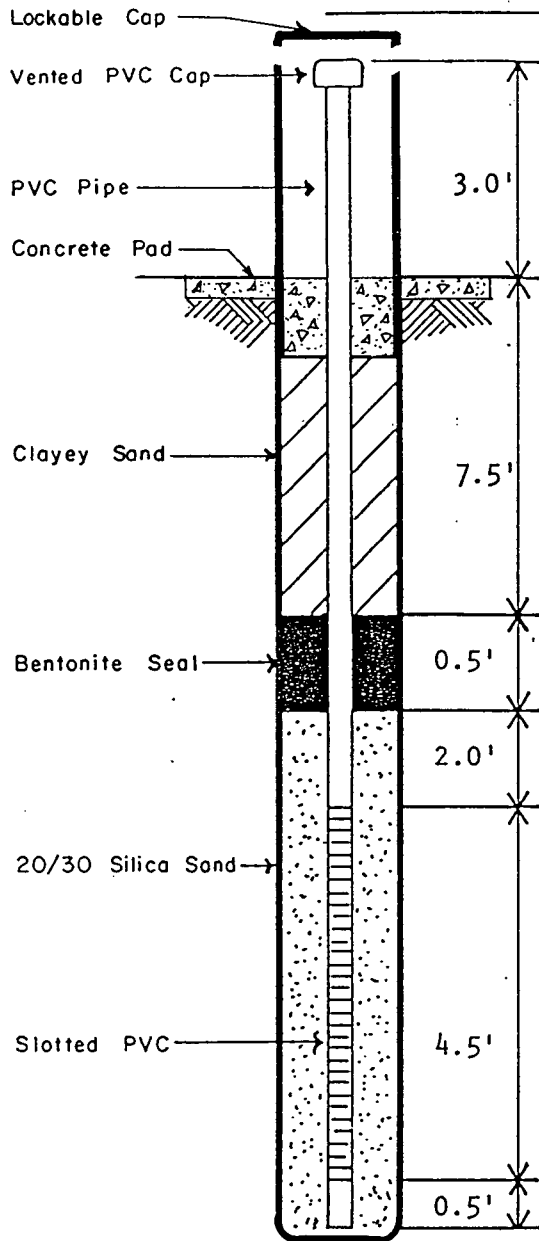
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LENA ROAD LANDFILL
FILE No. 90-8073

DRAWN BY: sunrise CHECKED BY: _____ DATE: _____

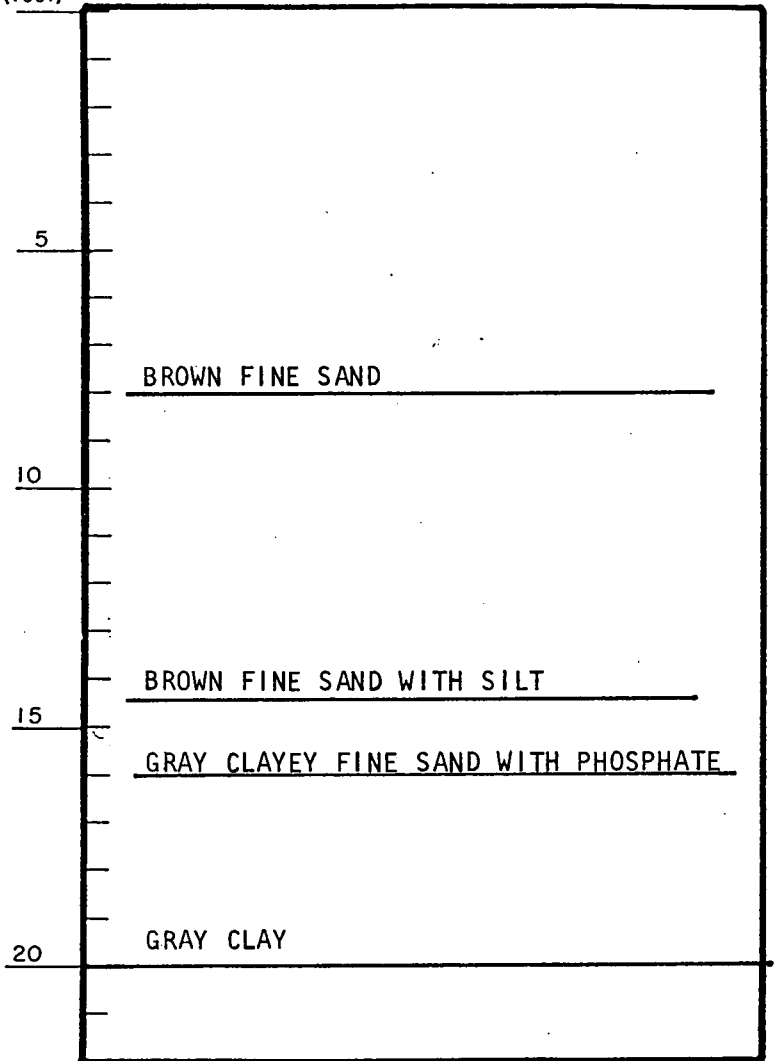
FILE NO. _____ APPROVED BY: *John H. Paul*

PIEZOMETER INSTALLATION RECORD



DEPTH (feet)

SOIL DESCRIPTION



WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	15.08'	

NO. PZ-4

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 11/28/90

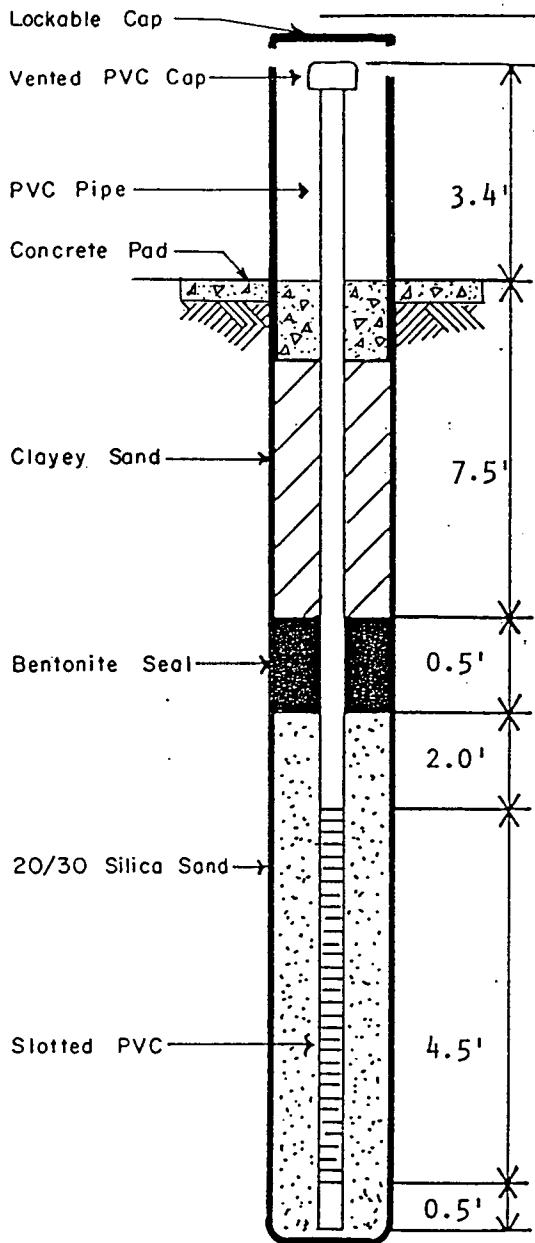
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
FILE No. 90-8073

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FILE NO.	APPROVED BY: <i>John D. Paul</i>	

PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
5	BROWN FINE SAND & REFUSE
10	BROWN FINE SAND
15	GRAY FINE SAND
20	GRAY FINE SAND WITH CLAY
	GRAY CLAY
20	ROCK

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	13.42'	

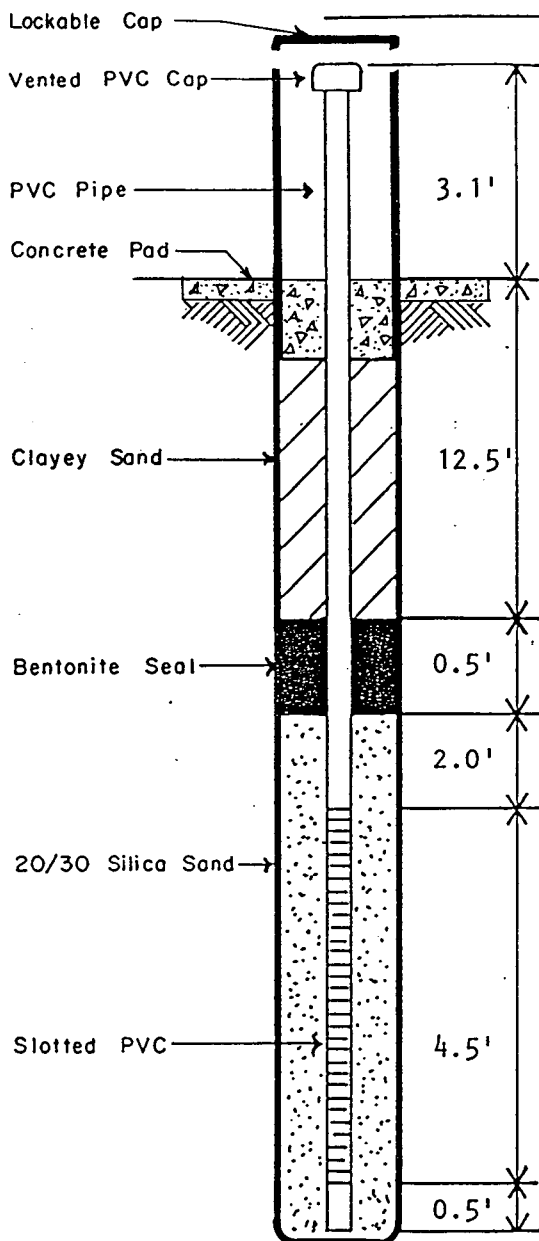
NO. PZ-5
 PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL
 BORING DIA. 6" PVC DIA. 2"
 DATE INSTALLED 11/28/90
 LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
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FILE NO.	APPROVED BY: <i>[Signature]</i>	

PIEZOMETER INSTALLATION RECORD



DEPTH
(feet)

SOIL DESCRIPTION

5	BROWN FINE SAND & REFUSE
10	BROWN FINE SAND
	GRAY FINE SAND
15	BROWN FINE SAND
20	GRAY CLAYEY FINE SAND WITH PHOSPHATE

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	13.08'	

NO. PZ-6

PROTECTIVE CASING SIZE & TYPE 4" x 4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 11/29/90

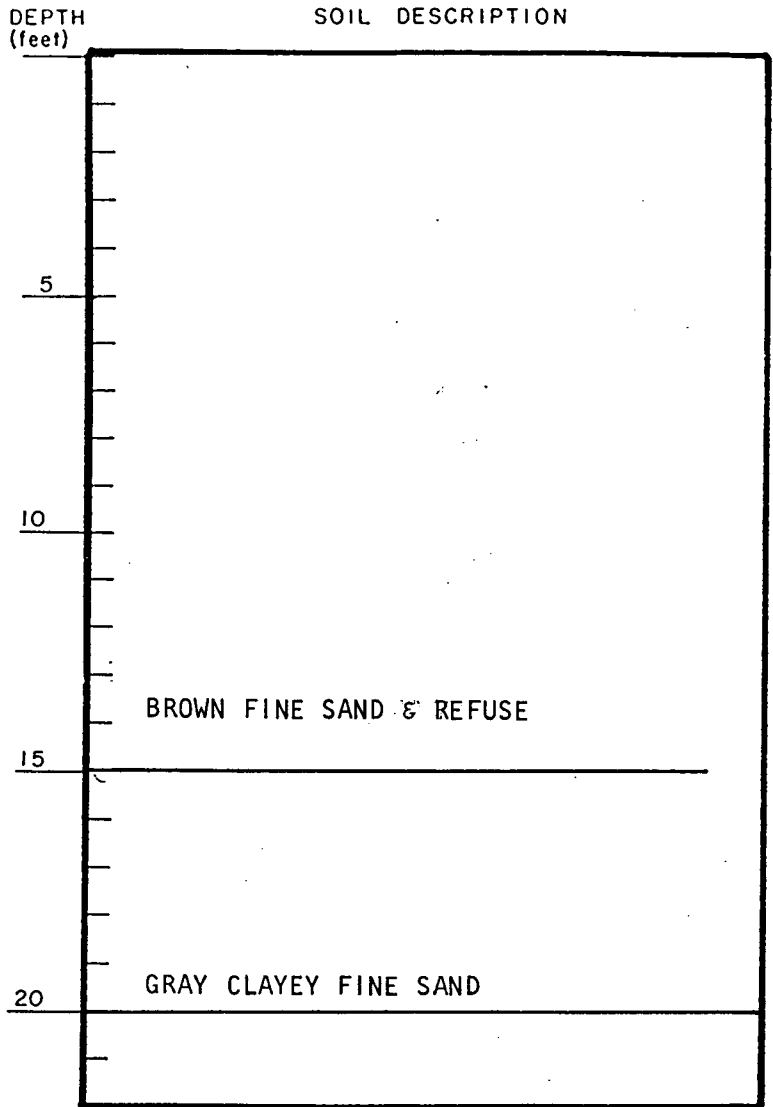
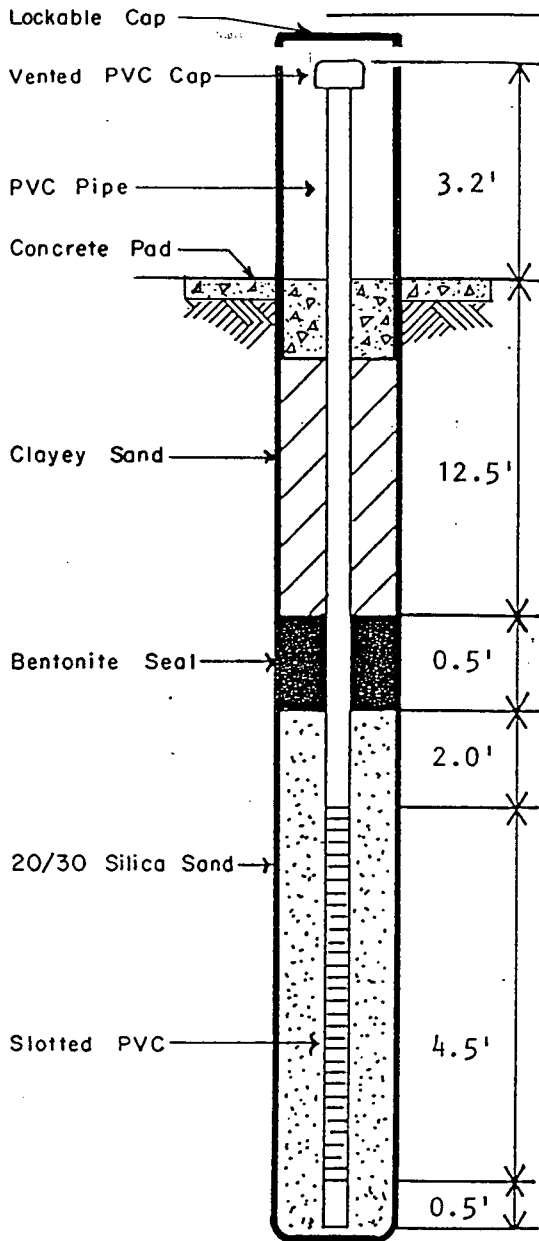
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
 FILE No. 90-8073

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FILE NO.	APPROVED BY: <i>Greg N. [Signature]</i>	

PIEZOMETER INSTALLATION RECORD



WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/10/90	10.83'	

NO. PZ-7

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 11/29/90

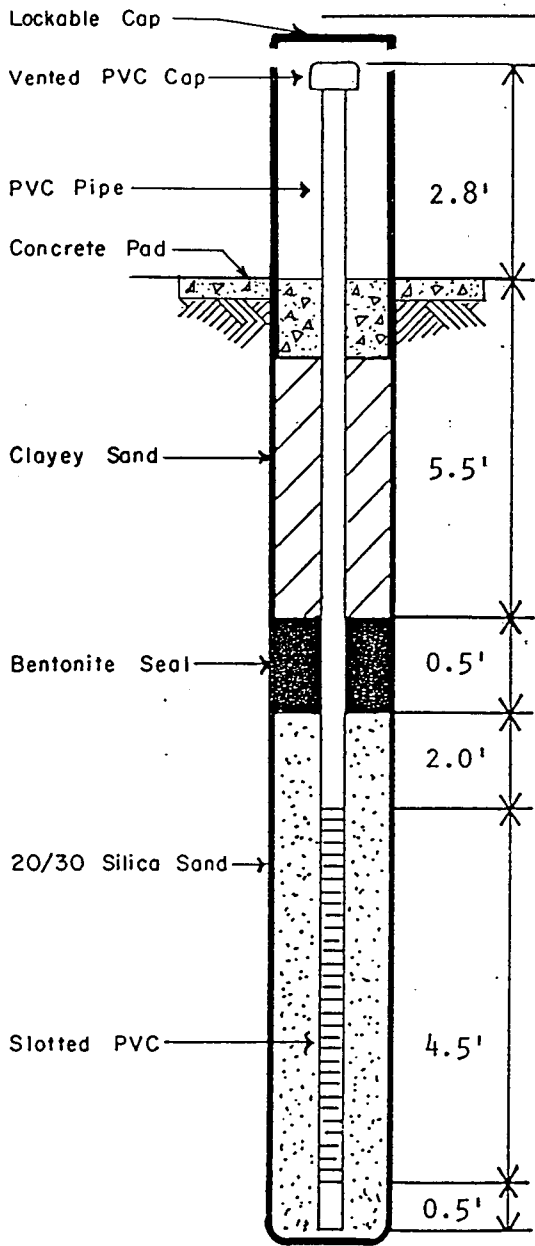
LOCATION SEE FIGURE 1

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PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
	GRAY FINE SAND DARK BROWN FINE SAND WITH SILT
5	BROWN FINE SAND
10	BROWN SILTY FINE SAND BROWN FINE SAND
15	GRAY CLAYEY FINE SAND WITH PHOSPHATE ROCK
20	

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/13/90	9.38'	

NO. PZ-12

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 12/3/90

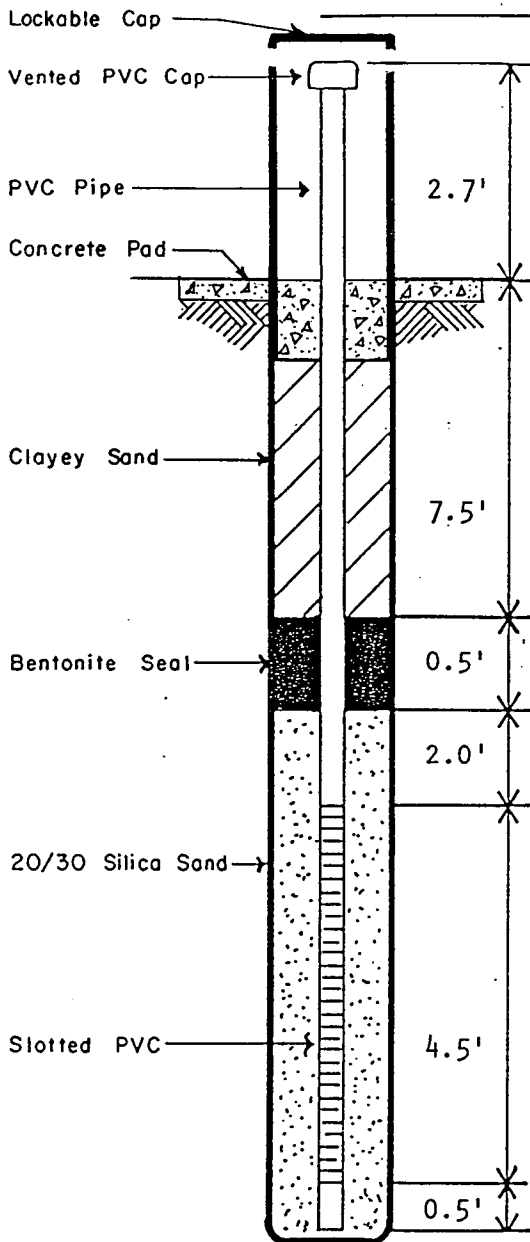
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
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PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
	GRAY FINE SAND
	DARK BROWN FINE SAND WITH SILT
5	BROWN FINE SAND
	GRAY SILTY FINE SAND
10	GRAY SILTY FINE SAND WITH PHOSPHATE
	GRAY CLAYEY FINE SAND
15	TAN CLAY
20	GREEN CLAY

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/13/90	7.50'	

NO. PZ-13

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 12/3/90

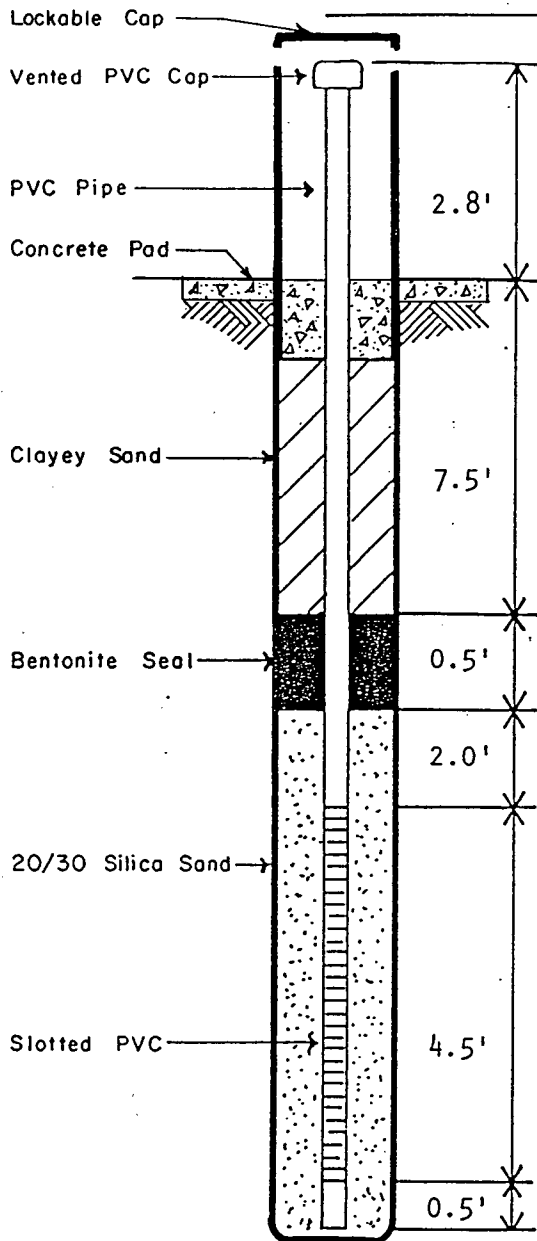
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
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PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
0	GRAY FINE SAND DARK BROWN FINE SAND WITH SILT
5	BROWN FINE SAND
10	GRAY SILTY FINE SAND
15	GRAY FINE SAND WITH CLAY
20	GRAY CLAYEY FINE SAND WITH PHOSPHATE
25	TAN CLAYEY FINE SAND
30	GRAY FINE SAND

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/13/90	6.92'	

NO. PZ-14

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 12/3/90

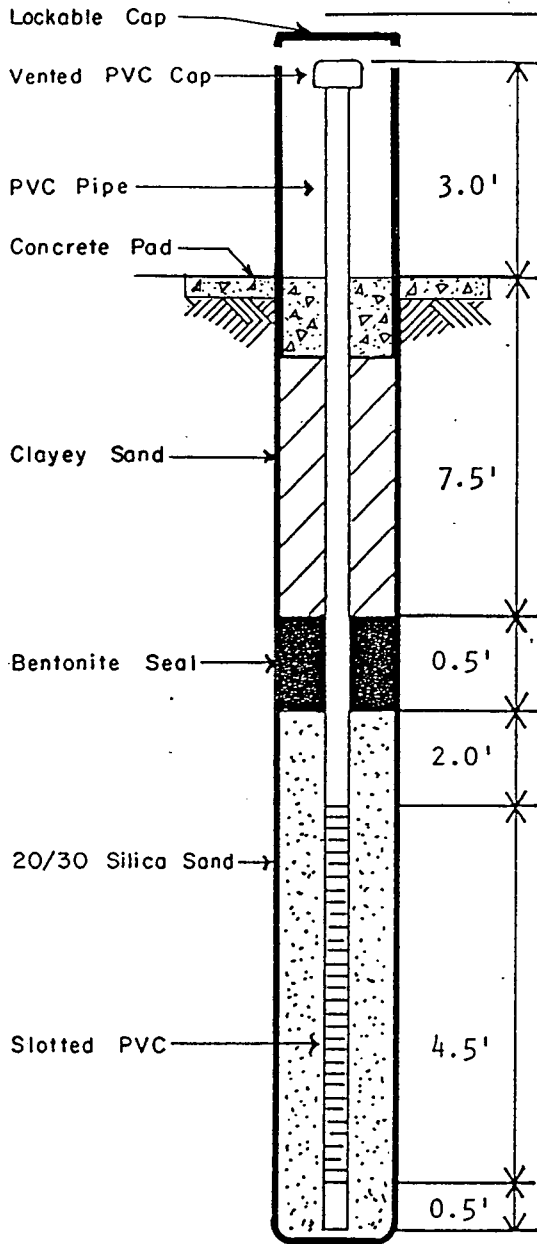
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
FILE No. 90-8073

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PIEZOMETER INSTALLATION RECORD



DEPTH (feet)	SOIL DESCRIPTION
5	BROWN FINE SAND
10	GRAY SILTY FINE SAND
15	GRAY CLAYEY FINE SAND WITH PHOSPHATE
20	TAN CLAY
20	GRAY FINE SAND

WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/13/90	5.75'	

NO. PZ-15

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

DATE INSTALLED 12/4/90

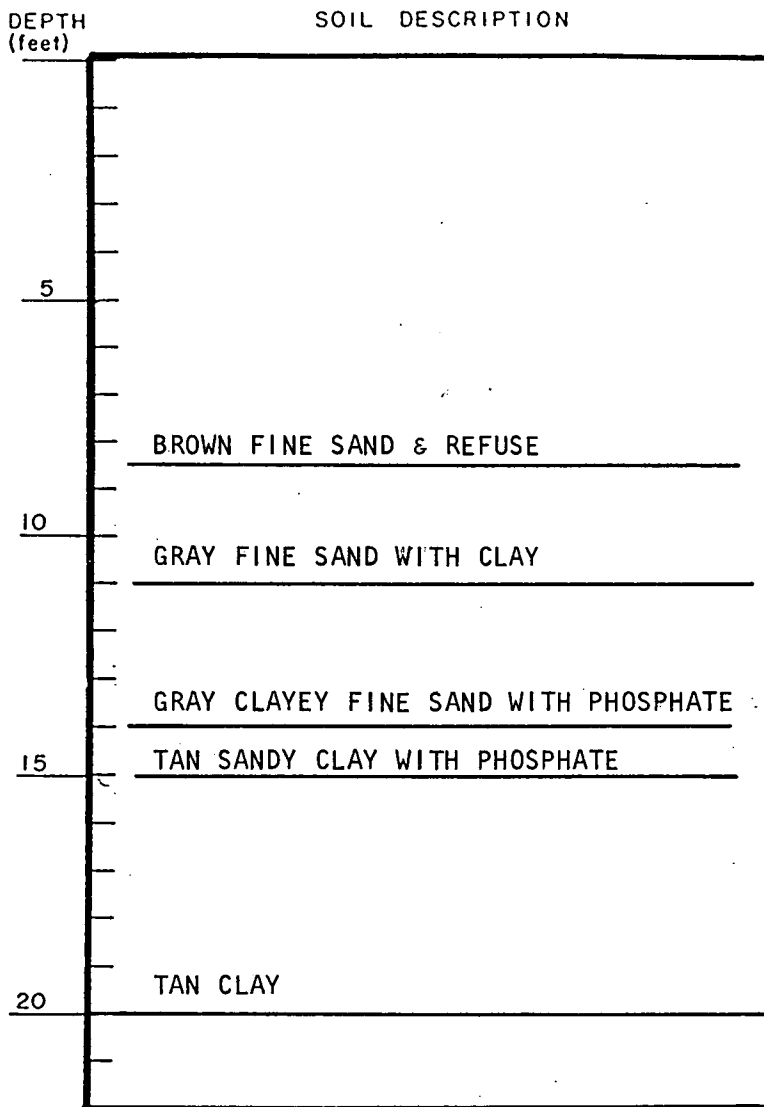
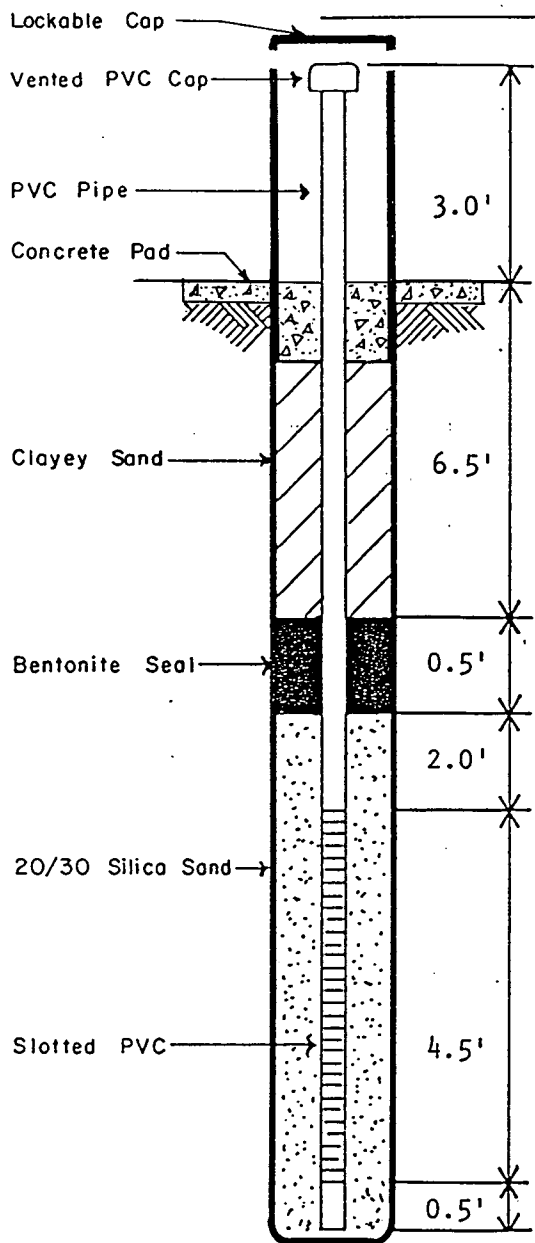
LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
 FILE No. 90-8073

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PIEZOMETER INSTALLATION RECORD



WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/13/90	6.79'	

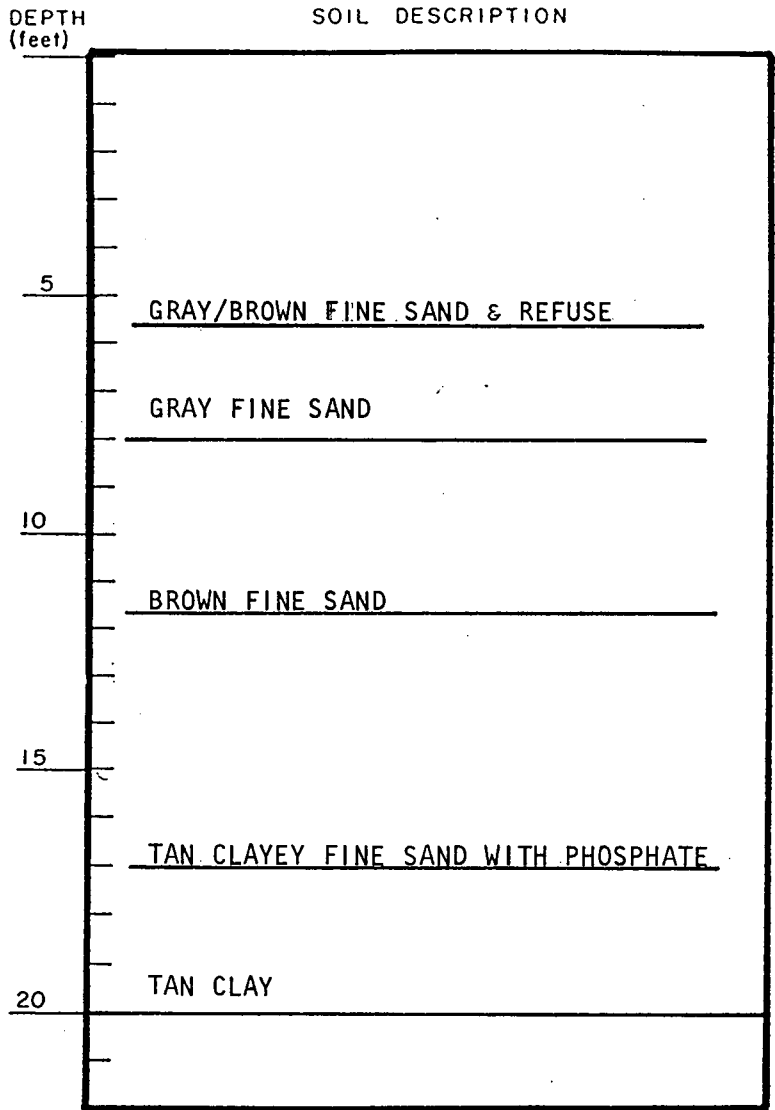
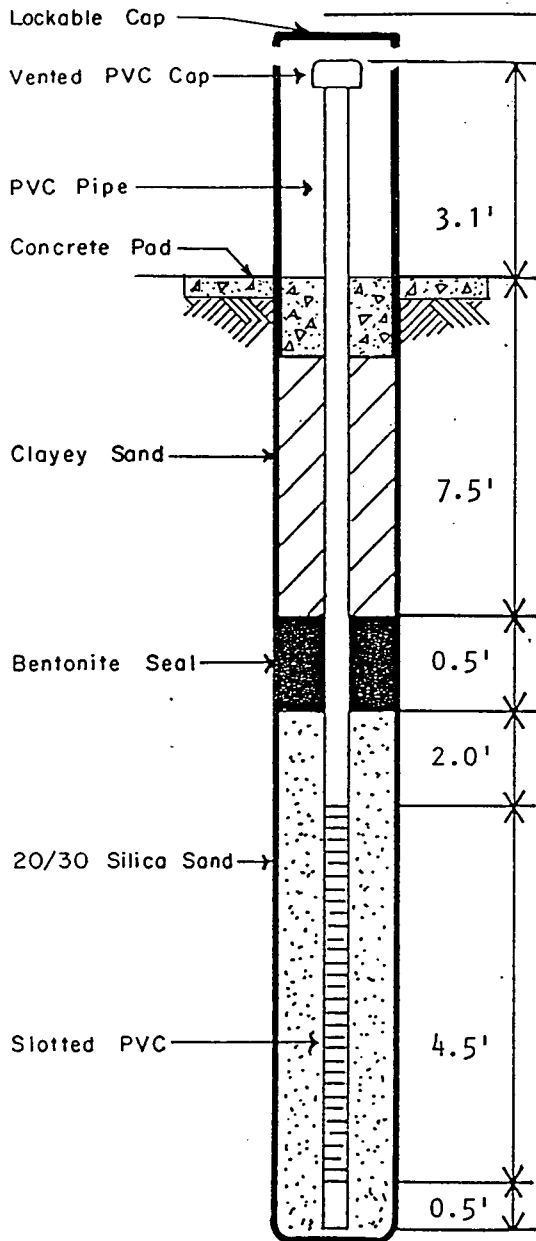
NO. PZ-16
 PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL
 BORING DIA. 6" PVC DIA. 2"
 DATE INSTALLED 12/4/90
 LOCATION SEE FIGURE 1

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LENA ROAD LANDFILL
FILE No. 90-8073

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FILE NO.	APPROVED BY: <i>July D. Paul</i>	

PIEZOMETER INSTALLATION RECORD



WATER LEVEL READINGS		
DATE	BELOW TOP	ELEVATION
12/13/90	12.00'	

NO. PZ-17

PROTECTIVE CASING SIZE & TYPE 4"x4" STEEL

BORING DIA. 6" PVC DIA. 2"

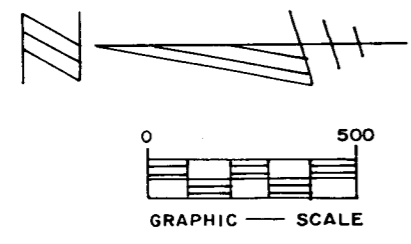
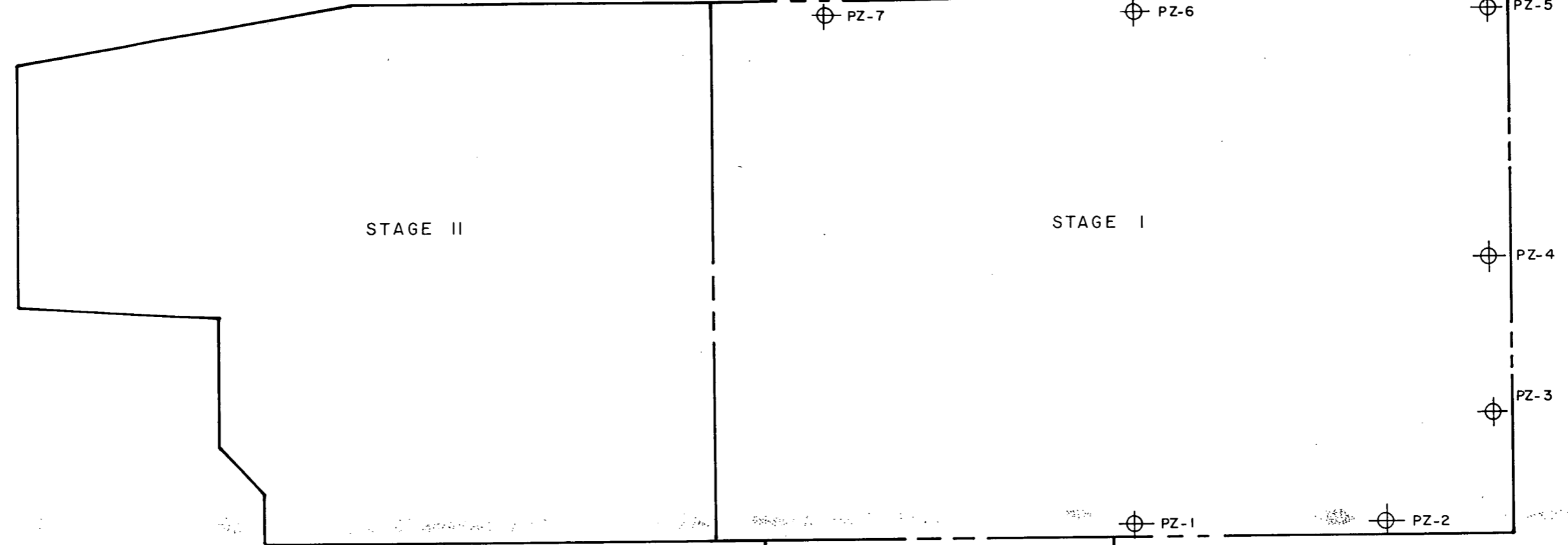
DATE INSTALLED 12/4/90

LOCATION SEE FIGURE 1

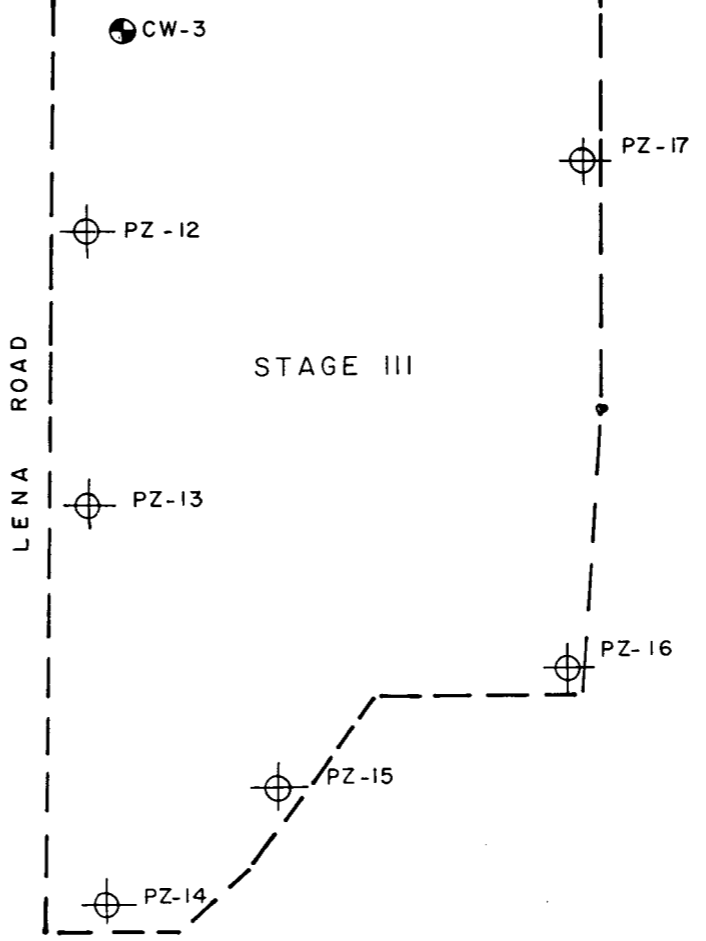
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FILE NO.	APPROVED BY: <i>John H. Paul</i>	



- — — — — EXISTING STAGE I SLURRY WALL
- — — — — EXISTING STAGE II SLURRY WALL
- - - - - EXISTING STAGE III SLURRY WALL
- ⊕ LOCATION OF PIEZOMETER
- LOCATION OF PLUGGED MONITOR WELL



Ardaman & Associates, Inc.
 Consulting Engineers in Soil Mechanics,
 Foundations, and Materials Testing

TEST LOCATIONS OF
 LENA RD. LANDFILL
 MANATEE COUNTY, FLORIDA

DRAWN BY: KCC	CHECKED BY:	DATE: 12/17/90
FILE NO. 90-8073	APPROVED BY:	

FIGURE 1