73307

ENVIRONMENTAL RESTORATION PROJECT

Los Alamos National Laboratory (LANL)
Environment Restoration Project (ER)
Records Processing Facility (RPF)
ER Record ID Number Barcode Label

LOS ALAMOS NATIONAL LABORATORY
ENVIRONMENTAL RESTORATION
Records Processing Facility
ER Records Index Form

ER ID NO. 73307 ***Date Received:*** 8/26/2002 ***Processor:*** DSV ***Page Count:*** 110

Privileged: (Y/N) N ***Record Category:*** P

FileFolder: N/A

Correction: (Y/N) N ***Corrected No.*** 0 ***Corrected By Number:*** 0

Administrative Record: (Y/N) Y

Refilmed: (Y/N) N ***Old ER ID Number:*** 0 ***New ER ID Number:*** 0

Miscellaneous Comments:

N/A

36079

THIS FORM IS SUBJECT TO CHANGE. CONTACT THE RPF FOR LATEST VERSION. (JUNE 1997)

#73307

(110)

Los Alamos
NATIONAL LABORATORY
University of California
Environmental Science and Waste Technology (E)
Environmental Restoration (ER) Project, MS M992
Los Alamos, New Mexico 87545
(505) 667-0808/FAX (505) 665-4747

Date: January 28, 2002
Refer to: ER2001-0831

Mr. Joe Vozella
Office of Los Alamos Site Operations
Los Alamos Area Office, MS A316
Los Alamos, NM 87545

SUBJECT: REPORT ON ALLUVIAL WELL COMPLETIONS 1994 TO 2001

Dear Joe:

Attached you will find a copy of the "Report on Alluvial Well Completions 1994-2001", dated November 2001. This report provides comprehensive completion information on alluvial groundwater monitoring wells completed in Los Alamos, Pueblo, Mortandad, Threemile Canyons, and Canon de Valle. This document builds on previous well completion reports in that it incorporates well completion data for alluvial groundwater piezometers installed in calendar year 2001, and also incorporates completion information for alluvial groundwater monitoring wells installed in Los Alamos Canyon in 1994.

If you have any questions, please don't hesitate to contact Allyn Pratt at (505) 667-2048 or Danny Katzman at (505) 667-0599.

Sincerely,

Julie A. Canepa

Julie A. Canepa, Program Manager
Environmental Restoration Project

JC/DK/th

Received by ER-RP
AUG 26 2002

Enclosure: Alluvial Well Completions 1994-2001

Cy (w/enc.):
Canyons Focus Area, MS M992
M. Johansen, OLASO, MS A316
M. Kirsch, E/ER, MS M992
J. Keiling, NMED, HWB
J. Parker, NMED, DOE OB
E/ER File, MS M992
IM-5, MS A150
RPF, MS M707

Cy (w/o enc.):
J. Canepa, E/ER, MS M992
A. Pratt, EES-9, MS M992
D. Katzman, EES-9, MS M992

REPORT ON ALLUVIAL WELL COMPLETIONS 1994-2001

Prepared for the

Environmental Restoration Project
Los Alamos National Laboratory

by

Robert N. Gray

November, 2001

TABLE OF CONTENTS

Page

1.0 **INTRODUCTION** 1

2.0 **LOS ALAMOS CANYON** 2
- 2.1 Summary Details for Alluvial Characterization Well LAO-1.6(g) 4
- 2.2 Summary Details for Alluvial Characterization Well LLAO-1(b) 7
- 2.3 Summary Details for Alluvial Characterization Well LLAO-2 10
- 2.4 Summary Details for Alluvial Characterization Well LLAO-3 13
- 2.5 Summary Details for Alluvial Characterization Well LLAO-4 16
- 2.6 Summary Details for Alluvial Characterization Well LLAO-5 19

3.0 **PUEBLO CANYON** 22
- 3.1 Summary Details for Alluvial Characterization Well PAO-4 23
- 3.2 Summary Details for Alluvial Characterization Well PAO-5S 27
- 3.3 Summary Details for Alluvial Characterization Well PAO-5N 30
- 3.4 Summary Details for Alluvial Characterization Well PAO-2.5 33
- 3.5 Summary Details for Alluvial Characterization Well PAO-3 36
- 3.6 Summary Details for Alluvial Characterization Well PAO-1(a) 38
- 3.7 Summary Details for Alluvial Characterization Well PAO-2 41

4.0 **THREEMILE CANYON** 43
- 4.1 Summary Details for Alluvial Characterization Well BG-4 43

5.0 **CAÑON DE VALLE** 46
- 5.1 Summary Details for Alluvial Characterization Well 16-2655 46
- 5.2 Summary Details for Alluvial Characterization Well 16-2656 49
- 5.3 Summary Details for Alluvial Characterization Well 16-2657 51
- 5.4 Summary Details for Alluvial Characterization Well 16-2658 53
- 5.5 Summary Details for Alluvial Characterization Well 16-2659 55
- 5.6 Summary Details for Alluvial Characterization Well 16-2660 57

6.0 **MORTANDAD CANYON** 59
- 6.1 Summary Details for Alluvial/Cerro Toledo Interval Characterization Well MCO-7.2 60
- 6.2 Summary Details for Alluvial Characterization Well MCO-0.6 63

7.0 **LOS ALAMOS CANYON - 1994 Installations** 65
- 7.1 Summary Details for Alluvial Characterization Well LAO-B 67
- 7.2 Summary Details for Alluvial Characterization Well LAO-0.3 69
- 7.3 Summary Details for Alluvial Characterization Well LAO-0.6 71
- 7.4 Summary Details for Alluvial Characterization Well LAO-0.8 73
- 7.5 Summary Details for Alluvial Characterization Well LAO-0.91 75

8.0 **LOS ALAMOS CANYON - Alluvial Piezometers** 77
- 8.1 Summary Details for Piezometer Nest LAP-1 80
- 8.2 Summary Details for Piezometer Nest LAP-1.5 82
- 8.3 Summary Details for Piezometer Nest LAP-1.7 84
- 8.4 Summary Details for Piezometer LAP-3 86

TABLE OF CONTENTS continued

Page

8.5 Summary Details for Piezometer Nest LAP-3.5 88
8.6 Summary Details for Piezometer Nest LAP-4 90
8.7 Summary Details for Piezometer Nest LAP-5.7 92
8.8 Summary Details for Piezometer LAP-6 94

9.0 REFERENCES 96

APPENDIX A: BOREHOLE LITHOLOGY LOGS 97

FIGURES

2-1 ER Project alluvial characterization wells in middle and lower Los Alamos Canyon 3
2.1-1 Location of alluvial characterization well LAO-1.6(g) in middle Los Alamos Canyon 5
2.1-2 Construction diagram for alluvial characterization well LAO-1.6(g) 6
2.2-1 Location of alluvial characterization well LLAO-1(b) in lower Los Alamos Canyon 8
2.2-2 Construction diagram for alluvial characterization well LLAO-1(b) 9
2.3-1 Location of alluvial characterization well LLAO-2 in lower Los Alamos Canyon 11
2.3-2 Construction diagram for alluvial characterization well LLAO-2 12
2.4-1 Location of alluvial characterization well LLAO-3 in lower Los Alamos Canyon 14
2.4-2 Construction diagram for alluvial characterization well LLAO-3 15
2.5-1 Location of alluvial characterization well LLAO-4 in lower Los Alamos Canyon 17
2.5-2 Construction diagram for alluvial characterization well LLAO-4 18
2.6-1 Location of alluvial characterization well LLAO-5 in lower Los Alamos Canyon 20
2.6-2 Construction diagram for alluvial characterization well LLAO-5 21
3-1 ER Project alluvial characterization wells in lower Pueblo Canyon 24
3.1-1 Location of alluvial characterization well PAO-4 in lower Pueblo Canyon 25
3.1-2 Construction diagram for alluvial characterization well PAO-4 26
3.2-1 Location of alluvial characterization well PAO-5S in lower Pueblo Canyon 28
3.2-2 Construction diagram for alluvial characterization well PAO-5S 29
3.3-1 Location of alluvial characterization well PAO-5N in lower Pueblo Canyon 31
3.3-2 Construction diagram for alluvial characterization well PAO-5N 32
3-2 Locations of alluvial characterization wells PAO-2.5 and PAO-3 in middle Pueblo Canyon 34
3.4-1 Construction diagram for alluvial characterization well PAO-2.5 35
3.5-1 Construction diagram for alluvial characterization well PAO-3 37
3-3 Locations of alluvial characterization wells PAO-1(a) and PAO-2 in upper Pueblo Canyon 39
3.6-1 Construction diagram for alluvial characterization well PAO-1(a) 40
3.7-1 Construction diagram for alluvial characterization well PAO-2 42
4.1-1 Location of alluvial characterization well BG-4 in Threemile Canyon 44
4.1-2 Construction diagram for alluvial characterization well BG-4 45
5-1 ER Project alluvial characterization wells in Cañon de Valle 47
5.1-1 Construction diagram for alluvial characterization well 16-2655 48
5.2-1 Construction diagram for alluvial characterization well 16-2656 50
5.3-1 Construction diagram for alluvial characterization well 16-2657 52
5.4-1 Construction diagram for alluvial characterization well 16-2658 54
5.5-1 Construction diagram for alluvial characterization well 16-2659 56

FIGURES continued Page

5.6-1 Construction diagram for alluvial characterization well 16-2660 58
6-1 Locations of alluvial/Cerro Toledo interval characterization well MCO-7.2 in middle Mortandad Canyon and alluvial characterization well MCO-0.6 in upper Mortandad Canyon 61
6.1-1 Construction diagram for alluvial/Cerro Toledo interval characterization well MCO-7.2 62
6.2-1 Construction diagram for alluvial characterization well MCO-0.6 64
7-1 Locations of alluvial characterization wells installed in 1994 in upper Los Alamos Canyon 66
7.1-1 Construction diagram for alluvial characterization well LAO-B 68
7.2-1 Construction diagram for alluvial characterization well LAO-0.3 70
7.3-1 Construction diagram for alluvial characterization well LAO-0.6 72
7.4-1 Construction diagram for alluvial characterization well LAO-0.8 74
7.5-1 Construction diagram for alluvial characterization well LAO-0.91 76
8-1 Locations of alluvial piezometers in upper Los Alamos Canyon 78
8-2 Locations of alluvial piezometers in middle Los Alamos Canyon 79
8.1-1 Construction diagram for alluvial piezometer nest LAP-1 81
8.2-1 Construction diagram for alluvial piezometer nest LAP-1.5 83
8.3-1 Construction diagram for alluvial piezometer nest LAP-1.7 85
8.4-1 Construction diagram for alluvial piezometer LAP-3 87
8.5-1 Construction diagram for alluvial piezometer nest LAP-3.5 89
8.6-1 Construction diagram for alluvial piezometer nest LAP-4 91
8.7-1 Construction diagram for alluvial piezometer nest LAP-5.7 93
8.8-1 Construction diagram for alluvial piezometer LAP-6 95

1.0 INTRODUCTION

This report presents technical information for 27 alluvial characterization wells, 6 alluvial piezometer nests and 2 alluvial piezometers installed in canyon settings in the Los Alamos National Laboratory (LANL) area by the Environmental Restoration (ER) Project during the period from April, 1994 through May, 2001. These include the alluvial wells and piezometers installed by the previous Field Unit 4 and current Canyons Focus Area teams in Los Alamos Canyon, Pueblo Canyon, and Mortandad Canyon, plus alluvial wells installed as part of Resource Conservation and Recovery Act (RCRA) facility investigations at TA-18 (Threemile Canyon) and TA-16 (Cañon de Valle).

Summary details provided for each well include surveyed location coordinates elevations, characterization and monitoring and objectives, installation dates, drilling methods, general stratigraphy, water levels, and construction details. Location maps and construction diagrams are also provided for each well, and borehole lithology logs are included in Appendix A. In some cases, the stratigraphy summaries depict stratigraphic interpretations made subsequent to the field investigation and may reflect changes made to initial field interpretations regarding encountered stratigraphic units.

Each well was constructed in accordance (to the extent possible) with LANL-ER-SOP-5.01 (LANL, 1991, 21556), New Mexico Environment Department (NMED) Monitor Well Construction and Abandonment Guidelines (NMED, 1992, 53805), and U.S. Environmental Protection Agency (EPA) requirements specified in Module VIII, Section C-1 of LANL's Hazardous Waste Permit (EPA, 1990, 1585).

The well information is presented in aggregate groups organized by canyons and installation dates. It includes information for eleven wells installed in Los Alamos Canyon (Sections 2 and 7):

1) LAO-1.6(g)
2) LLAO-1(b)
3) LLAO-2
4) LLAO-3
5) LLAO-4
6) LLAO-5
7) LAO-B
8) LAO-0.3
9) LAO-0.6
10) LAO-0.8
11) LAO-0.91,

seven wells installed in Pueblo Canyon (section 3):

1) PAO-4
2) PAO-5S
3) PAO-5N
4) PAO-2.5
5) PAO-3
6) PAO-1(a)
7) PAO-2,

one well installed in Threemile Canyon, a tributary to Pajarito Canyon (Section 4):

1) BG-4,

six wells installed in upper Cañon de Valle (Section 5):

1) 16-2655
2) 16-2656
3) 16-2657
4) 16-2658
5) 16-2659
6) 16-2660,

two wells installed in Mortandad Canyon (Section 6):

1) MCO-7.2
2) MCO-0.6,

and 8 piezometer nests/piezometers installed in Los Alamos Canyon (Section 8):

1) LAP-1
2) LAP-1.5
3) LAP-1.7
4) LAP-3
5) LAP-3.5
6) LAP-4
7) LAP-5.7
8) LAP-6.

2.0 LOS ALAMOS CANYON

Information is provided in this section for six alluvial characterization wells installed in middle and lower Los Alamos Canyon. The locations of these wells are shown in Figure 2-1. Summary details, detailed location maps, and well construction diagrams are provided for each well. The lithologic logs for each borehole are included in Appendix A.

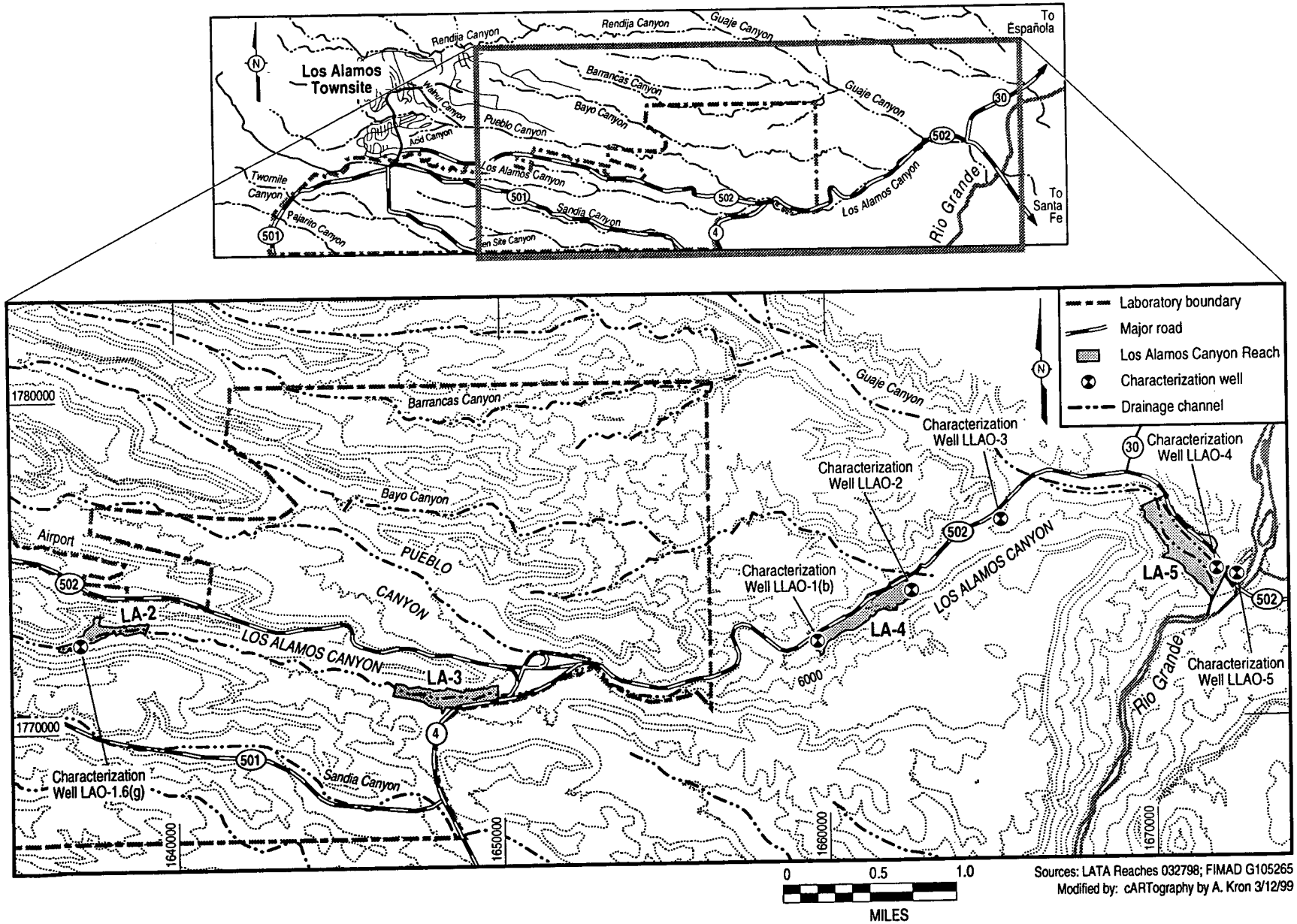
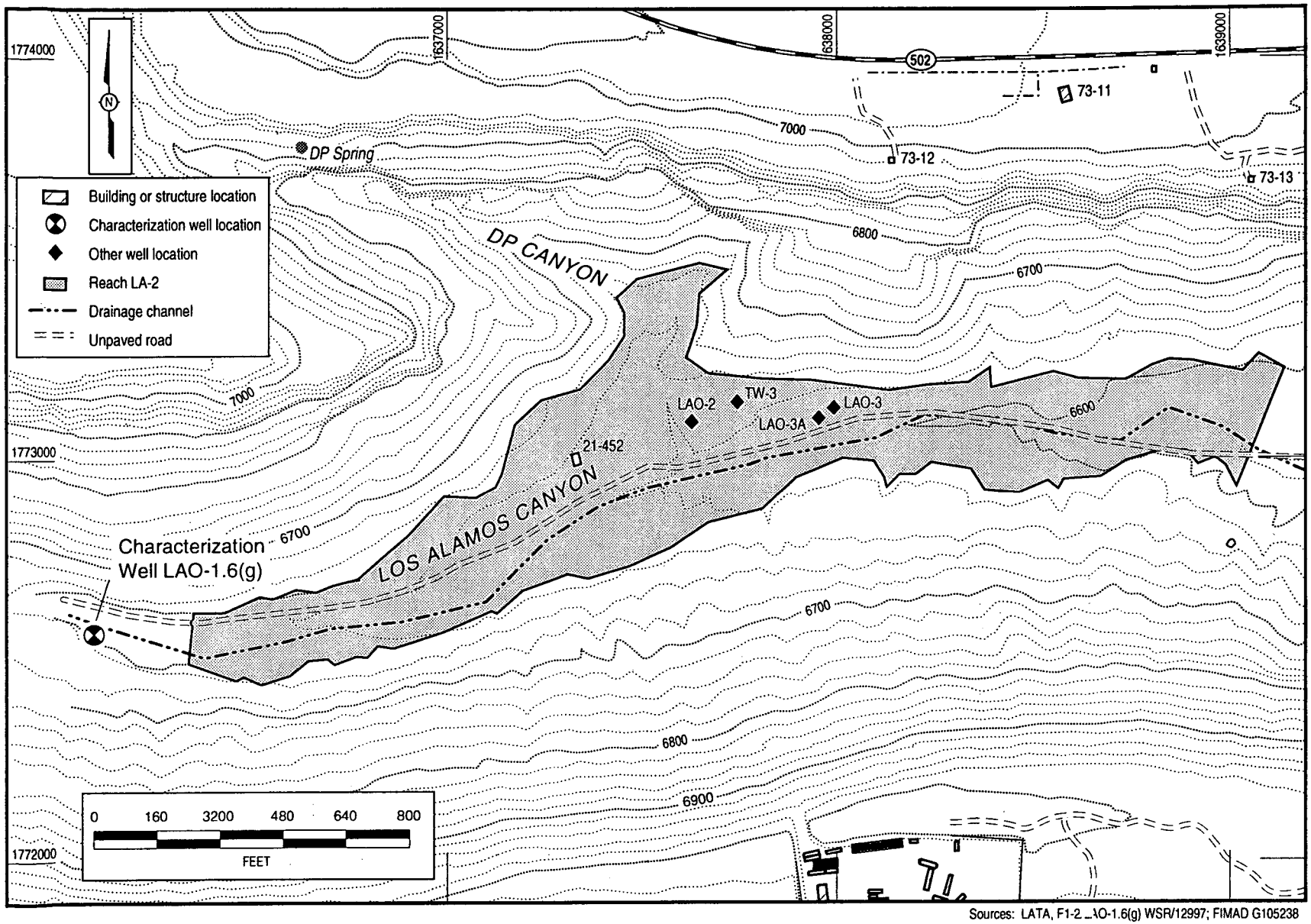


Figure 2-1. ER Project alluvial characterization wells in middle and lower Los Alamos Canyon.

2.1 Summary Details for Alluvial Characterization Well LAO-1.6(g)

Location:	Middle Los Alamos Canyon, approximately 400 feet west of confluence with DP Canyon. (see Figures 2-1 and 2.1-1)		
Survey Data:	Northing:	1,772,557.63	
	Easting:	1,636,083.42	(NM State Plane NAD 1983)
	Elevation:	6,661.07 ft msl (lid) 6,658.01 ft msl (disc) 6,657.68 ft msl (ground)	
Objectives:	Characterize alluvial groundwater quality in upper Los Alamos Canyon south of Technical Area (TA)-21, east of TA-2, and upstream of confluence with DP Canyon; identify contaminants from upstream sources (TA-2, TA-41); provide water level information.		
Date of Installation:	March 20, 1996		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-20 ft bgs Bandelier Tuff (Otowi Member): 20-36 ft bgs (see Appendix A)		
Water Level:	6.2-16.5 ft bgs (11/22/96-11/6/01)		
Construction Details: (see Fig. 2.1-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	36.0 ft bgs	
	Well Total Depth:	30.82 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	10.47-25.47 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	5.35 ft (25.47-30.82 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2_LAO-1.6(g) WSR/12997; FIMAD G105238
Modified by: cARTography by A. Kron 9/25/01

Figure 2.1-1. Location of alluvial characterization well LAO-1.6(g) in middle Los Alamos Canyon.

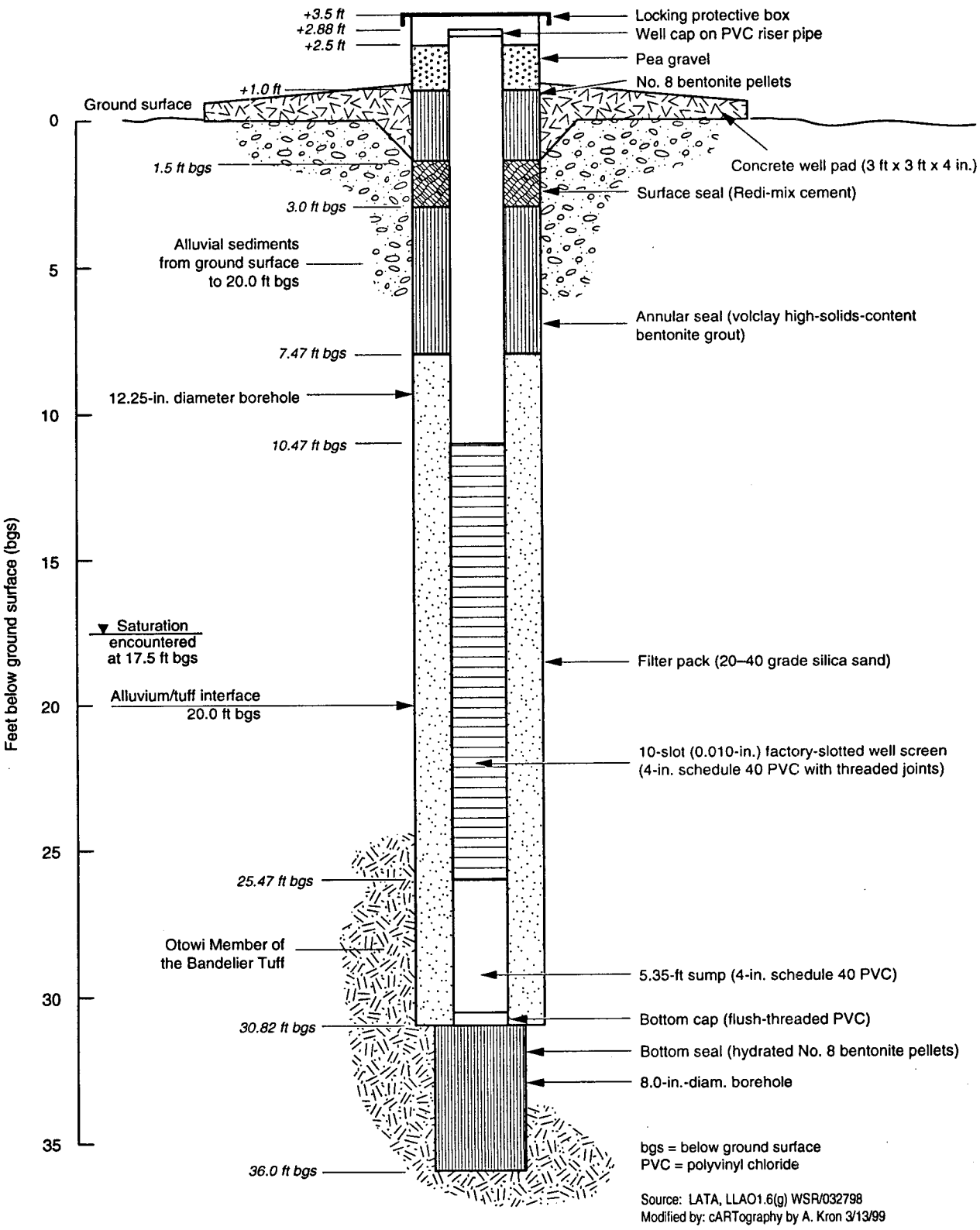
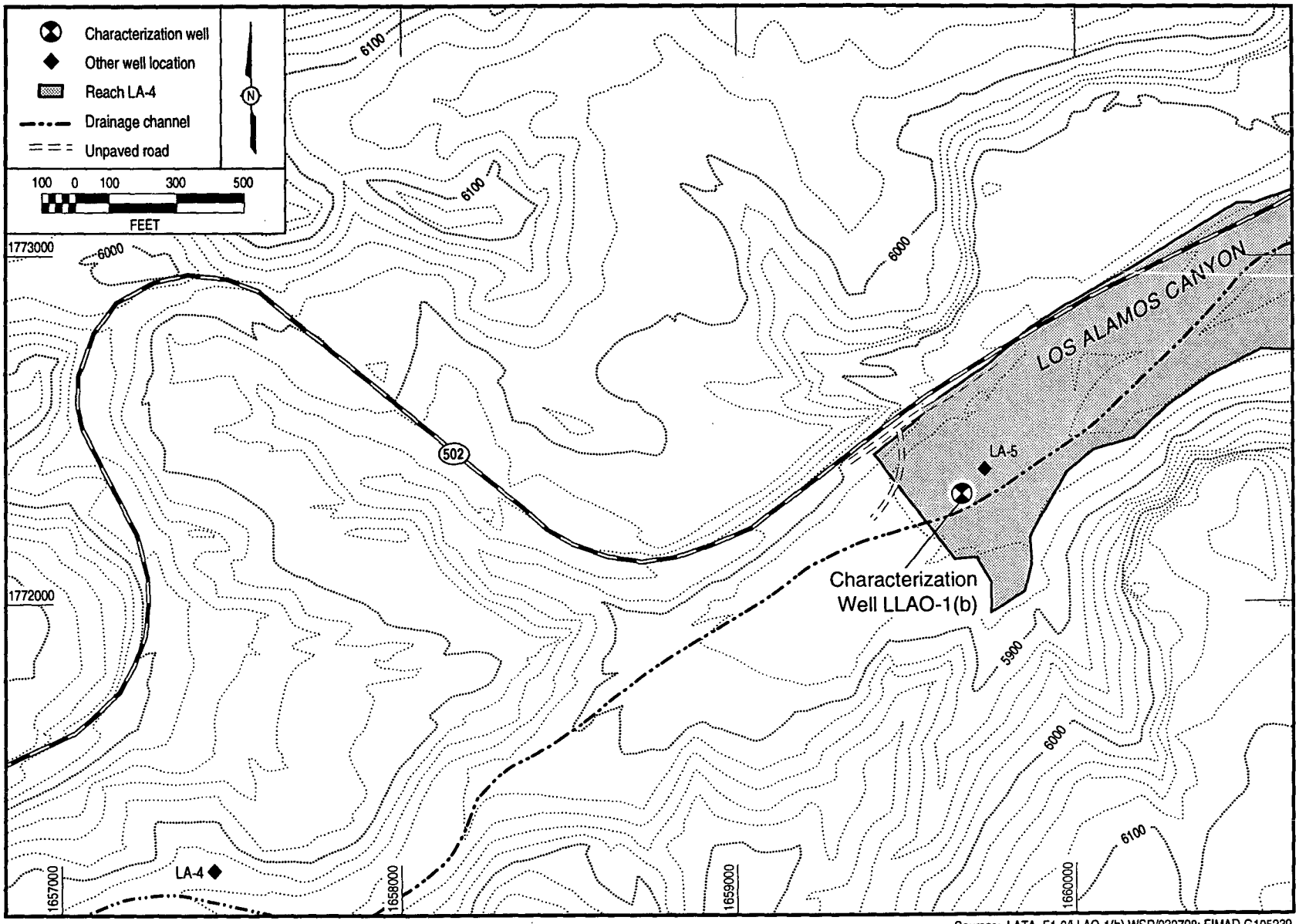


Figure 2.1-2. Construction diagram for alluvial characterization well LAO-1.6(g).

2.2 Summary Details for Alluvial Characterization Well LLAO-1(b)

Location:	Lower Los Alamos Canyon, approximately 3000 feet southwest of Totavi and approximately 100 feet east of western end of Reach LA-4. (see Figures 2-1 and 2.2-1)		
Survey Data:	Northing:	1,772,381.65	
	Easting:	1,659,738.70	(NM State Plane NAD 1983)
	Elevation:	5,852.89 ft msl (lid) 5,850.34 ft msl (disc) 5,848.84 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo (identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges and potential impacts from upper Los Alamos Canyon contaminant sources); provide water level information.		
Date of Installation:	July 16, 1997		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-18.0 ft bgs Puye Formation (or Totavi?) 18.0-24.0 ft bgs (see Appendix A)		
Water Level:	6.5-21.0 ft bgs (8/27/97-6/4/01)		
Construction Details: (see Fig. 2.2-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	24.17 ft bgs	
	Well Total Depth:	24.17 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	11.32-21.32 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (21.32-24.17 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/LLAO-1(b) WSR/032798; FIMAD G105239
Modifiec by: cARTography by A. Kron 3/12/99

Figure 2.2-1. Location of alluvial characterization well LLAO-1(b) in lower Los Alamos Canyon.

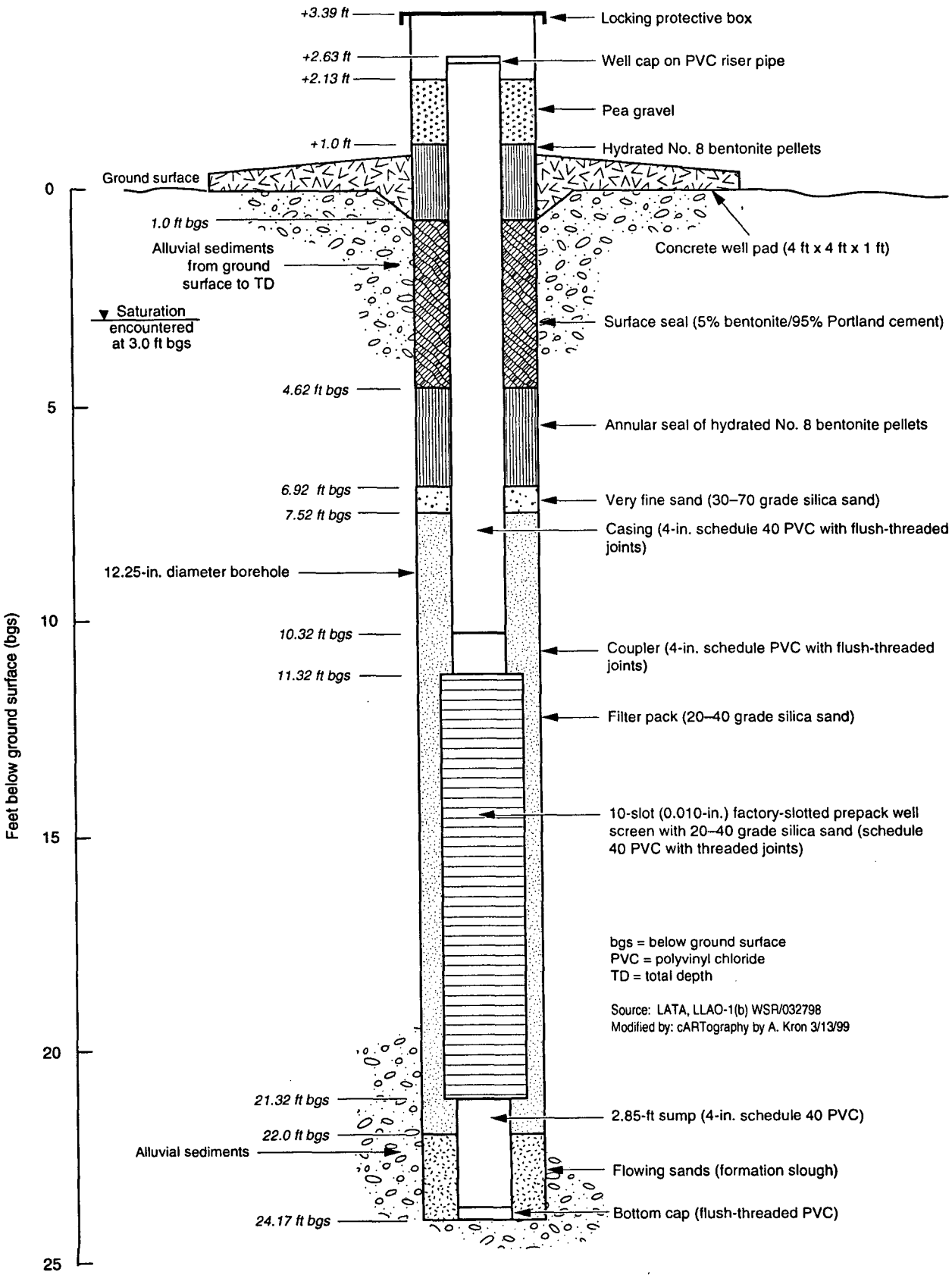
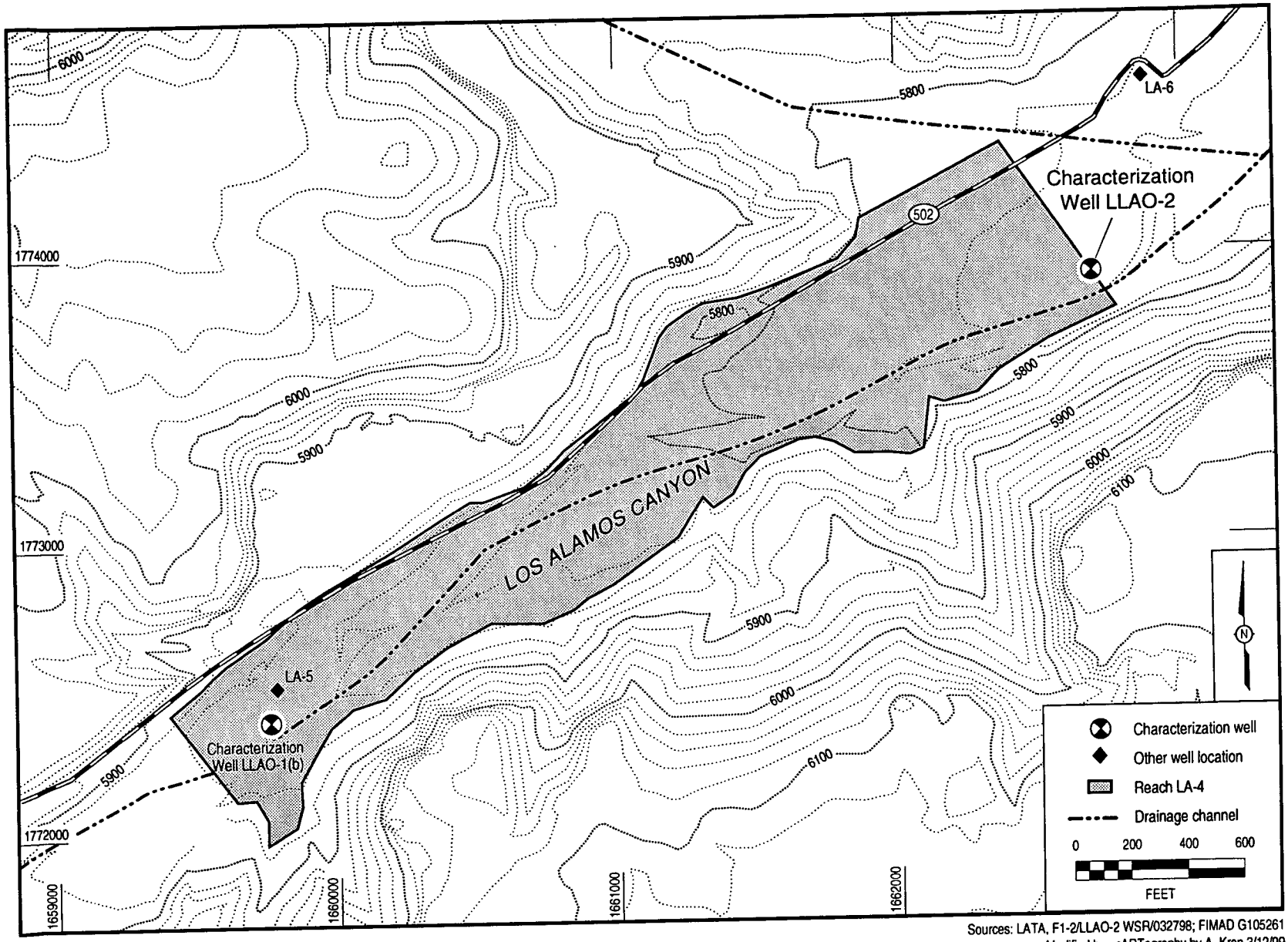


Figure 2.2-2. Construction diagram for alluvial characterization well LLAO-1(b).

2.3 Summary Details for Alluvial Characterization Well LLAO-2

Location:	Lower Los Alamos Canyon, near Totavi and eastern end of Reach LA-4. (see Figures 2-1 and 2.3-1)		
Survey Data:	Northing:	1,773,906.36	
	Easting:	1,662,717.26	(NM State Plane NAD 1983)
	Elevation:	5,772.18 ft msl (lid) 5,770.43 ft msl (disc) 5,770.18 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo (identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges and potential impacts from upper Los Alamos Canyon contaminant sources); provide water level information.		
Date of Installation:	September 26, 1996		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-30 ft bgs Puye Formation (or Totavi?): 30-34 ft bgs (see Appendix A)		
Water Level:	20.3-25.9 ft bgs (11/22/96-6/4/01)		
Construction Details: (see Fig. 2.3-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	32.5 ft bgs	
	Well Total Depth:	30.64 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	17.79-27.79 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	10-20 grade silica sand	
	Sump:	2.85 ft (27.79-30.64 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/LLAO-2 WSR/032798; FIMAD G105261
Modified by: cARTography by A. Kron 3/12/99

Figure 2.3-1. Location of alluvial characterization well LLAO-2 in lower Los Alamos Canyon.

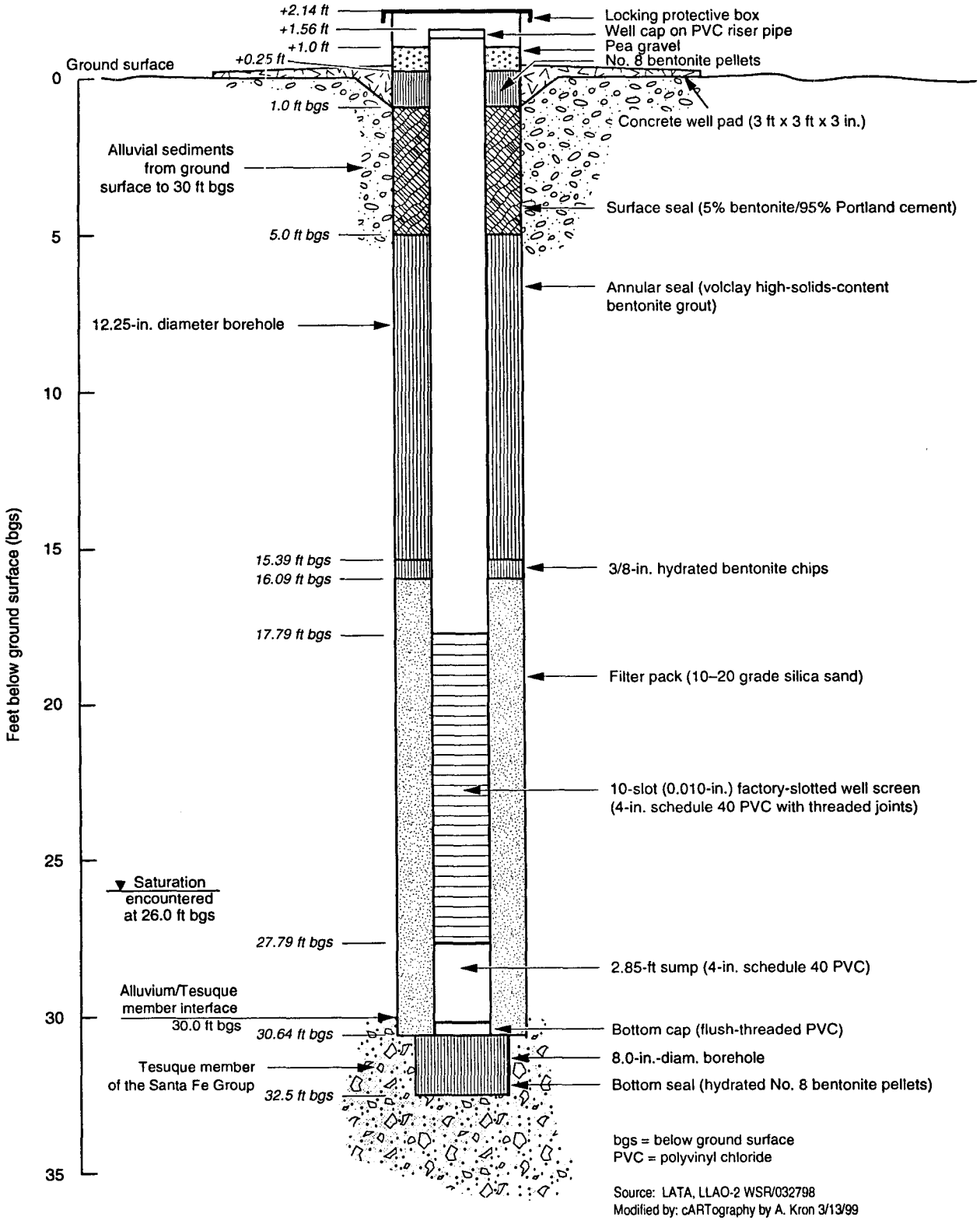
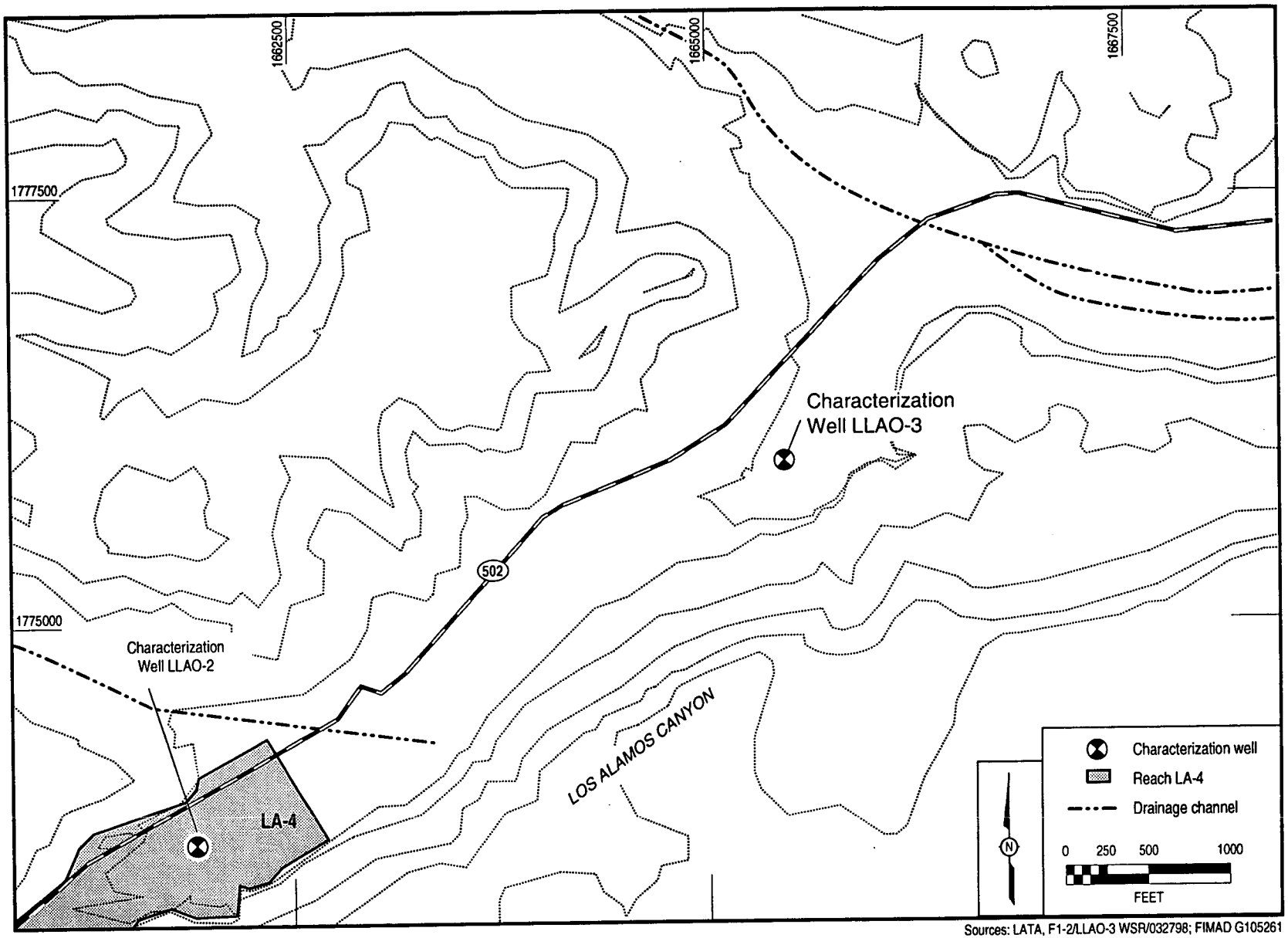


Figure 2.3-2. Construction diagram for alluvial characterization well LLAO-2.

2.4 Summary Details for Alluvial Characterization Well LLAO-3

Location:	Lower Los Alamos Canyon, approximately 3500 feet northeast of Totavi, and approximately 3600 feet northeast of east end of Reach LA-4. (see Figures 2-1 and 2.4-1)		
Survey Data:	Northing:	1,775,952.59	
	Easting:	1,665,475.00	(NM State Plane NAD 1983)
	Elevation:	5,692.62 ft msl (disc) 5,692.12 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo (identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges and potential impacts from upper Los Alamos Canyon contaminant sources); provide water level information.		
Date of Installation:	July 22, 1997		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-22.0 ft bgs (see Appendix A)		
Water Level:	12.3-18.3 ft bgs (8/27/97-6/4/01)		
Construction Details: (see Fig. 2.4-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	22.0 ft bgs	
	Well Total Depth:	21.5 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	8.65-18.65 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (18.65-21.5 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/LLAO-3 WSR/032798; FIMAD G105261
Modified by: cARTography by A. Kron 3/12/99

Figure 2.4-1. Location of alluvial characterization well LLAO-3 in lower Los Alamos Canyon.

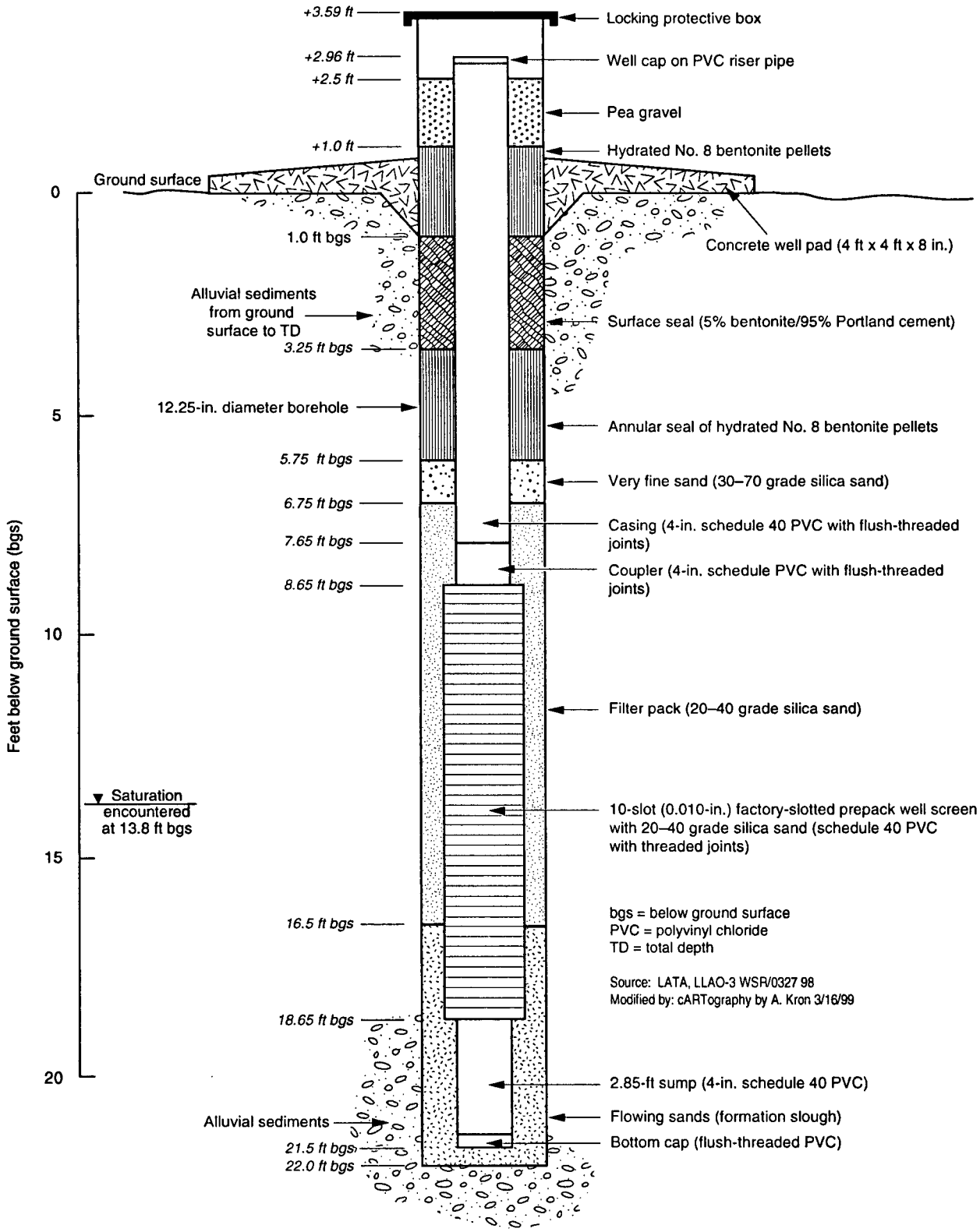
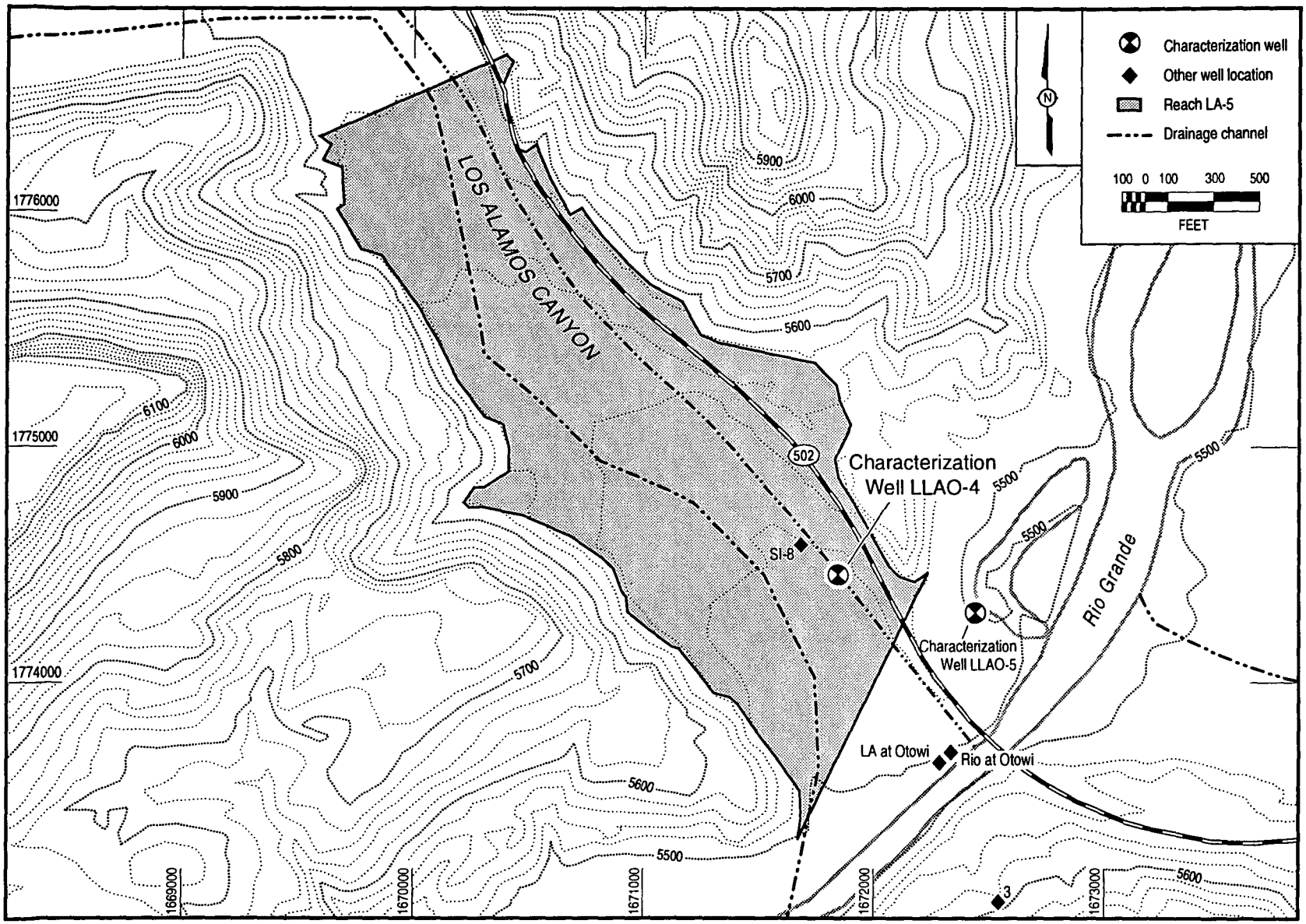


Figure 2.4-2. Characterization well construction for LLAO-3.

2.5 Summary Details for Alluvial Characterization Well LLAO-4

Location:	Lower Los Alamos Canyon, approximately 700 feet northwest of the Rio Grande at Otowi in Reach LA-5. (see Figures 2-1 and 2.5-1)	
Survey Data:	Northing:	1,774,468.006
	Easting:	1,671,820.226 (NM State Plane NAD 1983)
	Elevation:	5,517.33 ft msl (lid) 5,515.46 ft msl (disc) 5,515.21 ft msl (ground)
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo (identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges and potential impacts from upper Los Alamos Canyon contaminant sources); provide water level information.	
Date of Installation:	September 30, 1996	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-19.5 ft bgs (see Appendix A)	
Water Level:	3.1-7.3 ft bgs (9/30/96-6/4/01)	
Construction Details: (see Fig. 2.5-2)	Borehole Diameter:	12.25 in
	Borehole Total Depth:	21.0 ft bgs
	Well Total Depth:	18.09 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	5.24-15.24 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	10-20 grade silica sand
	Sump:	2.85 ft (15.24-18.09 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/LLAO-4 WSR/032598; FIMAD G105238
Modified by: cARTography by A. Kron 3/12/99

Figure 2.5-1. Location of alluvial characterization well LLAO-4 in lower Los Alamos Canyon.

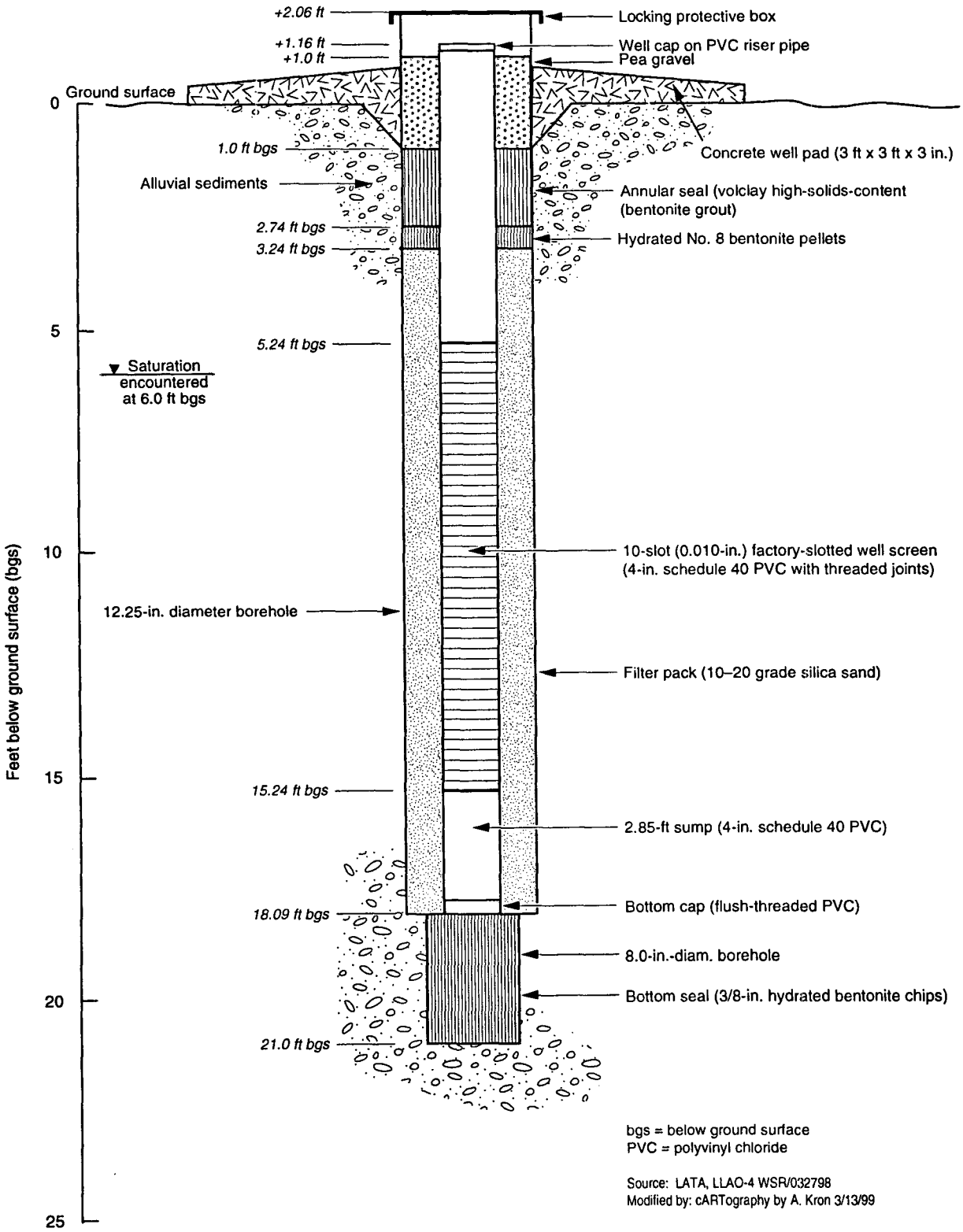
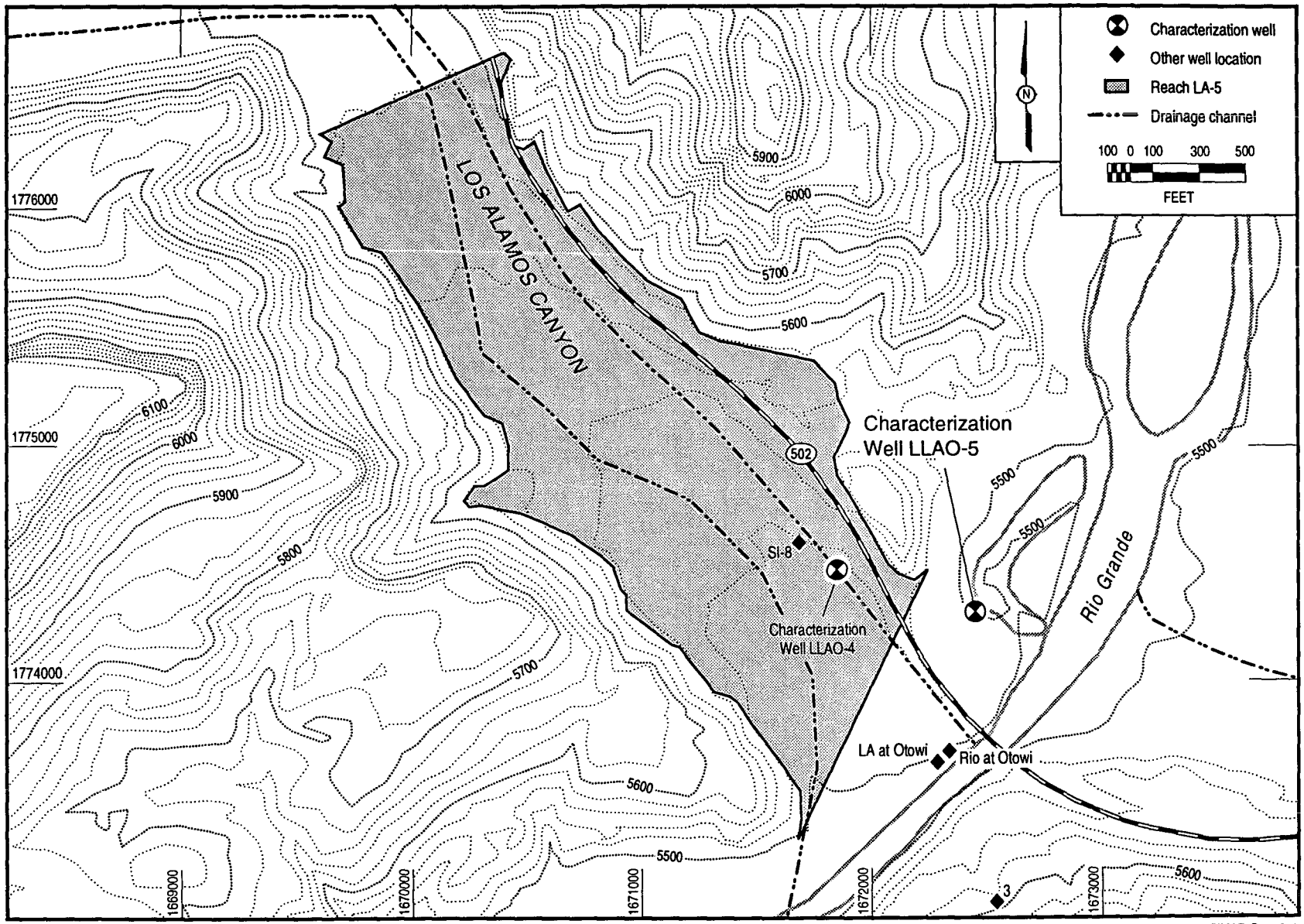


Figure 2.5-2. Construction diagram for alluvial characterization well LLAO-4.

2.6 Summary Details for Alluvial Characterization Well LLAO-5

Location:	Lower Los Alamos Canyon, approximately 500 feet north of the Rio Grande at Otowi, east of Reach LA-5. (see Figures 2-1 and 2.6-1)	
Survey Data:	Northing:	1,774,271.644
	Easting:	1,672,275.433 (NM State Plane NAD 1983)
	Elevation:	5,508.21 ft msl (lid) 5,504.71 ft msl (ground)
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo (identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges and potential impacts from upper Los Alamos Canyon contaminant sources); provide water level information.	
Date of Installation:	June 27, 1996	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-42.0 ft bgs (see Appendix A)	
Water Level:	11.1-15.3 ft bgs (6/27/96-6/4/01)	
Construction Details: (see Fig. 2.6-2)	Borehole Diameter:	12.25 in
	Borehole Total Depth:	42.0 ft bgs
	Well Total Depth:	24.22 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	11.37-21.37 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	20-40 grade silica sand
	Sump:	2.85 ft (21.37-24.22 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/LLAO-5 WSR/032598; FIMAD G105238
Modified by : cARTography by A. Kron 3/12/99

Figure 2.6-1. Location of alluvial characterization well LLAO-5 in lower Los Alamos Canyon.

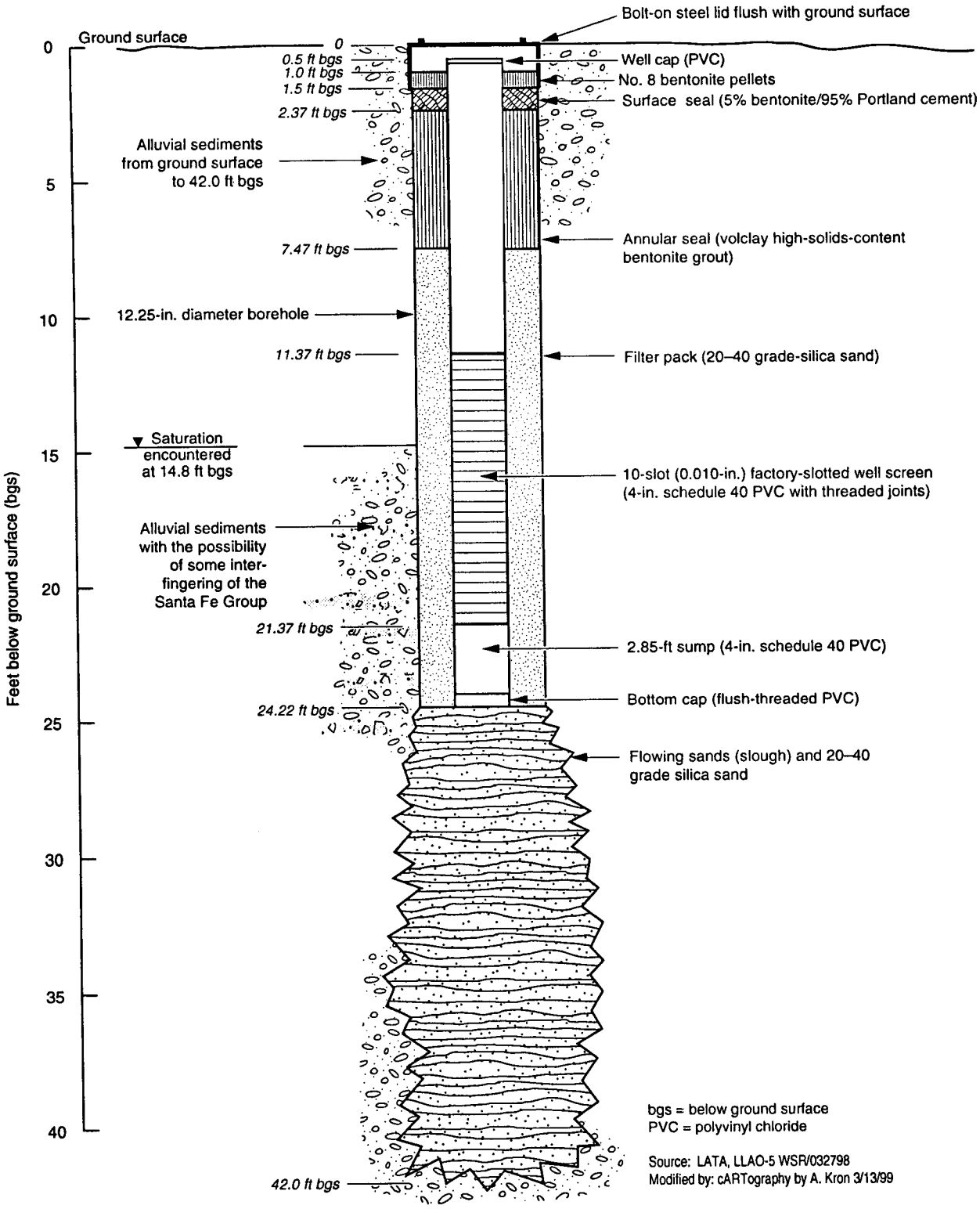


Figure 2.6-2. Construction diagram for alluvial characterization well LLAO-5.

3.0 PUEBLO CANYON

Information is provided in this section for 7 alluvial characterization wells installed in Pueblo Canyon. The locations of these wells are shown in Figures 3-1, 3.1-1, 3.2-1, 3.3-1, 3-2, and 3-3. Summary details and well construction diagrams are provided for each well. The lithologic logs for each borehole are included in Appendix A.

3.1 Summary Details for Alluvial Characterization Well PAO-4

Location:	Lower Pueblo Canyon, approximately 3100 feet southeast of the Los Alamos County Bayo Sewage Treatment Plant, in Reach P-3 (see Figures 3-1 and 3.1-1).		
Survey Data:	Northing:	1,775,098.35	
	Easting:	1,646,090.28	(NM State Plane NAD 1983)
	Elevation:	6,440.77 ft msl (lid) 6,437.37 ft msl (disc) 6,437.04 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo; identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges; provide water level information.		
Date of Installation:	July 24, 1997		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-13.4 ft bgs Puye Formation: 13.4-15.5 ft bgs (see Appendix A)		
Water Level:	2.01-3.48 ft bgs (8/27/97-11/8/01)		
Construction Details: (see Fig. 3.1-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	15.5 ft bgs	
	Well Total Depth:	9.82 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	1.97-6.97 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (6.97-9.82 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride

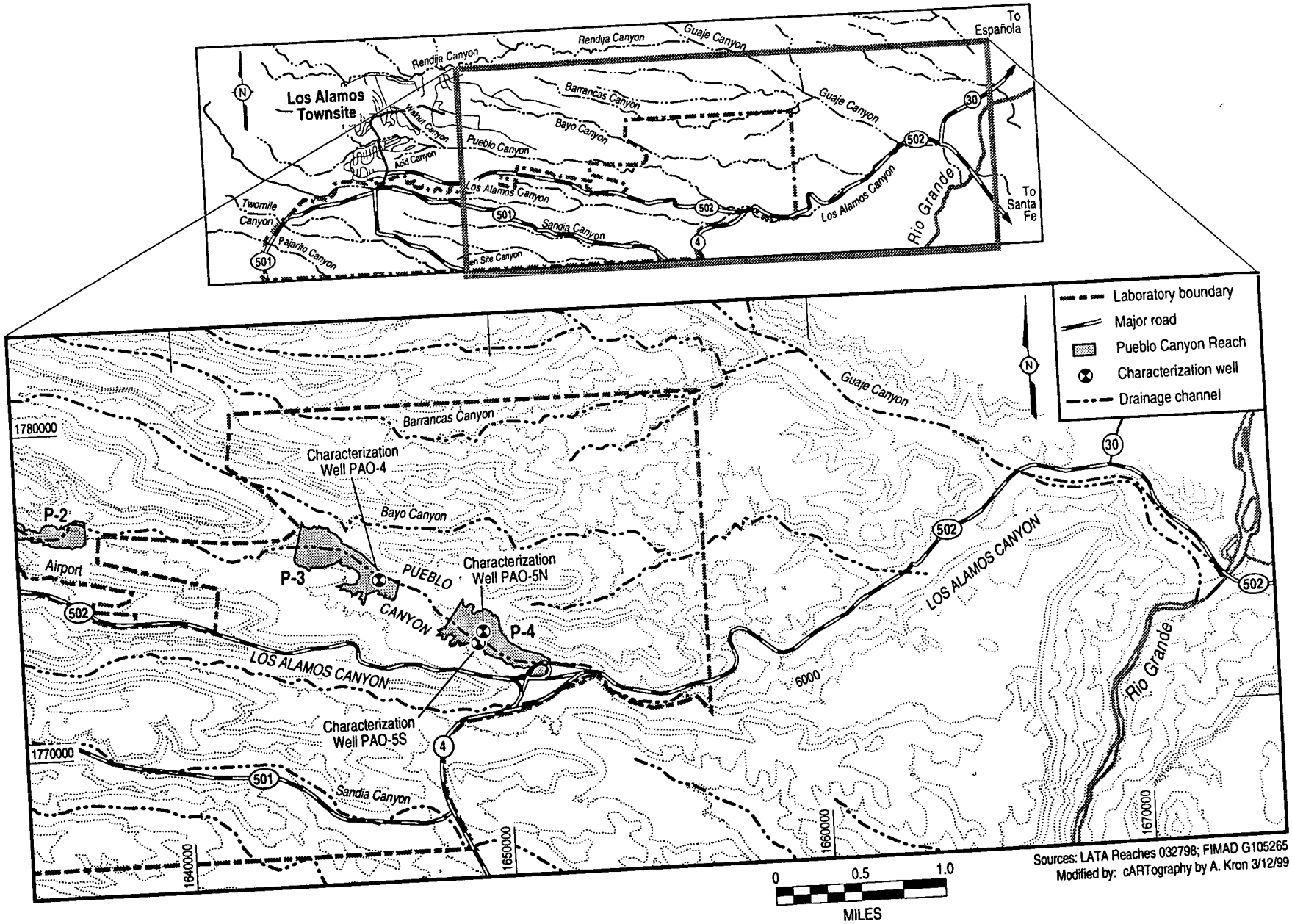
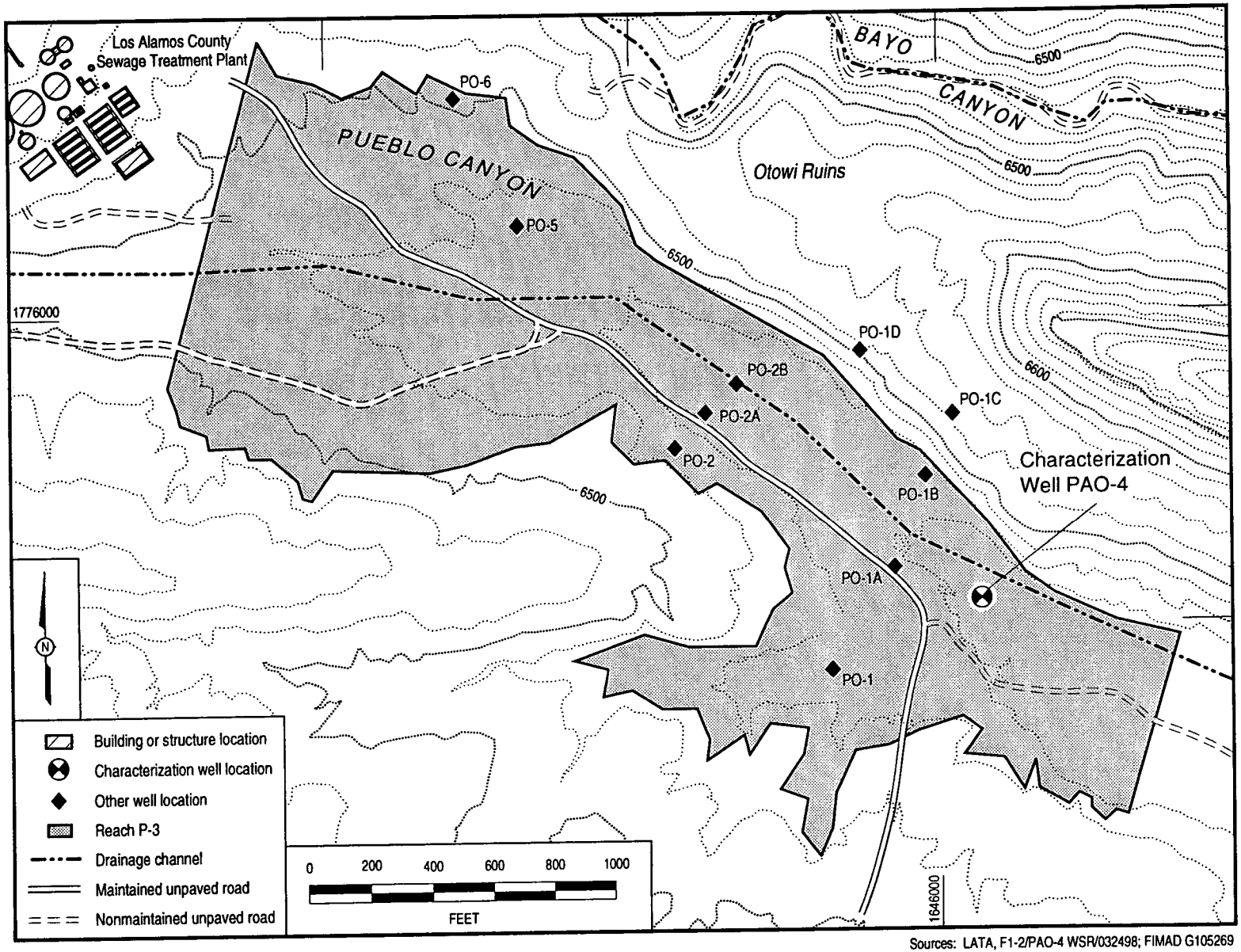


Figure 3-1. ER Project alluvial characterization wells in lower Pueblo Canyon.



Sources: LATA, F1-2/PAO-4 WSR/032498; FIMAD G105269
Modified by: cARTography by A. Kron 3/12/99

Figure 3.1-1. Location of alluvial characterization well PAO-4 in lower Pueblo Canyon.

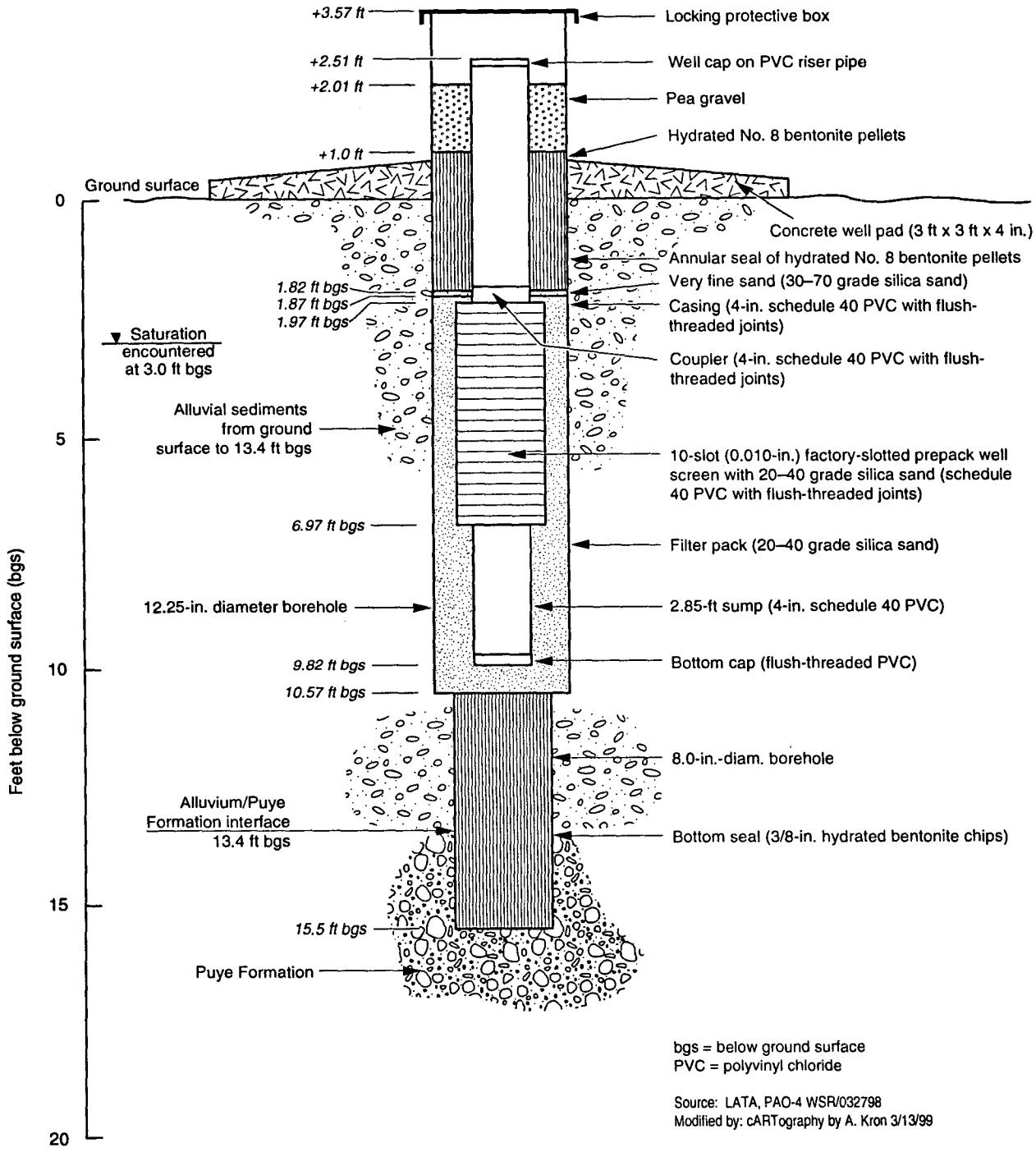
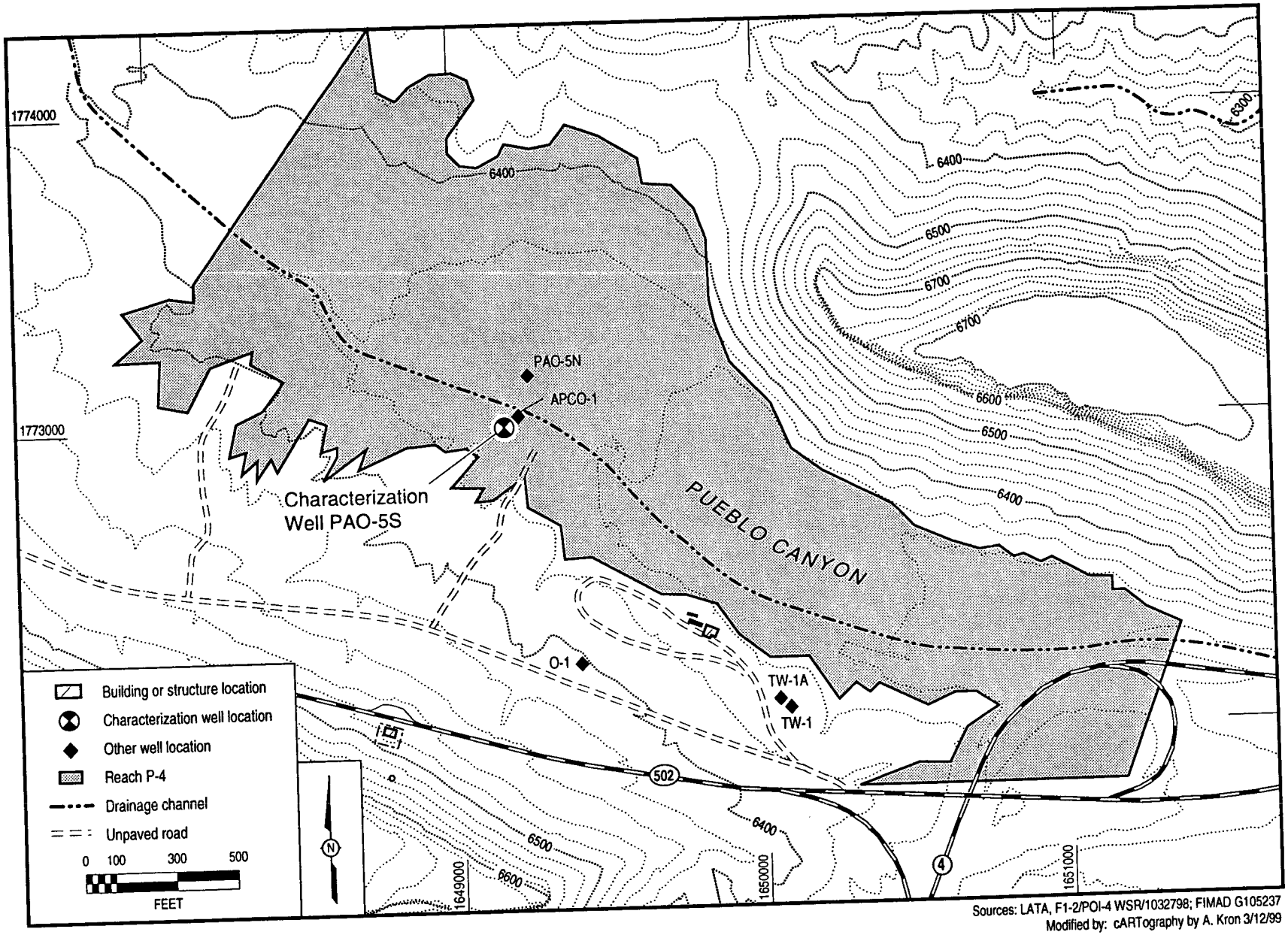


Figure 3.1-2. Construction diagram for alluvial characterization well PAO-4.

3.2 Summary Details for Alluvial Characterization Well PAO-5S

Location:	Lower Pueblo Canyon, approximately 800 feet north-northwest of the Otowi-1 supply well and approximately 1600 feet northwest of the White Rock "Y" in Reach P-4 (see Figures 3-1 and 3.2-1).		
Survey Data:	Northing:	1,772,991.48	
	Easting:	1,649,180.35	(NM State Plane NAD 1983)
	Elevation:	6,371.83 ft msl (lid) 6,368.33 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo and identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges; provide water level information; determine lateral extent of alluvial sediments from borehole transect.		
Date of Installation:	March 23, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-5.3 ft bgs Puye Formation: 5.3-20.0 ft bgs (see Appendix A)		
Water Level:	17.21-20.90 ft bgs (3/31/98-6/5/01) All water levels measured represent residual water sitting in the sump below the bottom of the screen except for 9/1/99 & 9/28/99 measurements when maximum water levels of 0.68 ft and 0.84 ft above bottom of screen, respectively, were observed.)		
Construction Details: (see Fig. 3.2-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	21.9 ft bgs	
	Well Total Depth:	20.9 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	8.05-18.05 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (18.05-20.9 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/POI-4 WSR/1032798; FIMAD G105237
Modified by: cARTography by A. Kron 3/12/99

Figure 3.2-1. Location of alluvial characterization well PAO-5S in lower Pueblo Canyon.

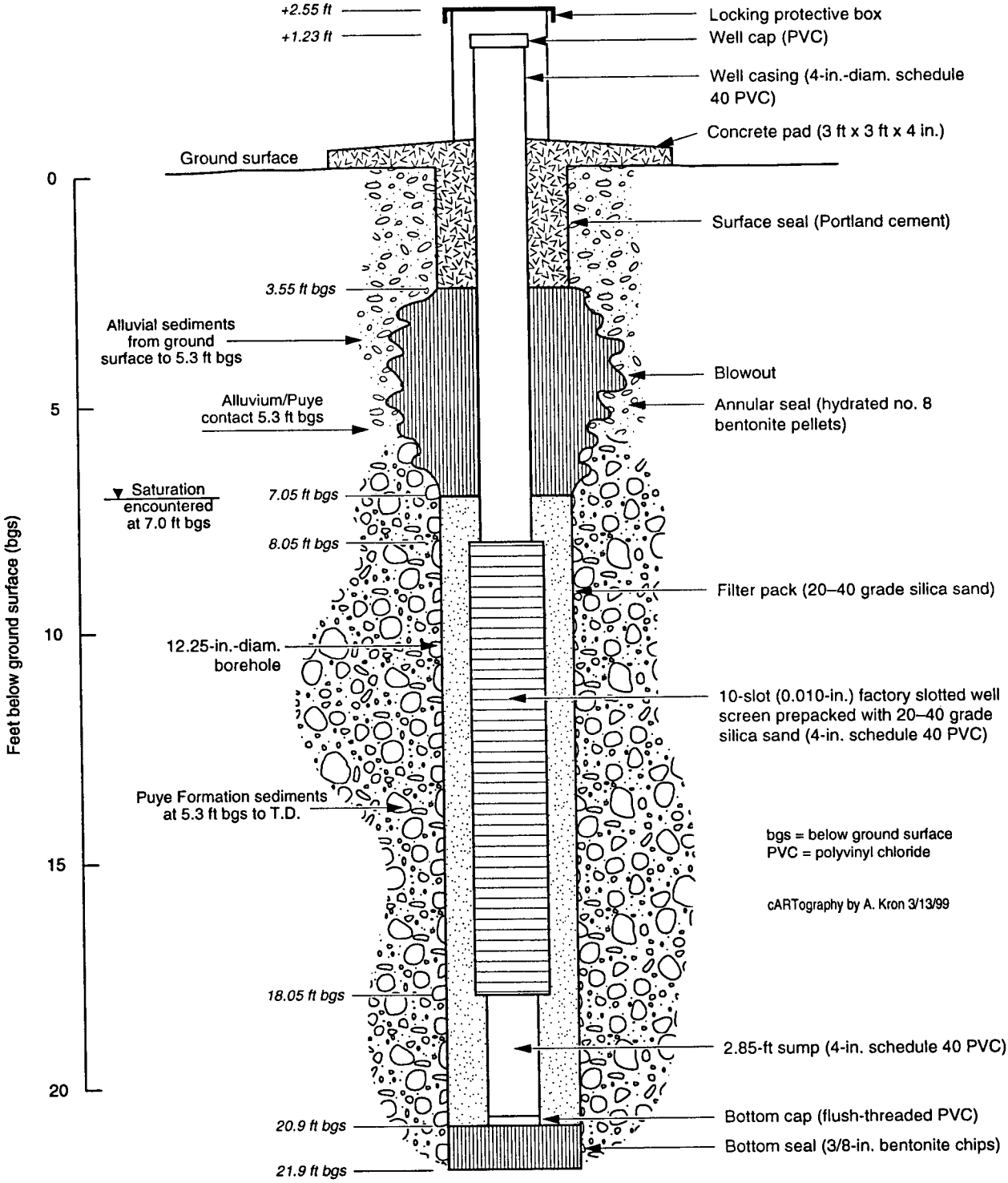
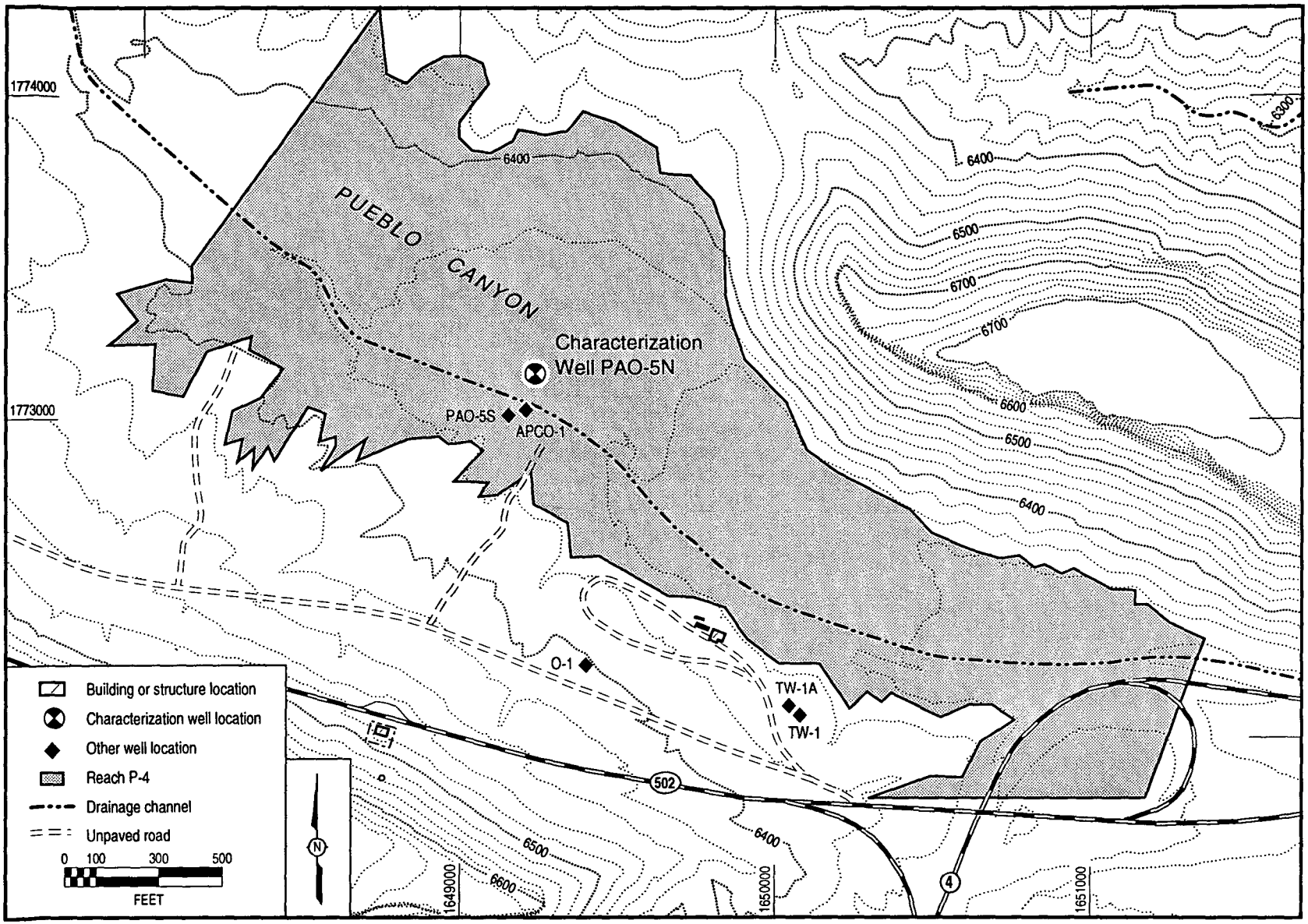


Figure 3.2-2. Construction diagram for alluvial characterization well PAO-5S.

3.3 Summary Details for Alluvial Characterization Well PAO-5N

Location:	Lower Pueblo Canyon, approximately 170 feet north-northeast of well PAO-5S, approximately 950 feet north-northwest of the Otowi-1 supply well, and approximately 1700 feet northwest of the White Rock "Y" in Reach P-4 (see Figures 3-1 and 3.3-1).		
Survey Data:	Northing:	1,773,133.50	
	Easting:	1,649,271.93	(NM State Plane NAD 1983)
	Elevation:	6,373.29 ft msl (lid) 6,369.79 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of San Ildefonso Pueblo and identify alluvial groundwater impacts from Los Alamos County Bayo Sewage Treatment Plant discharges; provide water level information; determine lateral extent of alluvial sediments from borehole transect.		
Date of Installation:	March 24, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-18.0 ft bgs Puye Formation: 18.0-22.5 ft bgs (see Appendix A)		
Water Level:	6.49-8.39 ft bgs (3/31/98-11/8/01)		
Construction Details: (see Fig. 3.3-2)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	22.5 ft bgs	
	Well Total Depth:	15.28 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	7.43-12.43 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (12.43-15.28 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



Sources: LATA, F1-2/POI-4 WSR/1032798; FIMAD G105237
Modified by: cARTography by A. Kron 3/12/99

Figure 3.3-1. Location of alluvial characterization well PAO-5N in lower Pueblo Canyon.

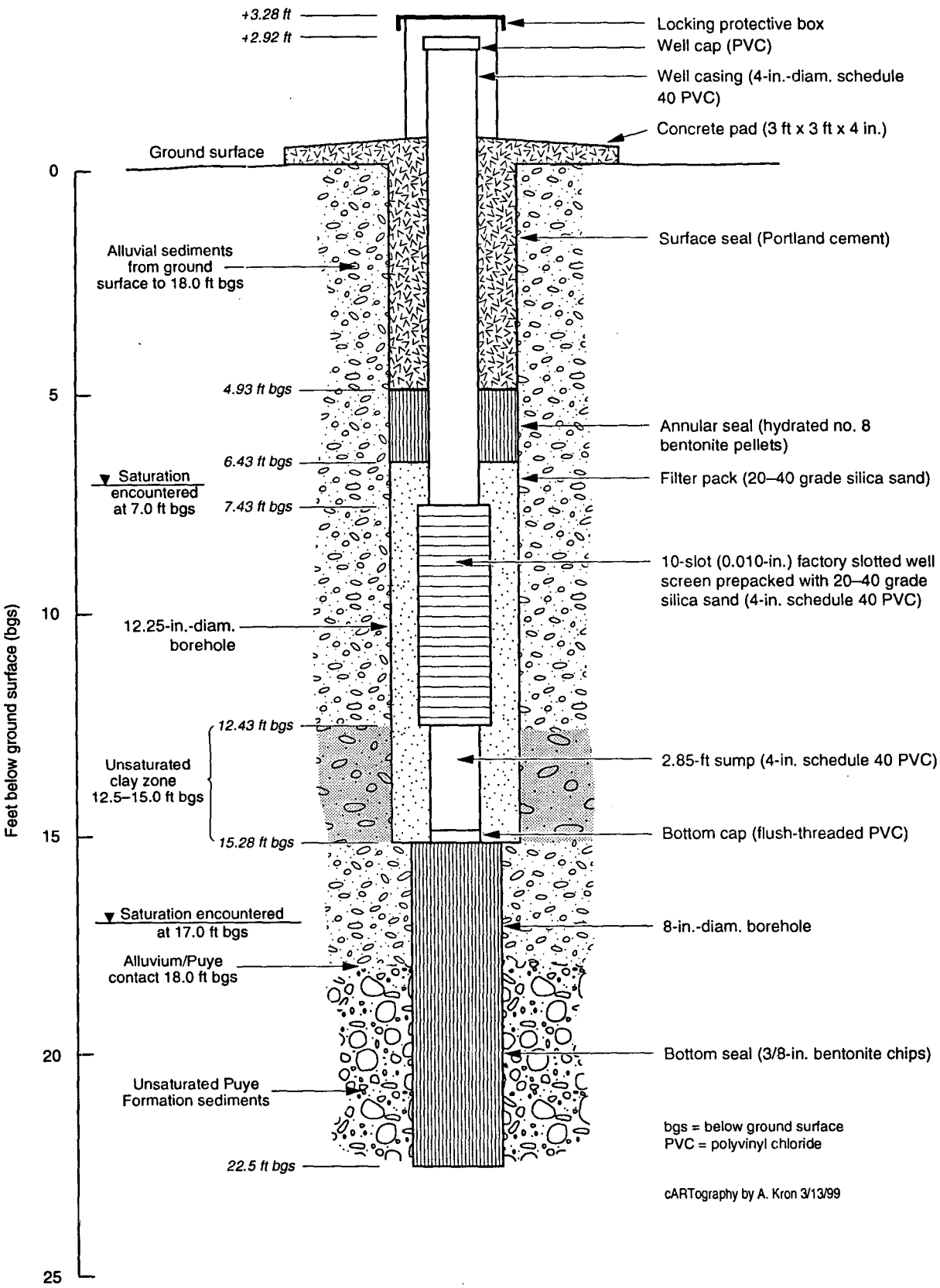
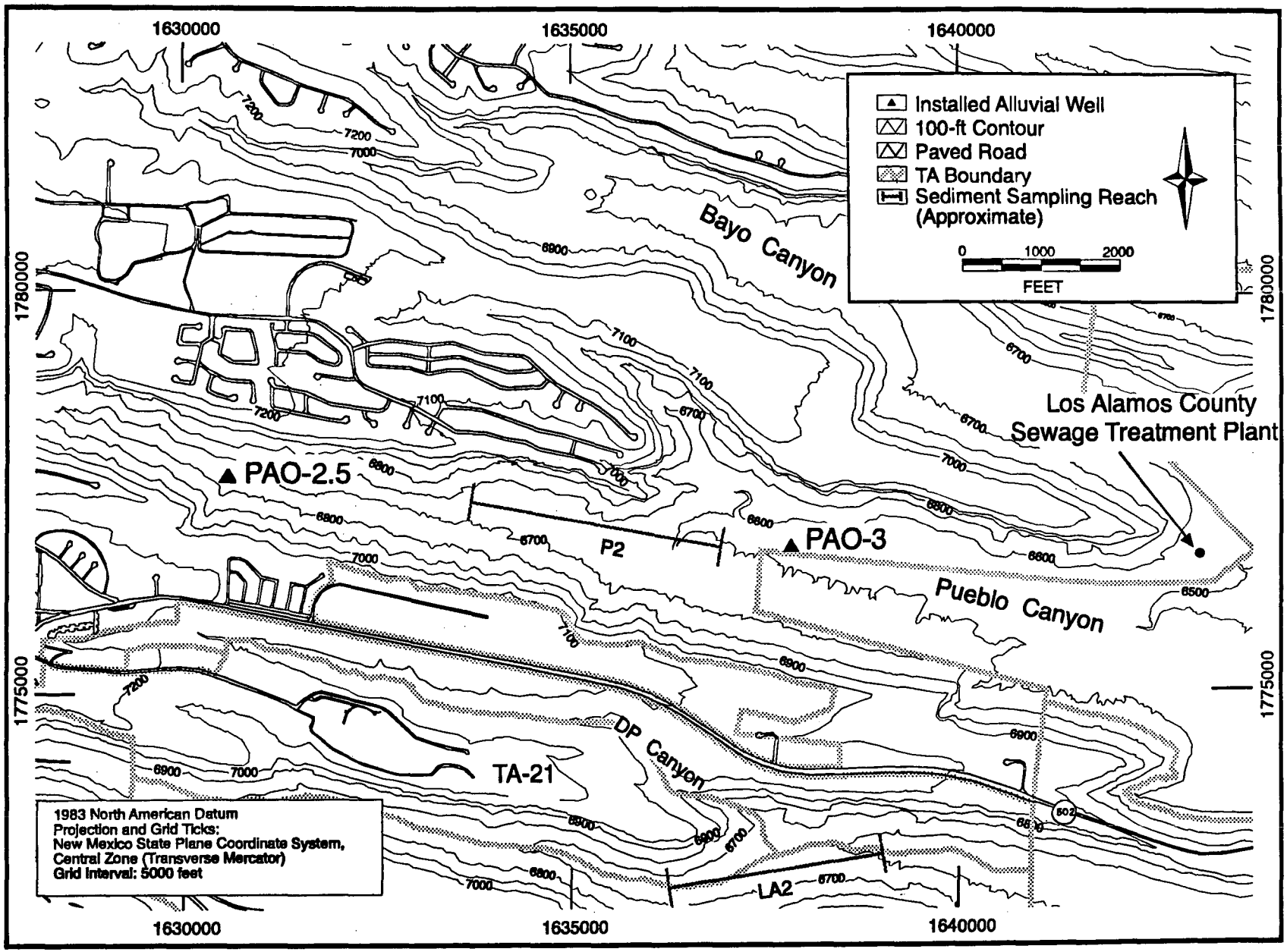


Figure 3.3-2. Construction diagram for alluvial characterization well PAO-5N.

3.4 Summary Details for Alluvial Characterization Well PAO-2.5

Location:	Middle Pueblo Canyon, approximately 7,250 feet west of alluvial characterization well PAO-3, approximately 12,350 feet west of the Los Alamos County Bayo Sewage Treatment Plant, and approximately 3,100 feet west of reach P2 (see Figure 3-2).		
Survey Data:	Northing:	1,777,700.31	
	Easting:	1,630,646.12	(NM State Plane NAD 1983)
	Elevation:	6,726.05 ft msl (lid) 6,722.39 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of Los Alamos County Bayo Sewage Treatment Plant discharges; determine continuity of alluvial groundwater in middle Pueblo Canyon; provide water level information.		
Date of Installation:	August 31, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-7.7 ft bgs Bandelier Tuff (Otowi Member): 7.7-13.9 ft bgs (see Appendix A)		
Water Level:	7.34-7.81 ft bgs (12/1/98-11/8/01) All water levels measured represent residual water sitting in the sump below the bottom of the screen except for 6/5/01 measurement when maximum water level of 0.06 ft above bottom of screen was observed.)		
Construction Details: (see Fig. 3.4-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	13.9 ft bgs	
	Well Total Depth:	10.25 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	2.4-7.4 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (7.4-10.25 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride



FIMAD G106961 03 Sep 98

Figure 3-2. Locations of alluvial characterization wells PAO-2.5 and PAO-3 in middle Pueblo Canyon.

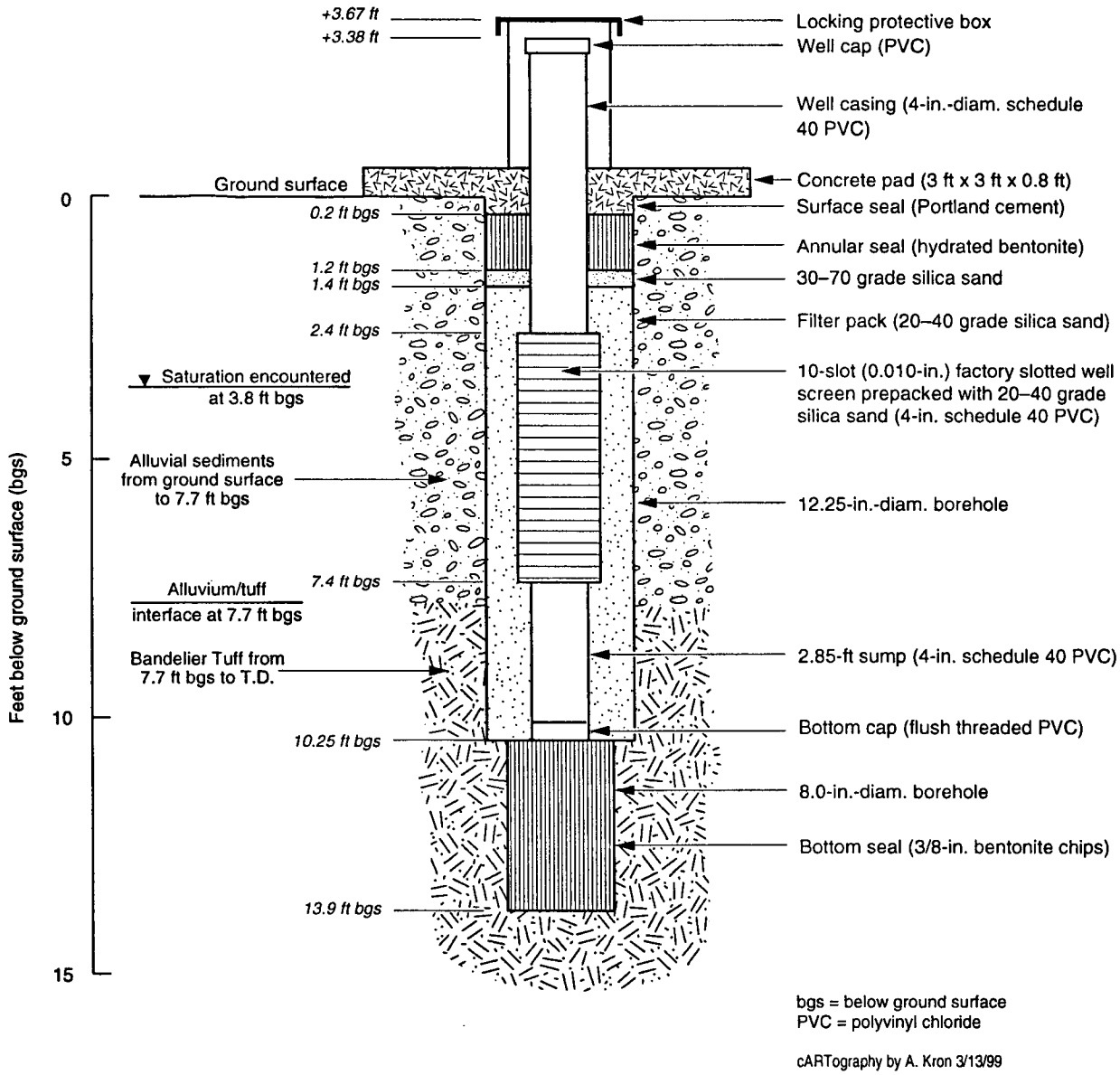


Figure 3.4-1. Construction diagram for alluvial characterization well PAO-2.5.

3.5 Summary Details for Alluvial Characterization Well PAO-3

Location:	Middle Pueblo Canyon, approximately 5,200 feet west of the Los Alamos County Bayo Sewage Treatment Plant, approximately 900 feet east of reach P2, and approximately 2,000 north of the east end of the Los Alamos County airport runway (see Figure 3-2).		
Survey Data:	Northing:	1,776,856.31	
	Easting:	1,637,747.70	(NM State Plane NAD 1983)
	Elevation:	6,582.05 ft msl (lid) 6,578.58 ft msl (ground)	
Objectives:	Monitor groundwater quality upgradient of Los Alamos County Bayo Sewage Treatment Plant discharges; determine continuity of alluvial groundwater in middle Pueblo Canyon; provide water level information.		
Date of Installation:	August 27, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-10.8 ft bgs Bandelier Tuff (Otowi Member): 10.8-17.5 ft bgs (see Appendix A)		
Water Level:	4.27-12.92 ft bgs (11/30/98-11/8/01)		
Construction Details: (see Fig. 3.5-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	17.5 ft bgs	
	Well Total Depth:	13.47 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	5.62-10.62 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (10.62-13.47 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride

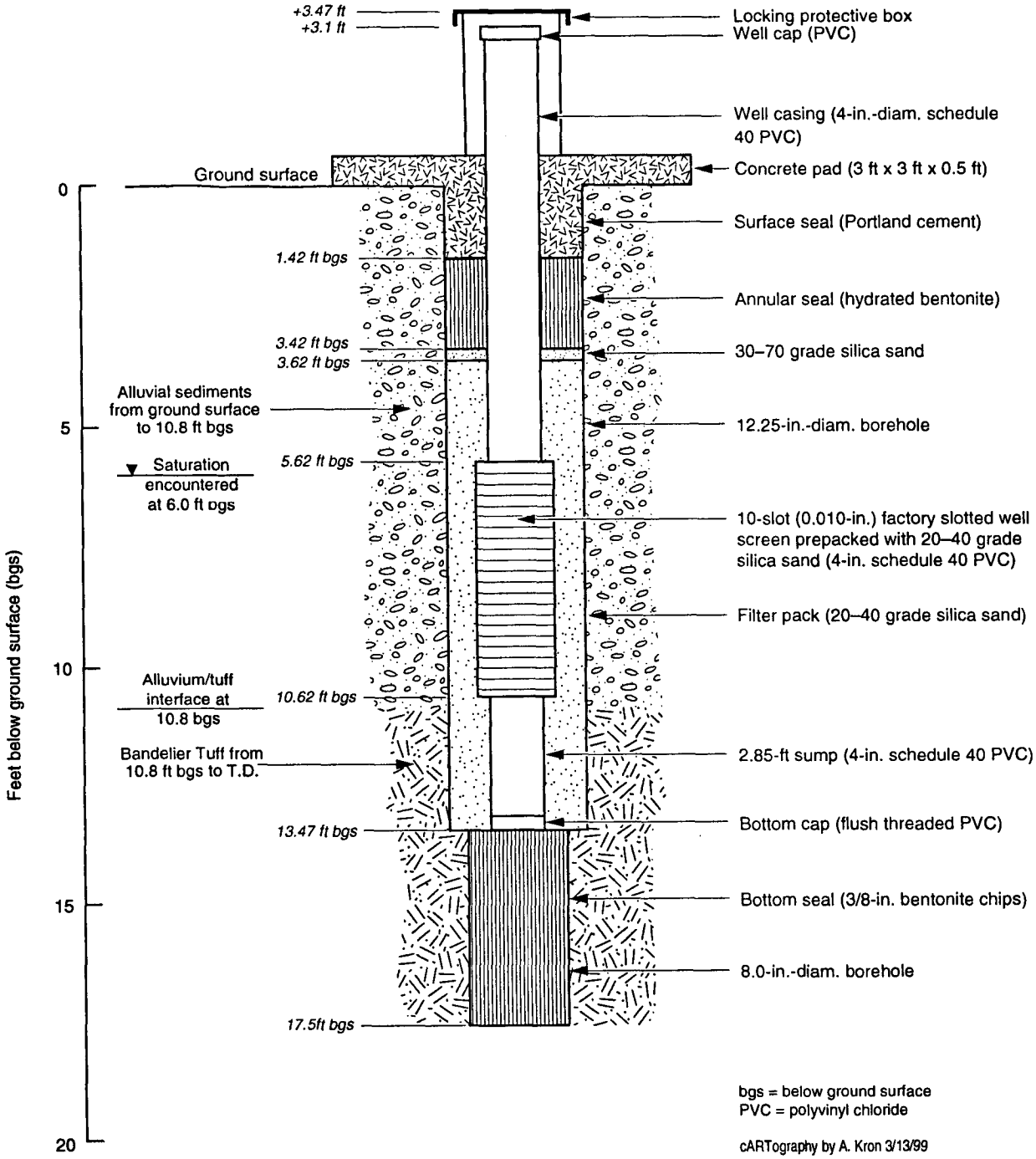


Figure 3.5-1. Construction diagram for alluvial characterization well PAO-3.

3.6 Summary Details for Alluvial Characterization Well PAO-1

Location:	Upper Pueblo Canyon, approximately 1000 feet west of the confluence with Acid Canyon and approximately 750 feet west of reach P1 (see Figure 3-3).		
Survey Data:	Northing:	1,778,988.72	
	Easting:	1,624,165.85	(NM State Plane NAD 1983)
	Elevation:	6,954.97 ft msl (disc) 6,954.47 ft msl (ground)	
Objectives:	Determine baseline groundwater chemistry and monitor groundwater quality upgradient of Acid Canyon drainage; determine extent of saturation and continuity of alluvial groundwater in upper Pueblo Canyon; provide water level information.		
Date of Installation:	October 30, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-11.0 ft bgs Bandelier Tuff (Otowi Member): 11.0-16.0 ft bgs (see Appendix A)		
Water Level:	4.45-9.46 ft bgs (11/30/98-11/8/01)		
Construction Details: (see Fig. 3.6-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	16.0 ft bgs	
	Well Total Depth:	13.74 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	5.89-10.89 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (10.89-13.74 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride

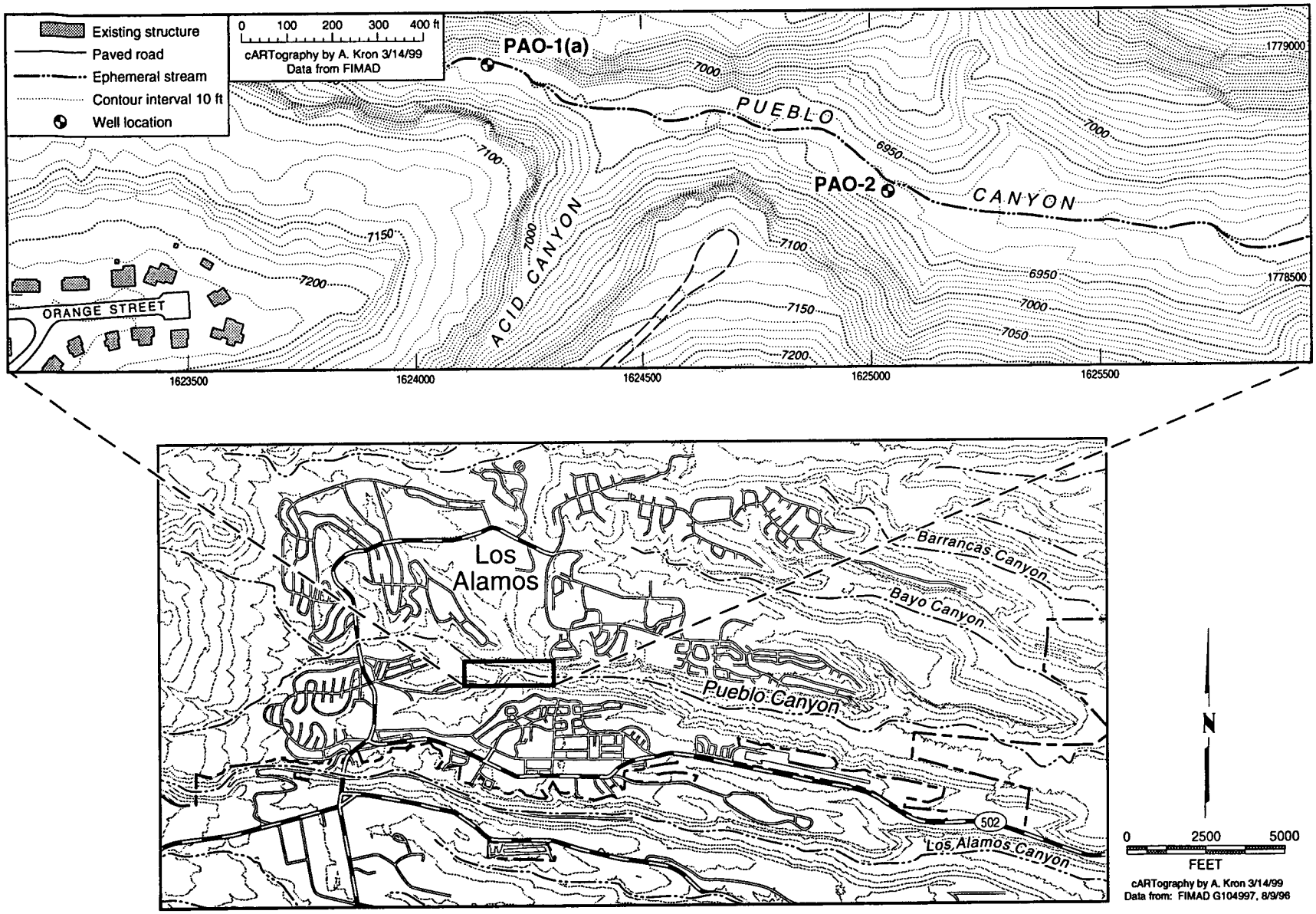


Figure 3-3. Locations of alluvial characterization wells PAO-1(a) and PAO-2 in upper Pueblo Canyon.

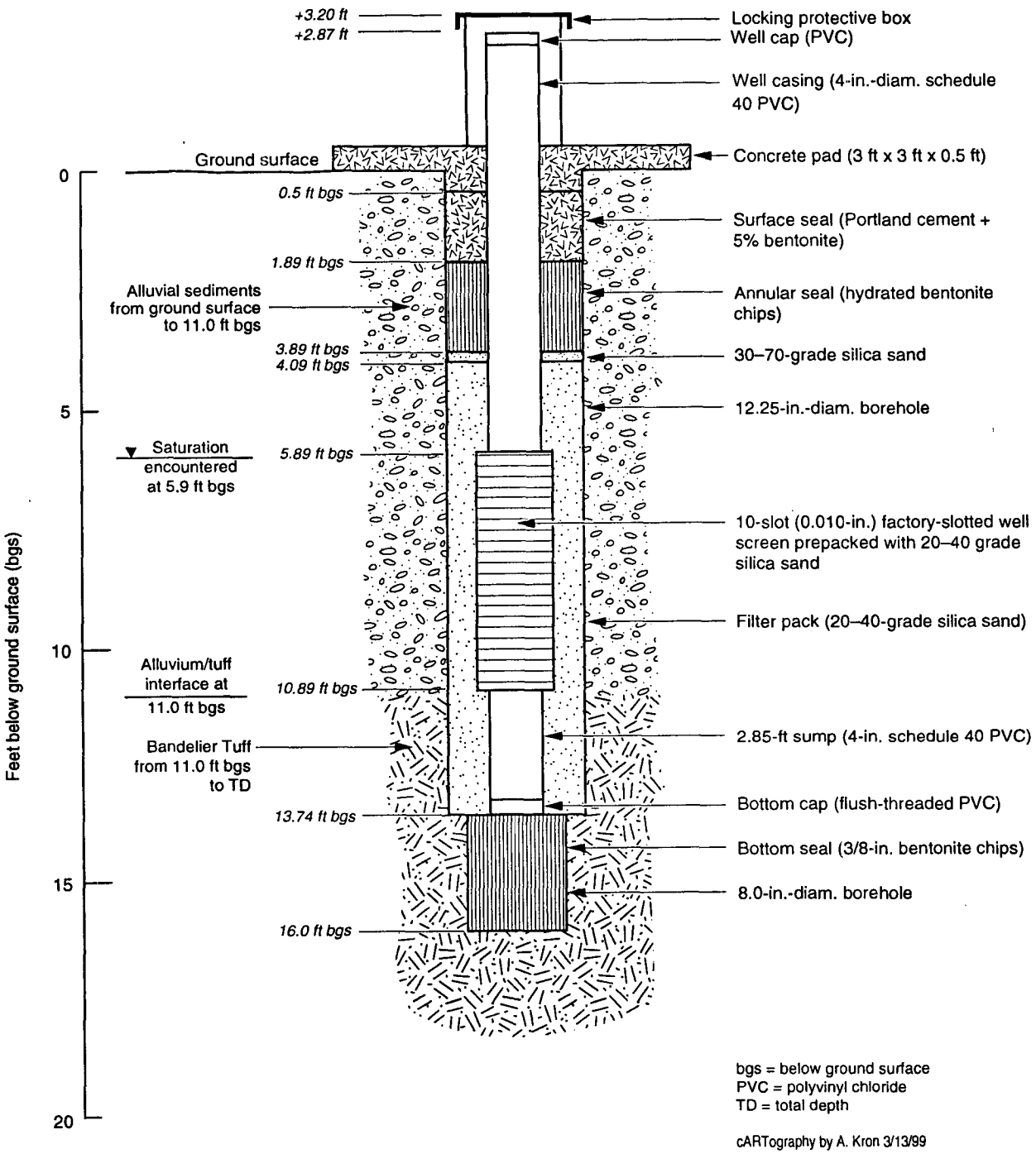


Figure 3.6-1. Construction diagram for alluvial characterization well PAO-1(a).

3.7 Summary Details for Alluvial Characterization Well PAO-2

Location:	Upper Pueblo Canyon, approximately 500 feet east of the of the confluence with Acid Canyon within reach P1 (see Figure 3-3).		
Survey Data:	Northing:	1,778,710.00	
	Easting:	1,625,040.90	(NM State Plane NAD 1983)
	Elevation:	6,930.98 ft msl (disc) 6,930.43 ft msl (ground)	
Objectives:	Determine baseline groundwater chemistry and monitor groundwater quality upgradient of Acid Canyon drainage; determine extent of saturation and continuity of alluvial groundwater in upper Pueblo Canyon; provide water level information.		
Date of Installation:	November 2, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-10.9 ft bgs Bandelier Tuff (Otowi Member): 10.9-16.2 ft bgs (see Appendix A)		
Water Level:	3.70-13.60 ft bgs (11/30/98-11/8/01)		
Construction Details: (see Fig. 3.7-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	16.2 ft bgs	
	Well Total Depth:	13.91 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	6.06-11.06 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	2.85 ft (11.06-13.91 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride

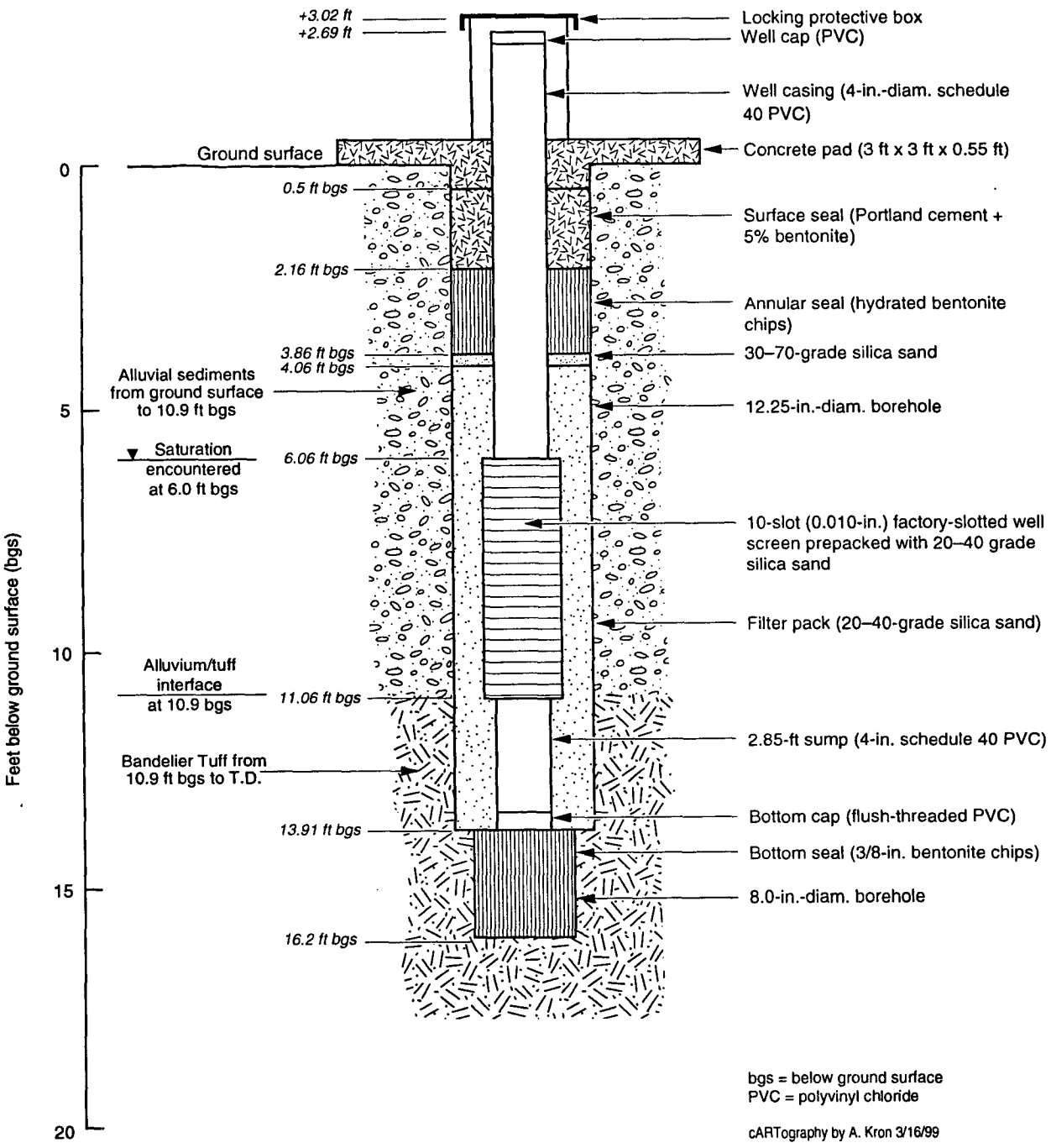


Figure 3.7-1. Construction diagram for alluvial characterization well PAO-2.

4.0 THREEMILE CANYON

Information is provided in this section for one alluvial characterization well installed in Threemile Canyon, which is a tributary to Pajarito Canyon and falls within its watershed. The well was installed as part of the RCRA facility investigation of TA-18. The location of this well is shown in Figure 4.1-1. Summary details, plus the detailed location map and a well construction diagram are provided in the following section. The lithologic log for the borehole is included in Appendix A.

4.1 Summary Details for Alluvial Characterization Well BG-4

Location:	Threemile Canyon, approximately 800 feet west of Kiva 2 reactor building at TA-18, & approximately 1750 feet west of confluence with Pajarito Canyon (see Figure 4.1-1).
Survey Data:	Location has not been surveyed.
Objectives:	Determine background groundwater chemistry and monitor groundwater quality upgradient of TA-18.
Date of Installation:	February 18, 1998
Drilling Method:	Hollow-stem auger
Stratigraphy:	Alluvial sediments: 0-6.25 ft bgs Tshirege Member (unit 1v) of the Bandelier Tuff: 6.25-25.0 ft bgs (see Appendix A)
Water Level:	2.5 ft bgs (initial water level encountered in borehole on 2/17/98) 6.55-6.60 ft bgs (6/27/00-7/25/00)
Construction Details: (see Fig. 4.1-2)	Borehole Diameter: 12.25 in at surface to 8.0 ft bgs; 8.0 in from 8.0 ft to 25.0 ft bgs Borehole Total Depth: 25.0 ft bgs Well Total Depth: 6.8 ft bgs Casing/screen: 4-in schedule 40 threaded PVC Screened Interval: 2.5-6.5 ft bgs Slot Size: 0.010 in Filter Pack: 20-40 grade silica sand Sump: 0.3 ft (6.5-6.8 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride

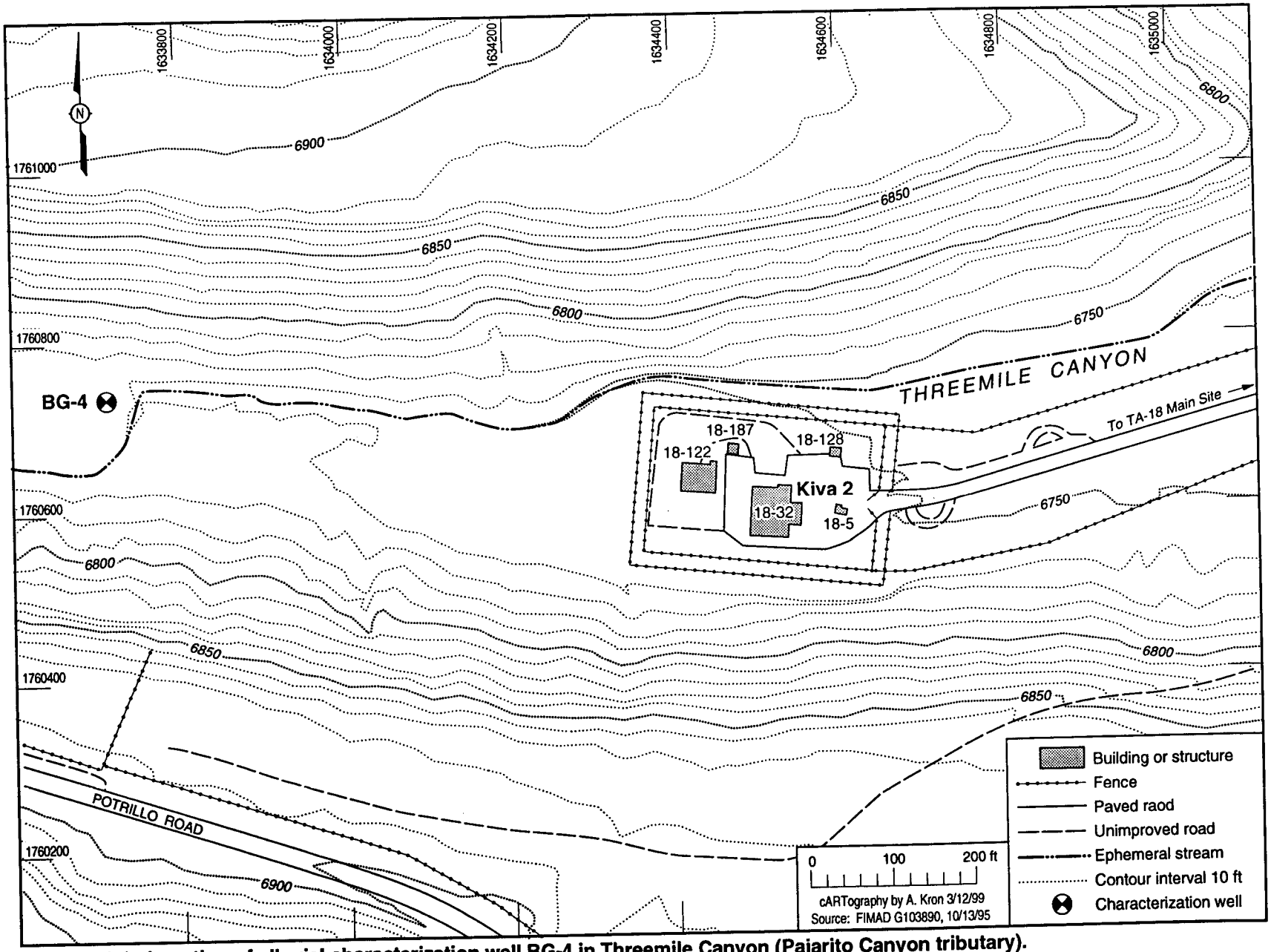


Figure 4.1-1. Location of alluvial characterization well BG-4 in Threemile Canyon (Pajarito Canyon tributary).

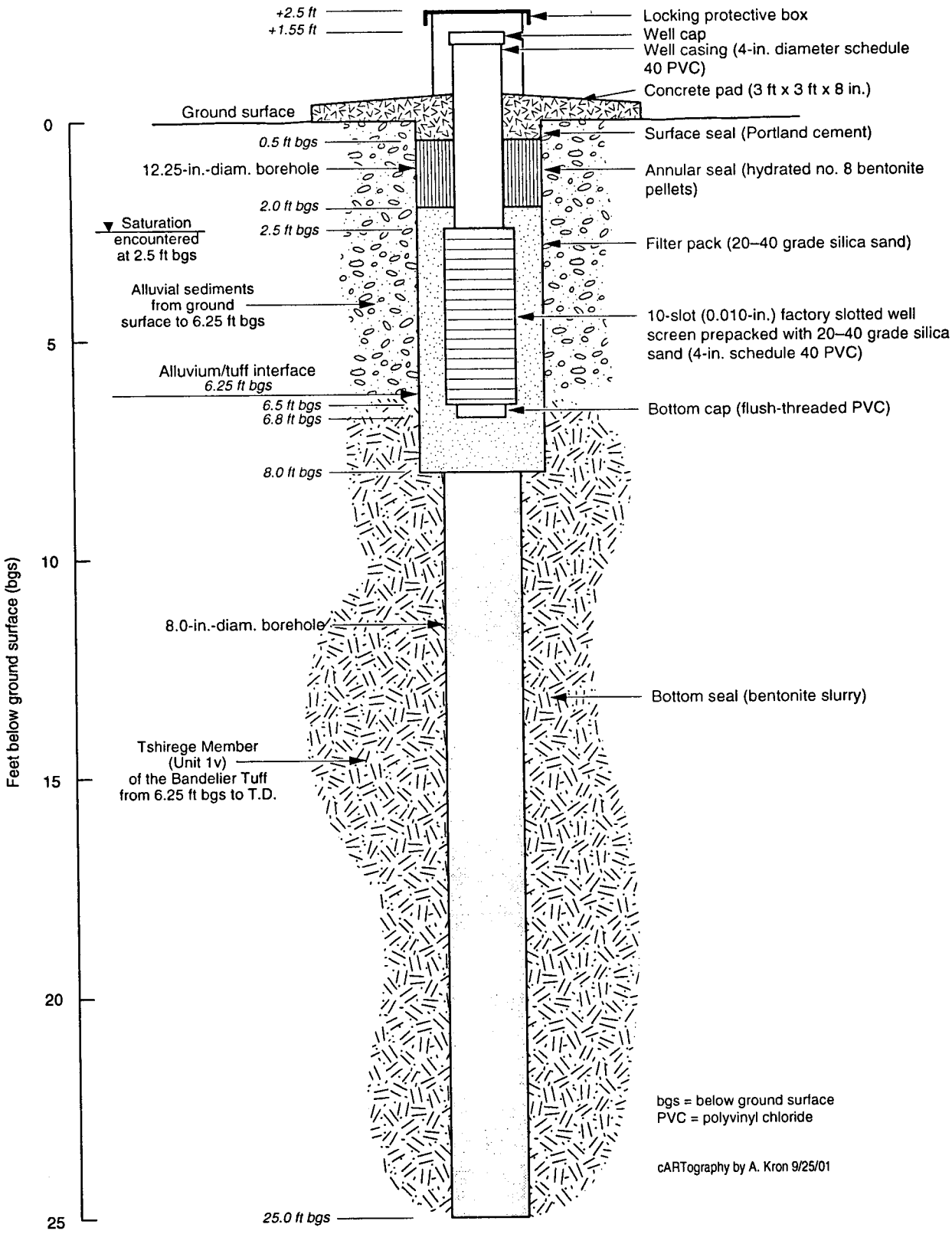


Figure 4.1-2. Construction diagram for alluvial characterization well BG-4.

5.0 CAÑON DE VALLE

Information is provided in this section for 6 alluvial characterization wells installed in Cañon de Valle as part of the RCRA facility investigation of TA-16. The locations of these wells are shown in Figure 5-1. Summary details and well construction diagrams are provided for each well. The lithologic logs for each borehole are included in Appendix A.

5.1 Summary Details for Alluvial Characterization Well 16-2655

Location:	Western-most upper Cañon de Valle in TA-16, approximately 800 feet east of Anchor Ranch Road, south of the steam plant, and approximately 100 feet north of the old 90s line area (see Figure 5-1).	
Survey Data:	Northing:	1,764,152.920
	Easting:	1,611,299.506 (NM State Plane NAD 1983)
	Elevation:	7,583.70 ft msl (ground)
Objectives:	Determine groundwater chemistry; monitor alluvial groundwater quality near PRSs in TA-16; identify COPCs; monitor seasonal variations in alluvial water chemistry.	
Date of Installation:	September 25, 1997	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-6.5 ft bgs Tshirege Member (unit 4) of the Bandelier Tuff: 6.5-12.0 ft bgs (see Appendix A)	
Water Level:	1.0 ft bgs (initial water level encountered in borehole on 9/24/97)	
Construction Details: (see Fig. 5.1-1)	Borehole Diameter:	12.25 in at surface to 7.6 ft bgs; 8.0 in from 7.6 ft to 12.0 ft bgs
	Borehole Total Depth:	12.0 ft bgs
	Well Total Depth:	7.6 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	2.3-7.3 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	20-40 grade silica sand (30-70 grade silica sand in prepack)
	Sump:	0.3 ft (7.3-7.6 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
COPC = Contaminant of potential concern
PRS = Potential release site

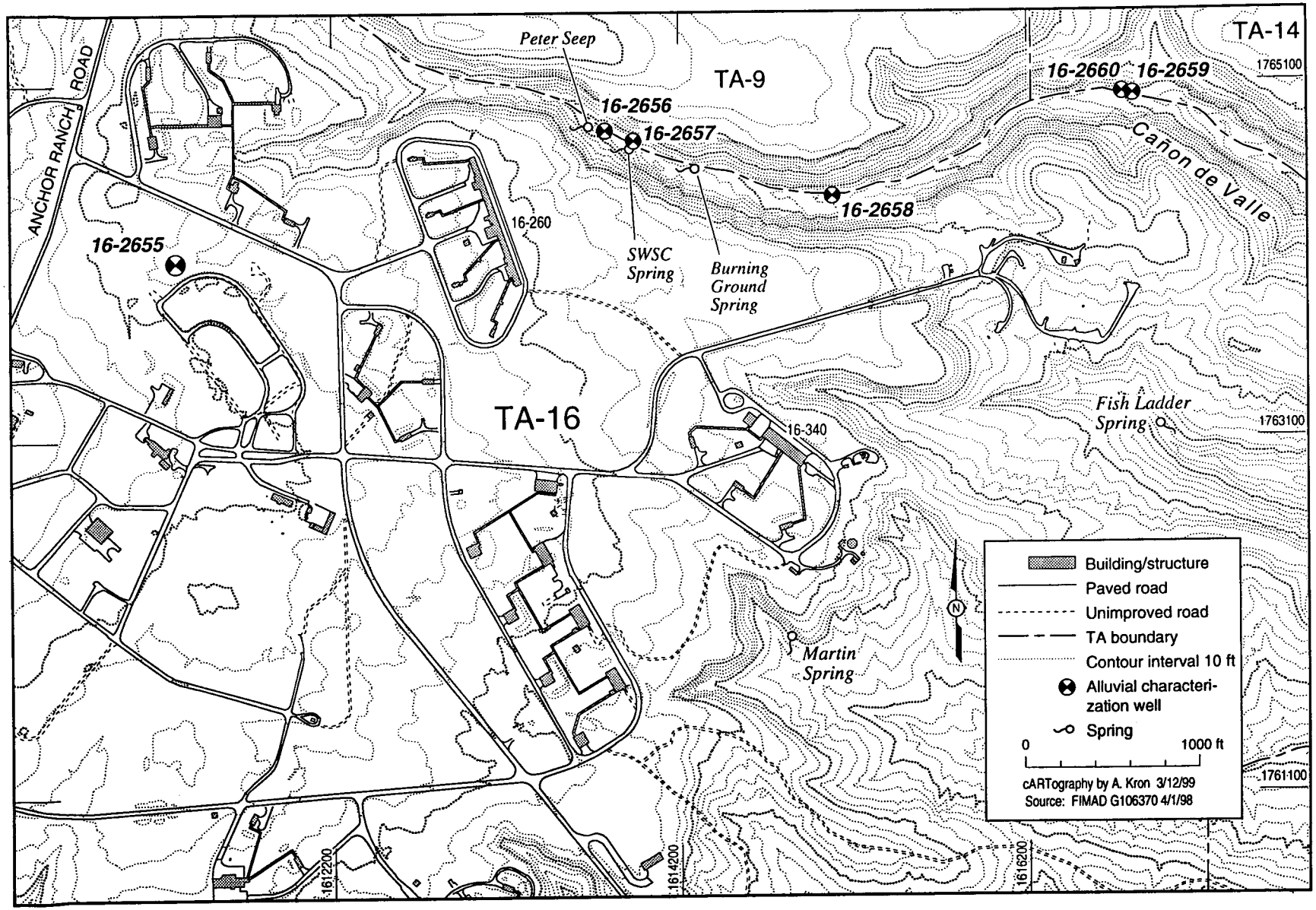


Figure 5-1. ER Project alluvial characerization wells in Cañon de Valle.

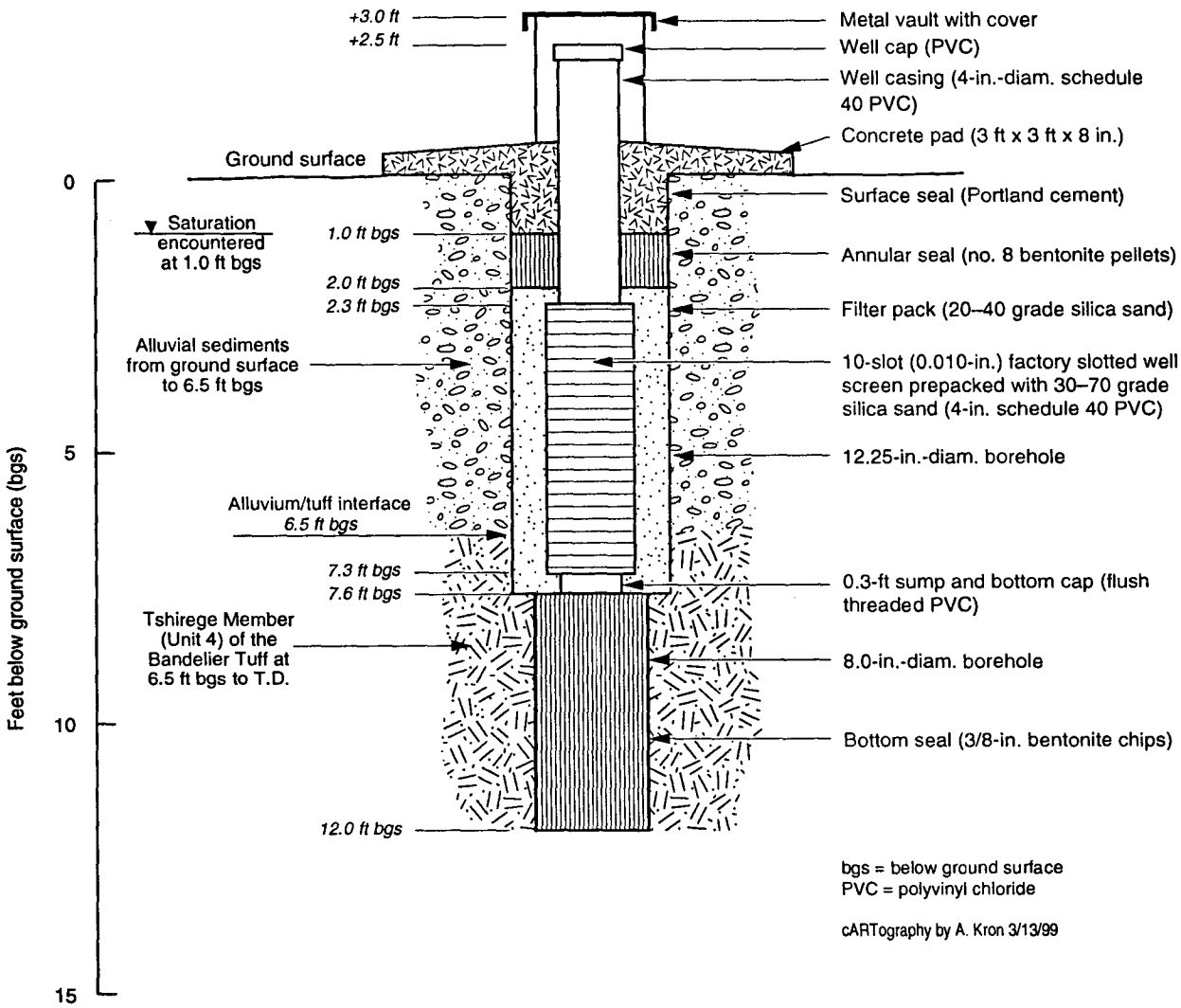


Figure 5.1-1. Construction diagram for alluvial characterization well 16-2655.

5.2 Summary Details for Alluvial Characterization Well 16-2656

Location:	Upper Cañon de Valle at northern boundary of TA-16, approximately 200 feet west-northwest of SWSC Spring, and approximately 50 feet east of Peter Seep (see Figure 5-1).		
Survey Data:	Northing:	1,764,932.79	
	Easting:	1,613,634.45	(NM State Plane NAD 1983)
	Elevation:	7,443.18 ft msl	(ground)
Objectives:	Determine groundwater chemistry; monitor alluvial groundwater quality near PRSs in TA-16; identify COPCs; monitor seasonal variations in alluvial water chemistry.		
Date of Installation:	November 5, 1997		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-9.2 ft bgs (Depth of alluvium is interpreted from log. It is assumed that core loss at 7.5-9.5 ft was due to unconsolidated sediments slipping out of the core barrel - see Appendix A)		
Water Level:	5.2 ft bgs (initial water level encountered in borehole on 11/4/97)		
Construction Details: (see Fig. 5.2-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	9.2 ft bgs	
	Well Total Depth:	8.2 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	3.0-8.0 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand (30-70 grade silica sand in prepack)	
	Sump:	0.3 ft (8.0-8.3 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
COPC = Contaminant of potential concern
PRS = Potential release site

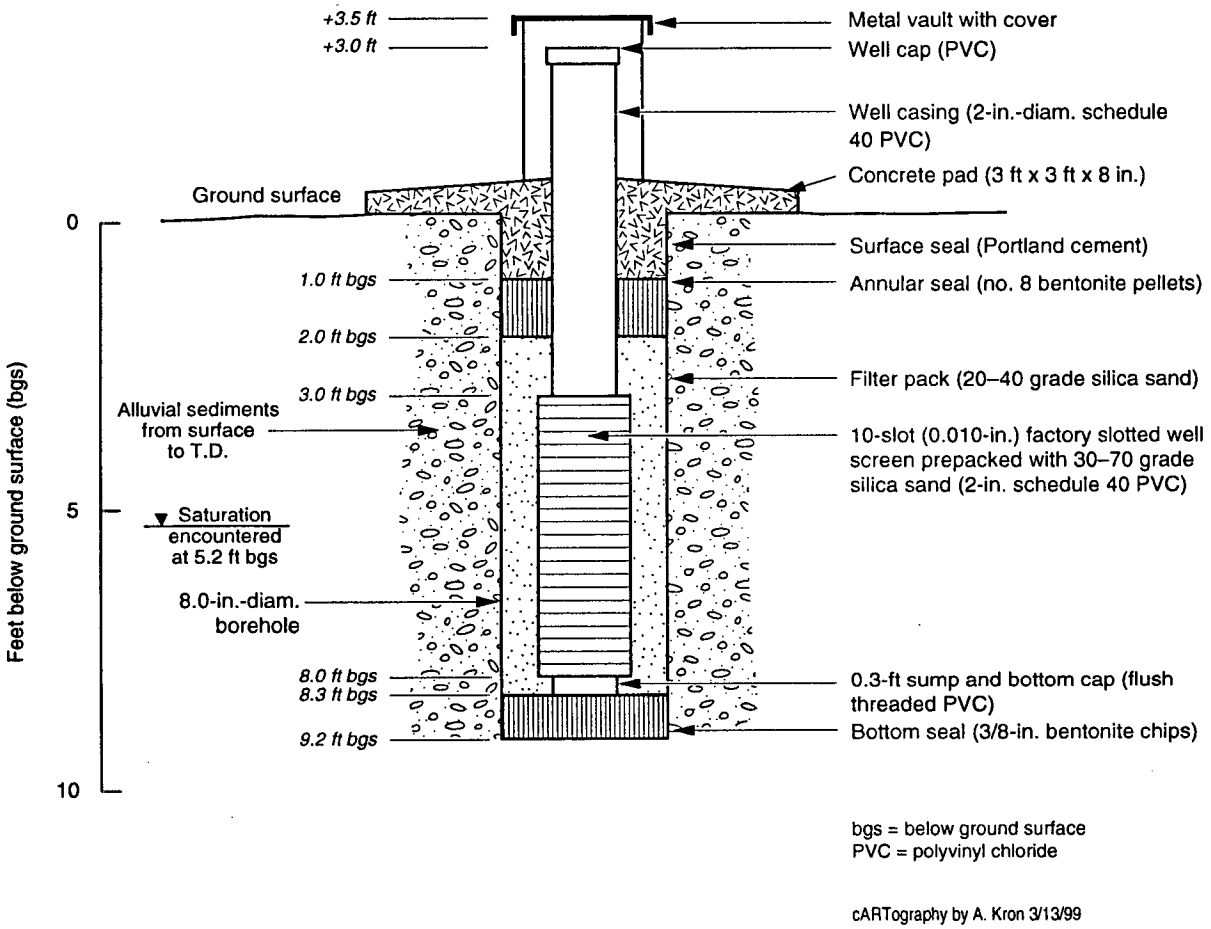


Figure 5.2-1. Construction diagram for alluvial characterization well 16-2656.

5.3 Summary Details for Alluvial Characterization Well 16-2657

Location:	Upper Cañon de Valle at northern boundary of TA-16, approximately 200 feet east-southeast of well 16-2656, just north of SWSC Spring (see Figure 5-1).	
Survey Data:	Northing:	1,764,850.60
	Easting:	1,613,813.19 (NM State Plane NAD 1983)
	Elevation:	7,433.25 ft msl (ground)
Objectives:	Determine groundwater chemistry; monitor alluvial groundwater quality near PRSs in TA-16; identify COPCs; monitor seasonal variations in alluvial water chemistry.	
Date of Installation:	October 10, 1997	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-5.0 ft bgs Tshirege Member (unit 4) of the Bandelier Tuff: 5.0-9.1 ft bgs (see Appendix A)	
Water Level:	Between 0.5 and 2.5 ft bgs (initial water levels encountered in borehole on 10/3/97)	
Construction Details: (see Fig. 5.3-1)	Borehole Diameter:	12.25 in at surface to 5.7 ft bgs; 8.0 in at 5.7 to 9.1 ft bgs
	Borehole Total Depth:	9.1 ft bgs
	Well Total Depth:	5.7 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	0.4-5.4 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	20-40 grade silica sand (30-70 grade silica sand in prepack)
	Sump:	0.3 ft (5.4-5.7 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
COPC = Contaminant of potential concern
PRS = Potential release site

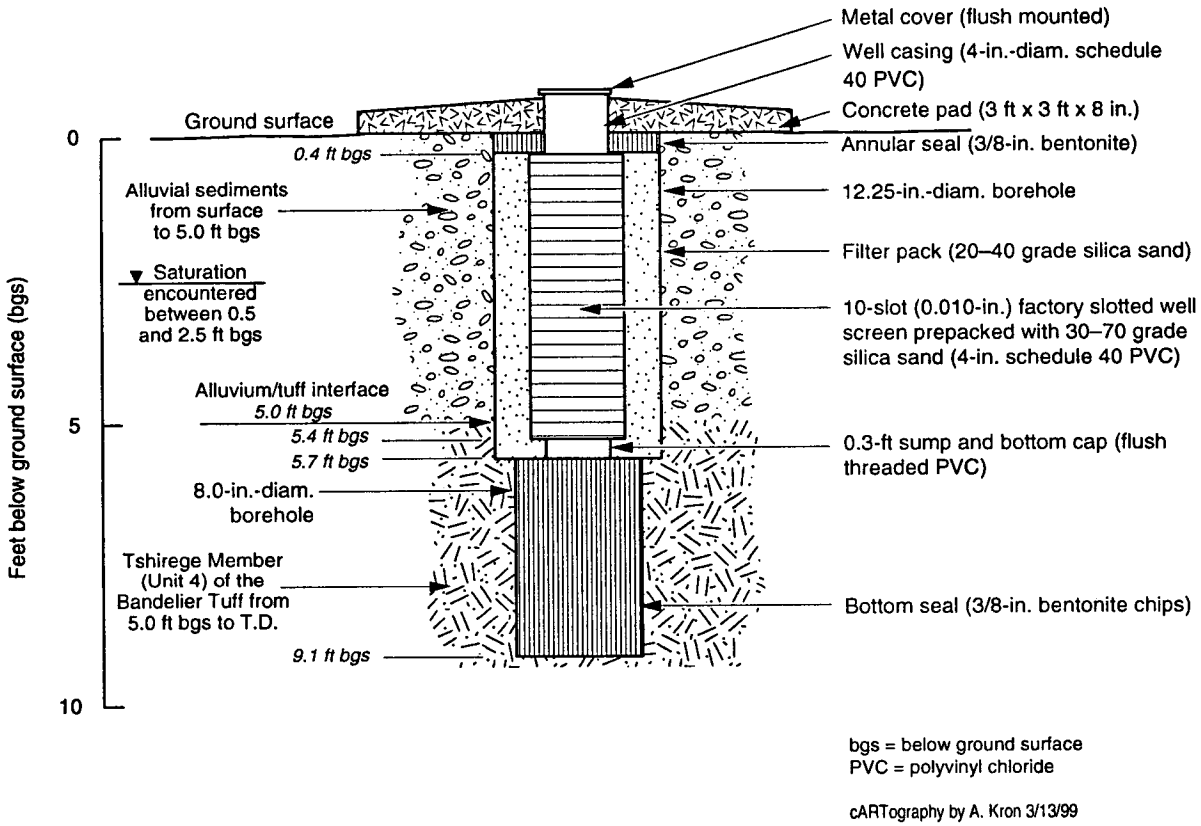


Figure 5.3-1. Construction diagram for alluvial characterization well 16-2657.

5.4 Summary Details for Alluvial Characterization Well 16-2658

Location:	Upper Cañon de Valle at northern boundary of TA-16, approximately 200 feet east-southeast of well 16-2657 and approximately 800 feet east-southeast of Burning Ground Spring (see Figure 5-1).	
Survey Data:	Northing:	1,764,469.556
	Easting:	1,615,071.383 (NM State Plane NAD 1983)
	Elevation:	7,375.60 ft msl (ground)
Objectives:	Determine groundwater chemistry; monitor alluvial groundwater quality near PRSs in TA-16; identify COPCs; monitor seasonal variations in alluvial water chemistry.	
Date of Installation:	September 16, 1997	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-5.4 ft bgs Tshirege Member (unit 4) of the Bandelier Tuff: 5.4-12.0 ft bgs (see Appendix A)	
Water Level:	1.5 ft bgs (initial water level encountered in borehole on 9/15/97)	
Construction Details: (see Fig. 5.4-1)	Borehole Diameter:	12.25 in at surface to 7.4 ft bgs; 8.0 in at 7.4 to 12.0 ft bgs
	Borehole Total Depth:	12.0 ft bgs
	Well Total Depth:	7.2 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	1.9-6.9 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	20-40 grade silica sand (30-70 grade silica sand in prepack)
	Sump:	0.3 ft (6.9-7.2 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
COPC = Contaminant of potential concern
PRS = Potential release site

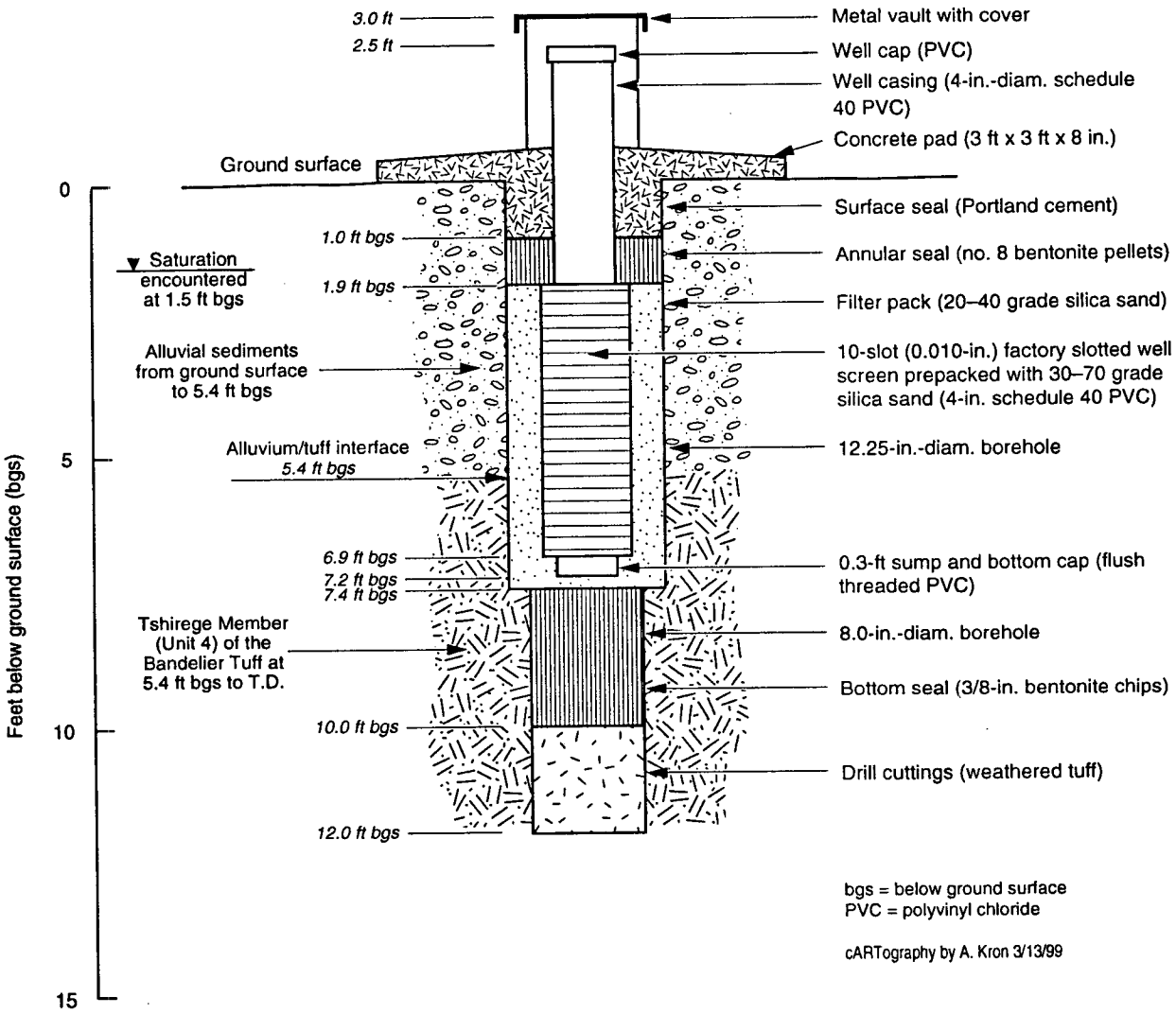


Figure 5.4-1. Construction diagram for alluvial characterization well 16-2658.

5.5 Summary Details for Alluvial Characterization Well 16-2659

Location:	Upper Cañon de Valle at northern boundary of TA-16, approximately 1800 feet east-northeast of well 16-2657, and 19 feet east of well 16-2660 (see Figure 5-1).	
Survey Data:	Northing:	1,765,035.064
	Easting:	1,616,712.082 (NM State Plane NAD 1983)
	Elevation:	7,300.50 ft msl (ground)
Objectives:	Determine groundwater chemistry; monitor alluvial groundwater quality near PRSs in TA-16; identify COPCs; monitor seasonal variations in alluvial water chemistry. Use for aquifer testing in conjunction with paired well 16-2660.	
Date of Installation:	September 18, 1997	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-5.8 ft bgs Tshirege Member (unit 3) of the Bandelier Tuff: 5.8-10.0 ft bgs (see Appendix A)	
Water Level:	2.5 ft bgs (initial water level encountered in borehole on 9/17/97)	
Construction Details: (see Fig. 5.5-1)	Borehole Diameter:	12.25 in at surface to 7.0 ft bgs; 8.0 in at 7.0 to 10.0 ft bgs
	Borehole Total Depth:	10.0 ft bgs
	Well Total Depth:	7.0 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	1.7-6.7 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	20-40 grade silica sand (30-70 grade silica sand in prepack)
	Sump:	0.3 ft (6.7-7.0 ft bgs)

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
COPC = Contaminant of potential concern
PRS = Potential release site

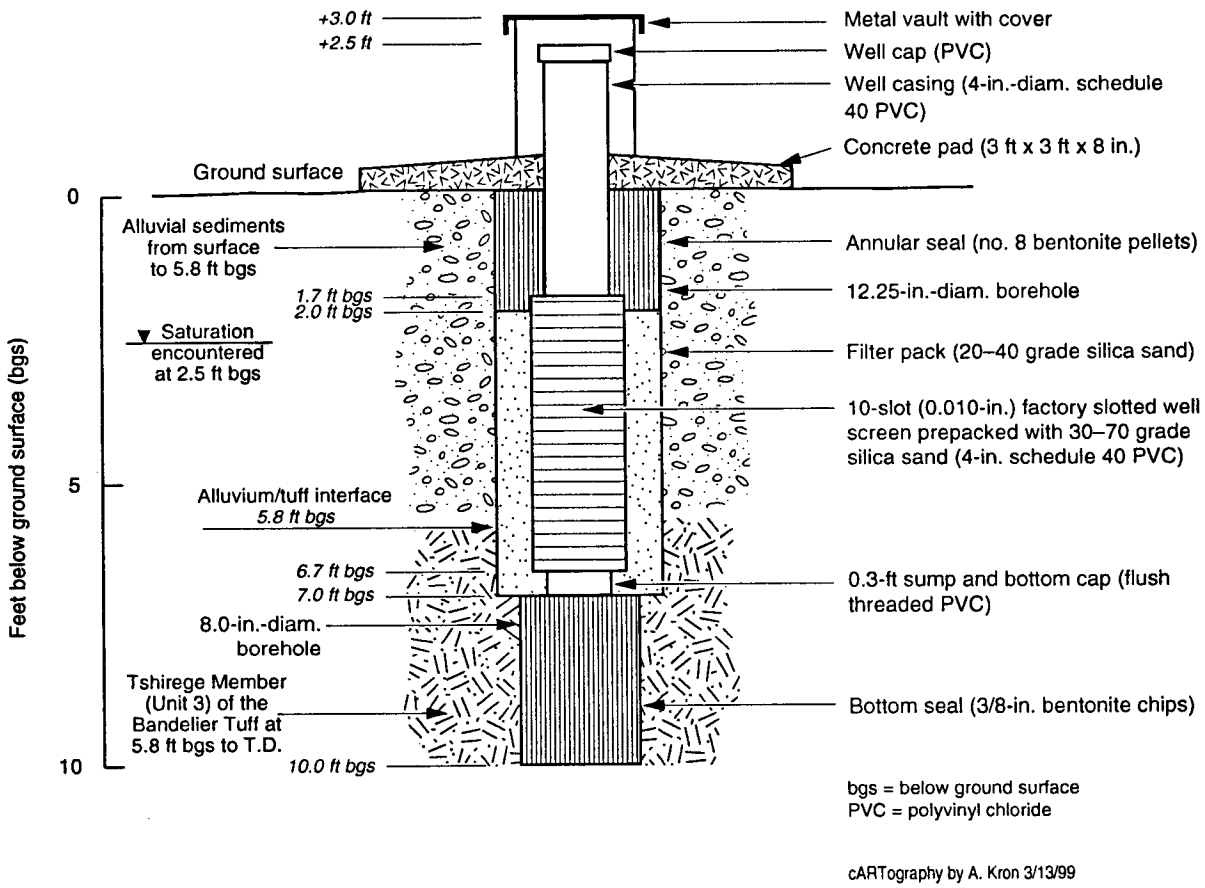


Figure 5.5-1. Construction diagram for alluvial characterization well 16-2659.

5.6 Summary Details for Alluvial Characterization Well 16-2660

Location:	Upper Cañon de Valle at northern boundary of TA-16, approximately 1800 feet east-northeast of well 16-2657, and 19 feet west of well 16-2659 (see Figure 5-1).	
Survey Data:	Northing:	1,765,036.299
	Easting:	1,616,693.200 (NM State Plane NAD 1983)
	Elevation:	7,301.30 ft msl (ground)
Objectives:	Determine groundwater chemistry; monitor alluvial groundwater quality near PRSs in TA-16; identify COPCs; monitor seasonal variations in alluvial water chemistry. Use for aquifer testing in conjunction with paired well 16-2659.	
Date of Installation:	September 22, 1997	
Drilling Method:	Hollow-stem auger	
Stratigraphy:	Alluvial sediments: 0-7.0 ft bgs (see Appendix A)	
Water Level:	3.2 ft bgs (initial water level encountered in borehole on 9/19/97)	
Construction Details: (see Fig. 5.6-1)	Borehole Diameter:	12.25 in
	Borehole Total Depth:	7.0 ft bgs
	Well Total Depth:	6.9 ft bgs
	Casing/screen:	4-in schedule 40 threaded PVC
	Screened Interval:	1.6-6.6 ft bgs
	Slot Size:	0.010 in
	Filter Pack:	20-40 grade silica sand (30-70 grade silica sand in prepack)
	Sump:	0.3 ft (6.6-6.9 ft bgs)

Abbreviations:

ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
COPC = Contaminant of potential concern
PRS = Potential release site

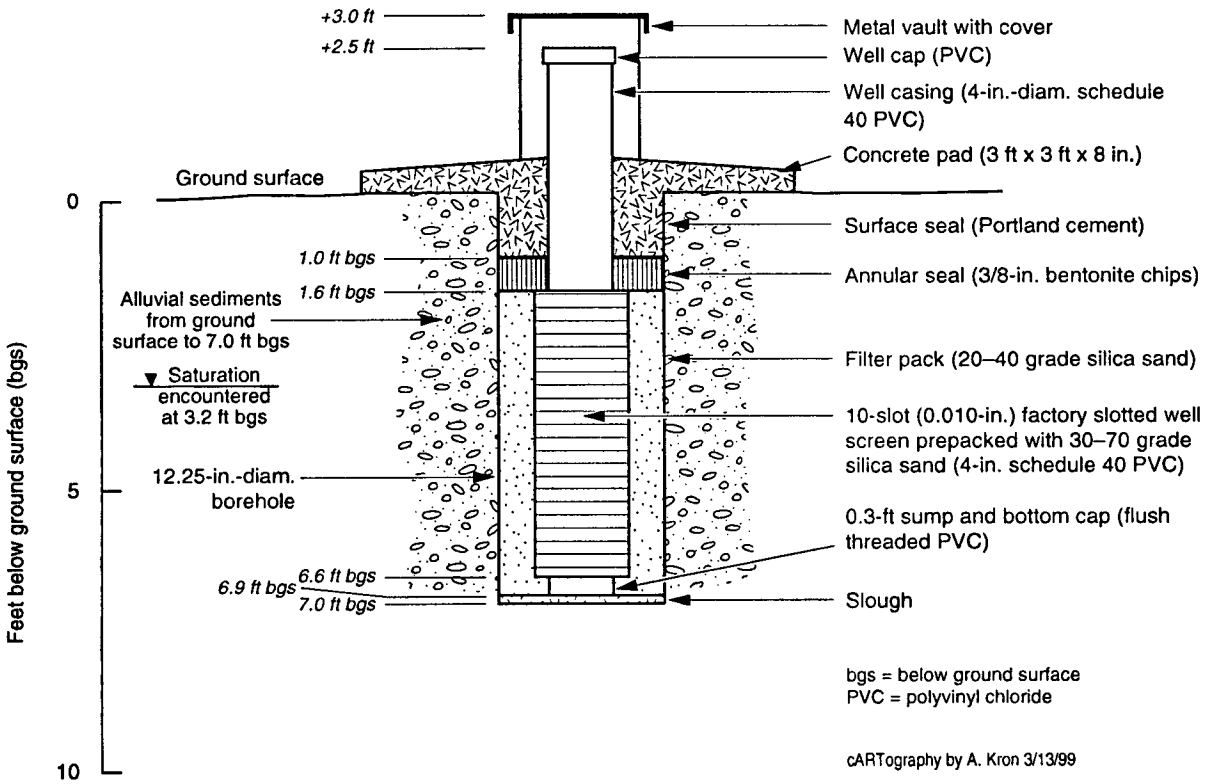


Figure 5.6-1. Construction diagram for alluvial characterization well 16-2660.

6.0 Mortandad Canyon

Information is provided in this section for one alluvial characterization well and one alluvial/Cerro Toledo interval characterization well installed in Mortandad Canyon. The locations of these wells are shown in Figure 6-1. Summary details and well construction diagrams are provided for each well. The lithologic logs for each borehole are included in Appendix A.

6.1 Summary Details for Alluvial/Cerro Toledo Interval Characterization Well MCO-7.2

Location:	Middle Mortandad Canyon, approximately 1400 feet east of the confluence with Ten Site Canyon (see Figure 6-1).		
Survey Data:	Northing:	1,768,538.54	
	Easting:	1,634,957.03	(NM State Plane NAD 1983)
	Elevation:	6,818.34 ft msl (disc) 6,817.82 ft msl (ground)	
Objectives:	Characterize subsurface stratigraphy; determine extent of saturation in the alluvium; assess potential for perched groundwater zones in the Cerro Toledo interval underlying the saturated alluvium; investigate possible hydrologic interaction of alluvium and Cerro Toledo interval units; characterize possible presence and distribution of contaminants in subsurface lithologic units; characterize subsurface unsaturated moisture profile.		
Date of Installation:	December 3, 1998		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-60.6 ft bgs Tsankawi Pumice: 60.6-64.0 ft bgs Cerro Toledo interval (epiclastic sediments and tephras): 64.0-110.6 ft bgs Otowi Member, Bandelier Tuff: 110.6-132.5 ft bgs (see Appendix A)		
Water Level:	Alluvial groundwater = 42.5 ft bgs (11/16/98) (Initially encountered water level in borehole only; alluvial section was sealed off with surface casing and well screen was placed in the unsaturated Cerro Toledo interval.) Cerro Toledo = 94.96-95.11 ft bgs (3/31/99-2/7/01) (All water levels measured in well represent residual water in the bottom of the sump only, and may represent leakage from the overlying saturated alluvium through the borehole annulus.)		
Construction Details: (see Fig. 6.1-1)	Borehole Diameter:	12.25 in (0-65.0 ft bgs); 8.0 in (65.0-132.5 ft bgs)	
	Borehole Total Depth:	132.5 ft bgs	
	Well Total Depth:	95.35 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Screened Interval:	72.0-92.5 ft bgs	
	Slot Size:	0.020 in	
	Filter Pack:	16-40 grade silica sand	
	Sump:	2.85 ft (92.5-95.35 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride

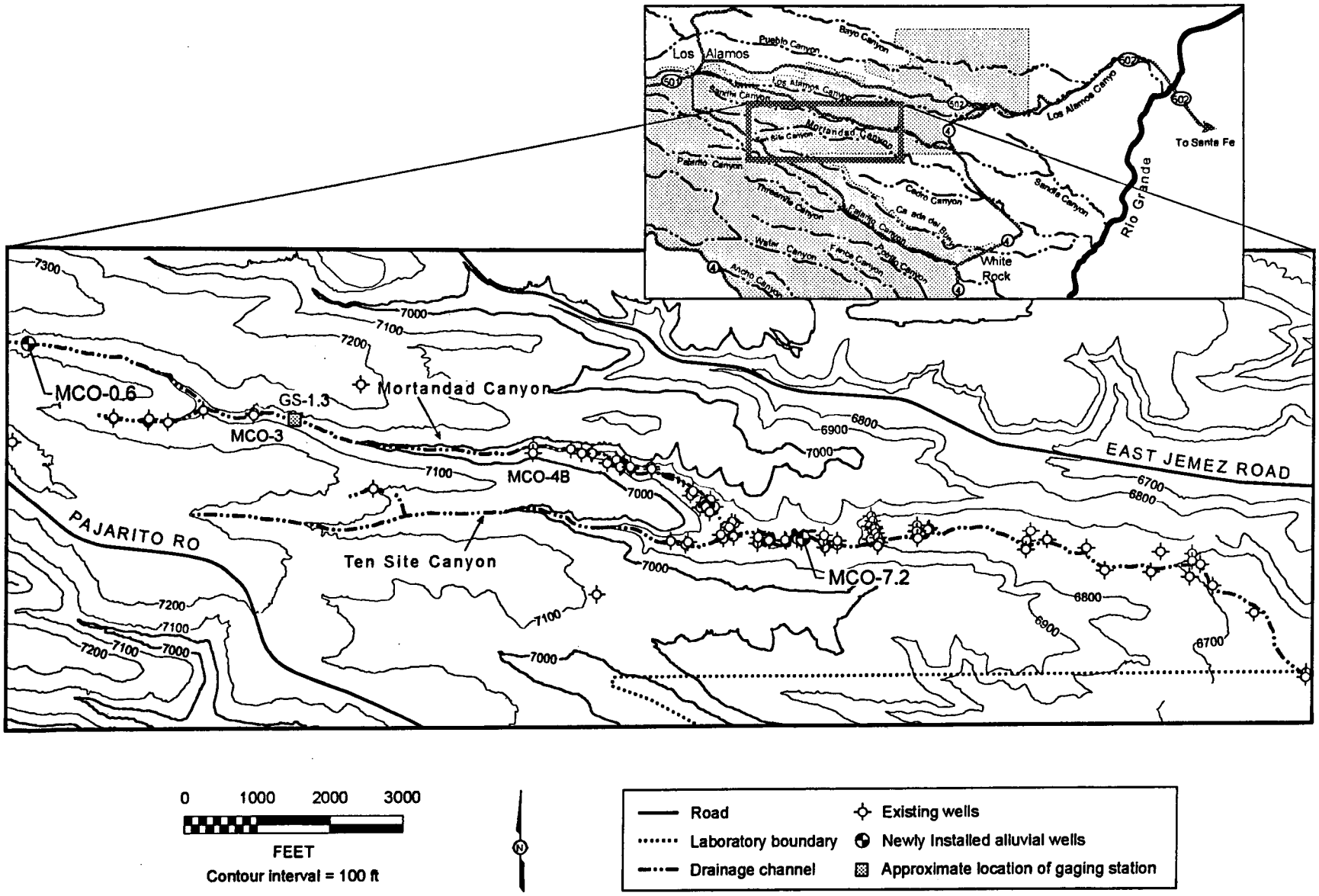


Figure 6-1: Locations of alluvial/Cerro Toledo interval characterization well MCO-7.2 in middle Mortandad Canyon and alluvial characterization well MCO-0.6 in upper Mortandad Canyon

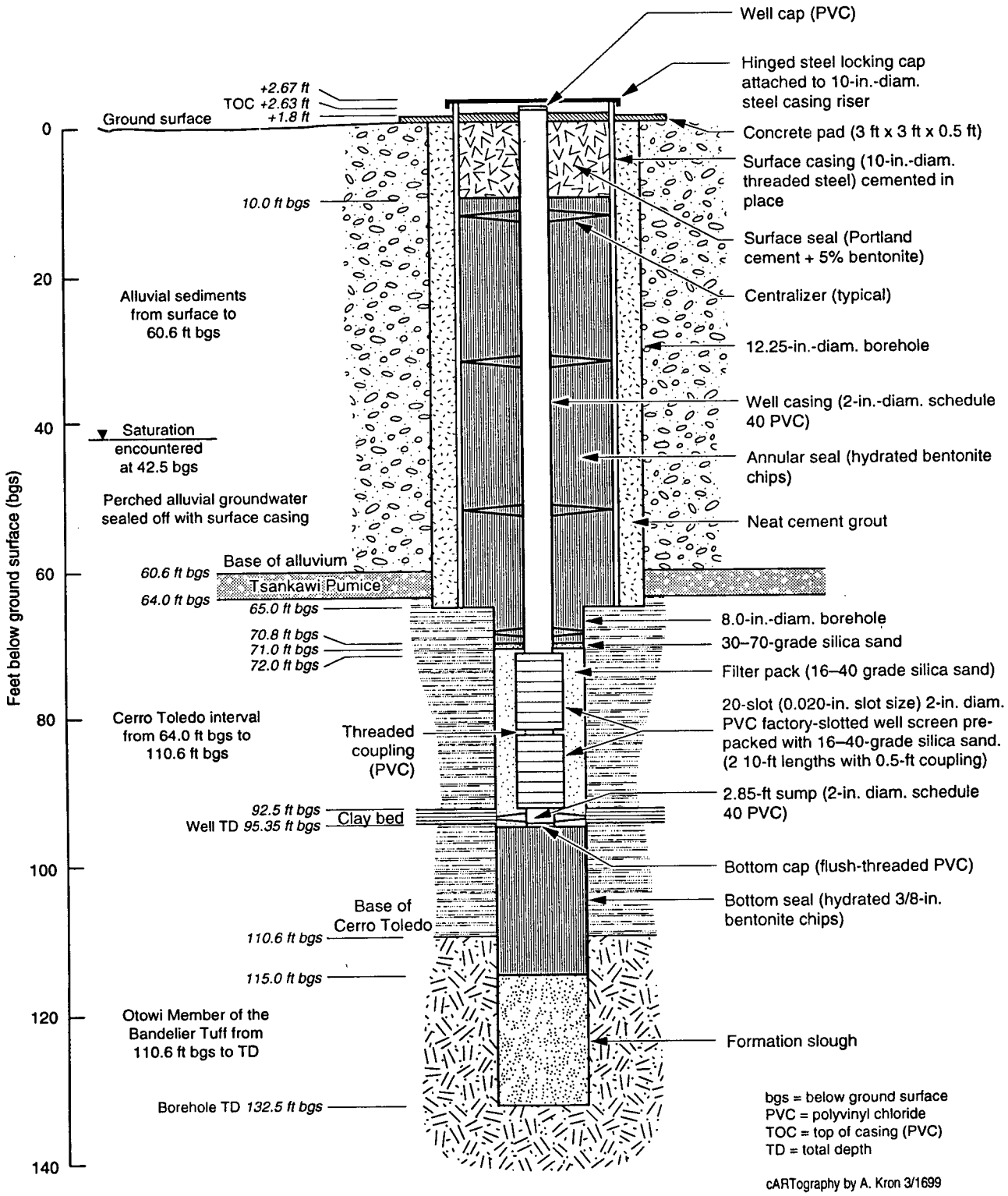


Figure 6.1-1. Construction diagram for alluvial/Cerro Toledo characterization well MCO-7.2.

6.2 Summary Details for Alluvial Characterization Well MCO-0.6

Location:	Upper Mortandad Canyon, approximately 2500 feet east of the confluence with Effluent Canyon and north of Technical Area 48 in Reach M-1 (see Figure 6-1).		
Survey Data:	Northing:	1,771,179.47	
	Easting:	1,623,987.76	(NM State Plane NAD 1983)
	Elevation:	7,188.28 ft msl	(disc)
		7,187.92 ft msl	(ground)
Objectives:	Determine baseline alluvial groundwater chemistry and monitor alluvial groundwater quality upgradient of TA-50 Radioactive Liquid Waste Treatment Facility discharges; determine extent of saturation and continuity of alluvial groundwater in upper Mortandad Canyon; provide water level information.		
Date of Installation:	February 25, 1999		
Drilling Method:	Hand auger		
Stratigraphy:	Alluvial sediments: 0-3.1 ft bgs Otowi Member, Bandelier Tuff: impenetrable formation contact at 3.1 ft bgs (see Appendix A)		
Water Level:	1.15-3.08 ft bgs (3/31/99-6/5/01)		
Construction Details: (see Fig. 6.2-1)	Borehole Diameter:	3.75 in	
	Borehole Total Depth:	3.1 ft bgs	
	Well Total Depth:	3.05 ft bgs	
	Casing/screen:	2¼-in diameter threaded stainless steel	
	Screened Interval:	1.05-3.05 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	16-40 grade silica sand	
	Sump:	0.05 ft (3.05-3.10 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface

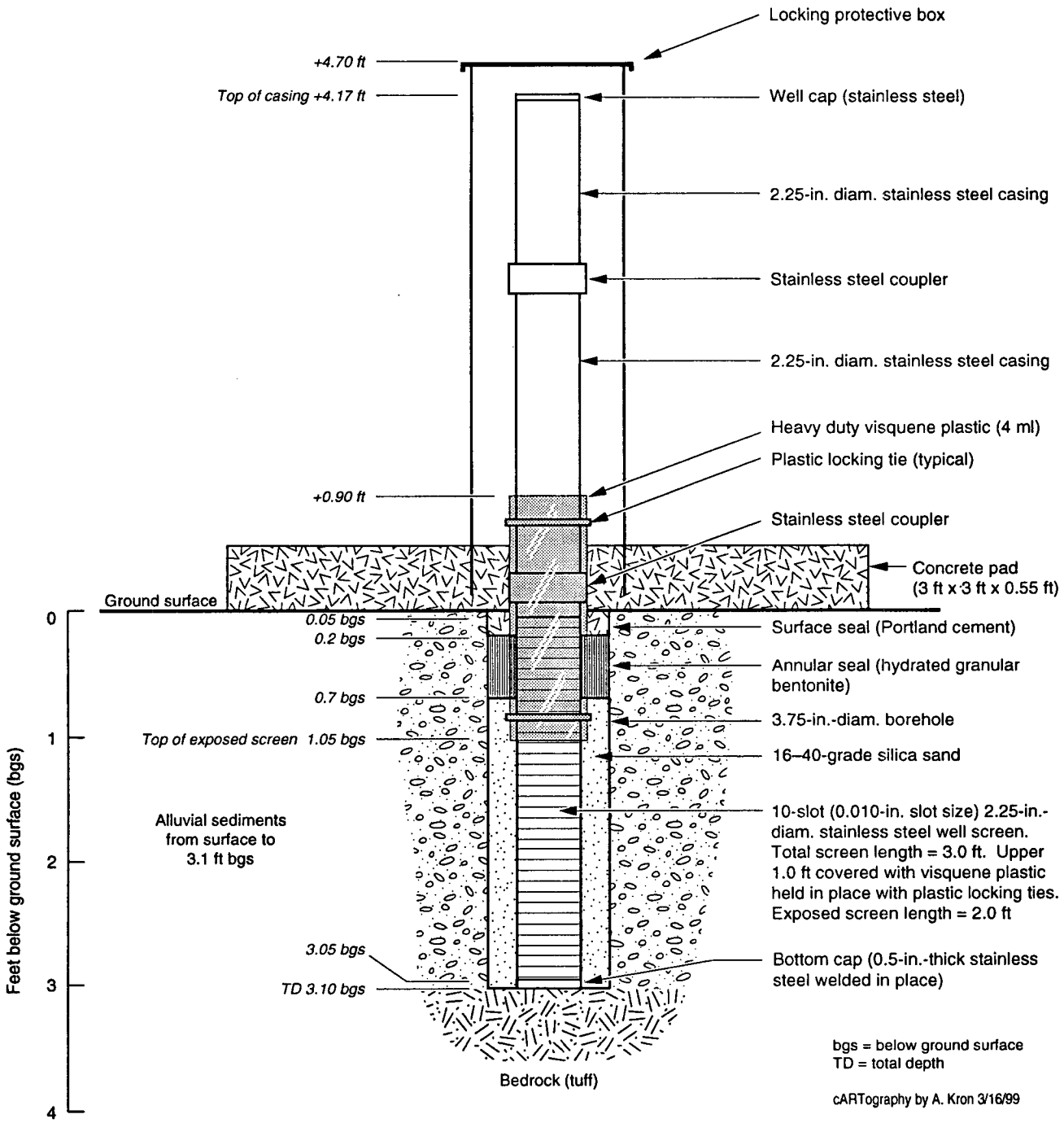


Figure 6.2-1. Construction diagram for alluvial characterization well MCO-0.6.

7.0 LOS ALAMOS CANYON - 1994 Installations

Information is provided in this section for five alluvial characterization wells installed in upper Los Alamos Canyon during 1994 for a RCRA Facility Investigation at Technical Areas 2 and 41 (ERM, 1995). The locations of these wells are shown in Figure 7-1. Summary details and well construction diagrams are provided for each well. The lithologic logs for each borehole are included in Appendix A.

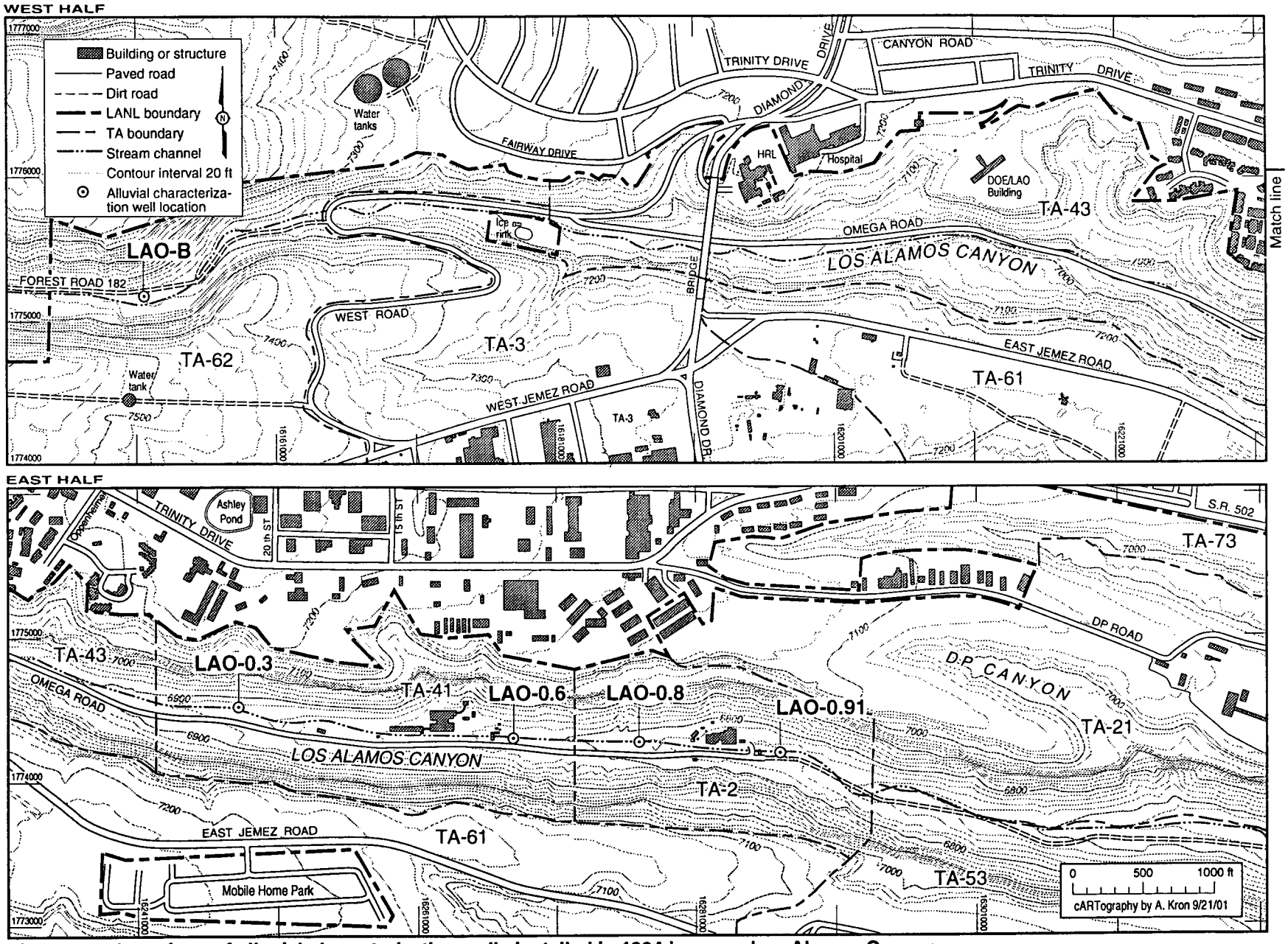


Figure 7-1. Locations of alluvial characterization wells installed in 1994 in upper Los Alamos Canyon.

7.1 Summary Details for Alluvial Characterization Well LAO-B

Location:	Upper Los Alamos Canyon, approximately 3000 feet west of the Diamond Drive bridge (see Figure 7-1).		
Survey Data:	Northing:	1,775,170.43	
	Easting:	1,615,148.84	(NM State Plane NAD 1983)
	Elevation:	7,325.03 ft msl	(TOC)
		7,323.59 ft msl	(disc)
		7,322.57 ft msl	(ground)
Objectives:	Characterize background alluvial groundwater quality in upper Los Alamos Canyon upgradient from Laboratory activities; provide water level information.		
Date of Installation:	April 28, 1994		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-27.5 ft bgs (see Appendix A)		
Water Level:	5.60-7.89 ft bgs (4/28/94-11/6/01)		
Construction Details: (see Fig. 7.1-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	27.5 ft bgs	
	Well Total Depth:	27.19 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	11.84-26.84 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	10-20 grade silica sand	
	Sump:	0.35 ft (26.84-27.19 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
TOC = top of casing

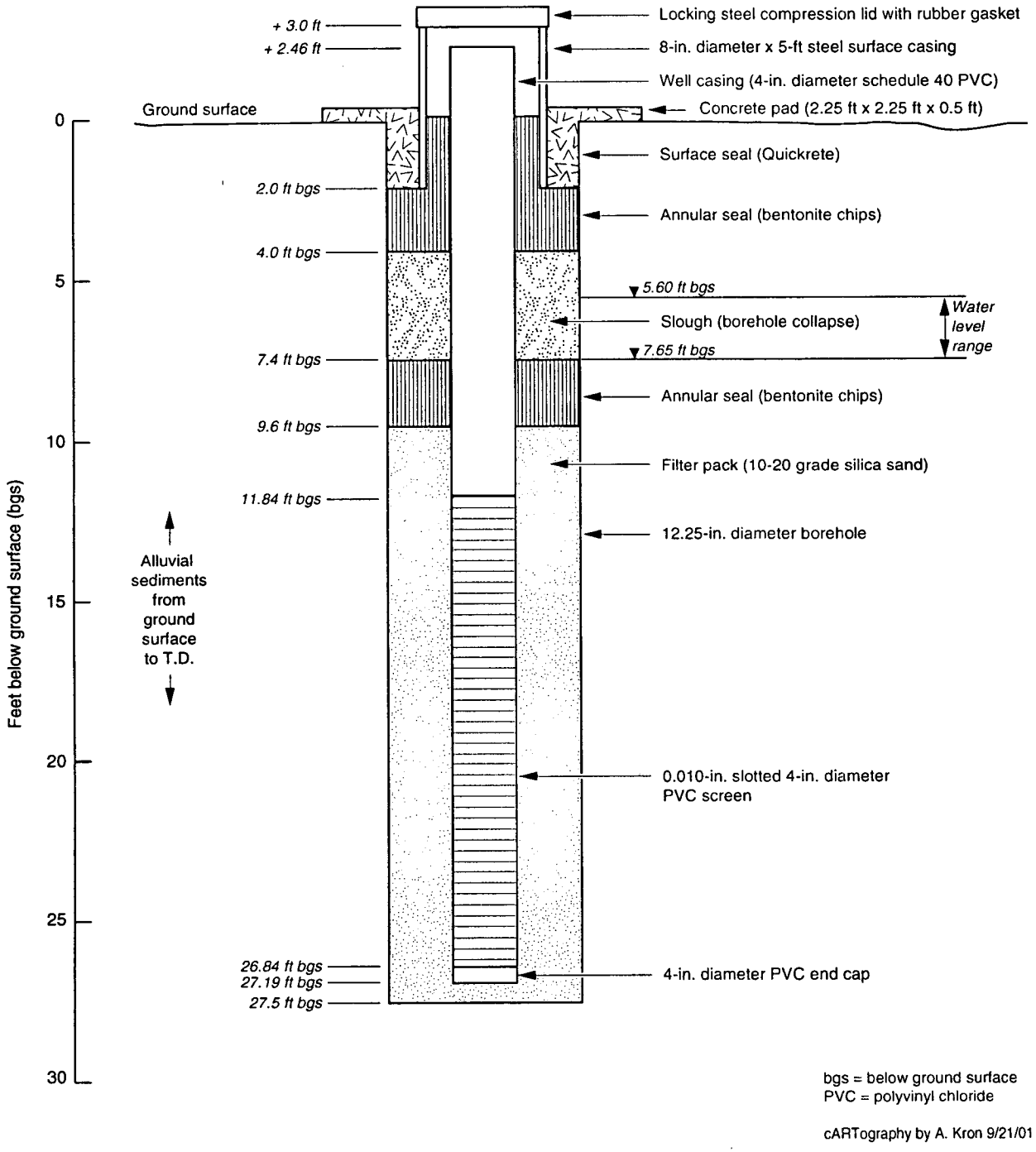


Figure 7.1-1. Construction diagram for alluvial characterization well LA0-B.

7.2 Summary Details for Alluvial Characterization Well LAO-0.3

Location:	Upper Los Alamos Canyon, approximately 5700 feet east of the Diamond Drive bridge (see Figure 7-1).		
Survey Data:	Northing:	1,774,511.64	
	Easting:	1,624,799.01	(NM State Plane NAD 1983)
	Elevation:	6,970.25 ft msl	(TOC)
		6,968.13 ft msl	(disc)
		6,967.82 ft msl	(ground)
Objectives:	Characterize alluvial groundwater quality in TA-41 area of upper Los Alamos Canyon, upstream of TA-2; provide water level information.		
Date of Installation:	May 27, 1994		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-12.5 ft bgs Bandelier Tuff (Otowi Member): 12.5-22.5 ft bgs note: lithology is from original borehole LAO-0.3(A) located 50 feet east of this location (see Appendix A); well LAO-0.3(R) installed on May 5, 1994 in the original borehole was abandoned on May 27, 1994 due to grout contamination.		
Water Level:	3.75-8.80 ft bgs (6/1/94-11/6/01)		
Construction Details: (see Fig. 7.2-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	12.0 ft bgs	
	Well Total Depth:	11.25 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	5.9-10.9 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	0.35 ft (10.9-11.25 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
TOC = top of casing

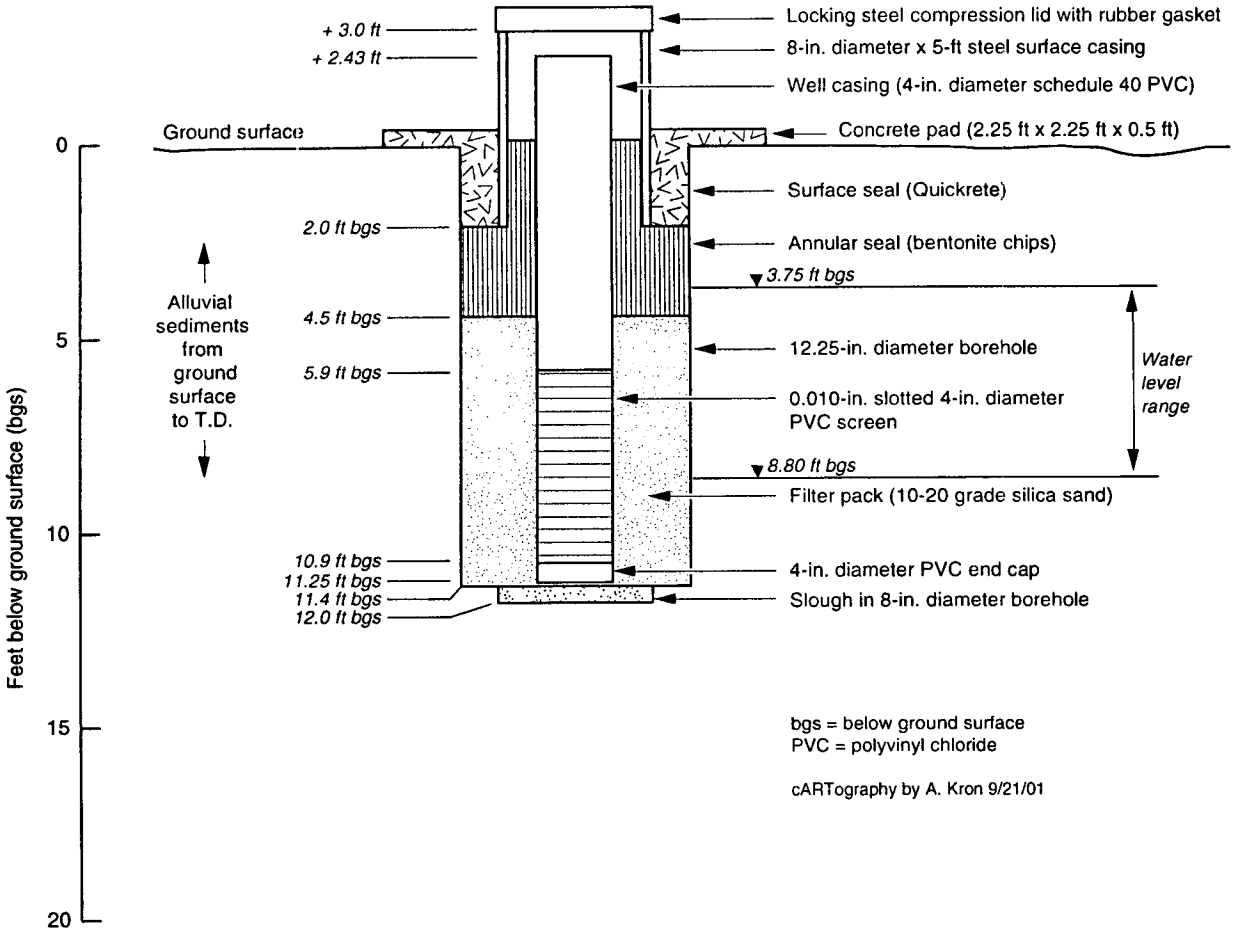


Figure 7.2-1. Construction diagram for alluvial characterization well LA0-0.3.

7.3 Summary Details for Alluvial Characterization Well LAO-0.6

Location:	Upper Los Alamos Canyon, approximately 7500 feet east of the Diamond Drive bridge (see Figure 7-1).		
Survey Data:	Northing:	1,774,332.90	
	Easting:	1,626,748.11	(NM State Plane NAD 1983)
Elevation:	6,912.88 ft msl (TOC) 6,910.74 ft msl (disc) 6,910.34 ft msl (ground)		
Objectives:	Characterize alluvial groundwater quality in TA-41 area of upper Los Alamos Canyon, upstream of TA-2; provide water level information.		
Date of Installation:	May 6, 1994		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-14 ft bgs (contact approximate; no recovery from 6.5-15.0 ft bgs) Bandelier Tuff (Otowi Member): 14-17.5 ft bgs (see Appendix A)		
Water Level:	1.56-7.42 ft bgs (5/6/94-7/13/01)		
Construction Details: (see Fig. 7.3-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	17.5 ft bgs	
	Well Total Depth:	13.35 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	8.0-13.0 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	0.35 ft (13.0-13.35 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
TOC = top of casing

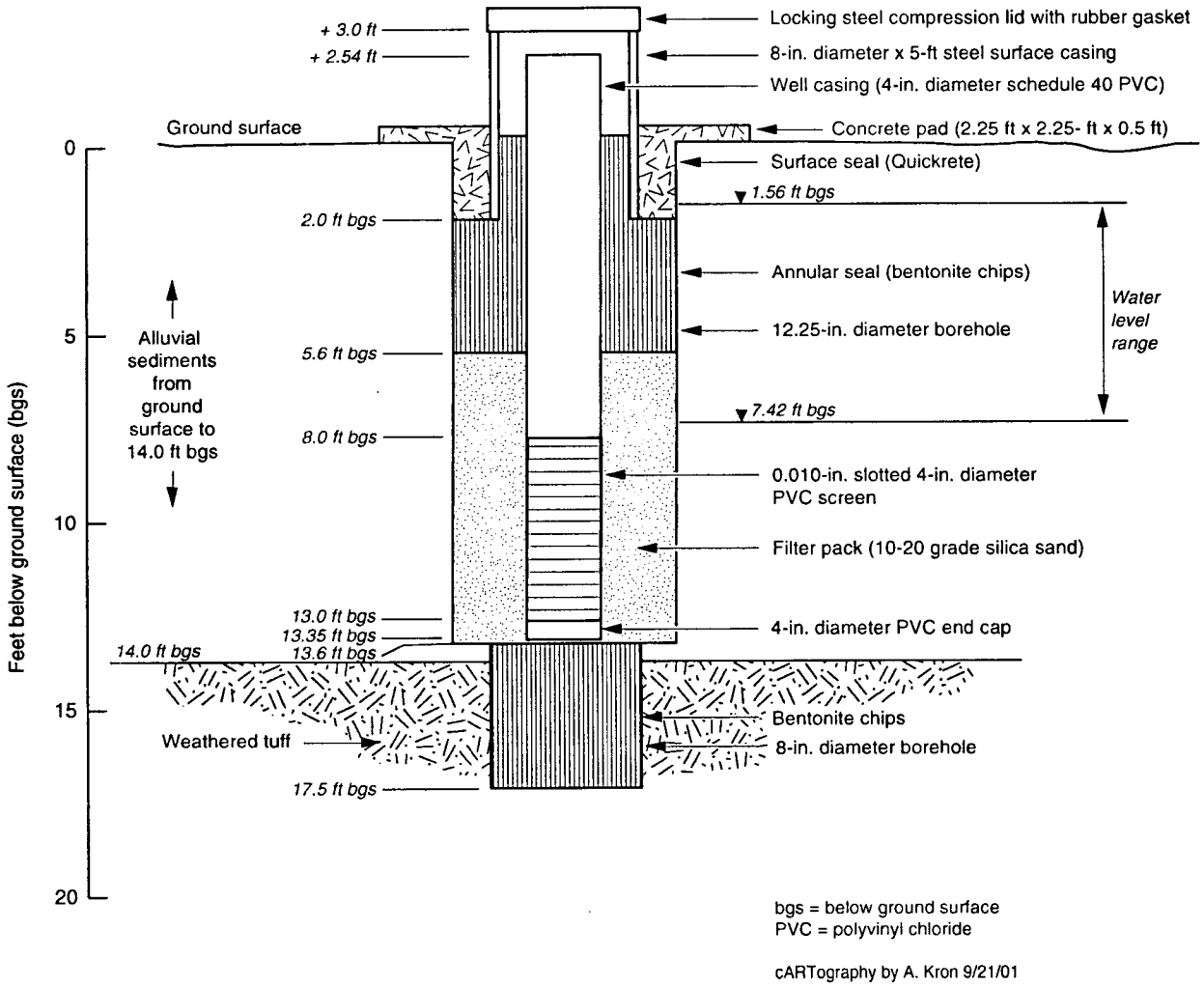


Figure 7.3-1. Construction diagram for alluvial characterization well LA0-0.6.

7.4 Summary Details for Alluvial Characterization Well LAO-0.8

Location:	Upper Los Alamos Canyon, approximately 8500 feet east of the Diamond Drive bridge (see Figure 7-1).		
Survey Data:	Northing:	1,774,274.66	
	Easting:	1,627,699.74	(NM State Plane NAD 1983)
	Elevation:	6,889.71 ft msl (TOC) 6,887.58 ft msl (disc) 6,887.04 ft msl (ground)	
Objectives:	Characterize alluvial groundwater quality in TA-2 area of upper Los Alamos Canyon; provide water level information.		
Date of Installation:	May 11, 1994		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-15.0 ft bgs Bandelier Tuff (Otowi Member): 15.0-17.5 ft bgs (see Appendix A)		
Water Level:	9.24-12.81 ft bgs (5/11/94-11/6/01)		
Construction Details: (see Fig. 7.4-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	17.5 ft bgs	
	Well Total Depth:	12.85 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	7.5-12.5 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	0.35 ft (12.5-12.85 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
TOC = top of casing

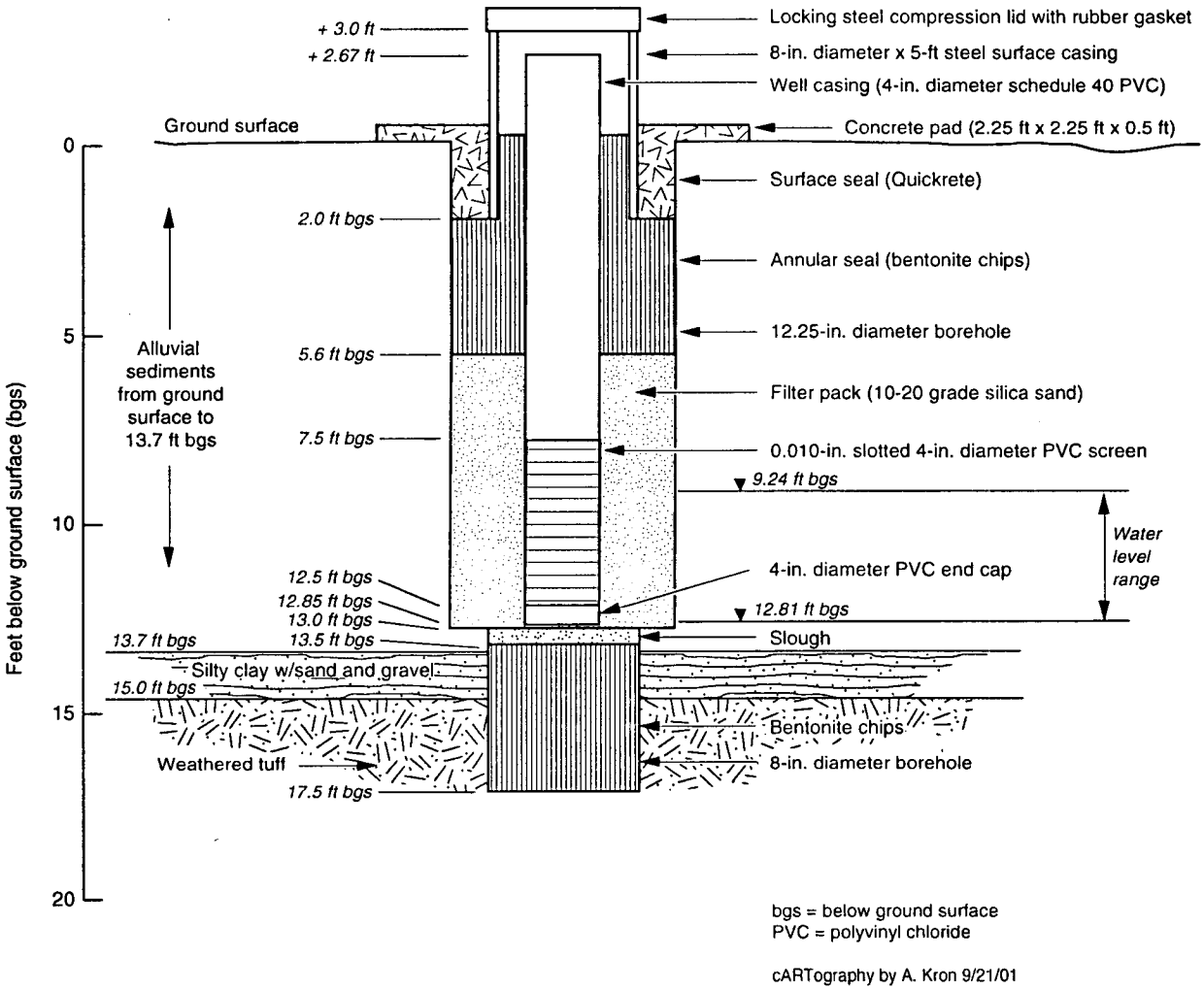
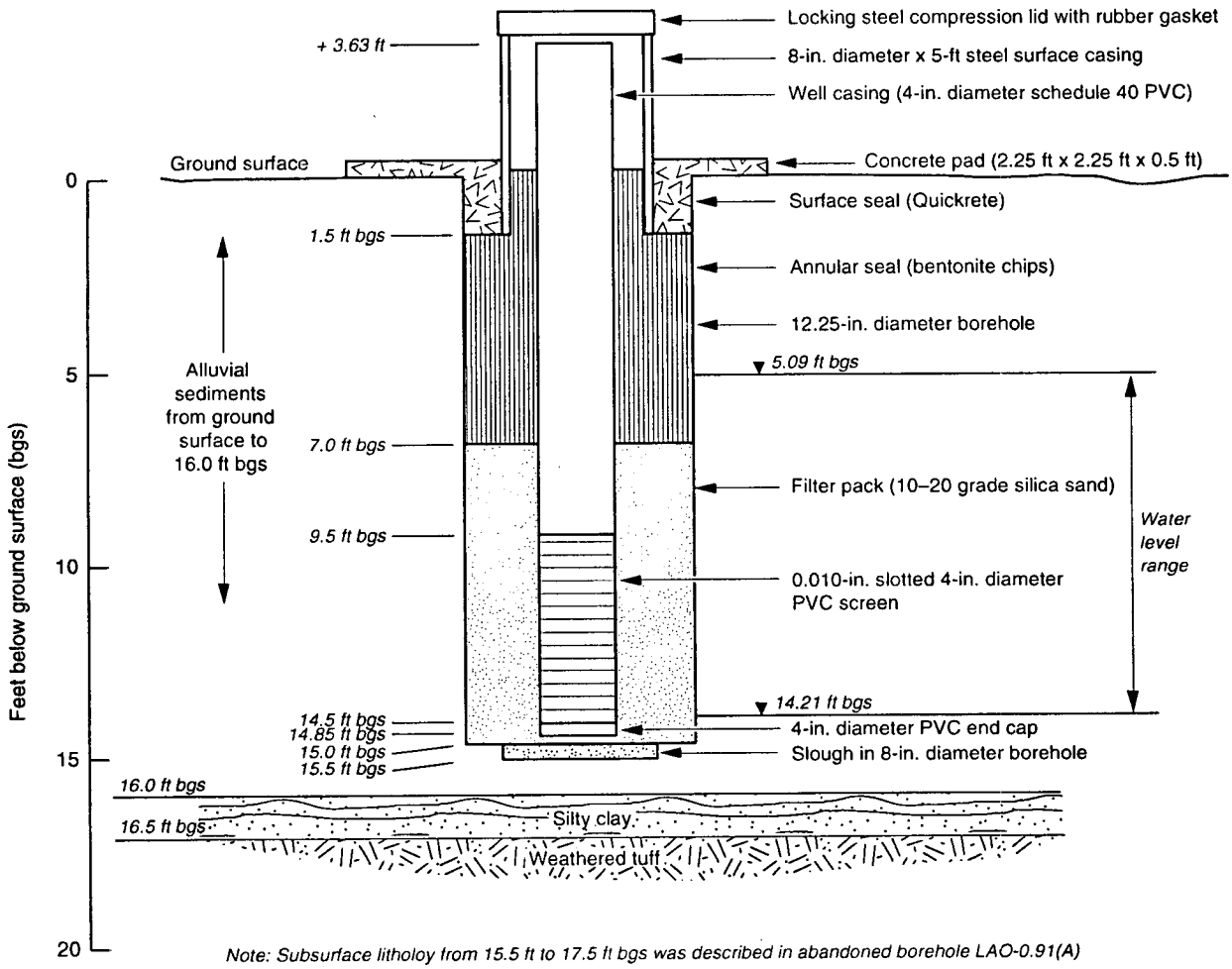


Figure 7.4-1. Construction diagram for alluvial characterization well LA0-0.8.

7.5 Summary Details for Alluvial Characterization Well LAO-0.91

Location:	Upper Los Alamos Canyon approximately 10,200 feet east of the Diamond Drive bridge and approximately 100 feet east of the eastern boundary of TA-2 (see Figure 7-1).		
Survey Data:	Northing:	1,774,207.01	
	Easting:	1,628,654.28	(NM State Plane NAD 1983)
Elevation:	6,864.79 ft msl (TOC) 6,861.74 ft msl (disc) 6,861.16 ft msl (ground)		
Objectives:	Characterize alluvial groundwater quality downstream form TA-2; provide water level information.		
Date of Installation:	May 12, 1994		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-16.0 ft bgs Bandelier Tuff (Otowi Member): 16.0-17.5 ft bgs (altered clay zone at 16.0-16.5 ft bgs) note: lithology is from original borehole LAO-0.91(A) located 15 feet east of this location (see Appendix A); The original borehole could not be reamed to the necessary diameter because of a large tuff boulder at 6.3-11.0 ft bgs and was abandoned.		
Water Level:	5.09-14.21 ft bgs (6/1/94-11/6/01)		
Construction Details: (see Fig. 7.5-1)	Borehole Diameter:	12.25 in	
	Borehole Total Depth:	15.5 ft bgs	
	Well Total Depth:	14.85 ft bgs	
	Casing/screen:	4-in schedule 40 threaded PVC	
	Screened Interval:	9.5-14.5 ft bgs	
	Slot Size:	0.010 in	
	Filter Pack:	20-40 grade silica sand	
	Sump:	0.35 ft (14.5-14.85 ft bgs)	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
ground = ground surface
PVC = polyvinyl chloride
TOC = top of casing



bgs = below ground surface
PVC = polyvinyl chloride

cARTography by A. Kron 9/21/01

Figure 7.5-1. Construction diagram for alluvial characterization well LA0-0.91.

8.0 LOS ALAMOS CANYON - Alluvial Piezometers

Information is provided in this section for 6 alluvial piezometer nests and 2 alluvial piezometers installed in upper and middle Los Alamos Canyon during 2001. The locations of these wells are shown in Figures 8-1 and 8-2. Summary details and well construction diagrams are provided for each well. The lithologic logs for each borehole are included in Appendix A.

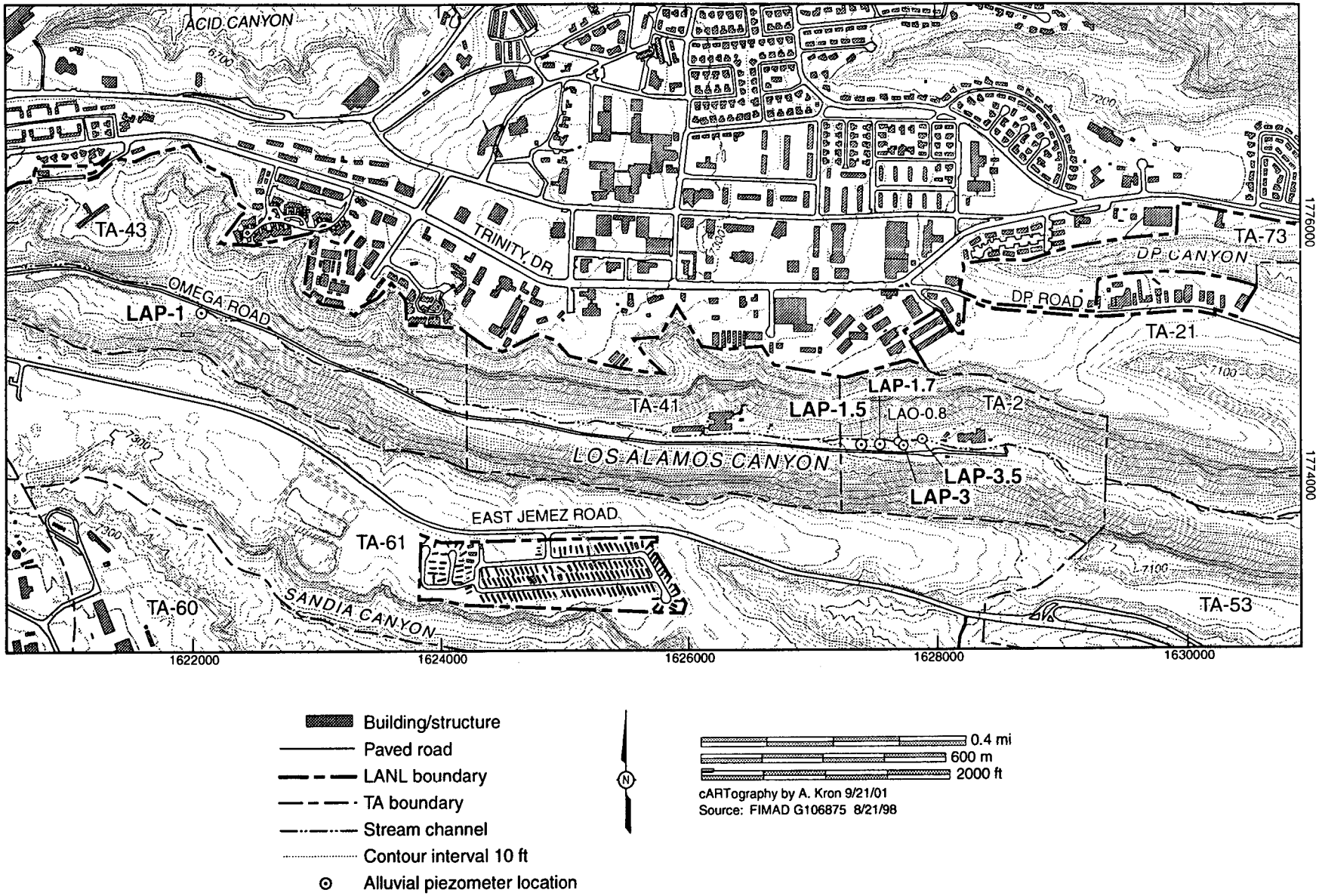


Figure 8-1. Locations of alluvial piezometers in upper Los Alamos Canyon.

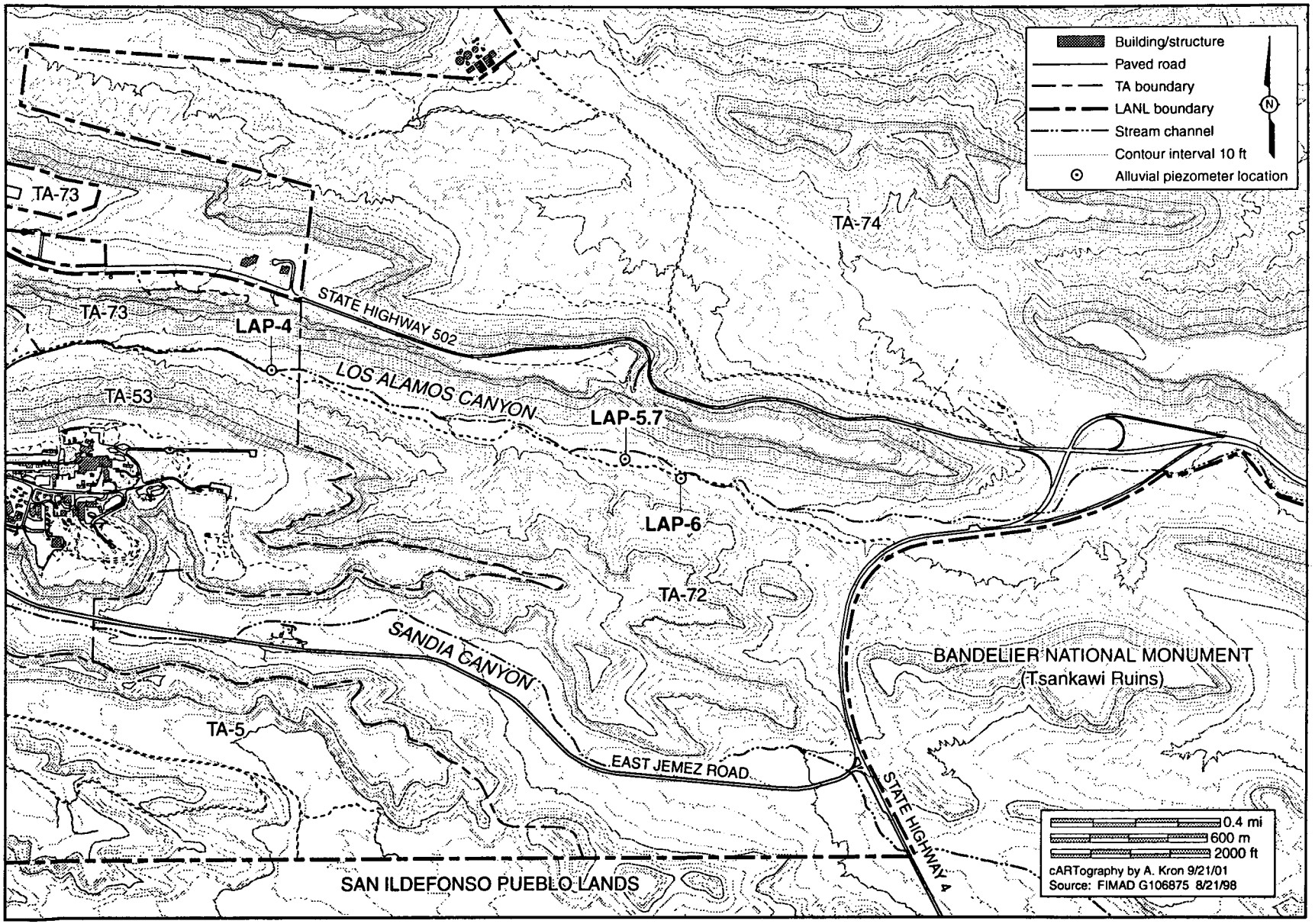


Figure 8-2. Locations of alluvial piezometers in middle Los Alamos Canyon.

8.1 Summary Details for Alluvial Piezometer Nest LAP-1

Location:	Upper Los Alamos Canyon, approximately 2900 feet east of the Diamond Drive bridge and 75 west of alluvial well LAO-C (see Figure 8-1).		
Survey Data:	Northing:	1,775,295.20	
	Easting:	1,622,074.52	(NM State Plane NAD 1983)
	Elevation:	7,061.68 ft msl	(pad)
		7,061.18 ft msl	(ground)
Objectives:	Monitor alluvial hydraulic head fluctuations at multiple discrete depths for assessment of vertical hydraulic gradient.		
Date of Installation:	May 17, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-11.45 ft bgs Bandelier Tuff (Otowi Member): 11.45-12.5 ft bgs (see Appendix A)		
Water Level:	5.9 ft bgs (initial)		
Construction Details: (see Fig. 8.1-1)	Borehole Diameter:	10.5 in	
	Borehole Total Depth:	12.5 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depths:	Piezometer #1: 11.01 ft bgs Piezometer #2: 9.00 ft bgs Piezometer #3: 7.01 ft bgs	
	Screened Intervals: (0.50 ft each)	Piezometer #1: 10.36-10.86 ft bgs Piezometer #2: 8.35-8.85 ft bgs Piezometer #3: 6.36-6.86 ft bgs	
	Sumps: (0.15 ft each)	Piezometer #1: 10.86-11.01 ft bgs Piezometer #2: 8.85-9.00 ft bgs Piezometer #3: 6.86-7.01 ft bgs	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

LITHOLOGY:

- TOPSOIL
- FINE SAND AND CLAY
- SANDY SILT
- COARSE SAND
- CLAY
- FINE TO MEDIUM SAND AND PUMICE
- COARSE SAND AND COBBLES

STANDARD PENETRATION TEST DATA:

Run Number	Interval (Ft.)	Blow Counts
1	0-2.0	5-5-5-5
2	2.0-4.0	5-5-5-5
3	4.0-6.0	5-13-9-9
4	6.0-8.0	4-12-11-37
5	8.0-10.0	6-11-11-18
6	10.0-11.0	50/10"
7	11-12.5	18-50-100/1.0"
8	12.5-13.5	100/1.0"
9	13.5-14.0	100(+)/6.0"
10	14.0-14.5	200+
11	14.5-15.4	200+

NOTE:

The information displayed in the Blow Counts column of the Standard Penetration Test data table is a measure of the number of hammer blows needed to drive a stainless steel split barrel sampling tube a distance of 2.0 ft. The test is performed using a hydraulically lifted hammer that is dropped a distance of 4.0 ft onto the top of a rod attached to the split barrel. The driller then counts how many blows of the hammer are neccessary to drive the sampler a distance of six inches and each time six inches is reached, the test is started over again. Usually the test is stopped if the hammer does not advance after a maximum of fifty blows has been reached. However, if the split barrel advances very slowly and fifty counts are reached, then the driller will report what distance (in inches) was reached after the fifty hammer strikes.

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: DANNY KATZMAN SIGNATURE:

NOTES:

1. Daily background radiation levels for the dates that drilling occured are as follows:

Date	Daily Background (alpha)	Daily Background (beta)
7-23-97	1.2 cpm	277 cpm
7-24-97	1.2 cpm	277 cpm

2. Units for field screening results are as follows:
Alpha (A) = counts per minute (cpm).
Beta/Gamma (B/G) = counts per minute (cpm).
Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
NDA = No Detectable Activity.

The instruments used to monitor radiation levels are as follows:

Model	HSE #	Calibration Date	Efficiency (CPM/DPM)
Ludlum-139 (alpha)	008323	4/24/98	36%
ESP-1 (beta/gamma)	007416	10/15/97	65%

3. All color descriptions are based on the Munsell guide for describing soils and rocks in the fieldand are described from the core under natural moisture conditions.

4. The information displayed in the **Recovery Data** column shows the amount of core that was retrieved. That is, the first number is the amount of footage drilled. The second number is the measurement of the amount of core present in the barrel and the last number is the measurement of the amount of core that was missing or not recoverd in the barrel. Consequently, the data is displayed in the format (drilled-recovered-lost). A graphical representation next to the measurement data shows the amount of core present in relation to the amount lost. A block with diagonal lines represents recovered core and a solid block represents core that has been lost.

This well was drilled in close proximity to the former well PO-4. PAO-1 was installed as a replacement for well PO-4 which was removed and abandoned to the surface on 25-July-97.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Depth (Feet)	Recovery Data	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Lithologic Unit	Notes
12	1.5'-1.5'-0 1.0'-1.0'-0' 0.5'-0.5'-0' 0.5'-0.5'-0' 1.0'-1.0'-0.0'	No analytical samples were collected from this borehole as of 15-August-97.	A= NDA BG= 185 cpm OVM= NDA A= NDA BG= 190 cpm OVM= NDA A= NDA BG= 183 cpm OVM= NDA A= NDA BG= 174 cpm OVM= NDA A= NDA BG= 166 cpm OVM= NDA	Box #4, 11.0-14.5 ft FCT Bar Code: 0005463 Box #5, 14.5-15.5 ft FCT Bar Code: 0005464	Run #7, 11.0 ft-12.5 ft: SAA, A large cobble (latite) is present in the shoe. The very bottom of the sample barrel exhibits an iron oxide coating on the outside. Core shows a lack of moisture. Run #8, 12.5 ft-13.5 ft: Consolidated, cohesive, coarse sand, 10R 3/2 dusky red, with rock fragments of dacite. The core shows a decrease in the amount of moisture from 13.2 ft to 13.4 ft. Well rounded to angular grains of quartz, dacite, hornblende, feldspar. and sanidine. Trace pumice fragments visible. Wet. Run #9, 13.5 ft-14.0 ft: Consolidated, cohesive, coarse sand, 10R 3/2 dusky red, with rock fragments. This run has almost no quartz present and virtually no sanidine or pumice. Clasts go from well rounded to very angular and range in size from silt to gravel. Wet. Run #10, 14.0 ft-14.5 ft: SAA, core contains many rock fragments and shows the first visible appearance of mica (<2%). Wet. Run #11, 14.5 ft-15.5 ft: SAA.		Alluvium Puye Fm.	The Puye/Alluvium contact is at 13.4 ft.
14								
16						TD= 15.5 Ft.		

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	PAO-4	PAGE NUMBER:	1 of 4	DRILLER:	Stanley Johnson
FIMAD I.D.:	PU-0123	BOXES:	5	RIG TYPE:	CME 750 Auger Rig AT
TECCHNICAL AREA:	NA	START DATE:	23-July-97	COMPANY:	Stewart Bros. Drilling Company
END DRILL DEPTH:	15.4 Ft.	END DATE:	24-July-97	AUGER SIZE:	4.25 I.D.

Depth (Feet)	Recovery Data [4]	Analytical Sample Number	Field Screening Results [1, 2]	Top/Bottom of Core in Box	Lithologic Description [3]	Graphic Log	Lithologic Unit	Notes
0	2.0'-1.3'-0.7	No analytical samples were collected from this borehole as of 15-August-97.	A= NDA BG= 185 cpm OVM= NDA	Box #1, 0-4.0 ft FCT Bar Code: 0005460	Run #1, 0 ft-2.0 ft: Consolidated, cohesive, brown topsoil, moist from 0 ft-0.4 ft. Unconsolidated, noncohesive, weak red 2.5YR 5/3, sandy silt from 0.4'-2.0 ft, dry.		Alluvium	Top of saturation zone is 3.2 ft. b.g.s Depth to water in relation to the bottom of the adjacent channel is approximately 2 ft
2	2.0'-1.8'-0.2		A= NDA BG= 180 cpm OVM= NDA		Run #2, 2.0 ft-4.0 ft: Unconsolidated, noncohesive, weak red 2.5YR 5/3, sandy silt from 2.0 ft-3.0 ft, dry to moist. Semiconsolidated, cohesive 2.5YR 4/2 dusky red fine to medium sand. Core grades to coarse sand at 3.2 ft - 4.0 ft. First show of saturation is at 3.2 ft.			
4	2.0'-2.0'-0'		A= NDA BG= 200 cpm OVM= NDA	Box #2, 4.0-8.0 ft FCT Bar Code: 0005460	Run #3, 4.0 ft-6.0 ft: Consolidated, cohesive, brown 2.5YR 4/1, coarse sand. Core contains an abundance of angular to well rounded clasts of quartz, dacite, sanadine, pumice and dacite rock fragments. Wet.			
6	2.0'-2.0'-0'		A= NDA BG= 210 cpm OVM= NDA		Run #4, 6.0 ft-8.0 ft: Consolidated, cohesive brown 2.5YR 4/1, coarse sand. Same as above (SAA). The lithology changes form coarse sand to medium from 7.5 ft to 8.0 ft. The sand matrix is 2.5YR 6/2 weak red. Below 7.5 ft the core shows some pumice cobbles embedded in the matrix with a small clay stringer at bottom of run.			
8	2.0'-2.0'-0'		A= NDA BG= 210 cpm OVM= NDA	Box #3, 8.0-11.0 ft FCT Bar Code: 0005462	Run #5, 8.0 ft-10.0 ft: SAA, A visible clay layer is present from 9.0 ft to 9.3 ft. The coarse sand zone above the clay layer is saturated and the finer sands below the layer have a significant decrease in moisture. Some interbedded clay stringers present.			
10	1.0'-1.0'-0'		A= NDA BG= 205 cpm OVM= NDA		Run #6, 10.0 ft-11.0 ft: Fine to medium sand grading back to coarse, consolidated, cohesive sand at 10.2 ft. Same material as the coarse sands in previous runs and same mineral suite. (Bandelier Tuff detritus).			
12	1.5'-1.5'-0		A= NDA BG= 191 cpm OVM= NDA	Box #4	RUN NUMBER 7 IS CONTINUED ON THE NEXT PAGE.			

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-5 TA/OU Drill Depth From To Page 5 of 5

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Recovery (feet per feet/ %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes

NOTES:

1. Units for field screening results are as follows:
   Alpha (A) = counts per minute (cpm).
   Beta/Gamma (B/G) = counts per minute (cpm).
   Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
   NDA = No detectable activity.
   SAA = Same as above

2. All color descriptions are based on the Munsell guide for describing soils and rocks in the field.

3. This borehole was drilled by Stewart Brothers Drilling Company of Milan, NM.

LITHOLOGY:

Fine Sand

Coarse Sand

Silty Sand

Sandy Silt

Cobbles

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: GRANT EVENSON

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-5 TA/OU Drill Depth From To Page 4 of 5

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
36							Alluvial Deposits	
38	2.0ft/2.0ft/0.0ft	NA	A=NDA B/G=138 FID=0	NA	Run #11, 37.0 ft-39.0 ft: Cohesive, consolidated, dark yellow brown 10YR 4/4, well sorted fine sand. Some rock fragments and well rounded pebbles present. Wet.			
40	2.0ft/2.0ft/0.0ft	NA	A=NDA B/G=138 FID=0	NA	Run #12, 40.0 ft-42.0 ft: Cohesive, consolidated, dark yellow brown 10YR 4/4, well sorted fine sand. Some rock fragments and well rounded pebbles present. Wet.			
42						T.D. 42.0'		
44								
46					THIS LOG CONTINUES ON PAGE 5.			

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-5 TA/OU Drill Depth From To Page 3 of 5

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
24	2.0ft/2.0ft/0.0ft	NA	NA	NA	RUN #8 CONTINUED. Cohesive, consolidated, coarse, well sorted sand grading to fine, v.fine sand at 23.3 ft. Color is 5YR 4/3 reddish brown. Some sanidine visible in the upper coarse layer with trace reddish-brown, well-rounded pebbles. Mostly quartz. A 1/2 inch wide band of yellow sand is present at 24.3 ft.		Alluvial Deposits	
26								
28	1.0'/1.0'/0.0'	NA	NA	NA	Run #9, 28.0 ft-29.0 ft: SAA. Core grades back to coarse sand at 28.5 ft. Abundance of mica. Wet.			
30								
32	2.0ft/2.0ft/0.0ft	NA	NA	NA	Run #10, 32.0 ft-34.0 ft: Cohesive, red brown 10R 6/6, fine to coarse sand. Core shows some mottling and appears to exhibit bimodal sorting. Trace well rounded pebbles with typical clasts of dacite etc. and some rock fragments. Wet.			Platy or laminate structure visible. Bands tend to be 2 cm wide on the average and 7-8 cm apart.
34								

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-5 TA/OU Drill Depth From To Page 2 of 5

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
12					CONTINUATION OF RUN #3		Alluvial Deposits	
14	2.5ft/0.4ft/2.1ft	NA	A=NDA B/G=138 FID=0	NA	Run #4, 12.5 ft-15.0 ft: Loose, semiconsolidated,10YR 5/2 dark gray, coarse silty sand. Sediments appear to be immature. Core shows the same variety of clasts present in the last run. Core tends to show many rock fragments. Very moist.			Stop drilling for 6-25-96 at 1600. WATER FIRST ENCOUNTERED AT 14.8 FT.
16	2.5ft/0.0ft/2.5ft	NA	NA	NA	Run #5, 15.0 ft-17.5 ft: No recovery, no sample.	?		Arrive on-site at 0700. Resume drilling at 0830 for 6-26-96.
18	2.5ft/0.0ft/2.5ft	NA	NA	NA	Run #6, 17.5 ft-20.0 ft: No recovery, no sample.	? ?		Due to the lack of core sample recovery the driller switches to a 2.0 ft drive sampler at the 20 ft interval instead of to a continous barrel split spoon.
20 22	2.0ft/2.0ft/0.0ft	NA	A=NDA B/G=138 FID=0	NA	Run #7, 20.0 ft-22.0 ft: Semiconsolidated, reddish gray 2.5YR 6/1, sand and pebbles. Core exhibits bimodal sorting. Predominantly quartz with some fragments of pumice and dacite. Wet. The change in lithologic color from gray to reddish tones may represent some contact between the alluvial deposits with sediments of the Santa Fe Group.			Sharp contact going from coarse SAND to fine SAND at 23.3 ft.
					Run #8, 23.0 ft-25.0 ft: THIS DESCRIPTION BEGINS ON THE NEXT PAGE.			

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-5 TA/OU 1049 Drill Depth From 0 ft To 42ft Page 1 of 5

Driller S. Johnson Box #(s) NA Start Date/Time 6/24/96, 1400 End Date/Time 6/25/96, 1430

Drilling Equip./Method CME 750 HSA Sampling Equip./Method 2.5 ft Stainless Steel Split Spoon

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	2.5ft/1.6ft/0.9ft	NA	A=NDA B/G=138 FID=0	NA	Run #1, 0.0 ft-2.5 ft: Loose, unconsolidated, uncohesive, light brownish gray 10YR 6/2 sandy silt. Approximately 30% well rounded gravel present (probabally road fill material), Damp.	FILL	Alluvial Deposits	The first 1 ft. of material appears to be roadfill material. The core tends to grade from a sandy silt to a silty sand as depth increases.
2	2.5ft/0.4ft/2.1ft	NA	A=NDA B/G=138 FID=0	NA	Run #2, 2.5'-5.0': Loose, semiconsolidated, uncohesive, light brownish gray 10YR 6/2, silty sand. Trace subrounded pebbles present. Clast of dacite, quartzite, pumice and basalt. Tschicoma dacite and granite represented. Damp.	SANDY SILT		
4					No recovery, no description.			The driller does not attempt to drive a split spoon between the 5.0 ft and 10 ft interval. A layer of cobbles has been encountered at this interval and does not allow for spoon penetration.
6								
8								Pebbles show a carbonate coating. Some clasts have a coating on the entire surface while others are coated on one side only.
10	2.5ft/0.2ft/2.5ft	NA	A=NDA B/G=138 FID=0	NA	Run #3, 10.0 ft-12.5ft: Loose, unconsolidated,10YR 5/2 gray brown, silty sand. Some well semi-rounded clasts of approximately 1/4 in. diameter of dacite, quartzite, pumice and basalt. Tschicoma dacite and granite represented. Moist.	SILTY SAND		

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

LLAO-4

NOTES:

1. Units for field screening results are as follows:
   Alpha (A) = counts per minute (cpm).
   Beta/Gamma (B/G) = counts per minute (cpm).
   Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
   NDA = No detectable activity.

2. All color descriptions are based on the Munsell guide for describing soils and rocks in the field.

3. This borehole was drilled by Stewart Brothers Drilling Company of Milan, NM.

LITHOLOGY:

SILTY SAND

SAMPLE COLLECTION SUMMARY:

SAMPLE	NUMBER	DATE	TIME	INTERVAL (FT.)
04LA-96-0289	01	30-Sep-96	1315	3.0-3.5
04LA-96-0290	01	30-Sep-96	1320	12.7-13.1
04LA-96-0291	01	30-Sep-96	1325	15.5-15.9
04LA-96-0291	02	30-Sep-96	1325	15.5-15.9
04LA-96-0292	01	30-Sep-96	1330	17.9-18.3

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: GRANT EVENSON

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-4 TA/OU Drill Depth From To Page 2 of 3

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
12					CONTINUATION OF RUN #6	fine	Alluvium	
14	2.0/2.0/0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #7, 13.5 ft.-15.5 ft. : Same as above. Slight increase in coarseness.	coarse		Sample 04LA-96-0290 01 collected from the 12.7-13.1 ft. interval.
16	2.0/2.0/0.0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #8, 15.5 ft.-17.5 ft. : Same as above. Driller performs the standard penetration test. Blow counts are as follows: 8-45-20-31.			Sample 04LA-96-0291 01 collected from the 15.5-15.9 ft. interval.
18	2.0/2.0/0.0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #9, 17.5 ft.-19.5 ft. : Same as above. Driller performs the standard penetration test. Blow counts are as follows: 6-15-16-27. Some bedding structure visible.			Sample 04LA-96-0292 01 collected from the 17.9-18.3 ft. interval.
20					FINISH DRILLING 27-SEPT.-1996, 13:00. TOTAL DEPTH IS 19.5 FT.			The stratigraphy tends to alternate between zones of coarse sand and fine sand.
22								

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-4 TA/OU 1049 Drill Depth From 0 To 19.5' Page 1 of 3

Driller S. Johnson Box #(s) NA Start Date/Time 9-27-96/1000 End Date/Time 9-27-96/1300

Drilling Equip./Method CME 750 All Terrain Rig Sampling Equip./Method 2.5' Stainless Steel split Spoon

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	2.5/0.3/2.2	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #1, 0.0 ft.-2.5 ft. : Loose, unconsolidated, 7.5 YR 5/2 brown silty sand. Approximately 80% coarse sand and 20% silt. Well sorted. Sample shows pebble - size clasts of pumice, quartz and dacite. Slightly damp.		Alluvium	Borehole and well installed in what appears to be an inactive stream channel.
2								
4	2.5/1.5/2.0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #2, 2.5 ft.-5.0 ft. : Loose, unconsolidated, 7.5 YR 5/2 brown silty sand. Approximately 80% coarse sand and 20% silt. Well sorted. Sample shows well sorted clasts of pumice, quartz and dacite. The shoe contains one large cobble of black vesicular Cerros Del Rio basalt. Sample has a slight increase in moisture.			Sample 04LA-96-0289 01 collected from the 3.0-3.5 ft. interval.
6	2.5/0.0/2.5	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #3, 5.0 ft.-7.5 ft. : No recovery, no return.			ZONE OF SATURATION ENCOUNTERED AT THE 6.0 FT. INTERVAL.
8	2.0/2.0/0	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #4, 7.5 ft.-9.5 ft. : Same description as run number one. Material tends to grade from medium coarse grain size to very coarse. Well rounded, well sorted, wet.			
10	2.0/2.0/0.0	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #5, 9.5 ft.-11.5 ft. : Same as above.			Radiation/ FID readings for run #6 are the same as run #5.
	2.0/1.0/1.0				Run #6, 11.5 ft.-13.5 ft. : Same as above.			

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

LITHOLOGY:

- TOPSOIL
- SANDY SILT
- COARSE SAND
- CLAY
- SANDY SILT AND COBBLES
- COARSE SAND AND COBBLES

STANDARD PENETRATION TEST DATA:

Run Number	Interval (Ft.)	Blow Counts
1	0'-2.0'	11/24"
2	2.0'-3.5'	4-47-50/6"
3	3.5'-6.0'	29-48-28-29
4	6.0'-8.0'	29-48-28-39
5	8.0'-10.0'	21-45-30-76
6	10.0'-12.0'	14-16-18-22
7	12.0'-14.0'	13-20-20-20
8	14.0'-16.0'	14-18-18-18
9	16.0'-18.0'	1-1-1-4
10	18.0'-20.0'	1-1-1-4
11	20.0'-22.0'	1-1-1-5

NOTE:

The information displayed in the Blow Counts column of the Standard Penetration Test data table is a measure of the number of hammer blows needed to drive a stainless steel split barrel sampling tube a distance of 2.0 ft. The test is performed using a hydraulically lifted hammer that is dropped a distance of 4.0 ft onto the top of a rod attached to the split barrel. The driller then counts how many blows of the hammer are neccessary to drive the sampler a distance of six inches and each time six inches is reached, the test is started over again. Usually the test is stopped if the hammer does not advance after a maximum of fifty blows has been reached. However, if the split barrel advances very slowly and fifty counts are reached, then the driller will report what distance (in inches) was reached after the fifty hammer strikes.

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: DANNY KATZMAN SIGNATURE:

NOTES:

1. Daily background radiation levels for the dates that drilling occured are as follows:

Date	Daily Background (alpha)	Daily Background (beta)
7-21-97	1.2 cpm	254 cpm
7-18-97	1.2 cpm	227 cpm
7-17-97	1.2 cpm	243 cpm

2. Units for field screening results are as follows:
Alpha (A) = counts per minute (cpm).
Beta/Gamma (B/G) = counts per minute (cpm).
Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
NDA = No Detectable Activity.

The instruments used to monitor radiation levels are as follows:

Model	HSE #	Calibration Date	Efficiency (CPM/DPM)
Ludlum-139 (alpha)	008323	4/24/98	36%
ESP-1 (beta/gamma)	007416	10/15/97	65%

3. All color descriptions are based on the Munsell guide for describing soils and rocks in the field and are described from the core under natural moisture conditions.

4. The information displayed in the **Recovery Data** column shows the amount of core that was retrieved. That is, the first number is the amount of footage drilled. The second number is the measurement of the amount of core present in the barrel and the last number is the measurement of the amount of core that was missing or not recoverd in the barrel. Consequently, the data is displayed in the format (drilled-recovered-lost). A graphical representation next to the measurement data shows the amount of core present in relation to the amount lost. A block with diagonal lines represents recovered core and a solid black block represents core that has been lost.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Depth (Feet)	Recovery Data	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Lithologic Unit	Notes
12	2.0'-2.0'-0'	No analytical samples were collected from this borehole.	A= NDA BG= 166 cpm OVM= NDA	Box #3, 12.0-16.0 ft FCT Bar Code: 0005453	Run #7, 12.0 ft-14.0 ft: Consolidated, cohesive, coarse sand. Color is 10R 5/3 dusky red. Well rounded to angular clasts of quartz (crystalline), dacite, quartzite, sanadine (<5%), basalt, and granitics. Minor mica flecks present. Core is very moist grading to wet from top to bottom.		Alluvium	Top of saturation zone begins at 13.75 ft. b.g.s.
14	2.0'-1.6'-0.4'		A= NDA BG= 158 cpm OVM= NDA		Run #8, 14.0 ft-16.0 ft: Consolidated, cohesive, coarse sand and pebbles. Color is 2.5 YR 4/2 dusky red. Well rounded to angular clasts of quartz (crystalline), dacite, and basalt with minor quartzite, sanadine (<5%), and granitics. Wet.			
16	2.0'-1.4'-0.6'		A= NDA BG= 143 cpm OVM= NDA	Box #4, 16.0-22.0 ft FCT Bar Code: 0005454	Run #9, 16.0 ft-18.0 ft: Consolidated, cohesive, coarse sand and pebbles. Color is 2.5 YR 4/2 dusky red. Well rounded to angular clasts of quartz (crystalline), dacite and basalt with minor quartzite, sanadine (<5%), and granitics. Sample includes large quartz cobble. Wet.			
18	2.0'-0.7'-1.3'		A= NDA BG= 150 cpm OVM= NDA		Run #10, 18.0 ft-20.0 ft: Semiconsolidated, cohesive, coarse, angular, sand and pebbles. Color is 2.5 YR 4/2 dusky red. Well rounded to angular clasts of quartz (crystalline), dacite, quartzite, sanadine (<5%), basalt, and granitics. Wet.			A clay stringer is present at 19.8 ft with an overlying cobble layer.
20	2.0'-1.4'-0.6'		A= NDA BG= 163 cpm OVM= NDA		Run #11, 20.0 ft-22.0 ft: Semiconsolidated, cohesive, coarse, angular sand. Color is 2.5 YR 4/2 dusky red. Well rounded to angular clasts of quartz (crystalline), dacite, quartzite, sanadine (<5%) and basalt, and granitics. Grain - size grades from medium - coarse to very coarse from top to bottom. cobbles present at 21.0 - 22.0 ft. Wet.			
22						TD=22.0 ft.		

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	LLAO-3	PAGE NUMBER:	1 of 4	DRILLER:	Stanley Johnson
FIMAD I.D.:	LA-0140	BOXES:	5	RIG TYPE:	CME 750 All Terrain
TECHNICAL AREA:	NA	START DATE:	17-July-97	COMPANY:	Stewart Bros. Drilling
END DRILL DEPTH:	22.0 Ft.	END DATE:	21-July-97	AUGER SIZE:	4.25 " I.D.

Depth (Feet)	Recovery Data [4]	Analytical Sample Number	Field Screening Results [1,2]	Top/Bottom of Core in Box	Lithologic Description [3]	Graphic Log	Lithologic Unit	Notes
0	2.0'-1.1'-0.9'	No analytical samples were collected from this borehole.	A= NDA BG= 176 cpm OVM= NDA	Box #1, 0-8.0 ft FCT Bar Code: 0005451	Run #1, 0 ft-2.0 ft: Loose, unconsolidated, uncohesive, sandy silt. Color is 10R 7/1 light gray. Well rounded to angular, pebble - size clasts of quartz (crystalline), dacite, quartzite, sanadine and granitics. Dry.		Alluvium	
2	1.5'-1.2'-0.3'		A= NDA BG= 224 cpm OVM= NDA		Run #2, 2.0 ft-3.5 ft: Loose, unconsolidated, uncohesive, sandy silt. Color is 10R 7/1 light gray. Well rounded to angular, pebble - size clasts of quartz (crystalline), dacite, quartzite, sanadine and granitics. Cobble zone begins around 3.5 ft. Dry.			
4	No Data Available		No Data Available		Run #3, 3.5 ft-6.0 ft: No core collected.	No Data Available		Driller attempts to auger through what is assumed to be a cobble layer.
6	2.0'-2.0'-0'		A= NDA BG= 184 cpm OVM= NDA		Run #4, 6.0 ft-8.0 ft: Consolidated, cohesive, coarse sand and pebbles. Color is 10R 7/2 Pale red. Well rounded to angular clasts of quartz (crystalline), dacite, quartzite, sanadine (<5%) and granitics. Pebbles up to 1/4 in. diameter. Core is moist grading to very moist, from top to bottom.			
8	2.0'-1.5'-0.5'		A= NDA BG= 197 cpm OVM= NDA	Box #2, 8.0-12.0 ft FCT Bar Code: 0005452	Run #5, 8.0 ft-10.0 ft: Consolidated, cohesive coarse sand with pebbles and cobbles. Color is 10R 7/2 Pale red. Well rounded to angular clasts of quartz (crystalline), dacite, quartzite, sanadine (<5%) and granitics. Core is very moist.			
10	2.0'-1.6'-0.4'		A= NDA BG= 158 cpm OVM= NDA		Run #6, 10.0 ft-12.0 ft: Consolidated, cohesive, coarse, well - rounded sand. Color is 10R 4/4 weak red. Well rounded to angular clasts of quartz (crystalline), dacite, quartzite, sanadine (<5%) and granitics. Some pebbles present. Core is very moist.			
12								

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

LLAO-2

NOTES:

1. Units for field screening results are as follows:
   Alpha (A) = counts per minute (cpm).
   Beta/Gamma (B/G) = counts per minute (cpm).
   Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
   mR=milli Roentgen per hour
   NDA = No detectable activity; SAA = Same as above.

2. All color descriptions are based on the Munsell guide for describing soils and rocks in the field.

3. This borehole was drilled by Stewart Brothers Drilling Company of Milan, NM.

LITHOLOGY:

SAND

SILTY SAND

SANDY SILT AND COBBLES

CLAY

Puye Formation (or Totavi Lentil?)

SAMPLE COLLECTION SUMMARY:

SAMPLE	NUMBER	DATE	TIME	INTERVAL (FT.)
04LA-96-0284	01	24-Sep-96	1600	17.0-17.5
04LA-96-0285	01	25-Sep-96	1515	22.1-22.5
04LA-96-0286	01	25-Sep-96	1520	27.0-27.5
04LA-96-0287	01	25-Sep-96	1530	30.0-31.0

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: GRANT EVENSON

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-2 TA/OU Drill Depth From To Page 3 of 4

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
24	Coninuation of Run #10				Tschicoma dacite. Some sanidine (<2%) present. Very moist.		Alluvium	0700 resume drilling for the date of 9-25-96.
26	2.5/1.6/0.9	See Notes	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #11, 25.0 ft.-27.5 ft. : Loose, semiconsolidated, well rounded, coarse sand in a clay/silt matrix. The color is 2.5 YR 5/2 weak reddish brown. The core contains clasts of sanidine (<5%), granite, dacite, and quartz. Well sorted. Some chalcedony. Core is 80% sand, 20% clay. Wet.	saturated		STATIC WATER AT 26.0 FT. Sample 04LA-96-0286 01 collected from the 27.0-27.5 ft. interval.
28	No Data Available	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #12, 27.5 ft.-30.0 ft. : Loose, semiconsolidated, well rounded coarse sand in a clay/silt matrix. The color is 2.5 YR 5/2 weak reddish brown. The core contains clasts of sanadine (<5%), granite, dacite, and quartz. Well sorted, wet. some chalcedony. Core is 80% sand, 20% clay. Wet.			The driller makes two separate runs for run #12.
30	1.0/1.0/0.0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	SAA	Run #13, 30.0 ft.-31.0 ft. : The driller drives a two ft. split spoon. The shoe of the spoon showed a dry sample of Santa Fe Group material. An abundance of mica present. Well rounded clasts of calcareous cemented well rounded conglomerate present. Core is 60% silt and 40% sand.	There is a significant decrease in moisture content starting from the 28.5 ft. interval.	Puye Formation (or Totavi Lentil?)	Sample 04LA-96-0287 01 collected from the 30.0-31.0 ft. interval.
32					NOTE : The driller advances the split spoon to a depth of 34.0 ft. as a confirmation sample. The material is the same as the previous interval.			11:45 Final water measurement prior to well installation taken from bgs is 27.6 ft.
34					FINISH DRILLING 25-SEPT.-1996, 11:45. TOTAL DEPTH IS 34.0 FT. WELL TO BE CONSTRUCTED TO A DEPTH OF 32.5 FT.			The state of New Mexico collects a water sample to be analyzed for nitrates from the 25.0 ft. to the 27.5 ft. interval.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-2 TA/OU Drill Depth From To Page 2 of 4

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
12					CONTINUED FROM PAGE NUMBER 1, RUN #4.	Silty Sand	Alluvium	The driller will make two separate runs to reach the 12.5 ft. interval.
14	2.5/0.4/2.1	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #6, 12.5 ft.-15.0 ft. : Loose, unconsolidated, 7.5 YR 4/2 brown, silty sand. core is 60% sand and 40% silt. Few, (less than 2%) pieces of pumice present. Some well rounded clasts of dacite and quartz present. Moist. The cobble zone ends at 12.5 ft.			10:10: The driller will offset the rig due to an obstruction.
16	2.5/0.5/2.0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #7, 15.0 ft.-17.5 ft. : Loose, unconsolidated, 7.5 YR 4/2 brown, silty sand. Core is 60% sand and 40% silt. Few, (less than 2%) pieces of pumice present. Pumice is angular and <5mm average size. Some well rounded clasts of dacite and quartz present. Moist.			Sample 04LA-96-0284 01 collected from the 17.0-17.5 ft. interval.
18	2.5/0.5/2.0	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #8, 17.5 ft.-20.0 ft. : Loose, unconsolidated, 7.5 YR 4/2 brown, silty sand. Core is 60% sand and 40% silt/clay. Core shows an abundance of quartz and basalt clasts. Moist.	An increase in core moisture content and grain size of clasts as depth increases.		14:00: Offset again.
20	2.5/1.4/1.1	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #9, 20.0 ft.-22.5 ft. : Consolidated alluvial sediments contacting clay at 22 ft. The color is 2.5 YR 6/1 reddish gray. The alluvium is composed primarily of coarse to fine, well rounded quartz. Very moist.			A total of four borings have been attempted, one original plus three offsets.
22	2.5/2.5/0.0	See Notes	A= NDA B/G= 100cpm FID= 0ppm	SAA	Run #10, 22.5 ft.-25.0 ft. : Loose, unconsolidated, uncohesive, well rounded, well sorted sand (70% sand, 30% clay/silt). The color is 2.5 YR 5/2 weak red. Clasts present are primarily quartz and	Clay		Sample 04LA-96-0285 01 collected from the 22.1-22.5 ft. interval.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LLAO-2 TA/OU 1049 Drill Depth From 0 ft. To 34.0 ft. Page 1 of 4

Driller S. Johnson Box #(s) NA Start Date/Time 9/24/96-0800 End Date/Time 9/25/96-1145

Drilling Equip./Method CME 750 All Terrain Rig. Sampling Equip./Method 2.5 ft. Stainless Steel Split Spoon

Depth (Feet)	Drilled/Recovered/Lost	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0 2	2.5/0.4/2.1	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #1, 0 ft.-2.5 ft. : Semiconsolidated, cohesive, dark brown 7.5 YR 3/2 clayey, sandy silt. Core is 60% silt and 40% sand. Clasts are moderately to well rounded and predominantly quartz. Material is well sorted. Moist.		Alluvium	Surface clasts include the following rocks/minerals: Pumice, Granite, Basalt, Dacite, Chalcedony and Quartzite.
4	2.5/2.5/0.0	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #2, 2.5 ft.-5.0 ft. : Semiconsolidated, cohesive, brown 7.5 YR 5/3 sandy silt. Core is 70% silt and 30% sand. Several well rounded clasts of granite present. Some organic matter (roots) visible. Moist.			An apparent bedding structure of dark brown silty sand is visible at the 4 ft. interval. The core shows a change in color to a darker sand at this interval and an increase in the coarseness of grain size.
6	2.5/0.5/2.0	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #3, 5.0 ft.-7.5 ft. : Semiconsolidated, cohesive, brown 7.5 YR 5/3 sandy silt. Core is 70% silt and 30% sand. Several well rounded clasts of granite present. Moist.			
8	2.5/1.5/1.0	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #4, 7.5 ft.-10.0 ft. : Semiconsolidated, cohesive, brown 7.5 YR 5/3 sandy silt. Core is 70% silt and 30% sand. Several well rounded clasts of granite present. Moist. The spoon had one large cobble lodged in the shoe. The clast appears to be a granitic.			The driller begins inserting steel/lexan barrel liners to the sample spoon beginning with run number three.
10	1.5/0.4/1.1	No sample collected from this interval.	A= NDA B/G= 100cpm FID= 0ppm	Core was not archived for SMO submittal.	Run #5, 10.0 ft.-12.5 ft. : Semiconsolidated, cohesive, brown 7.5 YR 5/3, sandy silt. Core is 70% silt and 30% sand. Several well rounded clasts of granite present. Moist. This run had an increase of cobbles (mostly black vesicular basalt).			The driller notes a zone of difficult drilling beginning at the 10 ft. interval. Cobbles first encountered in the split spoon shoe at 7.5 ft.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

LITHOLOGY:

- TOPSOIL
- SANDY SILT
- COARSE SAND
- CLAY
- SANDY SILT AND COBBLES
- COARSE SAND AND COBBLES
- SILTY COARSE SAND

STANDARD PENETRATION TEST DATA:

Run Number	Interval (Ft.)	Blow Counts
1	0'-2.5'	NA
2	2.5'-5.0'	NA
3	5.0'-5.5'	NA
4	5.5'-7.5'	NA
5	7.5'-8.25'	40-50-50/3.0"
6	8.25'-10.0'	NA
7	10.0'-12.0'	35-50-50-50
8	12.0'-13.0'	28/50+
9	13.0'-14.0'	NA
10	14.0'-16.0'	14-20-16-21
11	16.0'-18.0'	9-26-28-37
12	18.0'-20.0'	17-48-69-85
13	20.0'-22.0'	15-39-50-76/5"
14	22.0'-24.0'	9-32-55-80

NOTE:

The information displayed in the Blow Counts column of the Standard Penetration Test data table is a measure of the number of hammer blows needed to drive a stainless steel split barrel sampling tube a distance of 2.0 ft. The test is performed using a hydraulically lifted hammer that is dropped a distance of 4.0 ft onto the top of a rod attached to the split barrel. The driller then counts how many blows of the hammer are neccessary to drive the sampler a distance of six inches and each time six inches is reached, the test is started over again. Usually the test is stopped if the hammer does not advance after a maximum of fifty blows has been reached. However, if the split barrel advances very slowly and fifty counts are reached, then the driller will report what distance (in inches) was reached after the fifty hammer strikes.

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: DANNY KATZMAN SIGNATURE:

NOTES:

1. Daily background radiation levels for the dates that drilling occured are as follows:

Date	Daily Background (alpha)	Daily Background (beta)
7-14-97	1.2 cpm	243 cpm
7-15-97	1.2 cpm	245 cpm

2. Units for field screening results are as follows:
Alpha (A) = counts per minute (cpm).
Beta/Gamma (B/G) = counts per minute (cpm).
Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
NDA = No detectable activity.

The instruments used to monitor radiation levels are as follows:

Model	HSE #	Calibration Date	Efficiency (CPM/DPM)
Ludlum-139 (alpha)	008323	4/24/98	36%
ESP-1 (beta/gamma)	007416	10/15/97	65%

3. All color descriptions are based on the Munsell guide for describing soils and rocks in the field and are described from core under natural moisture conditions.

4. The information displayed in the **Recovery Data** column shows the amount of core that was retrieved. That is, the first number is the amount of footage drilled. The second number is the measurement of the amount of core present in the barrel and the last number is the measurement of the amount of core that was missing or not recoverd in the barrel. Consequently, the data is displayed in the format (drilled-recovered-lost). A graphical representation next to the measurement data shows the amount of core present in relation to the amount lost. A block with diagonal lines represents recovered core and a solid core represents core that has been lost.

This well was drilled in close proximity to the former well LLAO-1. LLAO-1(B) was installed as a replacement for well LLAO-1 which was removed and abandoned to the surface on 15-July-97.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Depth (Feet)	Recovery Data	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Lithologic Unit	Notes
12	1.0'-1.0'-0'	No analytical samples were collected from this borehole.	a= NDA bg= 235 cpm ovm= NDA	Box #2	Run #8, 12.0 ft-13.0 ft: Consolidated, cohesive, 5YR 3/2 dark reddish brown silty coarse sand. Clasts of quartz, basalt and dacite observed. Clay stringer at 12.3 ft-12.6 ft. Clasts are well rounded to angular. Moist.			
	See Notes		See Notes			See Notes		No data is available for Run #9, 13.0-14.0 ft.
14	2.0'-2.0'-0'		a= NDA bg= 180 cpm ovm= NDA	Box #3, 14.0-18.0ft FCT Bar Code: 0005457	Run #9, 13.0 ft-14.0 ft: No core attempted. The center bit was used to drill through a cobble zone. Run #10, 14.0 ft-16.0 ft: Cohesive, consolidated clay and coarse sand. Well rounded quartz and dacite pebbles zone present at 15.0 ft. Color is 5YR 4/2 dark reddish gray at 14.0 ft-15 ft and grades to 5YR 6/2 pinkish gray. At 15.0 ft-16.0 ft core grades from moist to wet.		Alluvium	
16	2.0'-2.0'-0'		a= NDA bg= 177 cpm ovm= NDA		Run #11, 16.0 ft-18.0 ft: Consolidated, cohesive, fine to very fine sand. Material is well sorted sand in a clay matrix. Core grades from coarse, crystal rich sand with grains of sanadine (<5%), dacite, and granite with clay, to fine sands and clay. A clay layer is present from 16.3ft.-16.8 ft. Color is 10YR 5/3 weak red. Mica abundant in the lower fine sand zone. Moist to wet.			
18	2.0'-2.0'-0'		a= NDA bg= 174 cpm ovm= NDA	Box #4, 18.0-22.0 ft FCT Bar Code: 0005458				Top of saturation zone begins at 18.0 ft. b.g.s.
20	2.0'-2.0'-0'		a= NDA bg= 192 cpm ovm= NDA		Run #12, 18.0 ft-20.0 ft: Consolidated, cohesive, clay and coarse sand. Color is 10YR 6/2 light brownish gray grading to 10YR 2/2 very dark brown from top to bottom. Core is micaceous, very-fine grained sand from 18.0 ft. to 18.6 ft. and coarse sand plus sandy clay from 18.6 ft to the botom of run.		Tesuque Member of the Santa Fe Group (?)	Subsequent stratigraphic interpretation is Puye Formation (or Totavi Lentil?)
22	2.0'-2.0'-0'		a= NDA bg= 205 cpm ovm= NDA	Box #5, 22.0-24.0 ft FCT Bar Code: 0005459	Run #13, 20.0 ft-22.0 ft: Consolidated, cohesive, fine to coarse sand. Material is primarily well rounded quartz grains. Color is 2.5YR 4/3 dusky red. Some black banding in core, basalt cobble in shoe. Wet. Run #14, 22.0 ft-24.0 ft: Same as above Pebble layer present at 23.5 ft. Clasts of gray tuff, basalt, quartz and dacite present. Wet.			
24						TD=24.0 ft.		

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	LLAO-1(B)	PAGE NUMBER:	1 of 4	DRILLER:	Stanley Johnson
FIMAD I.D.:	LA-0003	BOXES:	5	RIG TYPE:	CME 750 All Terrain
TECHNICAL AREA:	NA	START DATE:	14-July-97	COMPANY:	Stewart Bros. Drilling
END DRILL DEPTH:	24.0 Ft.	END DATE:	15-July-97	AUGER SIZE:	4.25" I.D.

Depth (Feet)	Recovery Data [4]	Analytical Sample Number	Field Screening Results [1,2]	Top/Bottom of Core in Box	Lithologic Description [3]	Graphic Log	Lithologic Unit	Notes
0	2.5'-2.5'-0'	No analytical samples were collected from this borehole.	A= NDA BG= 156 cpm OVM= NDA	Box #1, 0-8.25 ft FCT Bar Code: 0005455	Run #1, 0 ft-2.5 ft: Loose, unconsolidated, sandy silt. Angular to well rounded clasts of quartz and quartzite. Color is 7.5YR 6/3 light brown. Core is composed of 60% silt, 40% sand, dry.		Alluvium	5.0-5.5 ft interval recovery data: 0.5'/0.5'/0.0'
2	No Data Available		No Data Available		Run #2, 2.5 ft-5.0 ft: No core collected due to the presence of an obstruction.	No Data Available		
4					Run #3, 5.0 ft-5.5 ft: Same as run number one, except slightly less and slightly moist.			Field screening and recovery data for the 5.5'-7.5' interval is as follows: A= NDA BG= 150 cpm OVM= NDA
	See Notes		See Notes		Run #4, 5.5 ft-7.5 ft: No core collected due to the presence of an obstruction.			
6	No Data Available		A= NDA BG= 187 cpm OVM= NDA		Run #5, 7.5 ft-8.25 ft: Consolidated, cohesive, coarse sand and rock fragments. Color is 5YR 3/2 dark reddish brown. A small clay stringer is present at 8.25 ft. Angular clasts of quartz, quartzite and basalt present.	No Data Available		
8	0.75'-0.75'-0'		A= NDA BG= 187 cpm OVM= NDA					
	No Data Available		No Data Available	Box #2, 8.25-14.0 ft FCT Bar Code: 0005456	Run #6, 8.25 ft-10.0 ft: Core was not attempted.	No Data Available		A cobble zone was encountered at the 8.25-10.0 ft interval prohibbiting the use of a split barrel sampling spoon.
10	2.0'-2.0'-0'		A= NDA BG= 230 cpm OVM= NDA		Run #7, 10.0 ft-12.0 ft: Consolidated, cohesive, silty coarse sand. Angular to rounded clasts of basalt, quartz, quartzite and dacite present. Color is 5YR 3/2 dark reddish brown. A few small clay stringers present, moist.			
12								

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-1.6(G) TA/OU Drill Depth From To Page 3 of 3

Driller Box #(s) Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

Depth (Feet)	Recovery (feet per feet/ %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes

NOTES:

1. Units for field screening results are as follows:
   Alpha (A) = counts per minute (cpm).
   Beta/Gamma (B/G) = counts per minute (cpm).
   Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
   NDA = No detectable activity; SAA= Same as above; NA = Not applicable

2. All color descriptions are based on the Munsell guide for describing soils and rocks in the field.

3. This borehole was drilled by Stewart Brothers Drilling Company of Milan, NM.

LITHOLOGY:

Alluvial Deposits (sand, silt, pebbles, and cobbles)

Otowi Member of the Bandelier Tuff

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-1.6(g) TA/OU NA Drill Depth From 0 ft To 36 ft Page 2 of 3

Driller S. Johnson Box #(s) NA Start Date/Time 3/19/96 11:00 End Date/Time 3/20/96 09:00

Drilling Equip./Method CME 750 Auger Rig Sampling Equip./Method 2.5 ft Stainless Steel Split Spoon

Depth (Feet)	Recovery (feet per feet/ %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
20					Less than 2% lithics present. Approximately 10% angular quartz to 5 mm. Less than 2% sanidine, indurated, wet. THIS DESCRIPTION IS A CONTINUATION OF RUN#5.		Otowi Member of The Bandelier Tuff	
	No Data Available	See lith-ology.	SAA	NA	Run #6 22.5 ft-25 ft: Same as above. Collect analytical sample 04-LA-96-0046 from the 23.1 ft to 25.6 ft interval.			Stop drilling 13:20 for 3/19/96. A T.D. of 25.6 ft was reached. Drillers add a bentonite seal up to a depth of 20.1 ft.
	2.3'/2.5' 92%	NA	A=NDA B/G=90 OVM=0	NA	Run #7 25 ft-27.5 ft: SAA, pumice poor (~10 of core), lithics to 1 cm diameter, moist to slightly damp.			3/20/96, 08:00 Drillers remove the bentonite plug from yesterday. Begin drilling from the 25.6 ft interval.
	2.2'/2.5' 88%	NA	A=NDA B/G=90 OVM=0	NA	Run #8 27.5 ft-30 ft: SAA, slightly damp.			
30	1.8'/2.5' 72%	NA	A=NDA B/G=80 OVM=0	NA	Run #9 30 ft-32.5 ft: SAA, ash matrix was a powdery texture, slightly damp.			
	1.4'/1.5' 93%	NA	A=NDA B/G=80 OVM=0	NA	Run #10 32.5 ft-34 ft: SAA FINISH DRILLING 20-MARCH-96, 0850 CONTINUED ON PAGE 3			
						T.D. 36.0'		
40								Coring was completed to a depth of 34 ft. Drilling was then resumed to a total depth of 36 ft. This was the maximum depth reached.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-1.6(g) TA/OU NA Drill Depth From 0 ft To 36 ft Page 1 of 3

Driller S. Johnson Box #(s) NA Start Date/Time 3/19/96 11:00 End Date/Time 3/20/96 09:00

Drilling Equip./Method CME 750 Auger Rig Sampling Equip./Method 2.5 ft and 5.0 ft Stainless Steel Split Spoon

Depth (Feet)	Recovery (feet per feet/ %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	1.4'/5.0'/28%	NA	A=NDA B/G=100 cpm OVM= 0 ppm	NA	Run #1, 0 ft-5 ft: Unconsolidated, uncohesive, loose, dark brown (5YR 2.5/1) Sandy silt to reddish - gray (5YR 5/2) silty sand with cobbles < 0.2 ft diameter. Organic matter (roots) present, damp.		Alluvial Deposits	Several attempts were made to drill a borehole in the vicinity of LAO-1.6, the original designated well location. After failure to penetrate a boulder layer approximately 15 ft deep; seven additional attempts were made. The holes drilled are as follows: LAO-1.6, LAO-1.6 (a to g). A total of 8 boreholes were drilled.
	0.7'/5.0'/28%	NA	A=NDA B/G=100 cpm OVM= 0 ppm	NA	Run #2, 5 ft-10 ft: Unconsolidated, uncohesive, loose, gray to reddish brown (5YR 4/3) coarse sand. With 5% pebbles and rare cobbles < 0.3 ft. diameter.			
10	0.9'/5.0'/18%	NA	A=NDA B/G=100 cpm OVM= 0 ppm	NA	Run #3, 10 ft-15 ft: Unconsolidated, uncohesive, loose, gray to reddish brown (5YR 4/3) coarse sand and silt with pebbles and rare cobbles.			
	0.5'/5.0' /10%	NA	A=NDA B/G=100 cpm OVM= 0 ppm	NA	Run #4, 17.5 ft-20 ft: Unconsolidated, uncohesive, loose, reddish brown (5YR 4/3) coarse sand and silt with rare pebbles, wet. WATER FIRST ENCOUNTERED 17.5 ft.			
20	2.5'/2.5'/100%	NA	A=NDA B/G=100 cpm OVM= 0 ppm	NA	Run #5 20 ft-22.5 ft: Non-welded glassy ash flow tuff (Otowi Member, Bandelier Tuff). Fully inflated pumice up to 5 cm. Pumice is vitric light brown to cream color (2.5YR 7/2), fibrous texture. Matrix is a light pinkish gray (5YR 7/2) fine grained ash.			The stratum shows a decrease in moisture with increasing depth. This could represent a perching layer.

APPENDIX A: BOREHOLE LITHOLOGY LOGS

Logs of the core lithology descriptions made during the drilling of the boreholes for each well installation are provided in this section. Finalized (typed) logs were prepared for all the wells in Threemile Canyon; LAO-1.6(g), LLAO-1(b), LLAO-2, LLAO-3, LLAO-4 and LLAO-5 in Los Alamos Canyon; PAO-4, PAO-5S, and PAO-5N in Pueblo Canyon; and MCO-7.2 in Mortandad Canyon and are provided here. Copies of the original, hand-written core sample logs for PAO-1(a), PAO-2, PAO-2.5, and PAO-3 in Pueblo Canyon; and LAO-B, LAO-0.3, LAO-0.6, LAO-0.8, LAO-0.91, LAP-1, LAP-1.5, LAP-1.7 LAP-3, LAP-3.5, LAP-4, LAP-5.7, and LAP-6 in Los Alamos Canyon are also provided. A facsimile field log for MCO-0.6 in Mortandad Canyon was prepared from the geologist's field notes and is also included. Neither finalized logs or field logs are available for the wells in Cañon de Valle. Printouts of lithologic summaries from a draft field investigation summary report for TA-18 have been provided for these wells instead.

9.0 REFERENCES

EPA (US Environmental Protection Agency), April 10 1990. Module VIII of RCRA Permit No. NM0890010515, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. **(EPA 1990, ER ID 1585)**

EPA (US Environmental Protection Agency), May 1997. Test Methods for Evaluating Solid Waste, Laboratory Manual, Physical/Chemical Methods, SW-846, Third Edition, Update III, Washington D.C. **(EPA 1997, ER ID 57589)**

ERM (Environmental Resources Management), 1995. Draft Field Summary Report of RCRA Facility Investigation, Baseline Characterization, 1994 Activities, Operable Unit 1098, Technical Areas 2 and 41, March, 1995.

LANL (Los Alamos National Laboratory), May 1991. Environmental Restoration Standard Operating Procedures, Volumes I-II, Los Alamos, New Mexico. **(LANL 1991, ER ID 21556)**

LANL (Los Alamos National Laboratory), November 1995. Task/Site Work Plan for Operable Unit 1049: Los Alamos Canyon and Pueblo Canyon, Los Alamos National Laboratory Report LA-UR-95-2053, Los Alamos, New Mexico. **(LANL 1995, ER ID 50290)**

LANL (Los Alamos National Laboratory), September 1997. Work Plan for Mortandad Canyon, Los Alamos National Laboratory Report LA-UR-97-3291, Los Alamos, New Mexico. **(LANL 1997, ER ID 56835)**

NMED (New Mexico Environment Department), August 15, 1992. Monitor Well Construction and Abandonment Guidelines, Santa Fe, New Mexico. **(NMED 1992, ER ID 53805)**

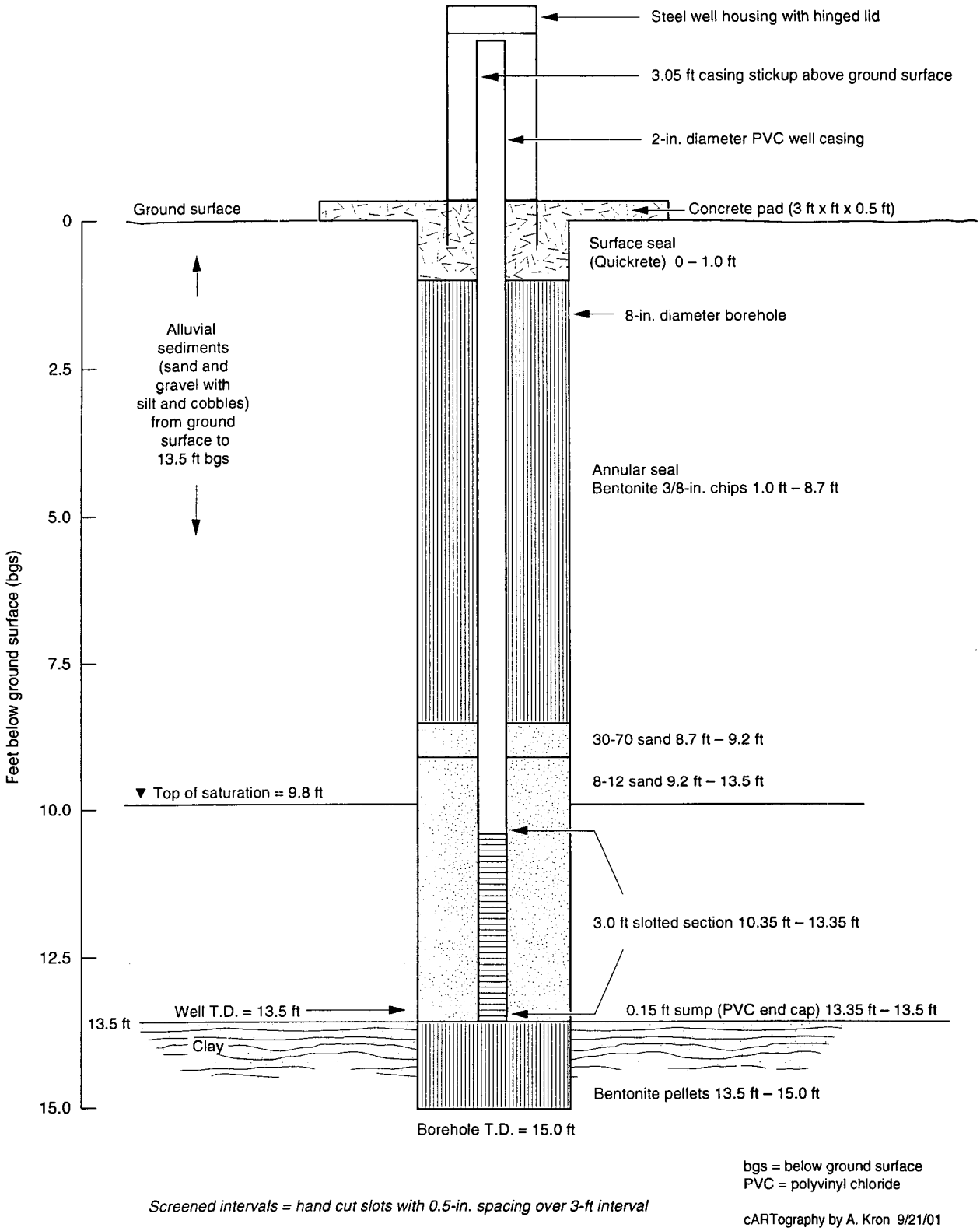
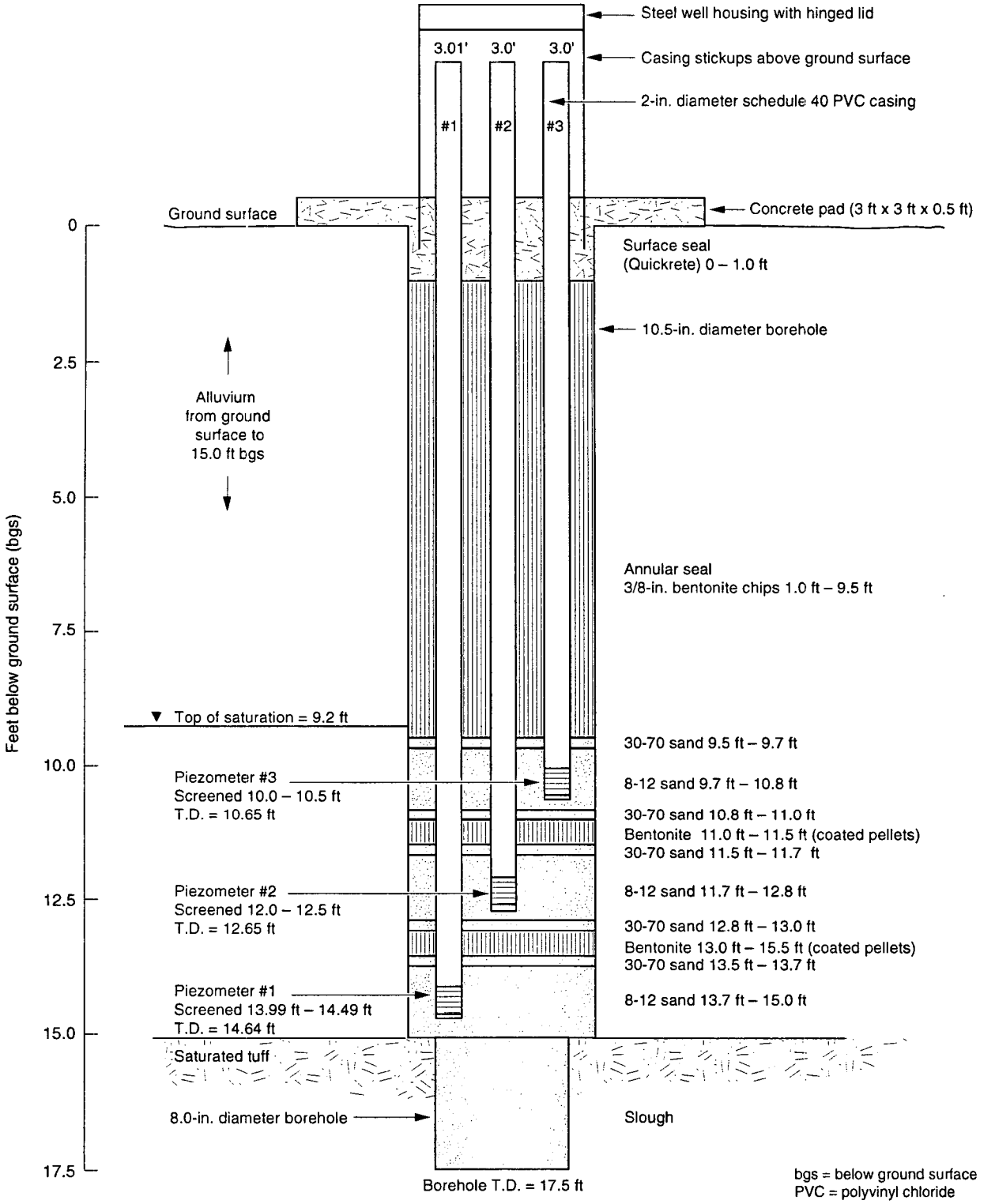


Figure 8.8-1. Construction diagram for alluvial piezometer LAP-6.

8.8 Summary Details for Alluvial Piezometer LAP-6

Location:	Upper Los Alamos Canyon, approximately 5.2 miles east of the Diamond Drive bridge and approximately 15 feet west of alluvial well LAO-6A (see Figure 8-2).		
Survey Data:	Northing:	1,771,332.32	
	Easting:	1,646,196.02	(NM State Plane NAD 1983)
	Elevation:	6,425.49 ft msl (pad) 6,424.99 ft msl (ground)	
Objectives:	Provide water level information.		
Date of Installation:	March 22, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-13.5 ft bgs Moist Clay: 13.5-15.0 ft bgs note: well installed in borehole LAP-6B (see Appendix A)		
Water Level:	9.08-10.50 ft bgs (3/23/01-7/13/01)		
Construction Details: (see Fig. 8.8-1)	Borehole Diameter:	8.0 in	
	Borehole Total Depth:	15.0 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depth:	13.50 ft bgs	
	Screened Interval:	10.35-13.35 ft bgs	
	Sump:	0.15 ft (13.35-13.50 ft bgs)	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride



Screened intervals = hand cut slots with 0.5-in. spacing over 6-in. interval.
Well T.D.s include 0.15 ft sump (PVC end cap) below bottom of each 6-in. screen.

Figure 8.7-1. Construction diagram for alluvial piezometer nest LAP-5.7.

8.7 Summary Details for Alluvial Piezometer Nest LAP-5.7

Location:	Middle Los Alamos Canyon, approximately 5.0 miles east of the Diamond Drive bridge and 2000 feet east of alluvial well LAO-4.5 (see Figure 8-2).		
Survey Data:	Northing:	1,771,630.21	
	Easting:	1,645,485.10	(NM State Plane NAD 1983)
	Elevation:	6441.96 ft msl (pad) 6441.46 ft msl (ground)	
Objectives:	Monitor alluvial hydraulic head fluctuations at multiple discrete depths for assessment of vertical hydraulic gradient.		
Date of Installation:	March 23, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-15.0 ft bgs Bandelier Tuff (Otowi Member): 15.0-17.5 ft bgs (see Appendix A)		
Water Level:	9.2 ft bgs (initial)		
Construction Details: (see Fig. 8.7-1)	Borehole Diameter:	10.5 in	
	Borehole Total Depth:	17.5 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depths:	Piezometer #1: 14.64 ft bgs Piezometer #2: 12.65 ft bgs Piezometer #3: 10.65 ft bgs	
	Screened Intervals: (0.50 ft each)	Piezometer #1: 13.99-14.49 ft bgs Piezometer #2: 12.00-12.50 ft bgs Piezometer #3: 10.00-10.50 ft bgs	
	Sumps: (0.15 ft each)	Piezometer #1: 14.49-14.64 ft bgs Piezometer #2: 12.50-12.65 ft bgs Piezometer #3: 10.50-10.65 ft bgs	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

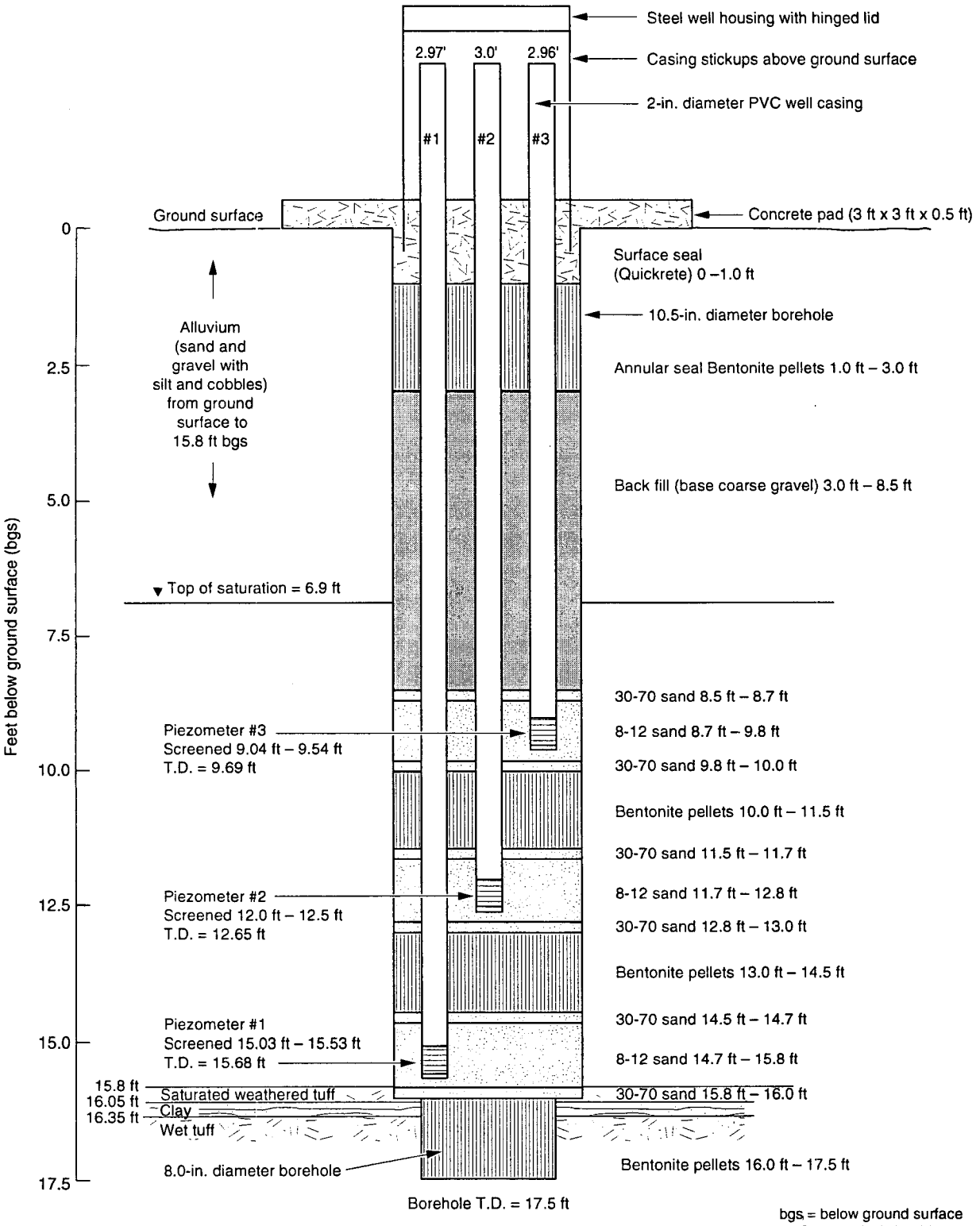


Figure 8.6-1. Construction diagram for alluvial piezometer nest LAP-4.

8.6 Summary Details for Alluvial Piezometer Nest LAP-4

Location:	Middle Los Alamos Canyon, approximately 4.1 miles east of the Diamond Drive bridge and 200 feet west of alluvial well LAO-4 (see Figure 8-2).		
Survey Data:	Northing:	1,772,716.99	
	Easting:	1,640,584.00	(NM State Plane NAD 1983)
	Elevation:	6,537.14 ft msl (pad) 6,536.64 ft msl (ground)	
Objectives:	Monitor alluvial hydraulic head fluctuations at multiple discrete depths for assessment of vertical hydraulic gradient.		
Date of Installation:	March 21, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-15.8 ft bgs Bandelier Tuff (Otowi Member): 15.8-17.5 ft bgs (see Appendix A)		
Water Level:	6.9 ft bgs (initial)		
Construction Details: (see Fig. 8.6-1)	Borehole Diameter:	10.5 in	
	Borehole Total Depth:	17.5 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depths:	Piezometer #1: 15.68 ft bgs Piezometer #2: 12.65 ft bgs Piezometer #3: 9.69 ft bgs	
	Screened Intervals: (0.50 ft each)	Piezometer #1: 15.03-15.53 ft bgs Piezometer #2: 12.00-12.50 ft bgs Piezometer #3: 9.04-9.54 ft bgs	
	Sumps: (0.15 ft each)	Piezometer #1: 15.53-15.68 ft bgs Piezometer #2: 12.50-12.65 ft bgs Piezometer #3: 9.54-9.69 ft bgs	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

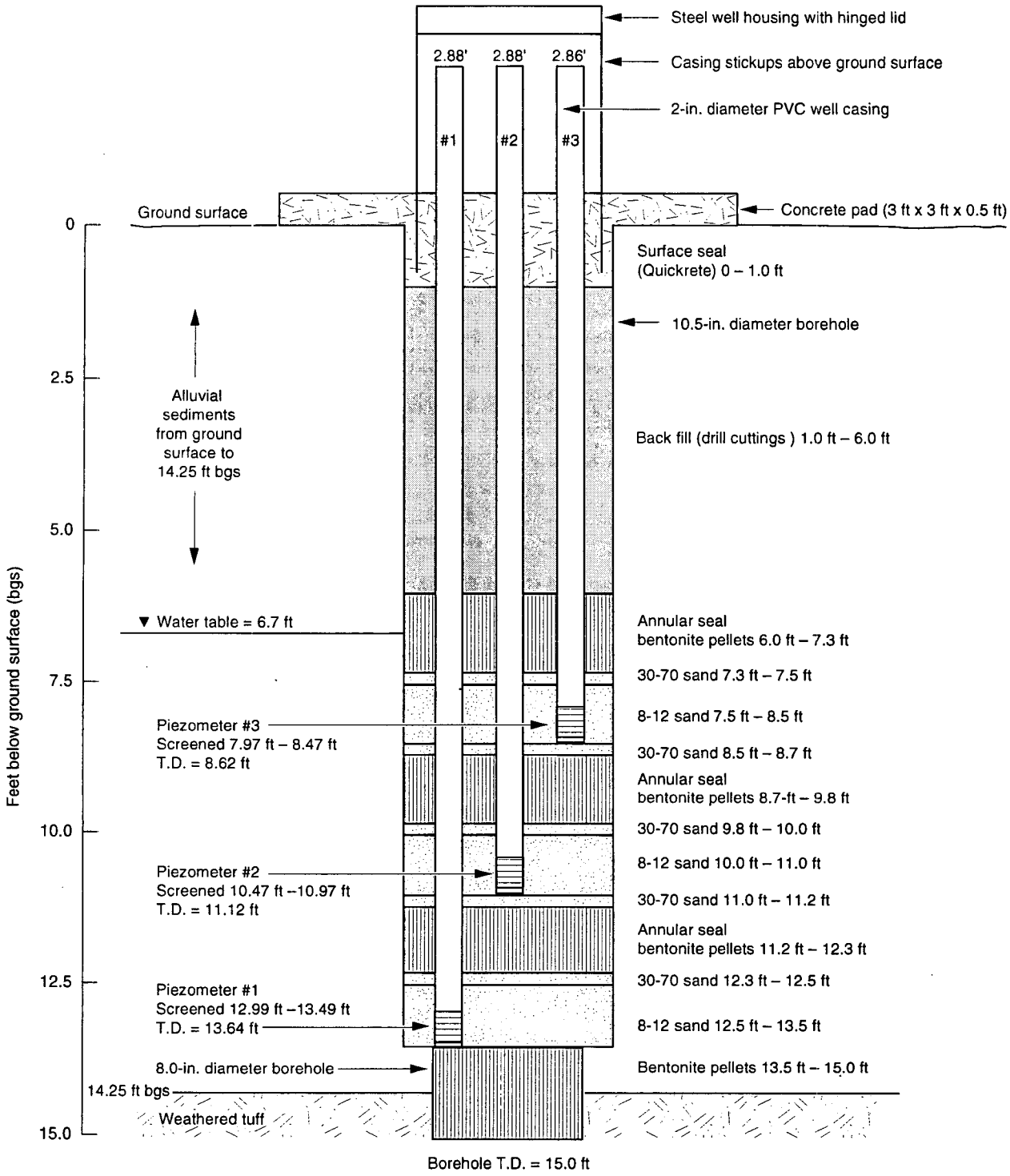


Figure 8.5-1. Construction diagram for alluvial piezometer nest LAP-3.5.

8.5 Summary Details for Alluvial Piezometer Nest LAP-3.5

Location:	Upper Los Alamos Canyon, approximately 8650 feet east of the Diamond Drive bridge and 150 feet east of alluvial well LAO-0.8 (see Figure 8-1).		
Survey Data:	Northing:	1,774,291.95	
	Easting:	1,627,925.31	(NM State Plane NAD 1983)
	Elevation:	6,877.26 ft msl (pad) 6,876.76 ft msl (ground)	
Objectives:	Monitor alluvial hydraulic head fluctuations at multiple discrete depths for assessment of vertical hydraulic gradient.		
Date of Installation:	May 16, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-13.5 ft bgs Bandelier Tuff (Otowi Member): 13.5-15.02 ft bgs (see Appendix A)		
Water Level:	9.99 ft bgs (initial water level in Piezometer #3 after stabilizing on May 17, 2001)		
Construction Details: (see Fig. 8.5-1)	Borehole Diameter:	10.5 in	
	Borehole Total Depth:	15.02 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depths:	Piezometer #1: 13.64 ft bgs Piezometer #2: 11.12 ft bgs Piezometer #3: 8.62 ft bgs	
	Screened Intervals: (0.50 ft each)	Piezometer #1: 12.99-13.49 ft bgs Piezometer #2: 10.47-10.97 ft bgs Piezometer #3: 7.97-8.47 ft bgs	
	Sumps: (0.15 ft each)	Piezometer #1: 13.49-13.64 ft bgs Piezometer #2: 10.97-11.12 ft bgs Piezometer #3: 8.47-8.62 ft bgs	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

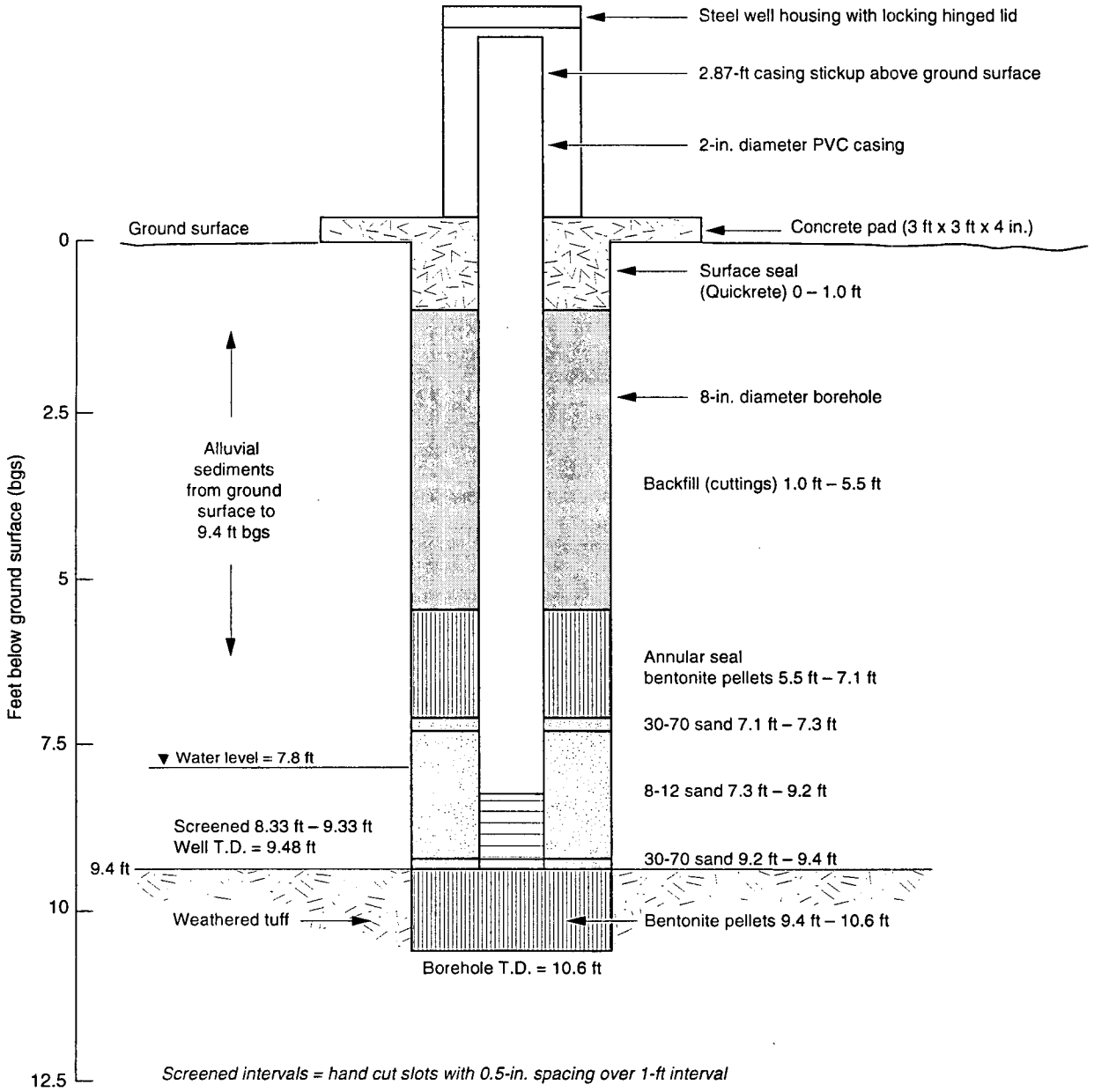


Figure 8.4-1. Construction diagram for alluvial piezometer LAP-3.

8.4 Summary Details for Alluvial Piezometer LAP-3

Location:	Upper Los Alamos Canyon, approximately 8500 feet east of the Diamond Drive bridge and approximately 50 feet southeast of alluvial well LAO-0.8 (see Figure 8-1).		
Survey Data:	Northing:	1,774,243.85	
	Easting:	1,627,746.15	(NM State Plane NAD 1983)
	Elevation:	6,881.78 ft msl (pad) 6,881.45 ft msl (ground)	
Objectives:	Provide water level information.		
Date of Installation:	May 11, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-9.4 ft bgs Bandelier Tuff (Otowi Member): 9.4-10.6 ft bgs (see Appendix A)		
Water Level:	7.8 ft bgs (initial)		
Construction Details: (see Fig. 8.4-1)	Borehole Diameter:	8.0 in	
	Borehole Total Depth:	10.6 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depth:	9.48 ft bgs	
	Screened Interval:	8.33-9.33 ft bgs	
	Sump:	0.15 ft (9.33-9.48 ft bgs)	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:

ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

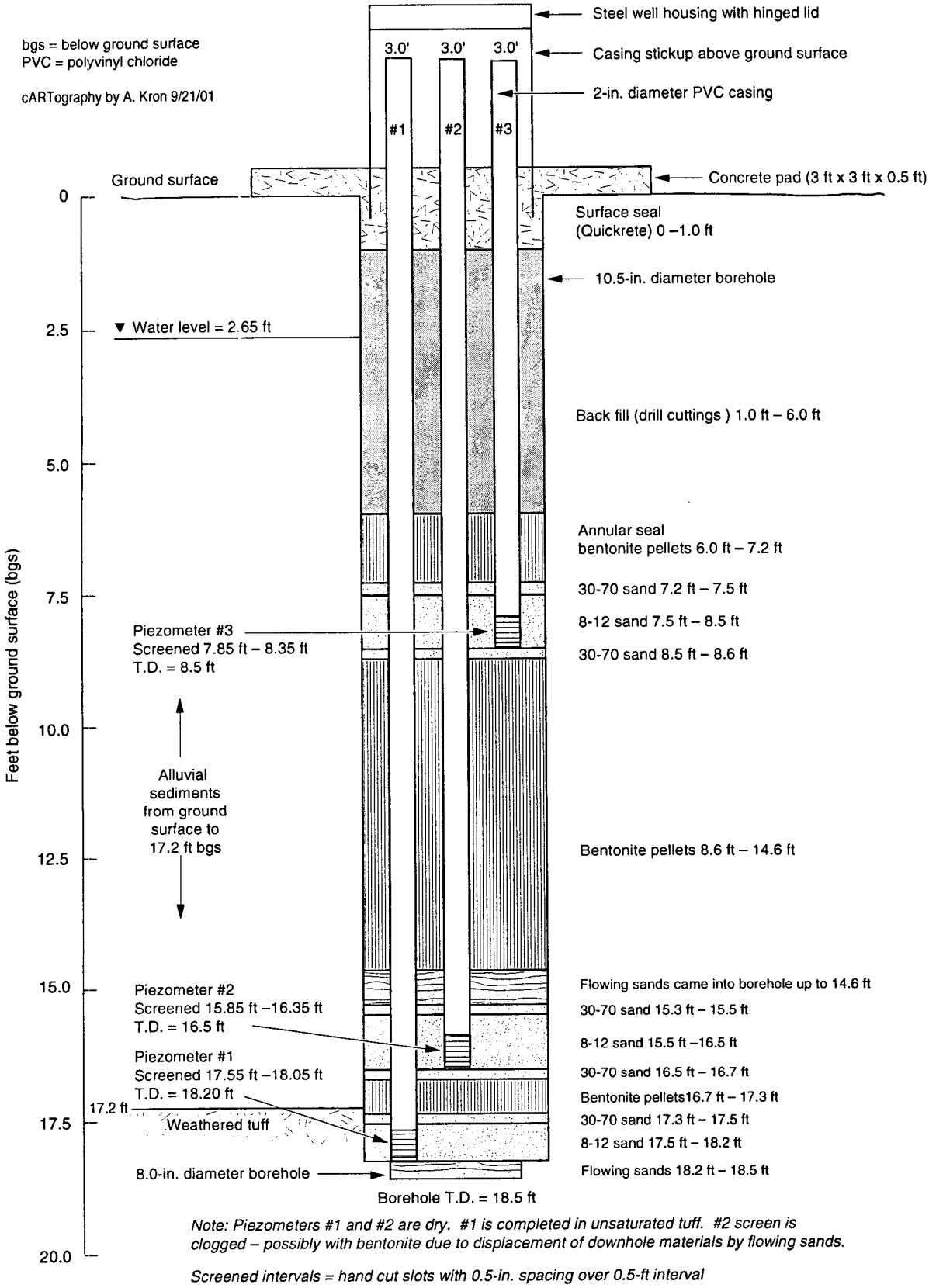


Figure 8.3-1. Construction diagram for alluvial piezometer nest LAP-1.7.

8.3 Summary Details for Alluvial Piezometer Nest LAP-1.7

Location:	Upper Los Alamos Canyon, approximately 8350 feet east of the Diamond Drive bridge and 150 feet west of alluvial well LAO-0.8 (see Figure 8-1).		
Survey Data:	Northing:	1,774,282.37	
	Easting:	1,627,554.03	(NM State Plane NAD 1983)
	Elevation:	6,893.08 ft msl (pad) 6,892.58 ft msl (ground)	
Objectives:	Monitor alluvial hydraulic head fluctuations at multiple discrete depths for assessment of vertical hydraulic gradient.		
Date of Installation:	May 16, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-17.2 ft bgs Bandelier Tuff (Otowi Member): 17.2-18.5 ft bgs (see Appendix A)		
Water Level:	2.65 ft bgs (initial)		
Construction Details: (see Fig. 8.3-1)	Borehole Diameter:	10.5 in	
	Borehole Total Depth:	18.5 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depths:	Piezometer #1: 18.20 ft bgs Piezometer #2: 16.50 ft bgs Piezometer #3: 8.50 ft bgs	
	Screened Intervals: (0.50 ft each)	Piezometer #1: 17.55-18.05 ft bgs Piezometer #2: 15.85-16.35 ft bgs Piezometer #3: 7.85-8.35 ft bgs	
	Sumps: (0.15 ft each)	Piezometer #1: 18.05-18.20 ft bgs Piezometer #2: 16.35-16.50 ft bgs Piezometer #3: 8.35-8.50 ft bgs	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

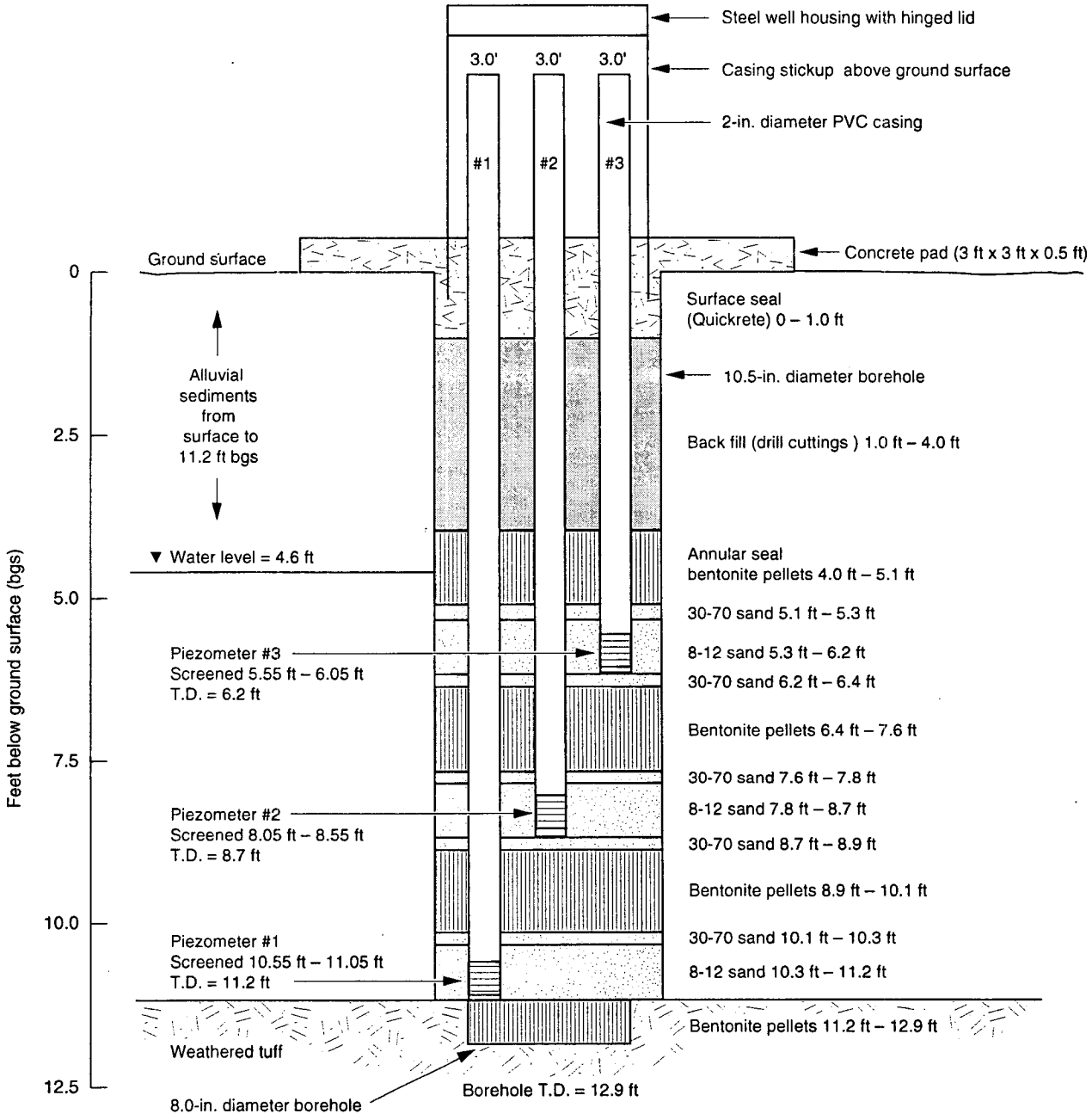


Figure 8.2-1. Construction diagram for alluvial piezometer nest LAP-1.5.

8.2 Summary Details for Alluvial Piezometer Nest LAP-1.5

Location:	Upper Los Alamos Canyon, approximately 8200 feet east of the Diamond Drive bridge and 300 feet west of alluvial well LAO-0.8 (see Figure 8-1).		
Survey Data:	Northing:	1,774,281.17	
	Easting:	1,627,393.80	(NM State Plane NAD 1983)
	Elevation:	6,897.82 ft msl (pad) 6,897.32 ft msl (ground)	
Objectives:	Monitor alluvial hydraulic head fluctuations at multiple discrete depths for assessment of vertical hydraulic gradient.		
Date of Installation:	May 15, 2001		
Drilling Method:	Hollow-stem auger		
Stratigraphy:	Alluvial sediments: 0-11.2 ft bgs Bandelier Tuff (Otowi Member): 11.2-12.9 ft bgs (see Appendix A)		
Water Level:	4.6 ft bgs (initial)		
Construction Details: (see Fig. 8.2-1)	Borehole Diameter:	10.5 in	
	Borehole Total Depth:	12.9 ft bgs	
	Casing/screen:	2-in schedule 40 threaded PVC	
	Well Total Depths:	Piezometer #1: 11.20 ft bgs Piezometer #2: 8.70 ft bgs Piezometer #3: 6.20 ft bgs	
	Screened Intervals: (0.50 ft each)	Piezometer #1: 10.55-11.05 ft bgs Piezometer #2: 8.05-8.55 ft bgs Piezometer #3: 5.55-6.05 ft bgs	
	Sumps: (0.15 ft each)	Piezometer #1: 11.05-11.20 ft bgs Piezometer #2: 8.55-8.70 ft bgs Piezometer #3: 6.05-6.20 ft bgs	
	Slot Size:	Approximately 0.02 in (hand cut)	
	Filter Pack:	8-12 grade silica sand	

Abbreviations:
ft = feet
in = inches
bgs = below ground surface
msl = mean sea level
pad = top of concrete well pad
ground = ground surface
PVC = polyvinyl chloride

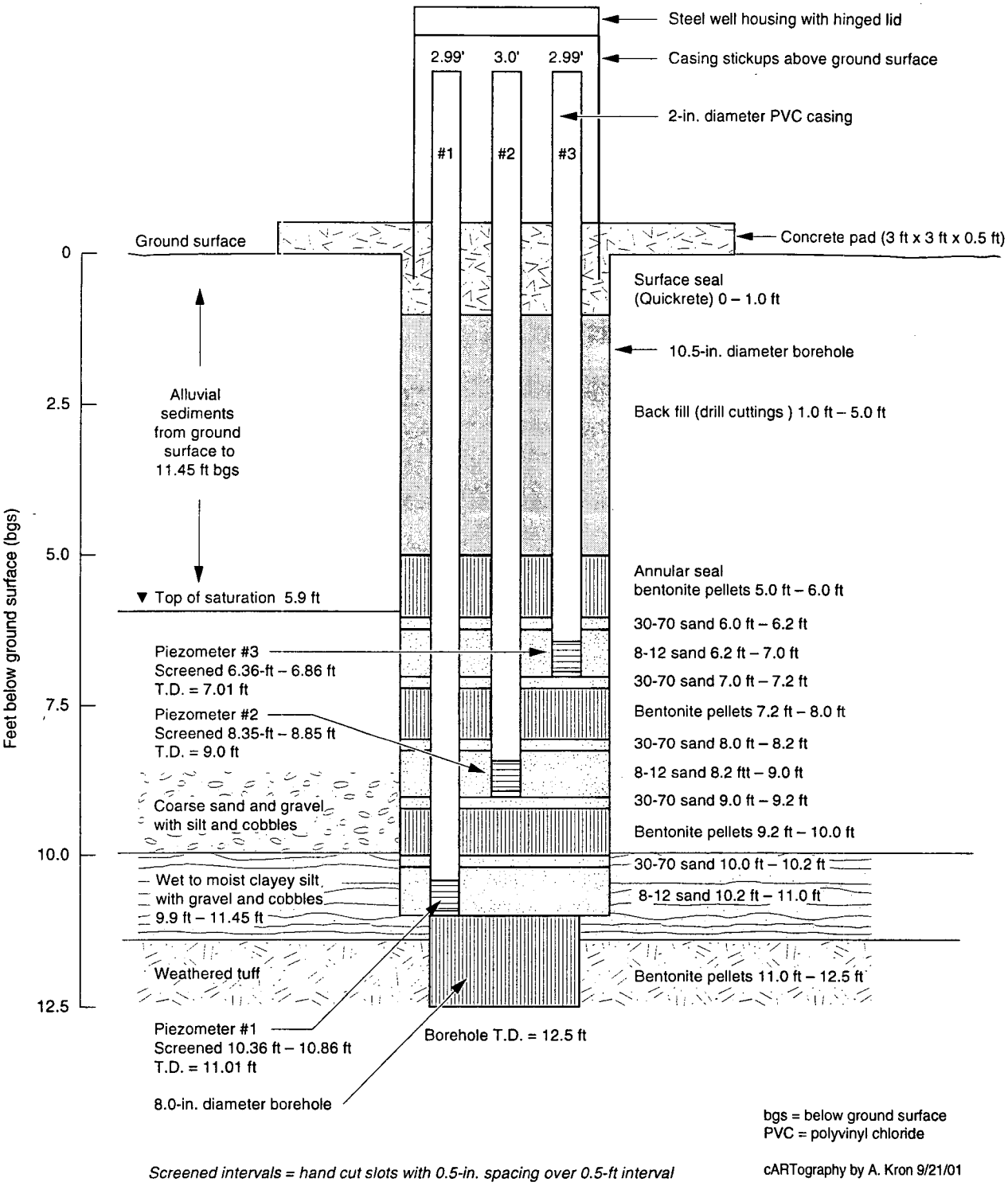


Figure 8.1-1. Construction diagram for alluvial piezometer nest LAP-1.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	PAO-5S	PAGE NUMBER:	1 of 3	DRILLER:	Stanley Johnson
FIMAD I.D.:	PU-0176	BOXES:	NA	RIG TYPE:	CME 750 All Terrain
TECHNICAL AREA:	NA	START DATE:	23-March-98	COMPANY:	Stewart Bros. Drilling Company
END DRILL DEPTH:	20.0 ft	START TIME:	09:00	AUGER SIZE:	4 1/4 I.D.

Depth (Feet)	Recovery (drilled/recovered/lost)	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Well Construction	Lithologic Unit	Notes
0	2.5/2.0/0.5	No analytical samples were collected from this borehole.	A = NDA B/G = 245 OVM = NA		Run #1, 0 ft-2.5 ft: Consolidated, cohesive, clayey topsoil. Very pale brown 10YR (7/3). Medium to coarse poorly sorted sand with angular dacite rock fragments. Clasts of bipyramidal crystalline quartz, sanadine. Damp.			Alluvium	2.5 - 0 ft. 5% bentonite and cement
2	2.5/2.5/0		A = NDA B/G = 235 OVM = NA		Run #2, 2.5 ft-5.0 ft: Consolidated, cohesive, clayey very pale brown 10YR (7/3) medium to coarse poorly sorted sand with angular dacite rock fragments. Clasts of bipyramidal crystalline quartz and sanadine. An increase in moisture near 5.0 ft.				6.0 - 2.5 ft. bentonite
4	2.5/2.5/0		A = NDA B/G = 170 OVM = NA		Run #3, 5.0 ft-7.5 ft: Consolidated, cohesive, clayey very pale brown 10YR (7/3) medium to coarse poorly sorted sand with angular dacite rock fragments. Clasts of bipyramidal crystalline quartz and sanadine. Alluvium/Puye contact is at 5.3 ft. The Puye formation consists of silty consolidated well sorted fine sand with clasts of dacite and quartz, but no sanadine. Clay stringer of coarse sand and pebbles from 6.1-6.8 ft. Material in the clay layer shows a significant decrease in moisture. Water table is at 7.0 ft.			Puye Fm.	6.0 - 18.5 ft. 20/40 grade filter pack sand surrounding a prepack screen. Screened interval from 7.0 to 17.0 ft.
6	2.5/0.3/2.2		A = NDA B/G = 165 OVM = NA						
8					Run #4, 7.5 ft-10.0 ft: Slough from the upper intervals. Puye from 9.7-10.0 ft. Wet				
10					NOTE: The driller will advance the augers to a depth of 20 ft so that a well can be constructed. Geologic logging will cease past 10 ft.				
12									

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	PAO-5S	PAGE NUMBER:	2 of 3	DRILLER:	
TECHNICAL AREA:		BOXES:		RIG TYPE:	
BEGIN DRILL DEPTH:		START DATE:		COMPANY:	
END DRILL DEPTH:		START TIME:		AUGER SIZE:	

Depth (Feet)	Recovery (feet per feet/ %)	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Well Construction	Lithologic Unit	Notes
12		No analytical samples were collected from this borehole.						Puye Fm.	6.0 - 18.5 ft. 20/40 grade filter pack sand surrounding a prepack screen. Screened interval from 7.0 to 17.0 ft.
14									
16									
18									18.5-20.0 ft bentonite seal.

Total Depth = 20.0 ft

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

NOTES:

1. Daily background radiation levels for the dates that drilling occured are as follows:

Date	Daily Background (alpha)	Daily Background (beta)
3-23-98	1.4 cpm	259 cpm
3-23-98	1.4 cpm	259 cpm

2. Units for field screening results are as follows:
Alpha (A) = counts per minute (cpm).
Beta/Gamma (B/G) = counts per minute (cpm).
Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
NDA = No Detectable Activity.

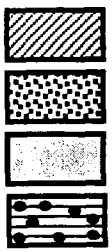
The instruments used to monitor radiation levels are as follows:

Model	HSE #	Calibration Date	Efficiency (CPM/DPM)
Ludlum-139 (alpha)	008323	4/24/98	36%
ESP-1 (beta/gamma)	007416	10/15/97	65%

3. All color descriptions are based on the Munsell guide for describing soils and rocks in the fieldand are described from the core under natural moisture conditions.

4. The information displayed in the **Recovery Data** column shows the amount of core that was retrieved. That is, the first number is the amount of footage drilled. The second number is the measurement of the amount of core present in the barrel and the last number is the measurement of the amount of core that was missing or not recoverd in the barrel. Consequently, the data is displayed in the format (drilled-recovered-lost). A graphical representation next to the measurement data shows the amount of core present in relation to the amount lost. A block with diagonal lines represents recovered core and a solid block represents core that has been lost.

LITHOLOGY:



TOPSOIL

COARSE SAND

PUYE FORMATION

CLAY/PEBBLES

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: DANNY KATZMAN, BOB GRAY SIGNATURE:

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	PAO-5N	PAGE NUMBER:	1 of 3	DRILLER:	Stanley Johnson
FIMAD I.D.:	PU-0177	BOXES:	NA	RIG TYPE:	CME 750 All Terrain
TECHNICAL AREA:	NA	START DATE:	24-March-98	COMPANY:	Stewart Bros. Drilling Company
END DRILL DEPTH:	22.5 ft	START TIME:	14:30	AUGER SIZE:	4 1/4 I.D.

Depth (Feet)	Recovery (drilled/recovered/lost)	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Well Construction	Lithologic Unit	Notes
0	2.5/0.7/1.8	No analytical samples were collected from this borehole.	A = NDA B/G = 210 OVM = NA		Run #1, 0 ft-2.5 ft: Unconsolidated, uncohesive, silty, clayey topsoil at 0-0.5 ft. (est.). Very pale brown 10YR (7/3). Medium to coarse, well sorted sand at 0.5-2.5 ft. (alluvial sediments). Clasts of crystalline quartz, sanidine, and dacite present. Dry to slightly moist.			Alluvium	0 - 5.0 ft. Grout
2	2.5/2.0/0.5		A = NDA B/G = 220 OVM = NA		Run #2, 2.5 ft-5.0 ft: Unconsolidated, noncohesive, medium to coarse, well sorted sand (alluvial sediments). Very pale brown 10YR (7/3). Clasts of crystalline quartz, sanidine, and dacite present. Dry to slightly moist.	Lexan Shelby Tube sample			
4	2.5/2.5/0		A = NDA B/G = 140 OVM = NA		Run #3, 5.0 ft-7.5 ft: Unconsolidated, uncohesive, very pale brown 10YR (7/3), medium to coarse, well sorted sand (alluvial sediments). Clasts of crystalline quartz, sanidine, and dacite present. A moisture gradient exists from moist to wet at 7.5 ft. Water table at 7.0 ft.				5.0 - 6.5 ft. bentonite
6	2.5/2.5/0		A = NDA B/G = 180 OVM = NA		Run #4, 7.5 ft-10.0 ft: Unconsolidated, uncohesive, very pale brown 10YR (7/3), medium to coarse, well sorted sand (alluvial sediments). Clasts of crystalline quartz, sanidine, and dacite present. Saturated.				6.5-15.0 20-40 silica sand filter pack surrounding a prepack screen. Screened interval from 7.5-12.5 ft.
8	2.5/2.0/0.5		A = NDA B/G = 170 OVM = NA		Run #5, 10.0 ft-12.5 ft: Unconsolidated, noncohesive, alluvial sediments as above. Very pale brown 10YR (7/3). Clasts of crystalline quartz, sanidine, and dacite present. Saturated.				
10									
12									

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

BOREHOLE I.D.:	PAO-5N	PAGE NUMBER:	2 of 3	DRILLER:	
TECHNICAL AREA:		BOXES:		RIG TYPE:	
BEGIN DRILL DEPTH:		START DATE:		COMPANY:	
END DRILL DEPTH:		START TIME:		AUGER SIZE:	

Depth (Feet)	Recovery (feet per feet/ %)	Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithologic Description	Graphic Log	Well Construction	Lithologic Unit	Notes
13	2.5/2.5/0	No analytical samples were collected from this borehole.	A = NDA B/G = 190 OVM = NA		Run #6, 12.5 ft-15.0 ft: Consolidated, cohesive, reddish brown 5YR (5/4) clay (weathered tuff). Pumice fragments visible in the clay matrix. Some sanidine present at the bottom. Wet.				20-40 grade silica sand filter pack.
15	2.5/2.0/0.5		A = NDA B/G = 200 OVM = NA		Run #7, 15.0 ft-17.5 ft: Semi-consolidated, cohesive, alluvial sediments with clayey coarse sand of quartz and sanidine. Large angular cobbles of dacite. Material is ~ 3% rock fragments up to 2 in. Wet.			Alluvium	
17	2.5/2.5/0		A = NDA B/G = 160 OVM = NA		Run #8, 17.5 ft-20.0 ft: Consolidated, cohesive, alluvial sediments with clayey coarse sand of quartz and sanidine as above at 17.5-18.0 ft. Alluvium/Puye contact is at 18.0 ft. The lithology below 18.0 ft is composed mostly of coarse sand of dacite/latite and some rounded quartz crystals. Color is 10YR (5/3) brown. Material is clayey, silty. Wet.				15.0 - 22.5 ft. bentonite seal
19									
21						Lexan Shelby Tube sample		Puye Fm.	
22									

Total Depth = 22.5 ft

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

NOTES:

1. Daily background radiation levels for the dates that drilling occurred are as follows:

Date	Daily Background (alpha)	Daily Background (beta)
3-24-98	1.4 cpm	267 cpm
3-24-98	1.4 cpm	267 cpm

2. Units for field screening results are as follows:
Alpha (A) = counts per minute (cpm).
Beta/Gamma (B/G) = counts per minute (cpm).
Organic Vapor Monitor (OVM) or Flame Ionization Detector (FID) = parts per million (ppm).
NDA = No Detectable Activity.

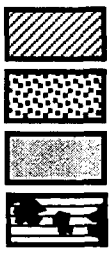
The instruments used to monitor radiation levels are as follows:

Model	HSE #	Calibration Date	Efficiency (CPM/DPM)
Ludlum-139 (alpha)	008323	4/24/98	36%
ESP-1 (beta/gamma)	007416	10/15/97	65%

3. All color descriptions are based on the Munsell guide for describing soils and rocks in the field and are described from the core under natural moisture conditions.

4. The information displayed in the **Recovery Data** column shows the amount of core that was retrieved. That is, the first number is the amount of footage drilled. The second number is the measurement of the amount of core present in the barrel and the last number is the measurement of the amount of core that was missing or not recovered in the barrel. Consequently, the data is displayed in the format (drilled-recovered-lost). A graphical representation next to the measurement data shows the amount of core present in relation to the amount lost. A block with diagonal lines represents recovered core and a solid block represents core that has been lost.

LITHOLOGY:



TOPSOIL

MEDIUM TO COARSE SAND

PUYE FORMATION

CLAY/WEATHERED TUFF

LOGGED BY: DAVE FRANK
PREPARED BY: DAVE FRANK
CHECKED BY: DANNY KATZMAN, BOB GRAY SIGNATURE:

CORE SAMPLE LOG

Sample Management Facility

Borehole ID: PAO-2.5 TA/FU: NA / Drill Depth From: 0 To 13.9 .....Page 1 of 1
Driller: STANLEY JOHNSON Box: 2 Start Date/Time: 8/31/98 End Date/Time 8/31/98
Print Name
Drilling Equipment/Method: CME-750 Rig, Hollow Stem Auger

Sampling Equipment/Method: SPLIT SPOON + LEXAN SLEEVES

Depth (Feet)	Recovery (feet per feet/ %)	Field Borehole Analytical Sample # CAPU-	Field Screening Results	Top/Bottom of Core in Box	Lithology – Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	RUN 1 1.5/2.5	4.4-4.6 98-0023			0-3.8 UNCONSOLIDATED, NON-COHESIVE, DARK YELLOWISH BROWN 10YR 3/4, WELL GRADED SAND WITH GRAVEL AND COBBLES. SW 25% cobbles, 5-25% gravel, 25-50% sand, 25-45% fines.		ALLUVIUM	DRY TO DAMP SATURATED @ 3.8'
5	RUN 2 2.5/2.5				3.8-4.0 SEMICONSOLIDATED, COHESIVE, DARK YELLOWISH BROWN 10YR 3/3, SILTY SAND, SM, 10% coarse sand, 70% med. sand, 20% fines			
	RUN 3 1/2	7.3-7.5 98-0027			4.0-4.4 SAME AS 0'-3.8'			
10	RUN 4 2.5/2.5	8.3-8.5 98-0025			4.4-4.6 SAME AS 3.8'-4.0'		BANDELIER TUFF	
	RUN 5 2.9/2.9				4.6-7.7 SAME AS 0'-3.8'			
					7.7-13.9 WEATHERED BANDELIER TUFF, WEAK, MASSIVE, PALE BROWN 10YR 6/3			MOIST TO DRY
15								TD = 13.9
20								

Prepared By: KEN KISIEL [signature] 9/9/98
Print Name/Signature Date

Checked By: Robert Gray / R Gray 9/9/98
Print Name/Signature Date

SOP-12.01, R2

Los Alamos

Environmental Restoration Project

CORE SAMPLE LOG

Sample Management Facility

Borehole ID: PAO-3 TA/FU: NA 1 Drill Depth From: 0' To 17.5' .....Page 1 of 1
Driller: STANLEY JOHNSON Box: 3 Start Date/Time: 8/27/98 End Date/Time 8/27/98
Print Name
Drilling Equipment/Method: CME-750 Rig, Hollow Stem Auger

Sampling Equipment/Method: SPLIT SPOON + LEXAN SLEEVES

Depth (Feet)	Recovery (feet per feet/%)	Field Borehole Analytical Sample # CAPU-	Field Screening Results	Top/Bottom of Core in Box	Lithology – Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	RUN1 1.25/2.5				0.-5' UNCONSOLIDATED, NON-COHESIVE, DARK YELLOWISH BROWN 10YR 3/4, SILTY SAND, SM, TRACE GRAVEL, DAMP, 5% gravel, 20% fines, 75% sand, gravel 1/8"-1"		ALLUVIUM	
	RUN2 2.5/2.5							
5	RUN3 1.8/2.5	6.6'-6.8' 98-0032			5'-10.8' UNCONSOLIDATED, NON-COHESIVE, DARK YELLOWISH BROWN 10YR 3/4, WELL GRADED SAND, SW, TRACE GRAVEL AND SILT, 10-20% gravel, 15-20% fines, 0-25% fine sand, 50-60% coarse sand			SATURATED @ 6.0'
	RUN4 1/2.5							
10	RUN5 1.5/2.5	10.5'-10.8' 98-0034 12.5'-12.6' 98-0036			10.8-17.5 WEATHERED BANDELIER TUFF, WEAK, MASSIVE, PALE BROWN 10YR 6/3, MOIST TO DRY		BANDELIER TUFF	
	RUN6 1.6/2.5							
15	RUN7 1.5/2.5							TD=17.5
20								

Prepared By: KEN KISIEL — Print Name/Signature — 9/9/98 — Date

Checked By: Robert Gray — Print Name/Signature — 9/9/98 — Date

Los Alamos

Environmental Restoration Project

SOP-12.01, R2

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID PAO-1(a) TA/OU _____ Drill Depth From 0 To 16 Page 1 of 1

Driller SBDC Box #(s) _____ Start Date/Time 10/29/98 1400 End Date/Time 10/29/98 1600

Drilling Equip./Method CME 750 / Hollow Stem Auger Sampling Equip./Method Split Spoon, lexan Sleeve

Depth (Feet)	Recovery (feet per feet/ %)	Field Borehole Anaytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.0				0-2.4 Brown, topsoil, organics.			
2.5	2.5				2.4 — 5.0 Brown unconsolidated, silty SAND, to coarse 25-35% gravel, 50-75% medium sand, 10-20% fines			Damp to moist 2.4-5.0'
5.0	1.0							
7.5	2.0							
10.0	0							
12.5	1.9				5.0-7.5 Brown unconsolidated, silty SAND & GRAVEL, 40-60% coarse sand, 25-35% medium sand, 10-15% gravel, 5-10% cobbles (up to 4½"), 5% fines			Saturated at 5.9'
15.0	3.5							
16.0	3.5							
17.5	(TAD)				7.5 - 10.0 No recovery			
20.0					10.0 - 11.0 same as above			
					11.0 - 16.0 Brown tuff, (Bandelier) weathered, weak, moist			11.0' Moist tuff unsaturated.
					Termination @ 16.0' 10/29/98			

Prepared By T. Benson Date 10/29/98 Checked By _____ Date _____

R.1

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID PAO-2 TA/OU _____ Drill Depth From 0 To 16.2' Page 1 of 1

Driller SBDC Box #(s) _____ Start Date/Time 11/2/98 0915 End Date/Time 11/2/98 1230

Drilling Equip./Method CME 750 / Hollow Stem Augers Sampling Equip./Method Split Spoon, stainless sleeves

Depth (Feet)	Recovery (feet per feet/ %)	Field Borehole Anaytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.5	2.5 / 4.0			0-1' Brown topsoil, organics, moist			
2.5	2.5				1'-6' Brown silty fine-grained SAND, moist to wet, tuff gravel (10%-20%), 70-80% fine sand, 30-40% silt.			▽ saturation @ 6'
5	2.0							
6.5	2.5							
9.0	2.0							
10	2.5							
11.5	1.5							
14.0	2.5							
15	1.5							
16.2	2.5							
					6'-6.5 Brown medium-gr. silt, sand, saturated, tuff gravel (20-40%), silt (30-40%), well sorted			
					6.5-9.0 SAA, gravel (20-40%) tuff gravel (20-30%) rock fragments (tuff) 20%, saturated			Tuff boulder @ 8'
					9-10.9' SAA, medium to coarse-gr. sand, gravel (30-60%) (10-20%) rock fragments (5-10%) saturated			Bandelier Tuff @ 10.9'
					10.9'-14.0 Tan-brown, weathered tuff, & pumice (white), damp			10.9'-16.2' unsaturated, damp
					14-16.2 SAA			
					Termination @ 16.2'			

Prepared By T. Thenson Date 11/2/98 Checked By _____ Date _____

R.1

ICF KAISER

Borehole # BG-4 (18-10024)

Date(s) Drilled	2/17/98	Rig Type	CME 750
Geologist/Engineer	Catherine Goetz	PRS	TA-18 Baseline Threemile Canyon
LANL Representative	Danny Katzman	Borehole Diameter	
Drilling Subcontractor	Stewart Brothers	Total Depth of Hole	

Depth (ft.)	% Recovery	Meter Reading	Sample ID	Samples	General Lithology	Materials Description	Remarks
0		PID & RAD Background			SM	Silty sand (SM); v. dk. grayish brown, (10 YR,3/2); 70-75% v. fine to course sands; 15-20% course clear(quartz?) sands; v. moist, non-plastic, loose.	
					SM	As above; sand fraction predominately v. fine to fine; damp; quartz possibly sanadine; rootlets.	
1	80%				SM	Silty sand(SM); dk. brown(10YR, 3/3); 60-70% sands v. fine to course, predom. v. fine to med.; 2" pink tuff pieces; damp; med. to course sand stringer 1'6" to 1'8"	
					ML	Sandy silt (ML); dk. brown (10YR, 3/3); 30-40% v. fine to med sands; nonplastic, v. moist to wet, loose.	
2						Core Lost	
3	86%		CA18-98-0004		SM	Silty Sand (SM); dk. grayish brown, (10YR, 3/2); 60-70 % v. fine to fine sands; loose; wet; rootlets. As above Increase in saturation	
4					ML/SM	As above Increase in silts-sandy silt(ML) to silty sand(SM); rootlets.	
					SM	Silty sand (SM); dk. grayish brown (10YR, 3/2); 60-70% fine to course sands; loose; saturated.	
5					SM/SW	Silty sands to clean sands (SM/SW); brown (10YR, 4/3); v. fine to course sands 80-85%, predom. med. to course grains, quartz, some sanadine; tuff (pink) gravels ~5%; wet/saturated, obsidian flake.	
6	100%		CA18-98-0005		QBT 1V	Tuff; gray (10YR, 5/1); highly altered clay; plastic; damp; stiff, occasional clear crystal at contact; limonite staining; relic pumices; mottled; altered ash.	
7						rootlets, color change (1 Gley, 5/N); low to non-plastic; stiff.	
8					QBT 1V	Tuff; gray (2.5Y, 5/1); moderately weathered; approaches clay; grainy texture; med. stiff; damp to moist; low plasticity. med. palsticity	
9	75%						
10			CA18-98-0008				
11	100%				QBT 1V	Altered tuff, ash flow; gray (10YR, 5/1); uncolsolidated, non-welded; v. fine to fine grain; rootlets; wet;slightly altered As above; gray (2.5Y, 5/1); white to light gray; v. fine to fine; angular crystal matrix, occasional sanadine, quartz, clear brown and elongated crystals; loose; saturated (free flowing).	
12							
13	100%		CA18-98-0006 Not Submitted		QBT 1V	As above; rootlet; increase in consolidation; increase in ash crystal size.	
14						Tuff; yellow red (7.5YR, 5/4) grading to brown (7.5YR, 5/3); nonwelded; unconsolidated; fine to med. crystals; saturated; altered.	

Job Number _____

ICF KAISER

Borehole # BG-4 (18-10024)

Date(s) Drilled 2/17/98 PRS BG-4 (18-10024) Rig Type CME 750

Depth (ft.)	% Recovery	Meter Reading	Sample ID	Samples	General Lithology	Materials Description	Remarks
14		PID & RAD Background			QBT 1V	Tuff, uncolsolidated, nonwelded; altered; fine to med. grained, subangular to subrounded crystals (gray, quartz, occasional sanidine); dk. grayish brown (10YR. 4/2).	14'7"-15'0" med. welded tuff with pumice fragments (<3") in med to course gray crystals; tuff brownish gray.
15					QBT 1V	Tuff, brown (10YR, 5/3); poorly consolidated, nonwelded, fine to course grain crystals (quartz, sanidines); wet to saturated; altered.	60%-75% crystals ~5% pumice
16	100%					Tuff, welded tuff fragments(<1.5") in unconsolidated matrix including clear crystals; v. loose; wet to saturated.	Fragments inc. welded brown with gray to black perphry; pale blue green with spherulites.
						As above; decrease in fragments.	Med. grained crystal stringer.
17						Tuff, moderately altered; yellowish brown(10YR. 5/8); consolidated: soft: few crystals noted; rust mottling: wet to v. moist; nonplastic; granular texture.	Mottling of strong brown(7.5YR, 5/6), brownish yellow(10YR, 6/8); and and dk. red(2.5YR. 3/6). v.fine grain crystals and ash 70-80%. 20-30% course crystals.
18					QBT 1V	Tuff, moderately altered, yellowish brown(10YR, 5/4); pinkish tuff fragments(3/4") weathered; 5-10% clear course size crystals; wet. Low to med. plasticity.	
19	100%						Limonite staining. Welded tuff frasgment at 19.5', approx. 4", dk. purple gray with crystal porphy.
20					QBT 1V	Tuff, moderately altered; mottled reddish yellow (5YR, 7/6), pink (5YR, 8/3), yellowish red (5YR, 4/6), brown (7.5YR, 5/4); Mod. consolidated; soft; v. moist.	60-70% crystals 10-20% pumice relic 10-20% ash Occasional stringers of clear to opaque med. course grain crystals in white matrix. 1/2" pumice relic, highly altered.
21	100%						
22						Tuff, moderately altered; brown (7.5YR, 5/3); ~30% pumice lapilli, dk. reddish brown (5YR, 4/2); soft; wet.	30-40% crystals 20-30% ash matrix
23					QBT 1V	Surge bed(?) Block and lapilli zone; rounded, highly welded dacite with ca. plag. and hornblende phenocrysts, block 4" purple gray welded tuff block with clear phenocrysts, highly mafic lapilli, blackish red, glassy.	When rolled or homogenized for sample--matrix releases water to become a thick, viscous flowing material.
24	100%		CA18-98-0007			Tuff, moderately altered, reddish yellow (5YR, 6/6) to yellowish red (5YR, 5/6); pumice fragments (1/4'-3/4") reddish brown (5YR, 4/4); consolidated; damp. Occasional purple gray welded tuff fragment (1/4'-1"); v. fine to med. clear, black, clear brown and gray crystals.	Colonade Tuff
25						TD= 25ft	
26						NOTE: Borehole advanced using a 8" HA, continuous core to 25'. Bentonite slurry backfilled to 7.5'. Borehole reamed to 8' using a 12" O.D. HA. 4" prepack well constructed inside HA.	
27							
28							
29							
30							

Job Number _____

Summary of Core Lithology for Borehole 16-2655

Run Interval	Core Depth (feet)	Lithology	Percent Recovery	Sample ID
1	0.0-1.0	Soil, loamy clay with intermixed silts, fine-grained sands, dacite gravels, angular to subrounded, many organics, dark brown.	100%	NA
1	1.0-2.5	Alluvium (saturated) still very rich, increase in sands.	100%	NA
2	2.5-5.0	No recovery	0%	NA
2	5.0-6.5	Alluvium (saturated) still very rich, increase in sands.	100%	316-97-2110
2	6.5-7.5	Qbt_4, welded 5% phenocrysts, 10% pumice, 5% lithics, and weathered, reddish gray.	100%	316-97-2111
3	7.5-8.5	No recovery.	0%	NA
3	8.5-9.5	Qbt_4 ,welded, 5% phenocrysts, 10% pumice, 5% lithics, and weathered, reddish gray	100%	NA
4	9.5-10.5	No recovery	0%	NA
4	10.5-12.0	Qbt_4, welded, 5% phenocrysts, 5-10% pumice, 5% lithics, clino pyroxene w/ smectite weathering, reddish gray	100%	316-97-2112

The Munsell® Soil Color Chart was used to determine color

Summary of Core Lithology for Borehole 16-2656

Run Interval	Core Depth (feet)	Lithology	Percent Recovery	Sample ID
1	0.0-0.4	Soil layer- silts and clays with intermixed sands, minor intermixed dacite gravels- slight loamy texture, abundant organics, mostly roots and pine needles, moist, 7.5YR 5/4 brown	100%	NA
1	0.4-1.0	Fine to coarse sands, abundant intermixed silts and clays, intermixed dacite gravels, slight loamy texture, abundant organics, mostly roots, 7.5YR 5/4 brown	100%	NA
1	1.0-2.5	No Recovery	0%	NA
2	2.5-3.5	Fine to coarse sands, abundant intermixed silts and clays, intermixed dacite gravels, slight loamy texture, abundant organics, mostly roots, 7.5YR 5/4 brown	100%	316-97-2116
2	3.5-5.0	No Recovery	0%	NA
3	5.0-7.5	Fine to coarse sands, abundant intermixed silts and clays, intermixed dacite gravels, slight loamy texture, abundant organics, mostly roots, saturated, 7.5YR 5/4 brown	100%	NA
4	7.5-9.2	No recovery	0%	NA

The Munsell® Soil Color Chart was used to determine color

Summary of Core Lithology for Borehole 16-2657

Run Interval	Core Depth (feet)	Lithology	Percent Recovery	Screening Sample ID
1	0.0-0.5	Alluvium, Soil, clay rich loam, some fine-grained sands and silts intermixed w/ dacite gravels, subrounded, medium brown.	100%	NA
1	0.5-2.5	No recovery	0%	NA
2	2.5-3.0	Soil, clay rich loam, some fine-grained sands and silts intermixed w/ dacite gravels, subrounded, medium brown.	100%	316-97-2122
2	3.0-5.0	Soil, clay rich loam, some fine-grained sands and silts intermixed w/ dacite gravels, subrounded, medium brown	50%	NA
3	5.0-7.5	Qbt_4 Densely welded, 10-15% phenocrysts, some smectite weathering on clino pyroxene, < 5% pumice , <5% lithics, grayish purple color	100%	NA
4	7.5-9.1	Qbt_4 Densely welded, 10-15% phenocrysts, some smectite weathering on clino pyroxene, < 5% pumice , <5% lithics, grayish purple color	100%	316-97-2123

The Munsell® Soil Color Chart was used to determine color

Summary of Core Lithology for Borehole 16-2658

Run Interval	Core Depth (feet)	Lithology	Percent Recovery	SampleID
1	0.0-2.5	Soil, clay rich silty loam, high organic content 0-0.75' , saturated from 1.5 to 2.5' also turns into a mix of silts, sands, less clay & dacite subrounded gravels	100%	
2	2.5-5	No recovery.	0%	NA
3	5-6.5	5-5.4'sands(medium)abundant intermixed clays, silts & sands- dark brown-saturated.5.4-6.5' Qbt_4, welded 20% phenocrysts, smectite alteration on clino-pyroxene apparent , <5% pumice, ,5% lithics, occasionally, thin, horizontal, layers	0%	NA
3	6.5-7.5	No recovery.	0%	NA
4	7.5-10.0	No recovery	0%	
5	11.0-12.0	No recovery.	100%	NA
6	10.0-12.0	Qbt_4, welded 20% phenocrysts, smectite alteration on clino-pyroxene apparent, <5% pumice, 5% lithics, occasional thin, horizontal layers w/ less clay	100%	NA

The Munsell® Soil Color Chart was used to determine color

Summary of Core Lithology for Borehole 16-2659

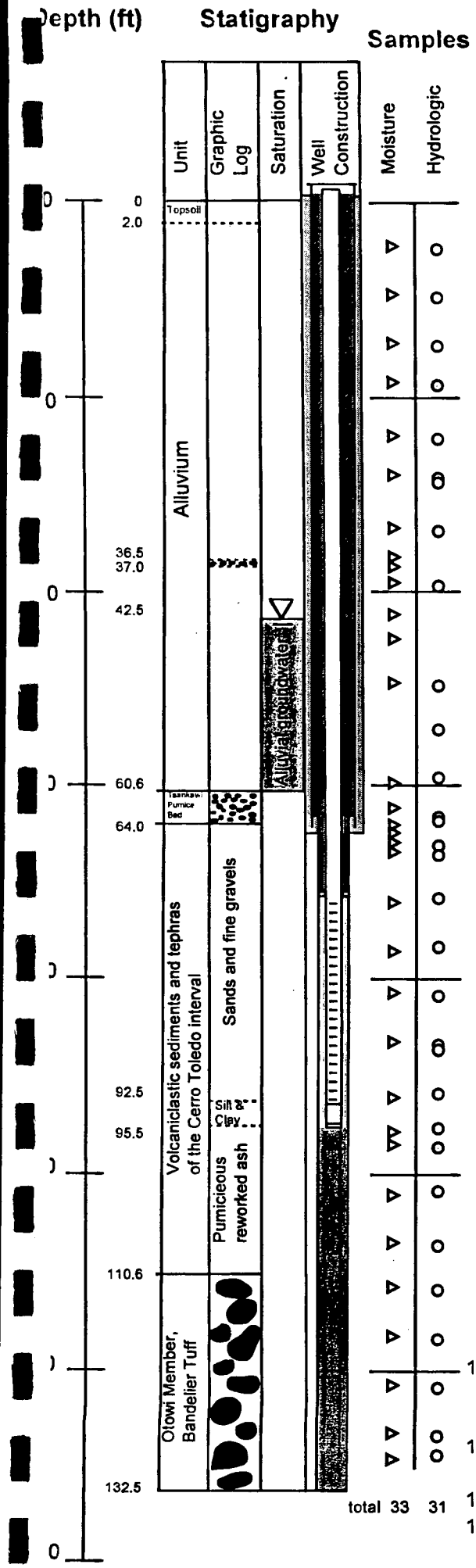
Run Interval	Core Depth (feet)	Lithology	Percent Recovery	Sample ID
1	0.0-0.5	Soil, fine sands, abundant organics, moist, very dark brown.	100%	NA
1	0.5-2.5	NA	0%	NA
2	2.5-3.5	Coarse sands abundant intermixed silts and clay, minor dacite gravels (subrounded to rounded) and cobbles, no organics, saturated, dark brown	100%	NA
2	3.5-5.0	NA	0%	
3	5.0-5.8	Coarse sands, abundant intermixed silts and clays, weathered dacite gravels, (rounded to subrounded), saturated, dark brown. Soil/ tuff interface at 5.8'	100%	316-97-0412
3	5.8-6.1	QBT_3 welded, 20% phenocrysts, no pumice, no lithics, Smectite weathering on clino-pyroxene, moist, pinkish red	100%	
3	6.1-7.0	QBT_3 welded, 20% phenocrysts, no pumice, no lithics, Smectite weathering on clino-pyroxene, w/ clay weathering layers, moist, pinkish red	100%	
3	7.0-7.5	No recovery	0%	
4	7.5-10.0	QBT_3 welded, 20% phenocrysts, no pumice, no lithics, Smectite weathering on clino-pyroxene, w/ clay weathering layers, moist, pinkish red	100%	316-97-0413

The Munsell® Soil Color Chart was used to determine color

Summary of Core Lithology for Borehole 16-2660

Run Interval	Core Depth (feet)	Lithology	Percent Recovery	Sample ID
1	0.0-0.4"	Loamy sand, abundant organics, mostly humus, dark brown.	5%	NA
1	0.4"-2.5	NA	0%	NA
2	2.5-3.5	Loamy coarse sands, abundant organics, minor clays and silts at 2.5'-3.0', coarse sands and cobbles at 3.0'-3.5', saturation encountered at 3.2'	100%	NA
2	3.5-5.0	NA	0%	NA
3	5.0-6.3	All saturated , mostly coarse sands and sub-rounded gravels, minor silts and clays	100%	NA
3	6.3-7.0	NA	0%	NA

MCO-7.2



Lithology

Depth (ft)	Lithology
0 - 2.0	TOPSOIL, organic, dry.
2.0 - 15.0	SAND and GRAVEL; phenocryst-rich (50-60%), some silt, dry.
15.0 - 28.0	SILT, some sand, dry.
@17.5	devitrified tuff in shoe to 8 cm, 2-3 cm pumice, 1-2 mm Fe oxide rim, dry.
@ 22.0	Tchicoma lithic to 4 cm in sandy phenocryst-rich matrix, dry.
28.0 - 32.0	SILT (75%), organic, some clay (10%), some sand (15%), moist.
32.0 - 36.5	SILT (50%), dk brown, clay (10%), minute 1-2 mm clay-rich (argillic) pumice relicts (15%), dry.
36.5 - 37.0	PUMICE FALL; vitric hard lappilli, lt brownish tan, 0.2-1 cm with 5% minute mafic mineral inclusions, dry.
37.0 - 38.0	CLAY and SILT, red brown, moist.
38.0 - 38.5	TUFF, devitrified, elongate pumice relicts 0.5 cm by 1.5 cm.
38.5 - 40.0	SAND (60%), medium grained, gravel (30%) fine grained, silt (10%), moist to saturated.
40.0 - 50.0	GRAVEL (50%) fine grained, sand (40%), silt (10%), saturated.
42.5	Depth to water prior to collecting samples CAMO-98-0328 (unfiltered) and CAMO-98-0329 (filtered) on 11/16/98.
50.0 - 54.5	SAND (40%) medium grained, silt (40%), clay (20%).
54.5 - 54.8	TUFF, devitrified, elongate dk gray sugary pumice relicts 0.5 cm by 1.5 cm in modly welded ash matrix.
54.8 - 57.3	SILT (60%), sand (30%), clay (10%), moist.
57.3 - 57.5	GRAVEL, phenocryst-rich, either surge bed or well sorted medium gravel, saturated.
57.5 - 58.5	TCHICOMA lithic to 8 cm, dry.
58.5 - 60.6	SAND (60%) fine grained, silt (40%), 1-4 cm fragments of slightly indurated vitric tuff (1g).
60.6 - 64.0	PUMICE FALL, light greenish yellow, clay-rich 1-3 cm argillic pumice lappilli (90%), silt (10%) moist to dry.
64.0 - 65.0	SAND (90%), medium grained, silt (10%), moist.
65.0 - 66.5	SAND (60%), coarse grained, lt gray, gravel (35%), fine to
66.5 - 92.5	medium grained, cobbles (5%), sand and gravel are mostly sub-rounded phenocrysts and cobbles are Tchicoma Fm.
92.5 - 93.5	SILT (60%), sand (30%) fine grained, argillic pumice lappilli (10%).
93.5 - 95.5	SILT (50%), sand (35%), fine grained, clay (15%), red brown, few minute reworked pumice at 93.5, **very clayey at 95.5.**
95.5 - 97.7	SAND (60%), silt (40%), grading from fine grained at top to coarse grained at 97.7.
97.7 - 105.8	SAND (60%) fine grained, silt (30%), vitric lt gray pumice (5%) 0.5-1.5 cm, oxidized Tchicoma lithics (5-10%) 1-2 cm, ashy matrix at 105, locally well oxidized, strata present.
105.8 - 109.2	SILT (50%), sand (40%) fine grained, moderate orange pink 10 YR 7/4 at 105.8 to moderate reddish brown 10 R 6/6 at 109.2, local oxidized vitric pumice, few lithics, some clay.
109.2 - 110.4	ASH, (90%), either reworked or in-situ, some argillic and some devitrified irregular shaped pumice to 5 cm.
110.4 - 110.6	SAND, (100%) coarse grained or surge bed, lt gray, dry.
110.6 - 132.5	TUFF, slightly indurated, lt orangish pink, some vitric, some devitrified pumice (10%) to 3 cm.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID MCO-0.6 TA/FU _____ Drill Depth From 0 To 3.1 ft Page 1 of 1

Driller J. Marin Box #(s) _____ Start Date/Time 2/24/99 1300 End Date/Time 2/25/99 1500

Drilling Equip./Method Hand auger Sampling Equip./Method Bagged cuttings

Depth (Feet)	Recovery (feet per feet/ %)	Field Borehole Anaytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes
1.0		1.0-2.0 99-0018			0 - 2.5 ft: Alluvium, dry, fine-grained sandy silt, very organic		Alluvium	
2.0					2.5 - 3.1 ft: Alluvium, damp, fine-grained silty sand, very organic			
3.0					3.1 ft: Ecountered hard, inpenetrable tuff (otowi Mbr)		Bandelier Tuff	T.D. = 3.1 ft

Prepared By J. Marin / R. Gray Date 2/25/99; 3/11/99 Checked By _____ Date _____

R.1

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-8 TA/OU 1098 Drill Depth From 0 To 27.5' Page 1 of 2

Driller Stewart Brothers Paul Garcia Box #(s) FCT000 1191, FCT000 1192, FCT000 1193, FCT000 1194 Start Date/Time 25 Apr. 94, 13:50 End Date/Time 26 Apr 94, 17:30

Drilling Equip./Method Failing F-10 WT / Hollow Stem Augering Sampling Equip./Method Split Barrel ; Drive Samples

Depth (feet)	Recovery (feet per feet)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 2 2.0/2.5 80%	2.0'-2.1' Mineralogic Kd	<250cpm B,γ α NDA PID NDA	0.0	(Run 2 0'-2.5') Grayish Brown 5YR 3/2, poorly sorted, subrounded, v. coarse sand with pebbles up to 3cm common (Predominantly Quartz). Sand mineralogy: Qtz, sanidine, lithics (dacite).			Split Barrel sampling. Drilling start: 13:50 (Run 2) Boulders hit w/in first 12 inches.
2.5	Run 3 1.0/1.3 77%	AAB 1312	Same as above (SAA)		(Run 2 2.5'-3.8') Grayish Brown 5YR 3/2, poorly sorted, subrounded-subangular, v. coarse cobbly sand. Pebbles up to 3cm common (Dacite, minor brick red angular lithics) Sand Mineralogy: Qtz, sparse shiny gray sanidine, lithics (dacite).			(Run 2) Damp sediments - core loss due to Boulder
3.8	Run 3 0/1.3 0%		N/A		(Run 3 3.8'-5.0') Center Bit - No recovery			(Run 3) Center Bit required, no recover/sampling
5	Run 4 2.9/4.0 72.5%	AAB 1311	<250cpm B,γ α: NDA PID: NDA	5.5' 5.5'	(Run 4 5.0'-9.0') 5.0'-6.0' same as Run 2. Saturated water Table encountered at 6.0'. Beneath W.T.: Grayish Brown 5YR 3/2, poorly sorted, subrounded-subangular, v. coarse cobbly sand to v. coarse sand fining upwards over interval. Minor interbedded clays and silts. Mineralogy same as Run 2.		Water Table	Breakthrough at 5.0', return to split barrel. (Run 4) water (Full saturation) hit at 6.0'. At 9.0' boulder hit, center bit used for
7.5					(Run 5 9.0'-9.8') Center Bit - No recovery			Run 5 - no recovery/sampling
9.8	Run 5 0/1.0 0%		N/A		(Run 6 9.8'-14.5') 9.8'-12.5' split Barrel, 12.5-14.5' drive sample. Upper 1±2': Grayish Brown 5YR 3/2, poorly sorted, subrounded-subangular, v. coarse cobbly sand. Below this interval: 5YR 3/2, poorly sorted, subrounded, medium to v. coarse sand, fining upwards over interval, cobble up to 3cm common (less common than immediately above) Mineralogy same as above.			(Run 6) Return to split barrel sampling. At 12.5' change to drive samples. 300lb hammer used. (2' spoons) Run 6 Blows 6/10/12/21 Drillers used "Kings Stuff" brand pipe dope on the hammer pipe. we have MSDS
10	Run 6 3.2/4.7 68%	AAB 1310	<250cpm B,γ α: NDA PID: NDA					
12.5								
14.5				14.5' 14.5'	(Run 7 14.5'-18.5') Moderate yellowish brown 10YR 5/4 to Dark yellowish brown 10YR 4/2, poorly sorted, subangular, v. coarse sand to v. coarse cobbly sand, minor silts and clays, fining upwards over interval. Mineralogy: Qtz dominant (>80%), minor sanidine, lithics (dacite dominant). Cobbles up to 3cm common, subangular dacite w/ minor brick red components.			Operations stopped after Run 6 at 17:00. (Run 7) Drilling started for 26 Apr 94 hole at 0810 at 14.5' rd. - Drive samples. Water level in auger at 0803 @ 6.5'
15	Run 7 4.0/4.0 100%	AAB 1305	SAA					
17.5								
18.5	Run 8 1.2/1.5 80%		SAA		(Run 8 18.5'-20.0') Dark yellowish brown 10YR 4/2, poorly sorted, subangular, coarse to v. coarse sand (18.5'-18.9') Mineralogy SAA; (18.9'-19.2') Med. Bluish gray 5B 5/1 Tuff Clast, Qtz rich (50%), minor sanidine (3-5%), moderately welded, poorly indurated. (19.2'-20.0') Return to above sediments with dacite cobbles up to 5cm common. Minor silts and clays interbedded at the base of interval. Fining upwards repeating over interval.			Blows 1st 3's: 10/12/11/19 second 3's: 16/28/22/26 Slightly lighter color and more clays than we had been seeing. Drilling downtime 0909-0940. Change from 2' spoons to 1.5' spoons.
20	Run 9 1.6/2.5 24%		SAA					
22.5				22.5' 22.5'	(Run 9 20.0'-22.5') Moderate Yellowish Brown 10YR 5/4 - Dark Yellowish Brown 10YR 4/2, Poorly sorted, subrounded to subangular, medium to coarse sand to very coarse cobbly sand. Fining upwards over interval. Mineralogy same as above sediments. Some minor silt and clays interbedded in the grading.			(Run 8) Blows 8/24/35 (Photo Missing)
22.5	Run 10 1.0/1.0 100%		SAA					
23.5	Run 11 1.5/1.0 70%		SAA					
24.5	Run 12 1.0/1.0 100%		SAA					
25.5	Run 13 1.0/1.0 100%		SAA					
26.5	Run 14 1.0/1.0 100%		SAA					
27.5				27.5'	(Run 10 22.5'-23.5') (22.5'-23.2'): Moderate Yellowish Brown 10YR 5/4, poorly sorted, subrounded to subangular, v. coarse sand and cobbles. cobbles up to 2cm common. Mineralogy: Qtz (>60%), sanidine, lithics (tuff dominant with dacite) clays and silts interbedded and very wet.	?	TD	(Run 9) Hit rock immediately Drilling downtime 1020-1100 Blow counts 38/29/21 Lost 1' due to rock. (Run 10) Going to 1.0' spoon - due to sands filling barrel.
30								

Prepared by Dennis Newell Date 25 Apr. 94 / 26 Apr. 94 Checked By [illegible] Date 4/26/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-B TA/OU 109B Drill Depth From 0 To 27.5' Page 2 of 2

Driller Stewart Brothers Paul Garcia Box #(S) FCT000 1191 FCT000 1192 FCT000 1193 FCT000 1194 Start Date/Time 25 Apr 94, 1350 End Date/Time 26 Apr. 94, 17:30

Drilling Equip./Method Failing F-10 WT / Hollow Stem Augering Sampling Equip./Method Split Barrel ; Drive Samples

Depth (feet)	Recovery (feet per feet / %)	Field Anaytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
					(Run 10 continued) (23.2'-23.5') Dark grey (N3) to Medium dark grey (N4) Tuff. Qtz rich (50-60%) Sanidine (<5%), Moderately welded, moderately-poorly indurated. The tuff is broken up and appears to be a clast.			(Run 10) Blow counts 10/17. Tuff clast near base of interval. Lunch 1200-1300 after Run 10.
					(Run 11 23.5'-24.5') Moderate Yellowish brown 10YR 5/4, very poorly sorted, subangular, very coarse sand and lithic chips. Sand is Qtz (60%) minor sanidine. Lithics is Dacite (up to 5cm). Minor silt and clay infillings. Grading not evident over interval.			(Run 11) Blows 22/23 Drillers running 5' split barrel down hole to clean out sands from augers (1340).
					(Run 12 24.5'-25.5') Medium dark grey (N4)-Dark grey (N3) Tuff Clast. Qtz (25%), sanidine (<3%), Moderately to highly welded, moderately to well indurated. Flattened pumice (Fiamme) present, sugary texture.			(Run 12) Blows 10/32
					(Run 13 25.5'-26.5') Moderate Brown 5YR 4/4, poorly sorted, subangular, v. coarse sands with cobbles up to 5cm (Dacite). Interbedded clays and silts (Dark Yellowish orange 10YR 6/6) Directly beneath these sediments is Med. grey (N5) Tuff clast, Qtz (<25%), Sanidine (<3%), moderate-poor welding, poorly indurated, generally fine textured.			(Run 13) Blows 15/13
					(Run 14 26.5'-27.5') (26.5-27.0) SAA Tuff Clast, (27.0-27.5) Moderately brown 5YR 4/4, poorly sorted, subangular, v. coarse sands with subangular to subrounded clasts (Dacite). Minor interbedded silts and clays. Grading not apparent within the interval.			(Run 14) Blows 11/17 Drilling ceased for the day at 17:16 26 Apr 94 At 0930, 27 Apr 94 Rut Longmire decided to TD hole due to the problems.

Prepared by Dennis Klewell Date 25 Apr 94 26 Apr 94 Checked By FAC Date 4/26/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-0.3(A) TA/OU OU 1098 (TA-41) Drill Depth From 0 To 22.5' Page 1 of 1

Driller Joel Stewart / Stewart Brothers Box #(s) FCT 000 1196, FCT 000 1197, FCT 000 1198 Start Date/Time 03 May 94 / 1335 End Date/Time 03 May 94 / 1700

Drilling Equip./Method CME 750 / Hollow Stem Auging Sampling Equip./Method Split Barrel

Depth (feet)	Recovery (feet/feet)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5 100%	AAB 1309 AAB 1307 (Duplicate)	PID: 0.0 ppm <35 ppm O,Y NDA: N	0.0	Run 1 (0-2.5) Grayish Brown 5YR 3/2 Clays, silts, fine sands (0-1.5') (Topsoil); Grayish Brown 5YR 3/2 Poorly sorted, subangular, coarse to v.coarse, fining upwards, sands with cobbles up to 8cm (6 few 7.5cm) (Dacite), (1.5-2.5):			Drilling started: 1335. Split Barrel Sampling. Run 1: Dry topsoil w/ dry sediments below. Roots & other organic material present.
2.5	Run 2 1.9/2.5 76%	Mineralogic composition [2 from soil, 2 from subsoil]	PID: NDA <35 ppm O,Y NDA: N		Run 2 (2.5-5.0) Dusky Brown 5YR 2/2 Poorly sorted, subangular, v. coarse, fining upwards sands with cobbles up to 5cm common. Sand mineralogy (Qtz dominant, minor sanidine, subrounded dacite lithics, subangular tuff lithics) cobbles (Subrounded Dacite, Subangular-angular tuff. Water table encountered (2.5'-3.0'). Sands are only fining upwards beneath the water table.			Run 2 water table hit at 2.5-3.0'.
5.0	Run 3 .3/1.5 20%	AAB 1306	SAA (Sands Above)	FCT 000 1196	Run 3 (5-6.5') Dacite Boulder, all but .3' lost.			Run 3: core lost on boulder (.3/1.5 recovered).
	Run 4 1.0/1.0 100%		SAA		Run 4 (6.5-7.5') Dusky Blue 5PB 3/2 Tuff cobble, Qtz <20%, minor sanidine (<2%), nonwelded, mod. indurated.			Run 4 Tuff cobble encountered.
7.5	Run 5 1.6/2.5 64%		SAA		Run 5 (7.5-10') Moderate brown 5YR 3/4, poorly sorted, subrounded very coarse sands with cobbles up to 4cm common (Tuff and Dacite). The sands fining upwards and are interbedded with silts. Sand mineralogy (Qtz, sanidine, lithics). At 8.5-9': Dacite Boulder. (9-10): Moderate olive Brown 5Y 4/4, poorly sorted, angular to subrounds v. coarse sand with cobbles up to 8cm (dacite). Sand not fining upwards in interval, mineralogy SAA sediments.			Run 5 Dacite cobble at 8.5-9'.
10	Run 6 2.0/2.5 80%	AAB 1325 3 Kd 4 mineralogic composition	SAA	10.0				Run 6 Easy drilling.
12.5	Run 7 2.0/2.5 80%		SAA	FCT 000 1197	Run 6 (10-12.5) Grayish Brown 5YR 3/2, poorly sorted, subrounded, v. coarse sand with cobbles (minor) up to 1.5cm (Tuff and dacite). Sand mineralogy = AA sediments. Not fining upwards over interval.			Run 7 contact encountered, photo taken of contact. Run 8 poor recovery: core barrel packed off. material is wet but not saturated.
15	Run 8 1.8/5.0 36%	No Sample	SAA	16.0	Run 7 (12.5-15) (12.5-13.5): Very Pale orange 10YR 8/2 to Grayish orange 10YR 7/4 to dark yellowish orange 10YR 6/6 moderately to poorly sorted, medium to coarse fining upwards sands. (Min: Qtz >60% (med. sand), Qtz <5% (coarse sand), lithics. (At 13.5' a depth contact exists): Dark yellowish orange 10YR 6/6, day rich very coarse sand lens (1-1.5cm wide). (13.5-15): Very Pale orange 10YR 8/2 poorly consolidated, non welded, high-rounded, vesicular white pumice with minor component of subangular grey tuff and dacite lithics <20%. Qtz phenos (sand grains?) <10%, sanidine absent. Below the contact at 13.5' the material is wet but not saturated.			Run 9: Mom sands and cobbles, Material is wet but not saturated. Also materials below contact at 13.5' appear oxidized compared to the saturated sediments. Well TD at 22.5' at 1700. The well was grouted back to 12.5'. Otowi not encountered, Tsankawi? or Cerro Toledo? intercepted.
17.5				FCT 000 1198				
20	Run 9 1.5/2.5 60%	No Sample	SAA					
22.5				22.5	Run 8 (15-20') Very Pale Orange 10YR 8/2 to Moderate yellowish orange 10YR 6/6 SAA pumice rich material followed by Moderate Yellowish brown 10YR 5/4 poorly sorted, subrounded fine-moderate sand with cobbles up to 5cm (subrounded dacite) with minor pumice (sandy vesicular). Material is nonsaturated but damp.	?		Subsequent stratigraphic interpretation is Bandelier Tuff (Otowi Member)
25					Run 9 (20-22.5') V. Pale Orange 10YR 8/2, poorly sorted, fine to v. coarse, subrounded to subangular, fining upwards, sands with cobbles up to 3cm common (subrounded dacite). Sand min. Qtz dominant, lithics (tuff, pumice, dacite) material is nonsaturated but damp.			
27.5								
30								

Prepared by Dennis Newell Date 03 May 94 Checked By [signature] Date 5/5/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-0.3 TA/OU 41/1098 Drill Depth From 0 To 12 Page 1 of 1

Driller J. Stewart Box #(s) Ø Start Date/Time 27-MAY-94 0817 End Date/Time 27-MAY-94 0907

Drilling Equip./Method CME 750/6¾", 10¾" O.D HSA Sampling Equip./Method N/A

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
5 10	N/A	N/A	α = NPA Δ/s = 210-240 cpm OVM = 2.1-26 ppm	N/A	No samples collected; refer to Boring Log LAO.0.3(A) for lithologic descriptions. Driller noted boulder w/cobbles at ~9 feet and again at 10.5-11.5 feet.		Alluvial Sediments	
15					Borehole Terminated at 12 ft BGS Borehole LAO-0.3 advanced to set replacement monitoring well LAO-0.3. 8" O.D. augers advanced to 12 ft and removed. 10¾" O.D auger ~~set~~ used to ream hole to 12 ft. BGS for well completion. Large augers equipped with teflon knockout plate.			

Prepared by C. Hugo Date 28-MAY-94 Checked By [illegible] Date 8/23/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-0.6 TA/OU TA-41 OU 1098 Drill Depth From 0 To 17.5' Page 1 of 1

Driller Joel Stewart, Stewart Brothers Box #(s) RT000 1212, FCT000 1213 Start Date/Time 06 May 94 / 1029 End Date/Time 06 May 94 / 1450

Drilling Equip./Method CME-750 / Hollow Stem Auger Sampling Equip./Method Split Barrel

Depth (feet)	Recovery (feet per feet)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.0/2.5 80%	AAB 1321	PID: 13.9 ppm <25 cpm β,γ α: NDA	0.0 FCT000 1212	Run 1 (0-2.5') Grayish Brown 5YR 3/2, Poorly sorted, subangular, medium to very coarse sand with minor silts in upper 1.0'. Tuff and dacite cobbles up to 5cm common. Plant roots and other organic material present. Grading not present in sediments.			Drilling started 1029 Using split barrel sampling. Run 1: Dry
2.5	Run 2 1.0/2.5 40%		PID: NDA <25 cpm β,γ α: NDA		Run 2 (2.5-5.0') Top 1.5': Boulder - lost core. Bottom 1.0': Grayish Brown 5YR 3/2. Poorly sorted, subrounded to subangular, v. coarse sand with cobbles (tuff and dacite) up to 5cm. Sand mineralogy (Qtz dominant, minor sanidine, lithics) No grading over interval. Water table encountered at ~5.0'.			Run 2: Large rock at top of interval - core lost. Water table hit at ~5.0'.
5	Run 3 1.0/1.5 67%	AAB 1308	S.A.				WT	Run 3: Poor recovery, large cobbles.
7.5	Run 4 0/2.5 0%	No Sample	N/A	7.5 / 7.5		Lost Core Center Bit		At 6.5', a large rock was hit. Center Bit used (1123) 6.5-7.5. Auger Bit tried 7.5-8.0 no recovery. Center Bit back on at 8-10'.
10	Run 4 0/5.0 0%	No Sample	N/A	FCT000 1213	Run 3 (5.0-6.5') Grayish Brown 5YR 3/2, Poorly sorted, subangular, v. coarse sands with v. large cobbles (3cm-8cm) (subrounded Tuff). No grading. Saturated. (6.5 — 15.0) Center Bit drilling, no recovery. Large rocks encountered. Tuff and dacite.			Auger bit / split barrel tried at 10'. Center Bit required: 10-15'. Downtime (1330-1416) - trouble with center bit.
12.5								At 15-17.5 split barrel resumed. Sleeves placed in barrel.
15	Run 4 1.5/2.5 60%	AAB 1313 Bags sieve sample retained for geotechnical analysis.	S.A. Run 3		Run 4 (15.0-17.5) Very Pale Orange 10YR 8/2, Moderately to Poorly sorted, medium to coarse sand (Qtz rich) with rounded, vesicular, vitric pumice (up to 1.5cm) and dark lithics (intermed. composition) ⇒ Cerro Toledo Formation. Saturated. Contact inferred to 14.0'. This is within the lost core interval - inferred to here, for it was when soft material was first entered with the center bit.		Water ↑ Cerro Toledo Fm. ↓ ?	Run 4: Cerro Toledo - No contact encountered. Drilling ceased at 1450, 17.5'. Contact with Cerro Toledo inferred to 14.0'. Bentonite fill up to 14.0'. Well completed to 14.0'.
17.5				17.5				
20								
22.5								
25								
27.5								
30								

Subsequent stratigraphic interpretation is Bandelier Tuff (Otowi Member).

Prepared by Dennis Newell Date 06 May 94 Checked By [signature] Date 5/9/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-0.8 TA/OU TA-2 OU 1098 Drill Depth From 0 To 17.5' Page 1 of 1

Driller Jack Stewart Box #(s) FETR00.1336 FETR00.1337 FETR00.1338 Start Date/Time 0853/10 MAY 94 End Date/Time 0900/11 MAY 94

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 1.3/2.5 73%	AAB1404	PID: 0.4ppm <25cpm, NDA	0.0	Run 1 (0-2.5') Top .6': Grayish Brown 5YR 3/2 soil - clays, silts, Poorly sorted, subangular, very coarse sands. Plant material (roots). Bottom 1.2': Pale Brown 5YR 5/2 same as above with less silt, cobbles up to 1cm (dacite, tuff) (subangular), root material.			Drilling started at 0853 - Split Barrel Sampling. Drilling stopped at 0858 due to lightning at 2.5'. Drilling started at 1335 @ Run 2.
2.5	Run 2 1.6/2.5 64%	No Sample	PID: NDA <25cpm, NDA	FETR00.1336	Run 2 (2.5-5.0') Pale Brown 5YR 5/2, Poorly sorted, subrounded-subangular, very coarse sand, subrounded cobbles up to 5cm (2cm common) (Dacite & Tuff). Sand ⇒ Qtz, minor sanidine, lithics. Grading not observed.			Run 1: No photo - too dark; Fill? Run 2: No photo; dark Fill? Run 3: No photo; dark Run 4: No photo; dark
5	Run 3 1.3/2.5 52%	AAB 1331	SAA					
7.5	Run 4 1.6/2.5 64%		SAA	7.5 FETR00.1337 7.5	Run 3 (5.0-7.5') Same as Run 2 (2.5-5.0')			
10	Run 5 2.3/2.5 92%	AAB 1317	SAA		Run 4 (7.5-10.0') Same as Run 3 (5.0-7.5') to 9.0' (9.0-10.0) Moderate Brown 5YR 4/4, Poorly sorted, subrounded to subangular, very coarse sand with abundant cobbles (up to 5cm) (dacite, tuff). Sand ⇒ Lithic dominant, Qtz, sanidine. Grading not observed.		WT	Drilling stopped at 1418 due to rain. 11 MAY 94 - 0832 Started at Run 5, split barrel sampling. Run 5 - Water Hit ~10.5'!
12.5	Run 6 2.0/2.5 80%	Bulk min/ Soil class. (From clay)	SAA	12.5 FETR00.1338 12.5	Run 5 (10.0-12.5) Grayish Brown 5YR 3/2 Poorly sorted, subrounded, very coarse sand with high silt content. cobbles up to 2cm very common (dacite, tuff) Fining upwards. Some roots. Saturated at 10.5'.		Cerro Toledo Fm	Run 6 Silty clay at 13.7-15.0' (less saturated) Run 7 Cerro Toledo Epiclastics at 15.0' (less saturated). Drilling stopped at 0900. Coarse bentonite chips back filled to 13.5' well set to 13.5'.
15	Run 7 2.0/2.5 80%	AAB 1323	SAA		Run 6 (12.5-15.0) SAA to 13.7' with cobbles up to 10cm; saturated. At 13.7-15.0: Silty clay with v. coarse, subrounded sands (Qtz dominant) cobbles up to 1.5cm (dacite, tuff) common. Less saturated than above sediments.		?	Subsequent stratigraphic interpretation is Bandelier Tuff (Otowi Member)
17.5				17.5	Run 7 (15.0-17.5) Moderate Reddish Orange 10R 6/6, Poorly sorted, subrounded, fine to v. coarse sand. Pumice (vesicular, v. thin rounded), some up to .5cm. Small intermediate composition lithics (dark) (<3%). Sand ⇒ Qtz-rich, no sanidine. Grading not observed. Pumice mostly busted up and not abundant. Less saturated than sediments above the clay layer.			
20								
22.5								
25								
27.5								
30								

Prepared by Dennis Newell Date 10 MAY 94 (11 MAY 94) Checked By [signature] Date 5/16/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-.91(A) TA/OU TA-2, OU 1098 Drill Depth From 0 To 17.5 Page 1 of 1

Driller Joel Stewart Box #(s) FCT000/1261 FCT000/1263 FCT000/1264 Start Date/Time 12 MAY 94 / 0924 End Date/Time 12 MAY 94 / 1150

Drilling Equip./Method CME-750 / Hollow Stem Auger Sampling Equip./Method Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 1.5/2.5 60%	AAB 1329 Bulk w. wet - Soil Class Kd	PID: NDA Kaccepn 3,5 NDA α	0.0 FCT000 1261	Run 1 (0-2.5') Dusky Brown 5YR 2/2, poorly sorted, subrounded, very course sand with interbedded silt with cobbles up to 5cm (Dacite & Tuff) High in organic material (roots, etc.) (Topsoil)			Drilling started at 0924 - split barrel sampling. Run 1 Topsoil - dry
2.5	Run 2 2.1/2.5 84%		PID: 11.5 ppm Kaccepn 3,5 NDA α		Run 2 (2.5-5.0') SAA to 2.8' (2.8-5.0') Pale Brown 5YR 5/2, poorly sorted, subangular-subrounded, very course sand with cobbles up to 5cm common (dacite & tuff). Lt organic material. Not Fining upwards. Sand minerology ⇒ qtz, minor sanidine, lithics.			Run 2 Sediments - dry
5	Run 3 2.5/2.5 100%	AAB 1330 Bulk min/ so. 1 class Kd	PID: 6 ppm Kaccepn 3,5 NDA α					Run 3 sediments, tuff cobble (dry)
7.5	Run 4 2.5/2.5 100%			7.5 FCT000 1263	Run 3 (5.0-7.5') (5.0-6.3') Moderate Brown 5YR 4/4, poorly sorted, subangular-subrounded, very course sand with minor silts. Cobbles up to 8cm (Tuff). Minerology SAA. (6.3-7.5') Grayish red purple 5RP 4/2 Tuff (boulder) Moderately indurated, moderate-dense welding, flattened pumice (80%), Qtz (<20%), Sanidine (3-5%)			Run 4 tuff cobble - dry (The cobble is more like a boulder) Run 5 water hit at 10.0' Run 6 wet sediments, minor clays (sleeves used in split barrel)
10	Run 5 2.9/2.5 96%	AAB 1327	PID: NDA Kaccepn 3,5 NDA α		Run 4 (7.5-10.0') Same as above Tuff boulder		WT	Run 7 sleeves used in barrel. Contact between 16-16.5 - collected in sleeve (archived) Cerro Toledo below contact?
12.5	Run 6 2.2/2.5 88%			12.5 FCT000 1264	Run 5 (10.0-12.5') 10.0-11.0 Same as above Tuff boulder (broken up) (wet at 10.0') (11-12.5) Mod. Yellowish Brown 10YR 5/4 to Mod. Brown 5YR 4/4 poorly sorted, subangular to angular, very course sand with minor silts and clays, cobbles up to 5cm common (tuff & dacite) (subangular - subrounded) Slight fining upwards over interval.		Cerro Toledo	Drilling stopped at 17.5' - 1200. Well to be completed to 15.0. The borehole could not be reamed through the tuff boulder (6.3-11.0'). The well was abandoned - using bentonite grout with a cement cap. The well was placed 15.0' to the west.
15	Run 7 2.0/2.5 80%	AAB 1326 (Brass Sleeve 16-16.5')	SAA	17.5	Run 6 (12.5-15.0') Moderate Brown 5YR 4/4 same as above sediments. (wet)	?		
17.5					Run 7 (15.0-17.5') (15-16') - SAA sediments (16-16.5) - Contact: Mod. Brown 5YR 4/4 silty clay (16.5-17.5) Moderate Reddish Orange 10R 6/6, poorly to moderately sorted, fine to course sand with minor broken up pumice (vitric, vesicular), medium-fine grained intermediate lithics. Sand is qtz dominant, minor sanidine. Silty clay and below: less saturated than sediments (damp)			Subsequent stratigraphic interpretation is Bandelier Tuff (Otowi Member)
20								
22.5								
25								
27.5								
30								

Prepared by Dennis Newell Date 12 MAY 1994 Checked By [illegible] Date 5/18/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID LAO-0.91 TA/OU 2/1098 Drill Depth From 0 To 15.5 Page 1 of 1

Driller J. Stewart Box #(s) Ø Start Date/Time 13-MAY-94 0850 End Date/Time 13-MAY-94 0935

Drilling Equip./Method CME 750 / 6 3/4" O.D / 10 3/4" O.D Hollow Stem Augur Sampling Equip./Method N/A

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
5, 10, 15	N/A	N/A		N/A	No samples collected; refer to Boring Log LAO-0.91(A) for lithologic descriptions.		Alluvial Sediments	
20					Boring Terminated at 15.5 ft BGS.			
					Borehole LAO-0.91 advanced due to subsurface obstruction (boulder) encountered during reaming of borehole LAO-0.91(A). Borehole LAO-0.91 advanced using 8" O.D augers to 15.5 ft. augers removed and borehole reamed using 10 3/4" O.D augers to 15.5 ft. Large augers equipped with teflon knockout plate.			

Prepared by C Kung Date 15-MAY-94 Checked By [illegible] Date 8/23/94

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-1 Date(s) Drilled 5-17-01

Location Los Alamos Canyon

Total Depth 12.5' Borehole Diameter 8"/10½"

Logged by R. Gray Drilling Method HSA

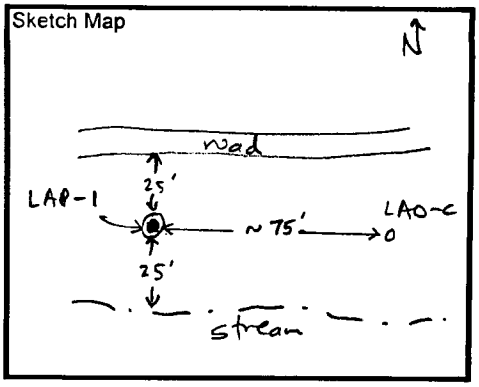
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. 2" (3) Length 10'/12'/14' Type PVC

Screen Info: Diam. 2" (3) Length 6"/ea. Slot Size hand cut

Water Level: Initial 5.9' After Completion

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		2.5/1.8/0.7	0 - 0.3': silty loam, sl. damp, w/ organic material, roots (topsoil). med. brown (5YR 3/2)
					0.3' - 0.7': sandy silt (~ 25% med. to coarse qtz sand, 75% organic rich silt) sl. damp, med. brn. as above.
					0.7' - 1.6': sandy silt + gravel (~ 90% silt, 5% med. to coarse sand, 5% gravel), sl. damp. dark brown (5YR 2/2)
					1.6' - 1.8': weathered tuff and dacite cobbles, dry.
					1.8' - 2.5': no recovery (cobbles)
					2.5 - 3.0': drilled with center bit - no recovery (cobbles)
2	3.0	5.0		2.0/1.4/0.6	3.0' - 3.3': silty coarse sand + gravel & cobbles (~ 40% sand, 30% silt, 30% gravel + cobbles) sl. damp, med. brown (5YR 3/2)
					3.3' - 4.4': silty coarse sand, gravel & cobbles, as above except ~ 50% cobbles of weath. dacite, 10% gravel, 20% silt, 20% sand, moist to wet silt and sand, cobble zones are damp to dry
					4.4' - 5.0': no recovery (cobble zone)
3	5.0	7.5		2.5/2.0/0.5	5.0' - 5.5': no recovery (cobble zone)
					5.5' - 5.6': silty coarse sand + gravel as above, wet
					5.6' - 5.9': weathered dacite cobble, damp
					5.9' - 7.5': silty coarse sand + gravel & cobbles of weath. dacite, saturated (~ 60% gravel + cobbles, 20% silt, 20% sand) top of saturation is ~ 5.9'; med. brown (10 YR 4/2)

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-1 Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
4	7.5	8.0		0.5/1.1/0	Only cored 0.5', but recovered 1.1' - upper 0.6' is slough from above (wet silty coarse sand + gravel)
					7.5'-7.7': wet silty coarse sand + gravel as above
					7.7'-8.0': weathered ryholite cobble, lt. red-brown (10R 4/6)
					Drilled 8.0'-8.5' with center bit (cobbles) - no recov.
5	8.5	10.0		1.5/1.5/0	8.5-8.7': saturated coarse sand and gravel (barrel is full of slough from upper hole)
					8.7-9.7' - cobbles + gravel w/ coarse sand + silt, saturated (~60% cobbles, 20% gravel, 15% silt, 5% coarse sand)
					9.7'-9.9': coarse sand w/ gravel + cobbles and silt, saturated, oxidized zone, w/ yellowish-red clayey decomposed rock + weathered dacite cobble.
					9.9'-10.0': sandy, silty reddish-brown clay, moist. (10R 4/6)
6	10.0	12.5	2.5	2.5/2.5/0	10.0'-11.45': clayey silt (60%) with gravel and cobbles (40%); wet to moist; med. yel-brown (10YR 4/2)
					11.45-12.50' - Tuff, weathered, damp, reddish-brown, 10R 5/4
					T.D. = 12.50'
					Saturated zone = 5.9'-9.9'; 9.9'-11.45' is wet to moist clayey zone.

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-1.5 Date(s) Drilled 5-15-01

Location Los Alamos Canyon

Total Depth 12.9' Borehole Diameter 8.0"/10½"

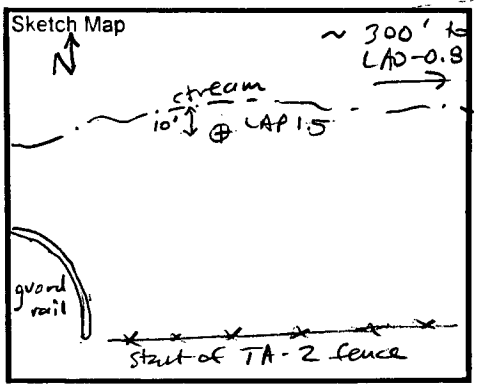
Logged by R. Gray Drilling Method HSA

Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. 2"(3) Length 9.2'/11.2'/14.2' Type PVC

Screen Info: Diam. 2"(3) Length 6"/ea Slot Size hand cut

Water Level: Initial 4.6' After Completion



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		2.5/2.5/0	0-0.4': med. brn. organic-rich silt (top soil)
					sandy, 10YR 4/2, sl. damp. w/ roots
					0.4'-1.1': silty fg sand, med brn, 10YR 4/2,
					sl. damp, ~ 40% silt, 60% sand, minor
					roots
					1.1'-1.7': silt, sl. sandy, med brn as above,
					damp.
					1.7'-2.0': silty clay, brown, 5YR 3/2, damp
					2.0'-2.5': dacite gravel & cobbles w/ f-coarse
					sand, sl. damp. (β/γ ≈ 350-400 dpm)
2	2.5	5.0		2.5/1.2/1.3	2.5'-3.8': no recovery (cobble zone)
					3.8'-4.4': coarse sand, gravel & cobbles as above,
					sl. damp.
					4.4'-4.6': coarse sand and gravel as above,
					poorly sorted, damp grading to wet @ bot.
					4.6'-5.0': coarse sand and gravel as above,
					wet - Top of saturation = 4.6' - coarse
					sand is ~ 50% of total (subangular qtz
					grains + dacite and tuff fragments)
					gravel = subangular dacite and tuff + minor
					rhyolite frags. @ 2 mm - 2 cm diam.
					(β/γ ≈ 500 dpm)
3	5.0	7.5		2.5/2.5/0	β/γ ≈ 450-550 dpm —
					5.0'-6.2' = coarse sand (60%) + gravel as above,
					saturated
					6.2-6.5' = coarse sand + gravel as above, w/
					~ 10% silt., saturated.

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-1.5 Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
					6.5'-6.8' = dacite cobble
					6.8'-7.5' = silty coarse sand + gravel as above,
					saturated - ~ 50% gravel, 40% sand, 10% silt.
					- sand = predom. subangular qtz. grains @ 1-2 mm
					diam. (65%) + subrounded dacite fragments (35%)
					- gravel = subangular to subrounded dacite + tuff
					frags. up to 2 cm diam. - saturated.
4	7.5	10.0		2.5/2.3/0.2	7.5-7.7' - no recovery (cobble zone)
					7.7'-9.2' - coarse sand, gravel & cobbles as above,
					saturated.
					9.2'-9.4' - med. grain sand - well sorted, (60%) +
					gravel as above (40%) - saturated
					9.4'-10.0' - silty coarse sand + gravel as above,
					saturated (~ 50% gravel - well rounded dacite
					frags; ~40% coarse sand (qtz), ~10% silt
					saturated. β/γ ≈ 400 dpm except 9.2'-9.4'
					zone ≈ 600 dpm.
5	10.0	12.9		2.9/2.5/0.4	10.0-10.4 - no recov.
					10.4'-11.2' - saturated coarse sand & gravel as above
					11.2'-12.9' - tuff, damp, pink-orange (5YR 8/4)
					weathered, soft. (β/γ ≈ 670 dpm)
					(β/γ @ 10.4-11.2 ≈ 470 dpm)
					T.D. = 12.9'
					Saturated zone = 4.6'-11.2' (6.6' thick)

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-1.7 Date(s) Drilled 5-15-01

Location Los Alamos Canyon

Total Depth 18.5' Borehole Diameter 8.0"/10½"

Logged by R. Gray Drilling Method HSA

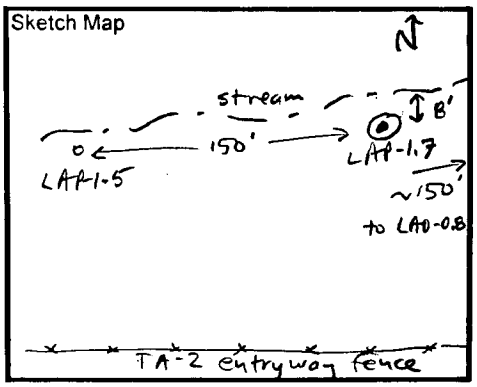
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. 2" (3) Length 11.5'/19.5'/21.2' Type PVC

Screen Info: Diam. 2" (3) Length 6"/ea. Slot Size hand cut

Water Level: Initial 2.65' After Completion

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		25/25/0	β/γ ≈ 450 dpm 0 - 0.3' - organic-rich silty loam,
					sl. damp., med. brown (5YR 3/2)
					0.3' - 1.1': sandy silt + minor gravel - sl. damp,
					brown as above ~ 10% med-coarse sand, ~ 10%
					gravel (weathered dacite) up to 2-in. diam.,
					with organic matter (roots).
					1.1' - 1.3': sandy silt as above, but w/ ~ 30%
					med. gr. sand (qtz.), sl. damp.
					1.3' - 1.6': organic silt, as above, sl. damp.
					1.6' - 2.0': sandy silt + gravel (~ 20% sand, 20%
					gravel)
					2.0' - 2.3': silt, med. brown (5YR 3/2), sl. damp
					2.3' - 2.5': silty sand + gravel, ~ 40% fine to
					med. gr. sand, 40% silt, 20% gravel
2	2.5	3.0		0.5/0.35/0.15	2.5' - 2.65': no recovery
					2.65' - 3.0': β/γ ≈ 500-600 dpm
					2.65' - 2.85': well sorted, med. grained qtz. sand,
					wet, top of saturation is at 2.65'
					2.85' - 3.0': mod. sorted med. gr. to coarse grained
					qtz. sand w/ sanidine (~ 80% coarse
					sand @ 1-2 mm diam, subangular qtz.)
					~ 20% med-gr. qtz. sand, wet
					3.0' - 4.0' = no recovery - drilled boulder w/ center bit
3	4.0	5.0		1.0/1.0/0	β/γ ≈ 450 dpm
					4.0' - 4.3' = tuff cobble, weathered, well rounded
					lt. brown (5YR 6/4), wet
					4.3' - 5.0': poorly sorted med. to coarse sand (70%)
					+ gravel (30%) wet

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP - 1.7 Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
4	5.0	7.5		2.5/1.5/1.0	5.0'-6.0' = no recovery (cobble zone)
					6.0'-7.5': β/γ ≈ 400-500 dpm
					~75% cobbles and gravel; 25% coarse qtz. sand
					saturated. Cobbles and gravel are well rounded
					tuff frags.
5	7.5	10.0		2.5/2.5/0	β/γ ≈ 450 dpm
					7.5'-8.1' - well sorted coarse qtz. sand, saturated
					8.1'-8.5' - coarse sand (50%) + gravel (50%) = well
					rounded tuff fragments @ 0.5-1.0 cm, saturated
					8.5'-9.4' - cobbles and gravel (60%) + silty
					coarse sand (~35% sand, 5% silt), saturated
					9.4'-10.0' - cobbles, gravel + silty sand as above,
					except ~10% silt, saturated.
6	10.0	12.5		2.5/0/2.5	10.0'-12.5' = no recovery; wet sand fell out of the
					barrel when it was pulled up.
7	12.5	15.0		2.5/0/2.5	12.5'-15.0' = no recovery - wet sand fell out of
					barrel, even using the core catcher.
8	15.0	17.5		2.5/1.0/1.5	β/γ ≈ 400-500 dpm. 15.0'-16.5' = no recovery,
					except residual material in barrel is saturated,
					well sorted fine grained sand (Driller calls it
					"flowing sands") sand is 95% angular to subangular
					qtz grains, ~5% subangular to rounded tuff frags,
					w/ trace dark lithic grains
					16.5'-17.0' = fine to med. grained sand as above, saturated
					17.0'-17.2' = well rounded dacite cobble
					17.2'-17.5' = tuff, weathered, soft, wet, pink-
					orange (10R 6/6)

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-1.7 Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
9	17.5	18.5		1.0/1.0/0	Tuff, as above, grading from wet at top to damp
					at bot.; β/γ ≈ 500 dpm.
					T.D. = 18.5'
					Saturated zone is 2.65' - 17.2'

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-2 Date(s) Drilled 5-11-01

Location LA Canyon

Total Depth 5.0' Borehole Diameter 8 in

Logged by R. Gray Drilling Method Hollow stem auger

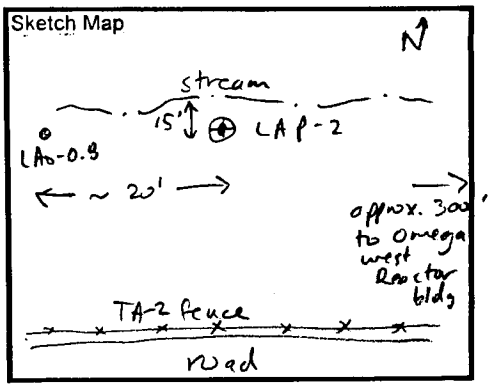
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. NA Length _____ Type _____

Screen Info: Diam. NA Length _____ Slot Size _____

Water Level: Initial NA After Completion _____

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		2.5/1.6/0.9	0-0.9': Sandy silt w/ abund. organic matter + roots, med. brown (5 YR 4/4), sl. moist, w/ ~ 20% well rounded dacite gravel @ 5 mm - 2 cm diam.
					0.9'-1.6': silty sand, fg to mg, dark brown, (10 YR 4/2), sl. moist, w/ ~ 10% dacite gravel as above (well rounded, up to 0.5 cm); with abund. roots (roots clogged core barrel)
					1.6'-2.5' - no recovery
2	2.5	5.0		2.5/1.8/0.7	2.5'-3.2' - no recovery (driller indicates cobble zone)
					3.2'-3.6' - poorly sorted fine-coarse silty sand + gravel, dk brown 10YR 4/2 slightly damp, approx 75% f-c S, 25% g up to 2 cm dia. g = dacite, 3.6'-5.0': moderately sorted - f-c S w/ minor g as above, ≈ 90% S, 10% g, light brown (10 YR 5/4), sl. damp, Sand is ~ 80% fg, 15% med. gr., 5% coarse g.; predom. subangular qtz. grains w/ trace (~ 1%) dark lithic grains.
					-Drilled on cobble w/ center bit 5.0' → refusal
					Pulled out of hole and plan to move location ~ 5' further west to try again.

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-2(a) Date(s) Drilled 5-11-01

Location LA Canyon

Total Depth 15.0' Borehole Diameter 8 in.

Logged by R. Gray Drilling Method HSA

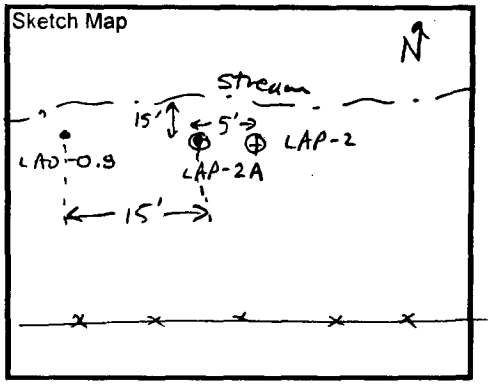
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. NA Length _____ Type _____

Screen Info: Diam. NA Length _____ Slot Size _____

Water Level: Initial 11.5' After Completion _____

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		2.5/2.5/0	0-0.3' - topsoil, organic silt & fg sand w/
					abund. roots, sl. damp, dk brown, 5YR 3/2
					0.3'-2.5'. fine to coarse gr. silty sand and
					gravel, sl. damp. to sl. moist @ 1.5'-2.5',
					dk brown, 5YR 2/2; ~ 10% gravel up to
					1 cm diam. 90% poorly sorted fine to coarse
					sand, predom. = subangular qtz grains; trace
					silt (Beta/Gamma ~ 400-500 dpm)
2	2.5	5.0		2.5/1.3/1.2	2.5-2.8' = fine to coarse sand as above w/
					~ 5% well rounded dacite gravel up to 1 cm,
					damp, med. brown 5YR 3/2 β/γ ≈ 300 dpm
					2.8'-3.5' = fg sand, mod. well sorted, w/
					min. coarse sand (10%) and gravel as above
					(5%). damp, med. brown, 10YR 5/4
					3.5'-3.8' = f to coarse sand (50%) + gravel
					and cobbles (50%), damp, med. brown a/a,
					3.8'-5.0' = no recovery (cobble zone)
3	5.0	7.5		2.5/2.1/0.4	5.0-5.4' = no recovery (cobble zone)
					5.4'-7.0' = poorly sorted f to c sand (50%)
					w/ abund. gravel and cobbles (50%), sl.
					damp. med. brn a/a (β/γ ≈ 350-450 dpm)
					cobbles are weathered tuff, brownish gray
					(5YR 4/1) w/ sanidine x tals
					7.0'-7.5' = crushed tuff (cobble) as above.

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-2 (a) Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
4	7.5	10.0		2.5/1.6/0.9	7.5'-8.4' = no recovery (cobble zone)
					8.4-9.4' = poorly sorted f to c sand w/ abund. gravel and cobbles (50%/50%) fg sand = pale brown (5YR 5/2); coarse sand = grayish brown (5YR 3/2), gravel & cobbles = dacite and tuff; slightly damp.
					9.4-10.0' = coarse sand (50%) w/ gravel (30%) + fg (10%) and med. gr. (10%) sand. Fine to med. S = subangular; coarse sand = sub rounded to well rounded qtz. grains w/ minor dark lithic grains, damp., mod. brn (5YR 4/4) to gray-brn (5YR 3/2) (β/γ ≈ 400 dpm)
5	10.0	12.5		2.5/2.3/0.2	10.0-10.2' = lost recovery
					10.2-11.5' = Cobbles and gravel (tuff + dacite) (50%) + fine to coarse sand as above, damp
					11.5'-12.5 = fine to coarse sand + cobbles as above, wet, top of saturation is @ 11.5'; grayish brown (5YR 3/2) to mod. brown (5YR 3/4) β/γ = 300-500 dpm tuff cobbles show sanidine xtals
6	12.5	15.0		2.5/1.7/0.8	12.5-13.3 = no recovery (cobbles)
					13.3-13.65' = gravel w/ f to coarse sand as above, saturated, gray-brown 5YR 3/2
					13.65'-15.0 = weathered tuff, damp at top to sl. damp @ bot. lt. orange-brn (5YR 6/4)

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-2(a) Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
					13.65 - 15.0' continued - B/G ≈ 350 dpm.
					T.D. = 15.0'
					saturated zone = 11.5' - 13.65'

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-3 Date(s) Drilled 5-11-01

Location LA Can.

Total Depth 10.6' Borehole Diameter 8.0"

Logged by R. Gray Drilling Method HSA

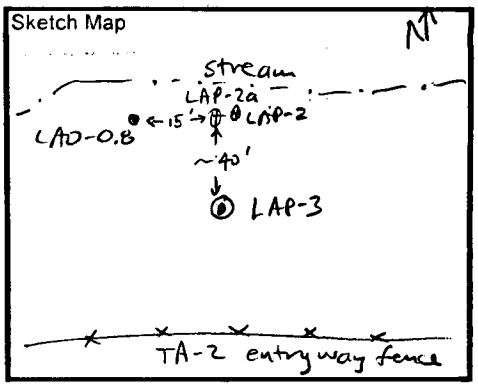
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. 2" Length 12.4' Type PVC

Screen Info: Diam. 2" Length 6" Slot Size hand cut

Water Level: Initial 7.8' After Completion

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		2.5/2.5/0	0-0.3 ft = topsoil, organic silt & roots, dark brown (5YR 3/2), sl. damp.
					0.3-1.3 ft = fine to coarse sand (65%) + gravel (30%) w/ 5% silt, dry, pale brown (5YR 5/2) w/ minor roots
					1.3-2.2 ft = weathered tuff boulder, med to lt gray (N5-N6), w/sanidine xtals, dry
					2.2-2.5 ft = poorly sorted silty fine to coarse sand (80%) + gravel (20%) up to 2 cm. diam., w/ organic matter + roots, damp., sand is ~ 50% sub-angular qtz grains + ~ 50% rounded dark lithics, gravel is angular (B/γ ≈ 450 dpm)
2	2.5	5.0		2.5/1.6/0.9	2.5-3.4' = no recovery (cobble zone)
					3.4-4.4' = Gravel & Cobbles, well rounded to sub angular tuff and dacite (50%) w/ poorly sorted fine to coarse sand (40%) + silt (10%) med.-dark brn (5YR 3/2), dry to v. sl. damp
					4.4'-4.6' = gravel and sand as above, oxidized + weathered hematite, red-brn, 5YR 4/4, dry
					4.6'-4.8' = coarse sand + gravel (crushed tuff) med gray (N5)
					4.8'-5.0' = mixed gr. sand (80%) med br (5YR 4/4) + gravel (20%), v. sl. damp B/γ ≈ 450 dpm
	5.0	5.5			Drilled 5.0-5.5' w/ center bit on boulder

Los Alamos National Laboratory · Environmental Restoration Project **Borehole Log**

Borehole ID LAP-3 Date(s) Drilled 5-11-01

Location LA Can

Total Depth _____ Borehole Diameter _____

Logged by _____ Drilling Method _____

Drilling Co. _____ Driller _____

Casing Info: Diam. _____ Length _____ Type _____

Screen Info: Diam. _____ Length _____ Slot Size _____

Water Level: Initial _____ After Completion _____

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
3	5.5	6.5		1.0/1.0/0	β/γ ≈ 400 dpm / fine to coarse gr. silty sand + gravel, poorly sorted, ~ 10% silt, 70% sand, 20% gravel, dk brown (10YR 4/2), dry to sl. damp at bot., fine to med. gr. sand (~ 35%) = subangular qtz. grains. coarse sand (~ 35%) = well rounded dark lithics. gravel = subrounded to well rounded gray weathered tuff fragments.
	6.5	7.5			Drilled 6.5-7.5 ft w/ center bit
4	7.5	8.6		1.1/1.1/0	β/γ = 400 dpm -
					7.5-7.8' = silty sand and gravel as above, damp.
					7.8-8.6' = silty sand and gravel as above, wet, ~ 20% silt, 60% fine to coarse sand, 20% gravel, top of saturation is at 7.8' sand is ~ 10% fg qtz, ~ 50% med. gr. to coarse gr. qtz. + misc. lithics; moderately sorted; sanidine xtals present; gravel up to 2 cm size = predom. gray tuff. - tuff cobble in bot. of barrel.
					8.6-9.1 ft = drilled with center bit (cobble)
5	9.1	10.6		1.5/1.5/0	9.1-9.4 ft = saturated sand & gravel as above dk brown (10YR 4/2) β/γ ≈ 400 dpm
					9.4-10.6 ft = weathered tuff (β/γ ≈ 500 dpm) orange-pink (5YR 8/4), damp, v. soft
					Saturated zone is 7.8'-9.4' / TD = 10.6 ft

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-3.5 Date(s) Drilled 5-14-01

Location Los Alamos Canyon

Total Depth 15.0 ft Borehole Diameter 8 in./10½ in.

Logged by R. Gray Drilling Method HSA

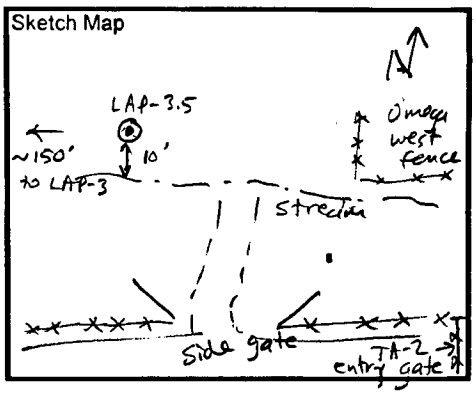
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. 2" (3) Length 11.5'/14.0'/16.5' Type PVC

Screen Info: Diam. 2" (3) Length 6"/ea. Slot Size hand cut

Water Level: Initial 6.7' After Completion

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
1	0	2.5		2.5/2.4/0.1	β/γ ≈ 400 dpm / 0 - 0.35': organic silt w/ roots,
					dark brown (5YR 3/2), damp
					0.35'- 0.75': poorly sorted fine to coarse-gr.
					silty sand + gravel - approx. 50% coarse sand,
					5% gravel, 25% med sand 10% fine sand, 10%
					silt (sand predom. angular qtz. grains - gravel
					= weathered tuff pieces up to ½ cm. diam.,
					sl. damp.; avg. color = med. brown (5YR 4/4)
					0.75' - 2.1': Silt, yel-brown (10YR 4/2), sandy
					(~ 10% coarse sand), damp.
					2.1' - 2.4': silty, med. to coarse sand, as
					above, w/ gravel & cobbles of weathered
					tuff and dacite, damp.
					2.4- 2.5' = no recov. (cobble zone)
2	2.5	5.0		2.5/1.8/0.7	β/γ ≈ 450 dpm
					2.5 - 3.2' = no recov. (cobble zone)
					3.2' - 4.1' = well sorted med. gr. sand w/
					min. coarse sand (< 5%) and gravel (< 5%)
					damp., pale brn (5YR 5/2); predom. qtz. grains
					w/ minor sanidine
					4.1' - 4.4' = coarse sand (up to 2mm) +
					gravel w/ cobble (~ 3 in. diam.) of weath.
					tuff, damp.
					4.4' - 5.0' = fine to coarse sand + gravel & cobbles
					as above, damp.

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-3.5 Date(s) Drilled

Location

Total Depth Borehole Diameter

Logged by Drilling Method

Drilling Co. Driller

Casing Info: Diam. Length Type

Screen Info: Diam. Length Slot Size

Water Level: Initial After Completion

Sketch Map

Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
3	5.0	7.5		2.5/2.5/0	β/γ = ~ 400-500 dpm
					5.0'-6.4': fine to coarse silty sand (50%) +
					gravel (50%) as above, damp
					6.4'-6.7': dacite cobble, damp
					6.7-7.5': weathered, oxidized, broken dacite
					cobbles w/ min. gravel and silty sand,
					wet top. of saturation is ~ 6.7' - weath.
					dacite is med. gray (N5) - silty sand is yel-brn
					(10YR 5/4)
4	7.5	10.0		2.5/1.7/0.8	Gravel and cobbles w/ silty med. gr. sand,
					saturated, β/γ = 450-500 dpm
					~ 10% sand, 40% gravel (weath. dacite)
					~ 50% weath dacite cobbles - dacite = dk
					gray (N3) - zone = 7.5-9.2'
					9.2-10.0' = no recovery (core fell out of barrel
					back into hole) - used center bit on cobble 10.0-10.1'
5	10.1	12.5		2.4/0/2.4	10.0'-12.5' = no recovery - wet sand fell out of
					barrel. plan to use core catcher on next run.
6	12.5	15.0	2.5	2.5/1.1/1.4	β/γ ≈ 400 dpm / 12.5-13.9 = no recovery - (flowing
					sands)
					13.9'-14.25' = silty coarse sand + gravel,
					saturated, ~ 60% sand, 30% gravel - sand is
					sub angular, mod. sorted qtz grains ~ 1 mm diam.
					gravel is subangular dacite fragments up to 1 cm
					diam. ; ~ 10% silt
					14.25'-15.0' = weathered tuff, moist, soft,
					pink-orange (10R 6/6)
					T.D. = 15.0'

Los Alamos National Laboratory - Environmental Restoration Project **Borehole Log**

Borehole ID LAP-3.5 redrill Date(s) Drilled 5-16-01

Location Los Alamos Canyon

Total Depth 15.0' Borehole Diameter 8-in.

Logged by R. Gray Drilling Method HSA

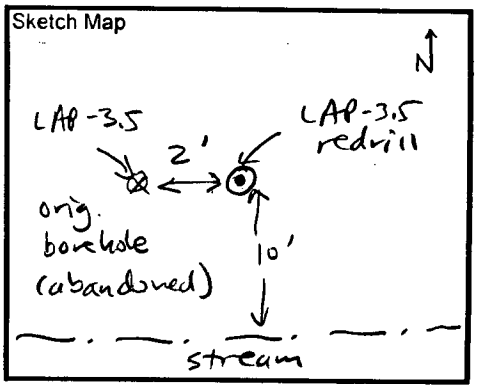
Drilling Co. Stewart Bros. Driller Stanley Johnson

Casing Info: Diam. _____ Length _____ Type _____

Screen Info: Diam. _____ Length _____ Slot Size _____

Water Level: Initial _____ After Completion _____

Sketch Map



Core Run No.	Depth From (feet)	Depth To (feet)	Sample No.	Core Recovery Cut/Recov/Lost	Drill Core/Cuttings Description
					Drilled with center bit from surface to 12.5'
1	12.5	15.0		2.5/1.6/0.9	12.5'-13.4' = no recovery
					13.4'-13.48 = gravel + silty coarse sand, saturated
					13.48'-15.0' = tuff, pink-orange, weathered, soft, damp.
					T.D. = 15.0'
					Driller used sounding tape to check depth and measured T.D. @ 15.02'
					15.02' TD
					- 1.52' thickness of cored tuff
					13.50' = tuff contact
					This is vs. 14.25' depth for tuff contact in orig. borehole loc. 2' East of this loc.
					Nested piezometers installed in original LAP-3.5 borehole were pulled because 2 of the 3 wells were dry. Original borehole was abandoned and filled with bentonite chips. Nested piezometers installed in redrilled borehole.

Environmental Resources Management **Drilling Log**

Project Canyons Piezometers Owner LANL ER

Location Los Alamos Canyon W.O. Number

Well Number LAP-4 Total Depth 17.5' Diameter 8 in./10½ in.

Surface Elevation Water Level: Initial 6.9' 24-hrs.

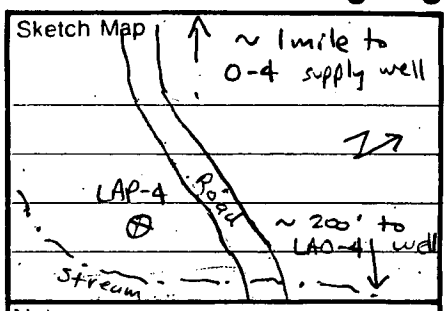
Screen: Dia. 2" (3) Length 6-in. / ea. Slot Size hand cut

Casing: Dia. 2" (3) Length 12.65'/15.65'/18.65' Type

Drilling Company Stewart Bros. Drilling Method HSA

Driller Stanley Johnson Log By D. Steven / D. Frank Date Drilled 3/20-21/01

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
2				Run # 1 0.0' - 2.5' (2.5/1.8/0.3) alluvium
1				core is moist, color 7.5yr 4/2, m-c S with sub-
0				rounded med-coarse gravel (up to 2 in.)
1				70% qtz. 10% dacite, 10% pumice, 10% silt, and
2				trace sanadine
3				cobble zone 2.5'-3.0'
4				Run # 2 3.0' - 5.0' (2.0/1.0/1.0), alluvium,
5				fine-c Sand, color - 5YR 4/2 @ 4.0'-4.7',
6				Sub angular gravel (1.5-2 in), 1 large cobble > 2 in
7	▼			45% gravel (5mm - 2in) well rounded, 20% silt,
8				35% Sand, trace sanadine, minor pumice
9				minor basalt, damp - moist. 4.7'-5.0' - m-c
10				S + gravel color. 5YR 3/4, 70% Gravel, 30%
11				Sand, angular to subrounded gravel up to 1.5 in.
12				predominately dacite, moist.
13				Run #3, 5'-7.5' (2.5/1.4/1.1) Core Grades
14				From Damp To Saturated. Saturation At 6.9 Ft.
15				50% Gravel w/ Silty Fine To M. Grain Sand.
16				Gravel is Angular Dacite To 1 in Q. ~ 40% Sand,
17				10% Silt. Color 5YR 4/4. 4.9'-7.5' Cobbles
18				& Gravel 60% ~ 10% Silt, 30% M-C Grain Sand
19				Cobbles up To 2.5 in. Q. Sanadine Present in Core
20				Minor Tuff & Pumice Present.
21				Run #4, 7.5'-10' (2.5/1.5/1.0) 8.5'-8.9'
22				C. Sand, Well Sorted Saturated, ~80% Quartz
23				up To 1 mm Q. Average Color is 7.5YR 4/4.
24				8.9'-10.0' ~ 50% Gravel 50% C. Sand Saturated

Environmental Resources Management

Drilling Log

Project _____ Owner _____

Location Los Alamos Canyon W.O. Number _____

Well Number LAP-4 Total Depth _____ Diameter _____

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company SBDC Drilling Method _____

Driller S. JOHNSON Log By D. Steven / D. Frank Date Drilled 3/21/01

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
25				RUN #4 (CONTINUED) SANADINE OBSERVED IN
26				CORE. ONE (1) LARGE DACITE COBBLE IN BOTTOM OF
27				CORE. NOTE: DRILLER NEEDS TO TRIP AUGERS OUT
				OF THE HOLE DUE TO A COBBLE AT 10'.
				DRILLER EXPLAINS THAT THEY HAVE ENCOUNTERED
				HEAVING (FLOWING) SANDS AT OR BELOW 10'.
				RUN #5, 10'-12.5' (~10% RECOVERED) PRED.
				F. GRAIN QUARTZ SAND, SATURATED, WELL SORTED
				SAND. COARSE SAND AT THE BOTTOM OF THE BARREL.
				SANADINE OBSERVED. FINE GRAIN SAND IS 70%
				QUARTZ, 25% DACITE, 5% MISC. DARK LITHIC
				GRAINS. COLOR IS 5YR 5/4.
				RUN #6, 12.5'-15.0' (2.5/2.5/0). CORE IS
				SATURATED, COLOR IS 5YR 5/3. 12.5'-14.3' CORE IS
				V. WELL SORTED ANGULAR DACITE GRAVEL W/ SOME MINR
				QUARTZ GRAINS PRESENT. 14.3-15.0' CORE IS ANGULAR
				DACITE GRAVEL & COARSE SAND IN A SILT MATRIX.
				70% GRAVEL, 20% F-C SAND, 10% SILT. TRACE
				SANADINE PRESENT. 70% DACITE, 20% QUARTZ,
				10% OTHER LITHICS. AVERAGE GRAVEL SIZE IS 1/4" UP
				TO 1".
				RUN #7, 15'-17.5', (2.5/2.0/0.5) 3" DACITE cobble
				FROM 15.5'-15.8'. 15.8'-16.05' V. WEATHERED TUFF (SAT,
				COLOR IS 7.5YR 7/4. 16.05'-16.35' CLAY, MOIST,
				COLOR 5YR 6/6. 16.35-17.5 WEATHERED TUFF AS
				ABOVE, V. WET.
				T.D. = 17.5 ft

Environmental Resources Management

Drilling Log

Project: CANYONS Piezometers Owner: LANL ER

Location: LAP-5 borehole#1 W.O. Number:

Well Number: Total Depth: 15.0' Diameter: 8 in.

Surface Elevation: Water Level: Initial 2.5' 24-hrs.:

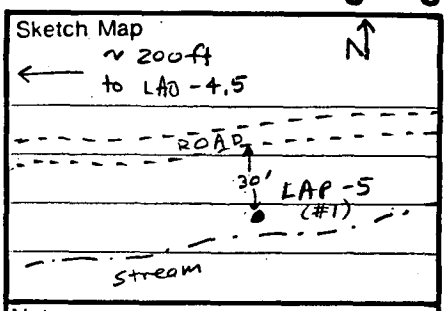
Screen: Dia. NA Length: Slot Size:

Casing: Dia. NA Length: Type:

Drilling Company: SBDC Drilling Method: HSA

Driller: S. JOHNSON Log By: B. GRAY Date Drilled: 3/20/01

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
2				RUN #1, 0.9-2.5' (1.6/1.6/0) 0.9-1.0 is
1				SILT, DAMP, LOAMY. COLOR IS 2.5 YR 3/1. 1.0'-1.9'
0 (ind. surf.)				SILT + F./M. GRAIN SAND, DAMP 50% SILT, 50%
1				SAND, TRACE FINE GRAVEL. COLOR IS 5YR 3/3. 1.9-2.5
2			#1	SAA W/ ABUNDANT GRAVEL, DAMP. GRAVELS W/
3 (top sat.)				MIXED TUFF & BASALT ANGULAR. 30% GRAVEL,
4 (recovery)				35% M-C GRAIN SAND, 35% SILT.
5				
6 (top of sat.)				RUN #2, 2.5'-5.0' (2.5/1.3/1.2) assume lost top of core
7				3.7'-3.9' basalt cobble, 3.9'-4.9' = coarse sand,
8				saturated, w/ gravel and cobbles (dacite and basalt
9				well rounded 1/2 in - 3 in dia.) color = 7.5yr 4/2
10				50% CS, 50% G + cobbles, 4.9-5.0' basalt cobble
11				Sanadine present
12				
13				Run #3, 5.0'-7.5' (2.5/2.0/0.5) assume top lost
14				5.5'-6.0' CS + G w/ silt, saturated, 70% G, 25%
15 (TD)				S, 5% silt, mixture of dacite, basalt, tuff
16				angular to well rounded, sanadine present; 6.0'-
17				6.25' same as above but wet to damp, 6.25'-7.5'
18				= tuff, highly weathered, color = 7.5yr 7/6, damp
19				(Otowi member) - observed abund. pumices (~5% @ 1-2 cm)
20				w/ trace euhedral qtz xtals (~ 1 mm) + angular, dk gray lithics (<1%) 1-2 mm → cont. pg. 2
				Run #4, 7.5-10.0' (2.5/2.5/0.0) tuff weathered,
				damp @ top to slightly damp @ bottom same
				as above

Environmental Resources Management

Drilling Log

Project Canyons Drilling Owner LANL

Location LAP-5 borehole #1 W.O. Number

Well Number Total Depth Diameter

Surface Elevation Water Level: Initial 24-hrs.

Screen: Dia. Length Slot Size

Casing: Dia. Length Type

Drilling Company Drilling Method

Driller Log By Date Drilled

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				Run #5, 10.0' - 12.5' (2.5/2.5/0.0), tuff, same as above, slightly damp
				Run #6 12.5 - 15.0' (2.5/2.5/0.0) tuff, Same as above, sl. damp.
				T.D. = 15.0'
				- Bandelier tuff should not be present here since Puye Formation was encountered at 12' depth @ LAO-4.5 located ~ 450 west of here.
				- May be drilling into a large boulder
				- will move rig ~ 75' to NW and try again. (Next hole is LAP-5a)
				description of tuff from run #3, 6.25 - 7.5' continued.
				- also observed minor glassy shards. 95% of core is highly weathered, very friable, tan-orange, non-laminated, tuffaceous matrix w/ occasional light tan, angular, rhyolite fragments @ 1-3 mm size.

Environmental Resources Management **Drilling Log**

Project Canyons Piezometers Owner LANL ER

Location LA Canyon W.O. Number

Well Number LAP-5(A) Total Depth 30.0' Diameter 8-in.

Surface Elevation Water Level: Initial 2.5' 24-hrs.

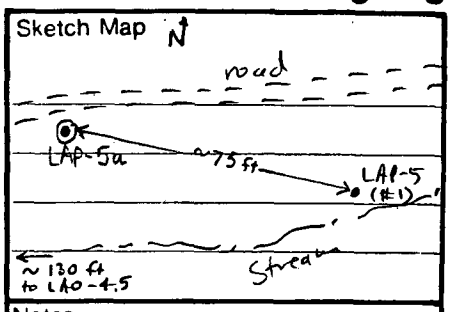
Screen: Dia. NA Length Slot Size

Casing: Dia. NA Length Type

Drilling Company Stewart Bros. Drilling Method HSA

Driller Stanley Johnson Log By D. Steven / D. Frank Date Drilled 3/20/01

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
2				0-0.7' center bit no recovery
1				Run #1 0.7-2.5' (1.8/1.8/0.0) saturation start
0				@ 2.5, 0.7'-1.0' silty Sand w/organics,
1				some gravel, small-med roots, damp
2				Color 7.5yr 3/2, 1.0'-1.4', coarse S, rounded
3				pebbles, damp, color 7.5yr 3/2, 1.4'-2.5' med S,
4				with rounded cobbles saturation begin @ 2.5', 1.9'-
5				2.5 increase in coarseness from med-f to coarse S
6				damp grading to wet @ bottom, color 7.5yr 4/3.
7		tuff		basalt and dacite, with Sanadine present.
8				10% pumice
9				
10				Run #2 2.5'-5.0'. (2.5/1.2/1.3), core saturated
11				from 4.2'-5.0' damp from 4.5-5.0, 4.5-5.0'
12				coarse S rounded pebbles, subangular clasts
13				dacite, cobble zone @ 4.6' slight increase in
14				coarseness and pebbles/cobbles, color - 5YR 3/2
15				
16				Run #3 5.0'-7.5' (2.5/2.5/0.0), core saturated
17				to 6.6', 6.6'-7.0' now moist, 6.6' - tuff,
18				color - 2.5yr 7/4. 5% pumice inclusion visible
19				zone of oxidation @ 6.6', 5-5.5' coarse S,
20				5.5'-6.6' fining upwards, Sanadine present
21				(no Sanadine @ 6.6'), color - 5YR 4/2
22				
23				note: zone of saturation ≈ 4.2'-6.6'
24				

Environmental Resources Management

Drilling Log

Project Canyons Groundwater Owner LANL

Location LA Canyon W.O. Number

Well Number LAP-5(A) Total Depth Diameter

Surface Elevation Water Level: Initial 24-hrs.

Screen: Dia. Length Slot Size

Casing: Dia. Length Type

Drilling Company Drilling Method

Driller Log By Date Drilled

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				Run #4 7.5'-10' (2.5/2.5/0.0) 7.5'-8.0' Sluff, 8.0'-10.0' is tuff, qtz crystals-no Sanadine color-5yr 7/3, Slightly damp
				Run #5 10.0-12.5' (2.5/2.5/0.0) - tuff Same as above, (12.1' Some oxidation of pumice, dark brown)
				Run #6 - 12.5'-15.0' (2.5/2.5/0.0) tuff Same as above Run #4
				Run #7 15.0'-17.5' (2.5/2.5/0.0) tuff Same as above Run #4
				Run #8 17.5-20.0' (2.5/2.5/0.0) tuff Same as above Run #4
				Run #9 20.0'-22.5' (2.5/2.5/0.0) tuff Same as above but more damp due water filled hole during lunch break.
				Run #10 22.5-25.0' (2.5/2.5/0.0) Change in color of tuff @ 23.2' tuff 22.5-23.2 color 7.5yr 7/2, 23.2-25.0 color 2.5yr 7/4 entire core damp to saturated, decrease in quartz note: Saturation could also be from water above.

Environmental Resources Management

Drilling Log

Project _____ Owner LANL

Location _____ W.O. Number _____

Well Number LAP-5a Total Depth _____ Diameter _____

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company _____ Drilling Method _____

Driller _____ Log By _____ Date Drilled _____

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				Run # 11 25.0 - 27.5 (2.5/2.5/2.0) 25.0-26.0
				Same as above, 26.0-27.5 apparent new unit of tuff
				(entire core moist.) angular dacite grains (5%)
				and pumice 85%, 10% qtz color - 7.5yr 7/3
				(with dark lithic fragment up 5mm, angular)
				more granular matrix than 25.0-26.0.
				Run # 12 27.5'-30.0' (2.5/2.5/0.0) - tuff
				Same as above - 29.0-29.4' distinct pumice
				layer, pumice fuzzy white, few visible tube
				structures, core is moist, with same matrix
				as 26.0'-27.5'.
				T.D. = 30.0'

Environmental Resources Management **Drilling Log**

Project: Canyons Piezometers Owner: LANL ER

Location: LA Canyon W.O. Number:

Well Number: LAP-5.7 Total Depth: 17.5' bgs Diameter: 8"/10½"

Surface Elevation: Water Level: Initial: 9.2' bgs 24-hrs.:

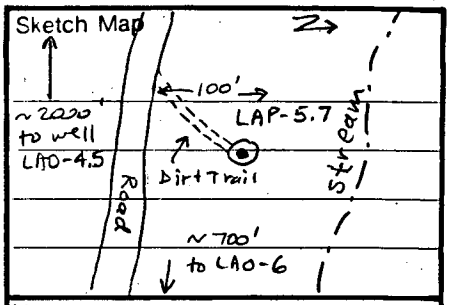
Screen: Dia. 2" (3) Length: 6-in. each Slot Size: hand cut

Casing: Dia. 2" (3) Length: 17.65' 15.65' 13.65' (incl. screened sec.) Type: Sch. 40 PVC

Drilling Company: SBDC Drilling Method: HSA

Driller: S. Johnson Log By: D. Steven / D. Frank Date Drilled: 3/23/01

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
2				Run #1, 0'-2.5' (2.5/1.5/1.0) Core is Moist
1				0-0.3 Fine To Medium Grain Sand With Gravel.
0				7.5 YR 4/2 (Brown). Some Well Rounded Pebbles At
1				2.5'. Sanadine Present With Quartz, Dacite & Trace
2				Tuff. 0.3'-0.6' Fine To Medium Sand in Silt
3				Matrix, Damp. 10% Gravel 90% Sand 7.5 YR 4/3
4				(Brown) 0.6-1.5 F-M Sand, Gravel (30%) up To
5				2 inches, Moist.
6				Run #2, 2.5'-5.0' (2.5/1.3/1.2) 2.5'-3.1' SAA
7				Silty Fine Sand With Gravel. 3.1'-3.8' Coarse Sand
8				With Gravel (40%), 40% C. Sand, 10% Silt, 10% F. Sand.
9	▼			Well Sorted Quartz Sand, Dry, Sanadine Present,
10				Well Rounded Dacite Pebbles up To 2". Moist Throughout.
11				Run #3, 5.0'-7.0' (2.0/2.0/0) Center Bit used
12				From 7.0'-7.5'. 5.0-5.5 C. Sand With Gravel SAA
13				5.0-5.1 Damp, 5.1-5.2 Dry, 5.2-5.5 Moist. 5.5-7.0
14				F. Grain Sand-Gravel, Gravel 30% up To 2 1/2" 70%
15				Sand, F-C. Predominately Dacite w/ Minor Rhyolite,
16				Quartz Sand w/ Trace Sanadine Present. Dry
17				Run #4, 7.5-10' (2.5/0.6/1.9) Water Apparent At
18				9.2' BGS. 7.5-8.1 SAA, F-C Silty Sand & Gravel.
19				No Recovery From 8.1-10'. Trace Sanadine Present
20				Run #5, 10'-12.5' (2.5/1.0/1.5) Core is Saturated,
21				Color is 7.5 YR 4/2. 90% Sand, 10% Gravel With
22				One Large Dacite Cobble Plugging Barrel. Core is
				Well Sorted C. Sand. 11-12.5 No Recovery.

Environmental Resources Management

Drilling Log

Project _____ Owner _____

Location _____ W.O. Number _____

Well Number LAP-5.7 Total Depth _____ Diameter _____

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company _____ Drilling Method _____

Driller _____ Log By _____ Date Drilled _____

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				RUN #6, 12.5'-15.0' (2.5/0/2.5) NO RECOVERY
				RUN #7, 15.0'-17.5 (2.5/2.5/0) DRILLER INSTALLED A CORE CATCHER FOR THIS RUN. EXTREMELY WEATHERED TUFF, SATURATED, EXTREMELY SOFT, CLAYEY, COLOR 7.5 YR 8/3. APPROXIMATELY THE UPPER FOOT APPEARS REMOLDED BECAUSE OF THE PRESENCE OF REWORKED BASALT GRAVEL (5MM-1IN) COMPRISES 2-3% OF CORE. TUFF EXHIBITS X-STAL STRUCTURES & INTACT PUMICES. PROBABLY OTOWI MBR. BANDLR. TUFF.
				DRILLER PULLING AUGERS. WILL DRILL DOWN TO 7.5' BGS WITH CENTER BIT & collect new core samples below 7.5'. OFFSET WILL BE LAP-5.7(A) loc. 5 ft N. of LAP-5.7 borehole
				RUN #1, 7.5'-10' (2.5/0/2.5) DRILLER USED THE CENTER BIT TO 7.5', SPLIT BARREL THE REMAINDER NO RECOVERY for 7.5'-10.0'
				RUN #2, 10'-12.5' (2.5/1.5/1.0) CORE IS SATURATED, COLOR IS 5YR 4/2. 70% COARSE SAND, 30% GRAVEL, SUBROUNDED TO ANGULAR, TRACE SANADINE PRESENT.
				RUN #3, 12.5'-15' (2.5/1.0/1.5) V. FINE SAND GRADING TO COARSE, WELL SORTED ANGULAR QUARTZ SAND. V. FINE SAND FROM 12.5-14, COARSE 14.4-15.0, SATUR.
				RUN #4, 15'-17.5' SAME AS THE PREVIOUS 15'-17.5' INTERVAL FOR BORING LAP-5.7 CONTACT WITH TUFF AT 15.0'. (2.5/2.5/0) Saturated, highly decomposed tuff, v. soft, clayey, same as in LAP-5.7 borehole

TD = 17.5'

Environmental Resources Management **Drilling Log**

Project CANYONS PIEZOMETERS Owner LANL ER

Location LA CANYON W.O. Number 4932 0018 02

Well Number LAP-6 Total Depth 15.0' Diameter 8 in.

Surface Elevation _____ Water Level: Initial 7.5' 24-hrs. _____

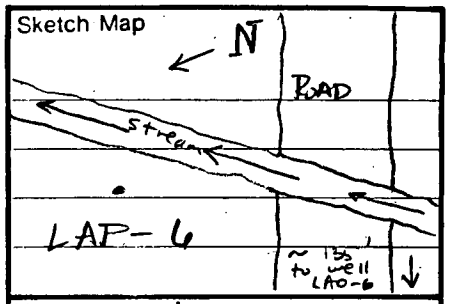
Screen: Dia. NA Length _____ Slot Size _____

Casing: Dia. NA Length _____ Type _____

Drilling Company SBDC, CME-750 Drilling Method HSA

Driller S. JOHNSON Log By D FRANK Date Drilled 3/19/01

Sketch Map



Notes 2.5/5.0' STAINLESS SPLIT SPOON 0.3" ID

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
2				
0				RUN #1, (2.5/2.5/0) SILTY SAND, ALLUVIUM DAMP. ANGULAR TO WELL ROUNDED CLASTS OF SANADINE, PUMICE, QUARTZ X-STALS (BIPYRAMIDAL) & DACITE. COLOR IS 2.5 YR 4/2 NATURAL MOISTURE.
5				RUN #2, 2.5'-5.0' (2.5'/1.2'/1.3') SILTY SAND AND GRAVEL, COLOR IS 7.5 YR 3 UNDER NATURAL MOISTURE CONDITIONS. FINE TO MEDIUM GRAIN SAND, ~50% GRAVEL 40% SAND, 10% SILT ANGULAR MATERIAL. SAME MINERAL SUITE AS LAST RUN.
10				RUN #3, 5.0'-7.5' (2.5/1.8/0.7) SAME AS ABOVE. Damp, Saturated @ 7.0 ft depth. DACITE 70%. SAME MINERAL SUITE AS ABVE. STILL OBSERVE SANADINE IN MATRIX. COLOR 7.5 YR 3/3.
15			NO ANALYTICAL SAMPLES COLLECTED.	No recovery 7.5'-9.0'. Drilled cobble w/ center bit 8.0'-9.0' RUN #4 9.0'-10.0' (1.0/1.0/0) Gravel w/ fine to coarse sand + minor silt, saturated, 7.5 YR 3/2. MATERIAL IS ~60% GRAVEL, 25% SAND, 10% COBBLES, 5% silt, mineralogy as above, STILL SANADINE PRESENT, dacite + pumice gravel, base of saturation is at 10.0 ft.
20				RUN #5 10'-12.5, (2.5/2.5/0) 10'-11.65' CLAY (SILTY) DAMP. COLOR IS 10 YR 4/6. 11.65'-12.25' = CLAY, DAMP, w/ ~5% coarse sand + small gravel (1/4") 12.25'-12.5' SAME CLAY W/ ABUNDANT GRAVEL (basalt)

Environmental Resources Management

Drilling Log

Project: LA Can Piezometers Owner: LANL

Location: LA Canyon W.O. Number:

Well Number: LAP-6 Total Depth: 15.0' Diameter:

Surface Elevation: Water Level: Initial: 24-hrs.:

Screen: Dia.: Length: Slot Size:

Casing: Dia.: Length: Type:

Drilling Company: Drilling Method:

Driller: Log By: Date Drilled:

Sketch Map

Notes

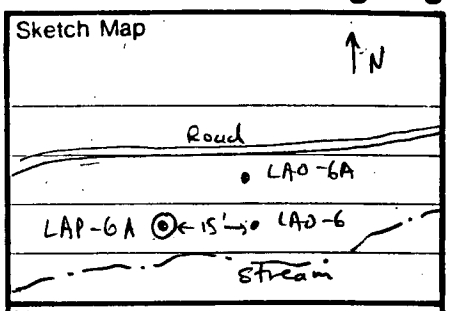
Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				RUN #5 CONTINUED: ~75% clay, 25% basalt gravel (1/4" - 1" diam.) well rounded (stream gravel)
				RUN #6 12.5' - 15.0' (2.5/2.5/0) Damp clay + gravel as above to 12.9'. COLOR 7.5 YR 5/6, 12.9' - 15.0' = clay, as above, sl. damp, 7.5 YR 5/8.
				TOTAL DEPTH = 15.0'
				BOTTOM OF SATURATION AT 10.0'
				ZONE OF SATURATION IS 3.0' THICK.
				Borehole abandoned, backfilled w/ drill cuttings

Environmental Resources Management

Drilling Log

Project: Canyons Piezometers Owner: LANL ER
Location: Los Alamos Canyon W.O. Number:
Well Number: LAP-6A Total Depth: 12.5' Diameter: 8-in.
Surface Elevation: Water Level: Initial ~8.5' 24-hrs.:
Screen: Dia. NA Length: Slot Size:
Casing: Dia. NA Length: Type:
Drilling Company: Stewart Bros Drilling Method: Hollow Stem auger
Driller: Stanley Johnson Log By: R. Gray Date Drilled: 3-22-01

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				Run #1 0.0'-2.5' (2.5/1.1/1.4)
				0.0-0.15: silty loam top soil with roots and organics
1				0.15, color 5YR 3/2 slightly damp
				0.15-1.1: loamy silt, color 5YR 3/2, slightly damp
2				1.1-2.5: no recovery
3				Run #2 2.5'-5.0' (2.5/1.5/1.0)
				2.5'-3.5': no recovery
4				3.5'-5.0': silt with coarse sand + gravel, color -
				10YR 6/3, approx 70% silt, 20% sand, 10% gravel
5				well rounded gravel, composed of dacite up to 2in dia.
				Sanadine observed, dry
6				
				Run #3 5.0'-7.5' (2.5/1.3/1.2)
7				5.0'-6.1': silt w/f-c S + gravel, ≈ 50% silt
				30% sand, 30% gravel, (up to 2in dia)
8				Color: 10YR 7/3, Dry
				6.1'-6.3': dacite cobble (5 in), coarse S + g composed
9				of dacite as above + minor tuff, sanadine present
10				Run #4 7.5'-8.0' (.5/.5/0.0)
				gravel as above, with f-c sand w/ silt, ≈
11				60% gravel, 20% sand, 20% silt, dry
				Color: 10YR 7/3, Gravels predom. dacite as
12				above. Well rounded to sub angular, sanadine present.
				8.0'-9.0' drilled with Center bit - no recovery
13				

S - Sand
g - gravel
f - fine C - coarse

Environmental Resources Management

Drilling Log

Project: Canyons Piezometers Owner:
Location: LA Canyon W.O. Number:
Well Number: LAP-6A Total Depth: Diameter:
Surface Elevation: Water Level: Initial: 24-hrs.:
Screen: Dia.: Length: Slot Size:
Casing: Dia.: Length: Type:
Drilling Company: Drilling Method:
Driller: Log By: Date Drilled:

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				Run #5 9.0'-10.0' (1.0/1.0/0.0)
				gravel, f-c S and silt, saturated, color: 7.5YR 5/3
				≈ 75% gravel up to 1in, 15% S, 10 silt, sanadine
				present, gravel predom. dacite, well rounded to
				sub angular, coarse S is predom. qtz up to 3mm
				Run #6 10.0'-12.5' (2.5/2.5/0.0)
				10.0'-10.2': coarse S+g, sand = 1-2mm, saturated, color 7.5YR 5/3
				Sanadine present, basalt, dacite + pumice in gravel
				10.2'-10.5': clay, moist color 7.5YR 6/6
				10.5'-10.75': heavily oxidized zone, clay with g
				comp as above, moist, color 7.5YR 6/6-7.5YR 5/8
				10.75'-12.5': clay, damp, color 7.5YR 7/6
				2% pumices @ 1-2 mm
				TD = 12.5'
				Top of saturation bet. 8.0 and 9.0 ft
				Bot. of saturation @ 10.2 ft

Environmental Resources Management

Drilling Log

Project Canyons Piezometers Owner LANL ER

Location Los Alamos Canyon W.O. Number

Well Number LAP-6B Total Depth 15.0' Diameter 8-in.

Surface Elevation Water Level: Initial 9.8' bgs 24-hrs.

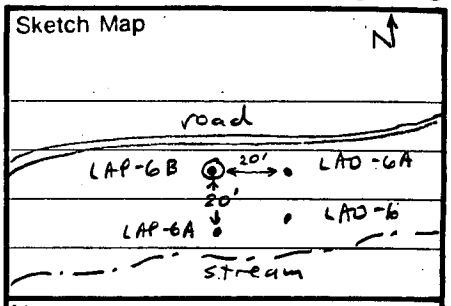
Screen: Dia. 2-in Length 3-ft Slot Size hand-cut

Casing: Dia. 2-in Length 16.55 ft Type sch 40 PVC

Drilling Company Stewart Brothers Drilling Method Hollow stem Auger

Driller Stanley Johnson Log By D. Steven / R. Gray Date Drilled 3/22/01

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) S - Sand g - gravel
				Run # 1 0.0'-2.5' (2.5/1.5/1.0)
				0.0'-0.3': silt, loamy top soil, organics, damp,
				Color 5YR 3/2,
				0.3'-1.5': coarse Sand g plus silt, damp, 5YR 3/2
				≈ 40% S, 40% silt, 20% gravel up to 1.5 in.
				gravel predom - dacite, well rounded to sub angular,
				S is ≈ 50% dacite, 50% qtz up to 2mm, Sanadine present
				poorly sorted.
				1.5'-2.5': no recovery
				Run # 2 2.5'-3.7' (1.2/0.8/0.4)
				2.5-2.85': fine to coarse gr. silty sand + gravel,
				damp, color 5YR 4/2, ~ 50% sand, 25%
				gravel up to 2", 25% silt, + organic matter;
				sand and gravel predominantly dacite w/
				minor rhyolite. ~2-3% of sand is qtz (~1mm),
				sanidine present.
				2.85-3.7': coarse sand, gravel, cobbles, w/ fine to
				med. gr. sand and minor silt, ~ 40% gravel
				(up to 2") & cobbles, ~ 40% coarse sand, 10%
				fine sand, 10% silt, damp, color 5YR 5/3;
				sand/gravel composition same as above,
				except coarse sand is predominantly quartz @
				1-2 mm diam, sanidine present.
				Ran center bit @ 3.7-4.5', no recovery

Environmental Resources Management

Drilling Log

Project _____ Owner _____

Location _____ W.O. Number _____

Well Number LAP-6B Total Depth _____ Diameter _____

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company _____ Drilling Method _____

Driller _____ Log By _____ Date Drilled _____

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				Run #3 4.5-5.0' (0.5/0.1/0.4)
				Coarse sand and gravel, same as above, damp
				(no picture, because running low on film)
				Run#4 5.0'-7.0' (2.0/0.2/1.8)
				coarse sand and gravel, same as above, damp
				(no picture because running low on film)
				sanidine present
				center bit used @ 7.0-7.5' (no recovery)
				Run #5 7.5'-10.0' (2.5/1.9/0.6)
				Fine sand w/ minor med. to coarse gr. sand
				+ gravel, ~ 50% fine sand, 20% gravel, 20%
				medium gr. sand, 5% coarse gr. sand up to 2mm.
				color 5YR 6/2; 8.1-9.4' = dry, 9.4-9.6' =
				damp, 9.6'-9.8' = moist; 9.8'-10.0' = saturated.
				predom. dacite + rhyolite gravel, well rounded
				to angular; qtz. sand, sanidine present.
				Run #6 10.0'-12.5' (2.5/2.0/0.5)
				Coarse sand and gravel, as above,
				saturated, color 5YR 5/2, with min.
				clay @ 12.3-12.5', ~ 50% coarse sand,
				50% gravel, sanidine present

Environmental Resources Management

Drilling Log

Project _____ Owner _____

Location _____ W.O. Number _____

Well Number LAP-6B Total Depth _____ Diameter _____

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company _____ Drilling Method _____

Driller _____ Log By _____ Date Drilled _____

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				Run #7 12.5-15.0' (2.5/2.5/0)
				12.5'-13.5': coarse S and g as above
				Saturated, ≈90% cS predom qtz 1-2mm, well sorted * See below
				13.5'-14.7': clay w/cS + g, moist, color
				7.5 yr 7/6 90% clay, 10% S+g up to .5 in.
				14.7'-15.0': clay, moist, color: 5YR 6/8
				*+10% = basalt gravel up to 2in diam.
				note TD = 15.0'
				saturated alluvium @ 9.8'-13.5'

Environmental Restoration Project
Document Signature Form

Document Catalog Number: ER2001-0831
(Please prefix the name of all electronic versions of this document with this number.)

Document Title /Subject: TRANSMITTAL LETTER FOR REPORT ON ALLUVIAL WELL COMPLETIONS 1994 TO 2001
PRSs: None **Privileged Information: Y / N**
Associated Document Catalog Number(s): ER2001-0832
Author: Katzman, Danny 667-0599 katzman@lanl.gov
Author Organization: Canyons
Document Team: Herrera, Tanya 667-8285 pth@lanl.gov

Document Type: Letter **Former OU:** N/A

Date Due: 1/28/2002 **Date Final Complete:** 1/28/2002
Date Sent to DOE: 1/28/2002 **Date Sent to NMED:** Unknown
Date Sent to RPF: 4/16/2002 **Received Per RPF:** Unknown

LA-UR Number: **RPF ER ID Number:** **Performance Measure:** No
AA Deliverable: No **Certification Required:** No **Force Peer Review:** No
Distribution TO: Mat Johansen **Distribution FROM:** Julie A. Canepa
Distribution COPY: **Distribution THRU:**
Attachment Notes:
Status/Comments: ER2001-0832(LA-UR-02-758 IS THE REPORT ON ALLUVIAL WELL COMPLETIONS 1994-2001

Reviewer Signatures: (By signing, the reviewer indicates that he/she **reviewed** and **approves** the document.)

Reviewer (Print reviewer's name under title)	Signature	Date
Word Processor		
Proof Reader		
Author		
Team Leader		
Focus Area Leader/Designee		
ER Program Manager		
DOE/LAAO Program Manager		
Distributed By		

Distribution TO:	Joe Vozella
Distribution FROM:	Julie A. Canepa
Distribution COPY:	Canyons Focus Area, MS M992 M. Johansen, DOE-LAAO, MS A316 M. Kirsch, E/ER, MS M992
Distribution THRU:	
Attachment Notes	
Status/Comments	

Reviewer Signatures: (By signing, the reviewer indicates that he/she **reviewed** and **approves** the document.)

Reviewer (Print reviewer's name under title)	**Signature**	**Date**
Word Processor Johanna Lopez	Johanna Lopez	10/4/01
Proof Reader VIVIAN NORRIS	Vivian Norris	10/4/01
Author Danny Katzman		10-5-01
Team Leader Danny Katzman	Same as Author	"
Focus Area Leader/Designee Allyn Pratt		11/8/01
ER Program Manager Julie A. Canepa		1/28/02
DOE/LAAO Program Manager	N/A	
Distributed By Tanya Herrera		1/28/02

Document Catalog Number ER2001-0831

Los Alamos
NATIONAL LABORATORY

Technical Information Release

Group S-7, Mail Stop F674, Phone 7-5013, Fax 5-4251
TA-3, SM-43, Room A115

This form is to be completed and submitted to S-7, Classification Group, with copies as required of abstract or paper BEFORE you present or submit for publication any technical work of the Laboratory.

Note: Form will be returned if all sections are not filled out correctly.

Allow three days for S-7 review.

Required Copies
Cover sheet is required on all papers
(Form 836 for LA-UR, Form 1756a-e for LA-CP)
One of this form
Two of unclassified submittal (abstract/vugraphs/paper)
One of classified or controlled submittal (abstract/vugraps/paper)

LA-UR/LA-CP LA-UR-02-758

1. Author(s) [full name, (first, middle, last) Z number, and group affiliation]
Robert N. Gray, 117424, E/ER

2. Author(s) Signature and Date (optional for S-7)

3. Title of Article (in caps: spell out all symbols)
REPORT ON ALLUVIAL WELL COMPLETIONS 1994-2001

4. Type of Information
Abstract ☐ Full Paper ☒
Summary ☐ Poster ☐
Audio-Visual (abstract required) ☐
Vugraphs (abstract required) ☐
Other: _____ ☐

Intended for: Journal ☐ Proceedings ☐ Meeting ☐ Talk ☐ Book ☐
Book Chapter ☐ Electronic (e.g. e-print archive) ☐ Other: _____ ☒

Particulars: (**See point #4 of instruction sheet.**)

Controlled Meeting/Journal/Report: Yes ☐ No ☐

5. List the LA numbers of previous reports that might be useful to the reviewer

6. Research sponsored by:
DOE ☐ DOD ☐ NRC ☐ Other: _____ ☐

Program Code used to fund this work: MR0A

Rough Draft Yes ☐ No ☒

DOE OSTI Distribution? Yes ☐ No ☐

7. Funding agency release required: Yes ☐ No ☐ Copy Attached: Yes ☒ No ☐

8. Deadline Date

Telephone number and e-mail address for notification of release
7-8285 Tanya Herrera/pth@lanl.gov

Mail Stop
M992

9. Derivative Classifier's Signature or DUSA Designator _____ Date _____
Classified ☐ Unclassified ☐ Unclassified, limited ☐ (Explain): _____

10. Typed/Printed Name of Responsible Party

Signature and Date (***Required***) for Bobby 2-8-02

Classification Group (S-7)

Date Received	Subject or NRC Category	Group/Author Notification of Release
Reviewer	Date	U ☐ C ☐ S ☐ RD ☐ FRD ☐ NSI ☐ UCNI ☐ ECI ☐ OUO ☐ Proprietary ☐ CRADA ☐ Other _____ ☐ Guide_____ Duration_____

Comments:

Business and Patent Law

Patent Interest	Docket Number	Patent Law Reviewer and Date
Yes ☐ No ☐		

Form 678 (9/01)

Environmental Restoration Project
Document Signature Form

Document Catalog Number: ER2001-0832
(Please prefix the name of all electronic versions of this document with this number.)

Document Title /Subject: REPORT ON ALLUVIAL WELL COMPLETIONS 1994-2001
PRSs: None **Privileged Information: Y / N**
Associated Document Catalog Number(s): ER2001-0831
Author: Gray, Robert 662-3700 bob.gray@wgint.com
Author Organization: Canyons
Document Team: Herrera, Tanya 667-8285 pth@lanl.gov

Document Type: Well Completion Report **Former OU:** N/A

Date Due: 1/28/2002 **Date Final Complete:** 1/28/2002
Date Sent to DOE: 1/28/2002 **Date Sent to NMED:** Unknown
Date Sent to RPF: 8/6/2002 **Received Per RPF:** Unknown

LA-UR Number: **RPF ER ID Number:** **Performance Measure:** No
AA Deliverable: No **Certification Required:** No **Force Peer Review:** No
Distribution TO: **Distribution FROM:**
Distribution COPY: **Distribution THRU:**
Attachment Notes:
Status/Comments:

Reviewer Signatures: (By signing, the reviewer indicates that he/she **reviewed** and **approves** the document.)

Reviewer (Print reviewer's name under title)	Signature	Date
Author Danny Katzman	Danny Katzman	8-6-02
Peer Review Chair N/A		
ESH-19 Reviewer N/A		
Reg. Compliance Deployed Reviewer N/A		
Team Leader N/A		
ER-ADC Reviewer N/A		
Legal Reviewer N/A		
DOE/LAAO Reviewer N/A		
Focus Area Leader/Designee		