M67001.AR.001516
MCB CAMP LEJEUNE
5090.3a

FINAL REMEDIAL INVESTIGATION FOR HADNOT POINT SHALLOW SOILS VOLUME 2 OF 3

4/1/92

ENVIRONMENTAL SCIENCE AND ENGINEERING

FINAL
REMEDIAL INVESTIGATION REPORT FOR HADNOT POINT INDUSTRIAL AREA OPERABLE UNIT SHALLOW SOILS AND CASTLE HAYNE AQUIFER CHARACTERIZATION STUDY TO DETERMINE EXISTENCE AND POSSIBLE MIGRATION OF SPECIFIC CHEMICALS IN SITU

VOLUME 2

MARINE CORPS BASE
Camp Lejeune, North Carolina

Contract No. N62470-83-C-6106

Prepared for:

NAVAL FACILITIES ENGINEERING COMMAND
Atlantic Division

APRIL 1992

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Orlando, Florida

4902036-0150

TABLE OF CONTENTS

Section	Title	Page
	VOLUME 1	
1.0	INTRODUCTION	
	1.1 Purpose of Report	1-1
	1.2 Site Background, Location, and Description	1-2
	1.2.1 MCB Camp Lejeune	1-2
	1.2.2 Hadnot Point Industrial Area	1-2
	1.3 RI Approach and Scope	1-3
	1.4 Report Organization	1-4
2.0	SUMMARY OF INVESTIGATIONS	
	2.1 Verification Step	2-2
	2.2 Characterization Step	2-2
	2.3 Supplemental Characterization	2-3
	2.4 Other Investigations	2-3
3.0	SITE INVESTIGATION	
	3.1 Record Search	3-1
	3.2 Soil Investigation	3-2
	3.2.1 Soil Gas Survey	3-2
	3.2.2 Data Analysis	3-3
	3.2.3 Soil Borings	3-4
	3.3 Groundwater Investigation	3-5
	3.3.1 Monitor Wells	3-5
	3.3.2 Monitor Well Development	3-12
	3.3.3 Groundwater Sampling	3-12
	3.3.4 Water Level Measurements	3-17
	3.3.5 Well Location and Elevation Survey	3-17
	3.4 Pump Testing	3-17
	3.5 Quality Assurance/Quality Control	3-18

TABLE OF CONTENTS
(Continued)

Section	Title	Page
	VOLUME 3	
	F - QA/QC SAMPLES: ANALYTICAL RESULTS	
	G - QA/QC: DISCUSSION OF RESULTS	
	H - ANALYTICAL RESULTS: SOIL SAMPLES	
	I - CHARACTERIZATION INVESTIGATION SHALLOW MONITOR WELLS ANALYTICAL RESULTS	
	J - SUPPLEMENTAL CHARACTERIZATION INVESTIGATION SHALLOW MONITOR WELLS ANALYTICAL RESULTS	
	K - CHARACTERIZATION INVESTIGATION INTERMEDIATE MONITOR WELLS ANALYTICAL RESULTS	
	L - SUPPLEMENTAL CHARACTERIZATION INVESTIGATION INTERMEDIATE MONITOR WELLS ANALYTICAL RESULTS	
	M - CHARACTERIZATION INVESTIGATION DEEP MONITOR WELLS ANALYTICAL RESULTS	
	N - SUPPLEMENTAL CHARACTERIZATION INVESTIGATION DEEP MONITOR WELLS ANALYTICAL RESULTS	
	O - SUPPLEMENTAL CHARACTERIZATION INVESTIGATION WATER SUPPLY WELLS ANALYTICAL RESULTS	

LIST OF FIGURES

Figure	Title
1-1	Camp Lejeune Location Map
1-2	Hadnot Point Industrial Area
1-3	Other Study Sites Adjacent to HPIA
2-1	Monitor Wells and Water Supply Wells at Hadnot Point Industrial Area - Confirmatory Study
3-1	Approximate Soil Boring Locations - Bldg. 902
3-2	Approximate Soil Boring Locations - Bldg. 1202
3-3	Approximate Soil Boring Locations - Bldg. 1602
3-4	New and Existing Monitor Wells at Hadnot Point Industrial Area
4-1	Surface Water Drainage Subbasins at Hadnot Point, Camp Lejeune
4-2	Water Quality Classifications for New River, Camp Lejeune
4-3	Geologic and Hydrogeologic Units in the Coastal Plain of North Carolina
4-4	Generalized Hydrogeologic Cross Section - Jones and Onslow Counties, North Carolina
4-5	Generalized Cross Section of Hadnot Point Industrial Area
4-6	Potentiometric Surface - Shallow Wells (2-20-91)
4-7	Potentiometric Surface - Intermediate Wells (2-20-91)
4-8	Potentiometric Surface - Deep Wells (2-20-91)
4-9	Regional Climatic Conditions at Camp Lejeune

LIST OF FIGURES

Figure	Title
5-1	Soil Gas Findings--Bldgs. 901, 902, and 903 - Confirmatory Study
5-2	Soil Gas Findings--Bldgs. 1101, 1102, 1202, 1300, 1301, and 1302 - Confirmatory Study
5-3	Soil Gas Findings--Bldgs. 1502, 1601, and 1602 - Confirmatory Study
5-4	Total VOC Isopleth Map - Shallow Aquifer, Confirmatory Study, Hadnot Point Industrial Area
5-5	Total VOC Isopleth Map - Shallow Aquifer, Supplemental Confirmatory Study, Hadnot Point Industrial Area

LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeters per second
DPDO	Defense Property Disposal Office
DRMO	Defense Reutilization and Marketing Office
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
ft	feet
ft/day	feet per day
ft^2/day	square feet per day
ft BLS	feet below land surface
ft/ft	feet per foot
gal	gallons
GC	gas chromatograph
GC/MS	gas chromatography/mass spectrometry
gpd/ft	gallons per day per foot
gpm	gallons per minute
gpm/ft	gallons per minute per foot
HPIA	Hadnot Point Industrial Area
IAS	Initial Assessment Study
ID	inside diameter
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MCL	Maximum Contaminant Level

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, 2 of 2)

MDL	method detection limit
MEK	methylethylketone
mmHg	millimeters of mercury
NEESA	Naval Energy and Environmental Support Activity
O&G	oil and grease
OD	outside diameter
1,1-DCA	1,1-dichloroethane
1,2-DCA	1,2-dichloroethane
1,2-DCE	1,2-dichloroethene
PCB	polychlorinated biphenyl
POL	petroleum, oil, and lubricant
ppb	parts per billion
PVC	polyvinyl chloride
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
TCE	trichloroethene
ug/L	microgram per liter
USGS	U.S. Geological Survey
VOC	volatile organic compound

APPENDIX A

DECONTAMINATION PROCEDURES

DECONTAMINATION PROCEDURES

All equipment involved in field sampling was decontaminated as required by the Quality Assurance Project Plan and the Health and Safety Plan.

(A) Field Decontamination

Heavy equipment (e.g. drilling rigs, augers, and rods) was steamcleaned prior to performing any work on site. Heavy equipment was also steamcleaned in between sampling locations, and prior to leaving the site. Gross contamination was removed from drilling equipment with a brush when necessary. Steamcleaning was conducted at a designated decontamination area.

Down-hole sampling equipment such as split-spoons and equipment used to fill sample jars such as bowls, spatulas, scoops, and spoons, were decontaminated according to the following procedure:

1) Phosphate-free soap (Liquinox or alconox) and potable water wash;
2) Potable water rinse;
3) 10% nitric acid (Reagent-grade acid or deionized water) rinse if sampling for metals (use 1% for equipment other than stainless steel);
4) Deionized water rinse
5) Solvent (Pesticide-grade iospropanol, acetone, or methanol) rinse (2 times);
6) Air dry.

Extraneous contamination was minimized by wrapping sampling equipment in aluminum foil (shiny side out) when not in use, and changing the sampler's gloves prior to collection of each individual sample.

Probes on temperature, specific conductivity, and pH meters were rinsed with deionized water in between samples.

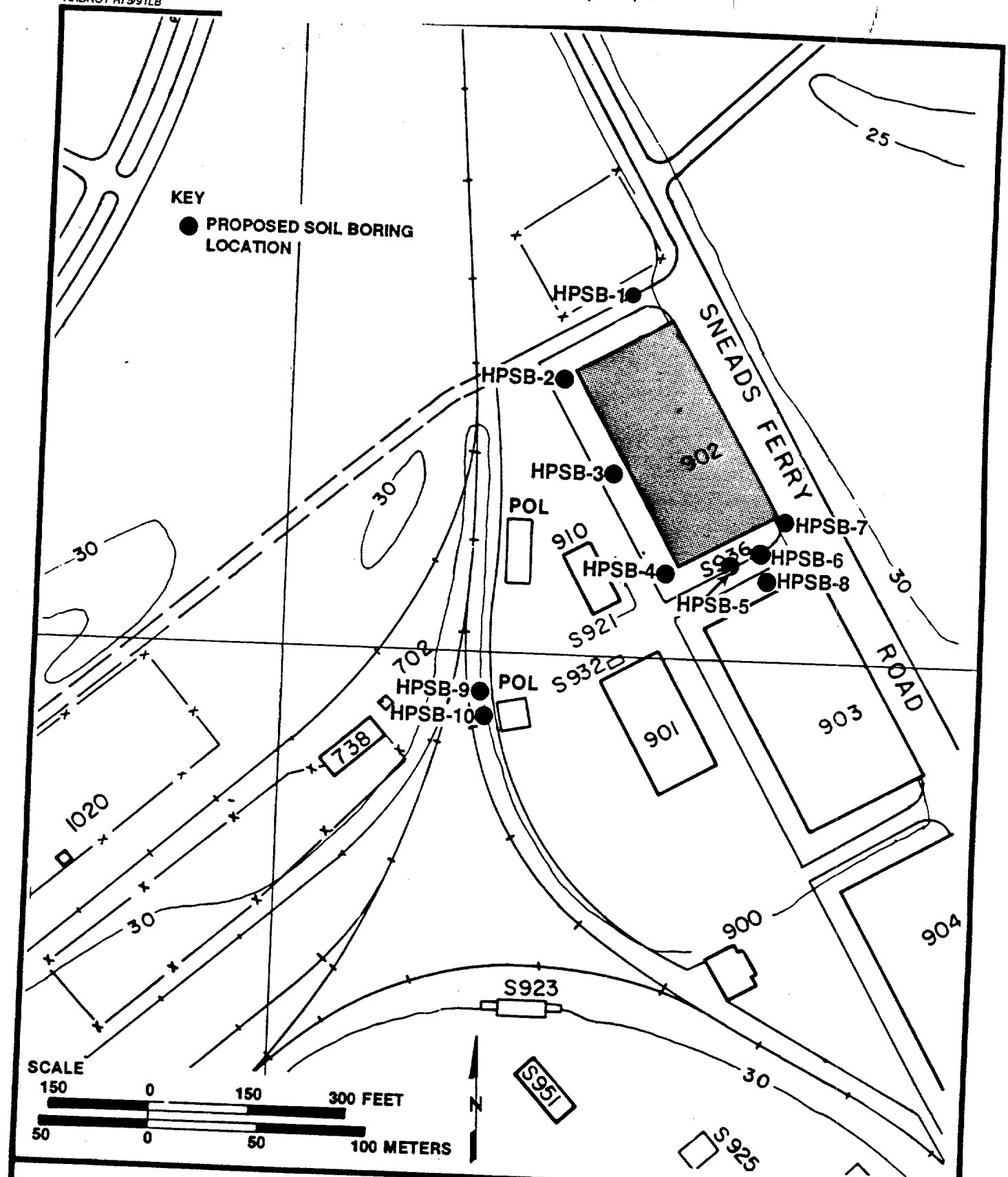
(B) Laboratory Decontamination (Bailers only):

1) Hand wash PVC bailers in hot water using Liquinox;
2) Machine wash PVC balls & stainless steel screws using Detergent-8 (Delete final DI rinse from wash cycle);
3) Rinse bailers twice with tap water;
4) Rinse bailers & balls with 1% nitric acid (use metals-grade acid);
5) Rinse stainless steel screws with 10% nitric (use metals-grade acid);
6) Rinse all items with DI water;
7) Rinse all items twice with B&J isopropanol. (pesticide grade solvent);
8) Allow all items to air dry.
9) Put a ball in the bottom of each bailer and secure with screws in pre-drilled holes, and
10) Wrap each bailer with aluminum foil with the shiny side out.

APPENDIX B

SOIL BORING LOCATIONS

HADNOT RI 5/91LB

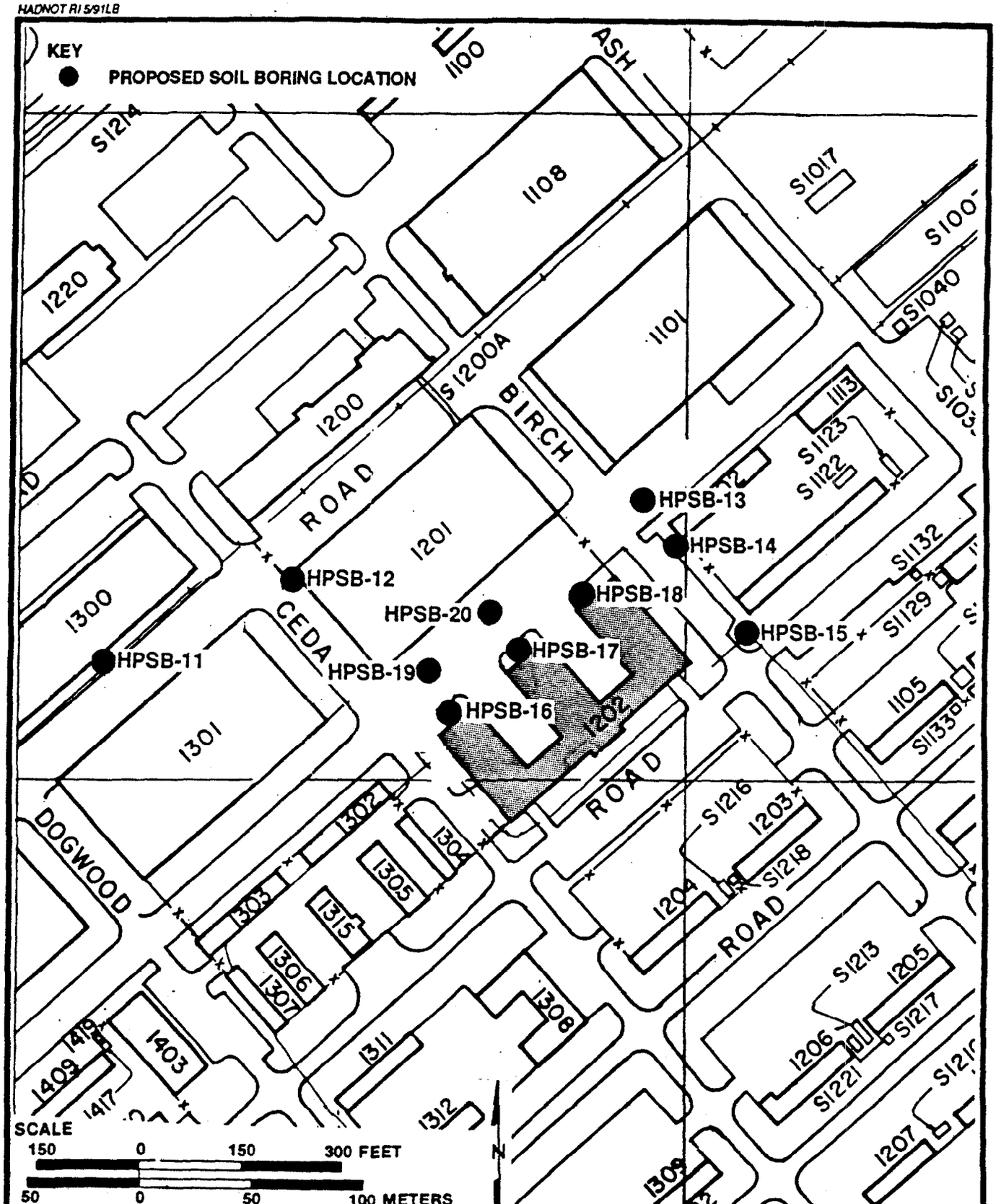


APPROXIMATE SOIL BORING LOCATIONS – BLDG. 902

SOURCE: ESE.

MARINE CORPS BASE
CAMP LEJEUNE

HADNOT RI 5/91LB

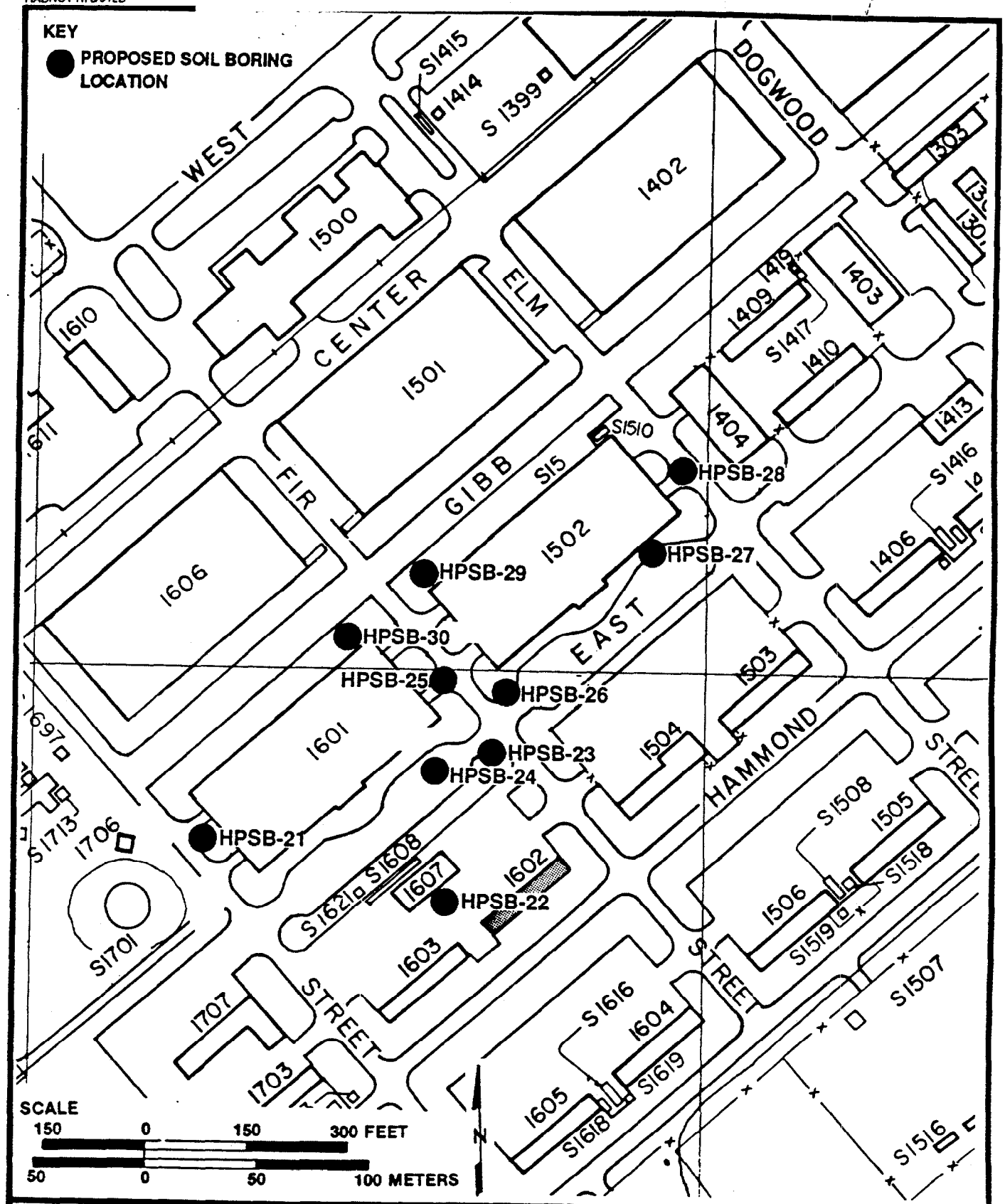


APPROXIMATE SOIL BORING LOCATIONS – BLDG. 1202

SOURCE: ESE.

MARINE CORPS BASE
CAMP LEJEUNE

HADNOT RI 5/91LB



APPROXIMATE SOIL BORING LOCATIONS – BLDG. 1602

SOURCE: ESE.

MARINE CORPS BASE
CAMP LEJEUNE

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB1

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring-Testing	Date started 1-8-91	completed 1-8-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~9.5' below ground	Total Depth 10ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2'	6-8 12-15	24/23	[SM] F-m silty sand, tr. stems Upper 17" orangey gray tan Lower 6" light gray brown Note: Lowest 5" has cohesive black stained chunk of material	BG	Background (BG) HNU = 2.8 ppm The sample was taken at 0919		✓
#2	2'-4'	3-15 11-6	24/20	[SM] Upper 8" stained black middle 5" light gray Lowest 7" orangey tan	BG	BG HNU = 2.4 ppm Sample time = 0932		<1
#3	4'-6'	5-4 4-5	24/19	[SM] Upper 7" stained black Lower 12" orangey tan - cohesive material	BG	Sample time = 0950		
	6'-8'	3-5 7-8	24/17	[SM] Light orangey gray tan cohesive material	BG	BG HNU = 2.2 ppm Sample time 1005		
	8'-10'	4-2 1-3	24/16	[SM] Upper 5" light gray brown middle 7" light orangey-yellow lower 4" orange tan & gray tan.	BG	BG HNU = 2.2 ppm Sample time 1015 Water Table ≈ 9½'		

Boring terminated at 10'

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPSB2

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-8-91 completed 1-8-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	~3' below ground	Total Depth 4 ft
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitoring HNU	Monitoring LEL
#1	0'-2'	7-7 6-5	24/19	Upper 16" [SM] Upper 16" light med. brown Lower 3" peat Lower 3" black (stained)	BG	Background (BG) HNU = 2.2 ppm Sample time = 1420		0
#2	2'-4'	4-2 1-3	24/24	peat/[SC] Upper 3" med. brown gray (dense in spots) Lower 21" blue gray	BG	Sample time = 1430 Water Table ≈ 3'		
				Boring terminated at 4'				

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-8-91 completed 1-8-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~1.5' below ground	Total Depth 2'
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	9-10 11-13	24/18	[SM] gray & light gray Note: upper 5" is dark brown to black - Black may be due to staining Boring terminated at 2'	BG	Background (BG) HNU = 2.5 ppm Sample time = 1545 Water Table ≈ 1½'		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB4

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-9-91 completed 1-9-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~4' below ground	Total Depth 10 ft
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	13-11 9-7	24/17	Upper 7" [SC] dark brown/black Lower 10' [GM] light brown	BG	Background (BG) HNU = 3.2 ppm Sample time = 0750		
#2	2'-4'	4-2 3-1	24/20	Upper 4" [SM] gray brown Middle 4" [CL] stained black Lower 12" [CL] light gray w/ some wisps of tan.	7.6 ppm	Sample time = 0757 Water Table @ ≈ 4'		
#3	4'-6'	4-2 1/12"	24/22	[CL] light gray	BG	BG = 3.0 ppm Sample Time = 0805		
	6'-8'	10-12 15-14	24/19t	[SM] light gray	BG	BG ≈ 2.8 ppm Sample Time = 0842		
	8'-10'	6-6 12-15	24/24	[SM] light blue gray	BG	BG ≈ 3.0 ppm Sample Time - 0900		0

Boring Terminated at 10'

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPSB5

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-9-91 completed 1-9-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	~5' below ground	Total Depth 6 ft
Logged by Paul M Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitoring HNU	Monitoring LEL
#1	0'-2'	5-7 10-12	24/23	Upper 7" top soil middle 3" [SM] stained black Lower 13" [SM] tan & gray tan	BG	Background (BG) HNU = 2.6 ppm Sample time = 1036 hrs		
#2	2-4'	12-19 10-11	24/15	Upper 7" [SM] light gray & tan Lower 8" wood chunk orange but stained black	10 ppm	Sample time = 1050 hrs		
#3	4'-6'	4-7 3-8	24/17	[SM] light gray w/ some portions apparently stained black. cohesive Boring terminated at 6'.	5.8 ppm	Sample time = 1105 Water-Table @ ≈ 5'		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB6

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-9-91	completed 1-9-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~4' below ground	Total Depth 6ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	12-10 8-7	24/22	[SM] Light brown & light gray in lower 8". Note: Top 4" of sample is stained black.	BG	Background (BG) = 3.6 ppm Sample time is 1315		
#2	2'-4'	4-4 5-6	24/21	Upper 7" [SM] gray Lower 14" [SC] light gray & tan	BG	Background (BG) = 3.2 ppm Sample time is 1319 Water Table @ ≈ 4'		
#3	4'-6'	2-1 1-4	24/24	Upper 4" [SM] medium gray & black Middle 16" [SC] light tan + light gray Lower 4" [SM] Light gray Boring terminated at 6'	BG	Background (BG) = 3.4 ppm Sample time is 1329		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB 7

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-9-91	completed 1-9-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ≈4' below ground	Total Depth 6ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	9-7 7-5	24/19	[SM] tan - lower 3" is stained black	BG	Background (BG) = 2.6 ppm Sample time is 1357		
#2	2'-4'	6-5 2-2	24/17	Upper 10" [SM] med. gray & black Lower 7" [SC] light gray	4.2 ppm	Sample time is 1405 Water Table @ ≈ 4'		0
#3	4'-6'	2-2 1-4	24/≈17	Upper 10" [SC] tan Lower 7" [SC] light gray - some dark gray to black coloration.	BG	Background (BG) = 3.0 ppm Sample time is 1430		

Boring terminated at 6'

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB 8

Project No. 4902036	Project Name Camp Lejeune Headnet Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-9-91 completed 1-9-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~4' below ground	Total Depth 6 ft
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorn HNU	LEL
#1	0'-2'	4-4 5-5	24/24	[SM]/[ML] L black L lightbrown/tan	BG	Background (BG) = 3.4 ppm Sample time = 1549 hrs		0
#2	2'-4'	5-6 4-7	24/22	Upper 11" [SM] black Lower 11" [ML] lightgray & tan	BG	Background (BG) = 3.2 ppm Sample time is 1555 hrs		
#3	4'-6'	2-2 1-4	24/23	Upper 12" [CL] gray tan w/ orange Lower 11" [SM] gray & black Cohesive - black possibly due to staining	BG	Background (BG) = 2.8 ppm Sample time is 1603 hrs Water Table ≈ 4'		

Boring Terminated at 6'

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB9

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-10-91	completed 1-10-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~4' below ground	Total Depth 6 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LE
#1	0'-2'	3-2 2-4	24/24	Upper 11" [SM] Black & dark brown some sections of upper 11" are cohesive Note - Black coloring may be due to staining Lower 13" [SM] tan	BG	Background (BG) = 2.9 ppm Sample Time = 0751 hrs		
#2	2'-4'	4-3 4-6	24/20	[SM] Light gray Tan	BG	Sample Time = 0755 hrs Water Table @ ≈4'		
#3	4'-6'	5-3 2-2	24/24	Upper 12" [SM] gray tan Lower 12" [CL] medium gray cohesive	BG	Sample Time = 0808 hrs		
				Boring Terminated @ 6'.				

CLEJ-00414-03.13-04/01/92

BORING LOG

BORING NO. HPSB10

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-10-91	completed 1-10-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	~4' below ground	Total Depth 6 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LE
#1	0'-2'	5-6 5-6	24/22	Upper 8" [SM] black (Black could be due to staining) Lower 14" [SM] tan some red spots	BG	Background (BG) = 2.9 ppm Sample time = 0845		0
#2	2'-4'	7-6 6-4	24/23	[SM] tan and trace red & orange patches.	BG	Sample time = 0851		
#3	4'-6'	2-3 6-7	24/24	Upper 12" [SM] tan Lower 12" [SC] medium gray cohesive		Sample time = 0901 Water Table @ ≈ 4'		

Boring terminated at 6'.

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB11

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-10-91	completed 1-10-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	~4' below ground	Total Depth 6 ft
Logged by Paul M. Fernberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LE
#1	0'-2'	10-9 14-19	24/14	[GM] gray	BG	Background (BG) = 3.0 ppm Sample Time = 1045		
#2	2'-4'	19-8 3-4	24/10	[GM] gray & black Note: black may relate to staining "Tar-like" smell present.	BG	Background (BG) = 3.3 ppm Sample Time = 1057 Water Table @ ≈ 4'		0
#3	4'-6'	10-12 4-4		[GM] gray	3.8 ppm	BG - 3.6 ppm Sample Time = 1116		

Boring terminated at 6'.

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB12

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-16-91 completed 1-16-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~9' below ground	Total Depth 10 ft.
Logged by Paul M. Fernberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2'	6-5 3-4	24/21	[SM] light gray brown	BG	Background (BG) = 3.4 ppm Sample Time = 0814		
#2	2'-4'	4-6 5-3	24/24	[SM] light gray brown top 18" - grades into orangey tan in lower 6"	5.6ppm	Sample Time = 0818		
	4'-6'	5-7 4-4	24/24	[SM] medium density orange & light gray & tan	BG	Sample Time = 0827		0
	6'-8'	4-7 8-4	24/24	[SM] light orange, light gray lower 2½" white	BG	Sample Time = 0832		
#3	8'-10'	5-3 6-4	24/21	[SM] light gray w/ small patches of orange & tan. Boring Terminated at 10'.	BG	Sample Time = 0839 Water Table @ ≈ 9'		

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPSB 13

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-12-91 completed 1-12-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~8.5 below ground	Total Depth 10 ft
Logged by Paul M. Reinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	4-5 5-8	24/21	[SM] gray tan (cohesive & dense) Note: Upper 8" appears to be stained black.	BG	Background (BG) = 3.2 ppm Sample Time = 0947		
	2-4'	5-10 4-4	24/23	[SM] orangey-tan somewhat cohesive.	BG	Sample Time - 0952		
	4-6'	12-8 11-13	24/24	[SM] orangey tan dense	BG	BG = 3.0 ppm Sample Time - 0959		
#2	6'-8'	10-8 8-12	24/24	upper 3" is black & orange [SM] light orangey tan	BG	Sample Time = 0907		
#3	8-10'	6-5 5-9	24/23	[SM] light gray tan	BG	Sample Time = 0915 Water Table @ ≈ 8½'		
				Boring Terminated @ 10'.				

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB14

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-12-91	completed 1-12-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~9' below ground	Total Depth 10 ft.
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
	0'-2'	12-9 7-10	24/15	[SM] ε' wood chip (partially dense in portion) light gray Note - upper 3" is black from staining apparently.	BG	Background (BG) = 3.8 ppm Sample Time = 1051 hrs	5.5 ppm on sand from hole.	0
#1	2'-4'	9-11 10-11	24/24	[SM] Upper 12" has wood chips primarily (light & dark gray) patches. Lower 12" light gray & tan	4.0 ppm	BG = 3.4 ppm Sample Time = 1102 hrs		
#2	4'-6'	10-12 10-11	24/24	[SM] orange ε' light orange tan somewhat dense	3.5 ppm	Sample Time = 1110 hrs		
	6'-8'	14-8 9-15	24/24	[SM] Upper 12" light orange Lower 12" light gray dense	BG	BG = 3.6 ppm Sample Time = 1120 hrs		
#3	8'-10'	10-8 5-5	24/24	[SM] Light gray Boring Terminated at 10'	13.2 ppm	Gasoline/solvent odor noted. Sample Time = 1130 hrs Water Table @ ≈ 9'		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB15

Project No. 4902.036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-10-91	completed 1-10-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~8.5' below ground	Total Depth 10ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	2-4 5-9	24/21	[SM] Upper 12" black Lower 9" tan Lower 9" is very dense	BG	Background (BG) = 4.0ppm Sample time = 1310		
	2'-4'	6-5 4-6	24/22	[SM] light tan Upper 6" is dense	BG	Sample Time - 1314		
	4'-6'	8-7 8-9	24/24	[SM] orange & light tan	BG	Sample Time: 1322		
#2	6'-8'	4-6 7-6	24/24	[SM] orange w/ patches of light tan	BG	Sample Time = 1338		
#3	8'-10'	6-6 8-10	24/18	[SM] light tan Boring Terminated at 10'		Sample Time - 1343 Water Table @ ≈ 8½'		

CLEJ-00414-03.13-04/01/92

BORING LOG

BORING NO. HPSB 16

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-11-91	completed 1-11-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	~8' below ground	Total Depth 10 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitorin HNU	LEL
#1	0'-2'	7-9 12-18	24/20	[SM] tan dense Note: upper 5" possibly stained black	BG	Background (BG) = 4.3 ppm Sample Time = 0937		0
	2'-4'	9-8 7-6	24/14	[SM] light tan	BG	BG = 5.6 ppm Also note: HNU needle fluctuating w/ wind Sample Time = 0941		
	4'-6'	10-14 12-17	24/24	[SM] light tan w/ orange patches dense, cohesive	BG	BG = 3.6 ppm Sample Time = 0953		
#2	6'-8'	9-6 5-3	24/24	Upper 15" [SM] orange Lower 9" [CL] light gray	BG	Sample Time = 1000 Water Table appears to at 8'		
#3	8'-10'	3-5 4-4	24/24	[SM] light gray Boring terminated at 10'.	BG	BG = 2.6 ppm Also note: HNU needle is slightly erratic in rain Sample Time = 1008		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB17

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-11-91 completed 1-11-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~8' below ground	Total Depth 10 ft
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitoring HNU	Monitoring LEL
#1	0'-2'	12-9 7-18	24/18	Upper 6" [GM] Black - possibly staining Middle 6" [GP] gray & light gray tan Lower 6" [GM] upper 2" gray lower 4" light gray tan.	BG	Background (BG) = 3.2 ppm Sample Time = 1400		
	2'-4'	10-9 6-10	24/21	[SM] light gray tan, some orange (a patch) toward bottom. Fairly cohesive	BG	BG = 2.2 ppm Sample Time = 1405		
	4-6'	5-4 2-4	24/24	[SM] light gray tan & orange	BG	BG = 2.8 ppm Sample Time = 1419		0
#2	6-8	6-4 2-6	24/est 20	[SM] light gray Tan & light orange tan	BG	BG = 2.2 ppm Sample Time = 1425		
#3	8-10'	6-4 4-9	24/est 20	[SM] light gray Tan compact	BG	Water Table @ ≈ 8' Sample Time = 1430		

Boring Terminated @ 10'

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB18

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-11-91 completed 1-11-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~9' below ground	Total Depth 10 ft
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
	0'-2'	10-8 8-7	24/24	Upper 11" [SM] grayish black w/ red spots Lower 13" [SM] gray tan	BG	Background (BG) = 2.8 ppm Sample Time = 1530		
	2'-4'	9-11 14-5	24/24	[SM] light gray & tan	BG	Sample Time = 1536		
#1	4'-6'	12-7 7-10	24/24	[SM] light gray Tan	2.6 ppm	BG = 2.5 ppm Possible shift of background to 2.6 ppm Sample Time = 1559		
#2	6'-8'	5-3 2-3	24/21	[SM] light gray tan & has patches of light	BG	BG = 2.6 ppm Sample Time = 1614		
#3	8'-10'	6-5 7-5	24/24	Upper 10" [SM] light gray tan w/ light orange coloration Lower 14" light gray, dense Boring Terminated at 10'	BG	Sample Time = 1617 Water Table @ ≈ 9'		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB19

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-11-91	completed 1-11-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~8.5' below ground	Total Depth 10 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2'	7-6 6-9	24/24	[SM] tan Note: upper 2" is dense	BG	Background (BG) = 3.4 ppm Sample Time = 0806		0
#2	2'-4'	6-6 5-5	24/22	[SM] tan w/ orange coloration within the tan	BG	Sample Time = 0811		
	4'-6'	4-3 4-3	24/24	[SM] light orangey tan	BG	Sample Time = 0816		
	6'-8'	4-4 4-6	24/24	[SM] light tan & light orange (lower 6" is cohesive)	BG	Sample Time = 0825		
#3	8'-10'	4-3 3-4	24/24	[SM] light tan & orange coloration in parts. Boring Terminated at 10'.	BG	Sample Time = 0835 Water Table @ ≈ 8½'		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB20

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-10-91	completed 1-10-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ 9.5' below ground	Total Depth 10 ft
Logged by Paul M. Reinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitor HNU	Monitor LE
#1	0'-2'	7-9 8-10	24/21	[SM] light gray tan dense	BG	Background (BG) = 3.8 ppm Sample Time = 1450 hrs		
	2'-4'	3-4 5-7	24/24	[SM] light gray tan & orange patches	BG	Sample Time = 1454 hrs		0
	4'-6'	5-3 4-5	24/24	[SM] light gray tan & orange patches	BG	Sample Time = 1501 hrs		
#2	6'-8'	7-10 8-9	24/21	[SM] light tan & orangey patches	BG	Sample Time = 1510 hrs		
#3	8'-10'	4-6 7-6	24/22	[SM] light tan Boring Terminated at 10'	BG	Sample Time 1530 hrs Water Table is @ ≈ 9½'		

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB21

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc	Driller Environmental Monitoring & Testing	Date started 1-14-91	completed 1-14-9
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~5' below ground	Total Depth 8 ft.
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitor: HNU	LE
#1	0'-2'	9-8 5-7	24/24	Upper 8" topsoil - black Lower 16" [SM] black & orange - tan (dense)	BG	Background (BG) = 3.4 ppm Sample Time = 0849 hrs.		
#2	2'-4'	7-8 10-12	24/24	[SM] Upper 5" orange Lower 19" light gray	3.5 ppm	BG = 3.3 ppm Sample Time = 0853 hrs		
#3	4'-6'	3-8 3-2	24/20	[SM] light gray Note: upper 5" is dense	BG	BG = 3.4 ppm Sample Time = 0859 hrs Water Table @ ≈ 5'		
	6'-8'	2-1 3-2	24/24	Upper 13" [SM] light tan Lower 11" [CL] medium gray		Sample Time = 0907 hrs		0

Boring Terminated after 8'

CLEJ-00414-03.13-04/01/92

F.___ ___.___ ___

BORING NO. HPSB22

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-15-91	completed 1-15-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~4.5 below ground	Total Depth 6 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2' (0-3')	4-5 7-7	24/20	Upper 4" [SM] very slight cohesiveness, tan. Lower 16" [SM] dense, black.	BG	Background (BG) = 2.9 ppm. Sample Time = 0938		C
#2	2'-4' (2-5')	6-7 7-9	24/24	Upper 9" [SM] very slight cohesiveness, tan. Lower 15" [SM] dense, black.	BG	Sample Time = 1001. W.T. @ ≈ 4½' below surface.		
#3	4'-6' (5-6')	1-3 3-9	24/19½	Upper 6 [SM] tan & black. Lower 13½" [SM], trace wood stems, black.	BG	Sample Time = 1006		
	* This spoon is actually at the 1'-3' depth interval. This was due to penetration of an asphalt cover. All other spoons are actually ≈ 1' deeper than "labelled" spoon interval.			Boring Terminated at 6'.				

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB23

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-14-91	completed 1-14-9
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~2-3' below ground	Total Depth 6 ft.
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitor HNU	L
#1	0'-2'	1-3 4-7	24/24	[SM] tan – upper 8" is black to 5½" at which point it grades to a tan coloration	BG	Background (BG) = 4.2 ppm Sample Time = 1416		
#2	2'-4'	2-2 3-2	24/20	[SM] tan slightly cohesive Note: In upper 6" of spoon is trace - little black coloring		Sample Time = 1426 Water Table @ ≈ 2'-3'		
#3	4'-6'	3-3 3-4	24/17	[SM] light tan slightly cohesive		Sample Time = 1435		
				Boring is terminated at 6'				

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPSB24

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-15-91	completed 1-15-9
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~6-8' below ground	Total Depth 8 ft.
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2' (✓ 1'-3')	7-4 6-5	24/21	upper 14" [SM] dense, lightbrown lower 7" [SM] light brown & white	BG	Background (BG) = 2.8ppm Sample Time = 0814		0
	2'-4' (1'-3')	6-5 5-3	24/18	[SM] white & light brown	BG	Sample Time: 0819		
#2	4'-6'	4-5 5-7	24/21	[SM] dense, but not very cohesive. light brown & white.	BG	Sample Time = 0833		
#3	6'-8' (7'-9')	10-7 7-6	24/24	[SM] orange-brown	BG	BG - 3.0 ppm Sample Time: 0840 W.T. esti. betw/ 6'-8'.		
	✓ This 1st spoon is actually at the 1'-3' depth interval. This was due to penetration of an asphalt cover. All other spoons are actually ≈1' deeper than "labelled" spoon interval			Boring Terminated at 8'.				

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSB 25

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-14-91	completed 1-14-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~7.5' below ground	Total Depth 8ft.
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitor HNU	Monitor LE
#1	0'-2' *	7-5 3-4	24/19	[SM] Light brown	BG	Background (BG) = 4.4 ppm Sample Time = 1252 hrs		0
#2	2'-4'	4-6 4-3	24/24	Upper 1½" [SM] dense, light brown Lower 22½" [SM] light tan	BG or 3.8 ppm	BG = 3.7 ppm Note: HNu needle is shaky Sample Time = 1300 hrs		
	4'-6'	3-4 2-4	24/21	[SM] light tan	BG	BG - 4.3 ppm Sample Time = 1305 hrs		
#3	6'-8'	3-3 4-5	24/≈22"	[SM] dense, tan & orange	BG	BG - 5.0 ppm Sample Time is 1312 hrs Water Table is @ ≈ 7½'		

Boring is terminated after 8'

* This 1st spoon is actually at the 1'-3' depth interval. This was due to an asphalt cover. All other spoons are 1' deeper than "located" spoon interval

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB26

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-15-91	completed 1-15-9
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	~10' below ground	Total Depth 10 ft
Logged by Paul M. Fernberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitor HNU	Monitor LS
#1	0'-2' (1'-3')	4-5 3-6	24/21	[SM] stiff clumps present reddish brown	BG	Background (BG) HNu = 3.9 ppm Note: Needle is a little unsteady. Sample Time = 1138		C
	2'-4' (3'-5')	6-5 4-4	24/24	[SM] white & light brown.	BG	BG = 3.7 ppm Sample Time = 1143		
	4'-6' (5'-6)	4-4 6-11	24/24	[SM] white	BG+	BG: 3.8 ppm May have a slight rise, but it is < 1 ppm. Sample Time = 1159		
#2	6'-8' (7-9')	10-10 8-9	24/24	[SM] dense, cohesive orange & tan	4.1 ppm	BG = 3.8 ppm Sample Time = 1204		
#3	8'-10' (9'-11')	8-7 4-5	24/20	upper 6 [SM] white Lower 14" [SM] dense, cohesive light orange	BG	BG = 2 ppm Sample Time = 1211 Water Table @ ≈ 10'		

Boring Terminated at 10'.

[illegible]

CLEJ-00414-03.13-04/01/92

BORING LOG

BORING NO. HPSB 27

Project No. 4702036	Project Name Camp Lejeune Hadnot Point Soil Borings	Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-15-91 completed 1-15-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~10' below ground	Total Depth 10ft
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitor HNU	LE
	0'-2' (1-3') ✗	8-6 3-4	24/24	[SM] dark brown	BG	Background (BG) = 4.2 ppm Sample Time = 1452		
#1	2'-4' (3'-5')	8-6 5-9	24/24	Upper 8" [SM] brown Lower 16" [SM] dense, white	4.0 ppm	BG ≈ 3.8 ppm Sample Time = 1459		
#2	4'-6' (5'-7')	10-8 9-10	24/24	[SM] orange & tan & white	4.0 ppm	Sample Time = 1508		
	6'-8' (7'-9')	7-5 5-3	24/23	[SM] orange & light grey	BG	Sample Time = 1516		
#3	8'-10' (9'-11')	3-2 1-2	24/24	Upper 8" [SM] White & Light orange Lower 16" [SC] Light grey & orange	BG	Water Table @ ≈ 10' Sample Time = 1521		

Boring Terminated at 10'.

✗ This first spoon is actually closer to the 1'-3' depth interval. This was due to the penetration of an asphalt cover. All other spoons are consequently ≈ 1' deeper than the "labelled" spoon interval. E.G. The next spoon interval is actually closer to 3'-5', than 2'-4'.

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB28

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-14-91	completed 1-14-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~9-11' below ground	Total Depth 10 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2' (1'-3')*	6-5 3-5	24/22	[SM] Upper 18" brown to tan Lower 4" Reddish brown to black.	4.6 ppm	Background (BG) = 4.2 Sample Time = 1539 hrs Possible "solvent"-type smell.		
#2	2'-4' (3'-5')	6-5 5-6	24/24	Upper 6" [SM], somewhat cohesive light brown Lower 18" [SM], dense, cohesive orange brown.	BG	Sample Time 1543 hrs		
	4'-6' (5'-7')	4-4 6-7	24/24	Upper 10" [SM] dense, somewhat cohesive orange tan. Lower 14" [SM] upper 7" orange & white, lower 7" white	BG	Sample Time = 1551 hrs		
	6'-8' (7'-9')	6-5 3-3	24/23	[SM] dense, cohesive orange & white.	BG	BG = 3.8 Sample Time = 1623 hrs		
#3	8'-10' (9'-11')	1-3 2-4	24/23	[SM] Upper 12" orange middle 3" light gray & orange. lower 9" white & orange. Boring terminated at 10'	BG	Sample Time = 1628 hrs Water Table @ ≈ 9'-11'		

*This 1st spoon is actually at the 1'-3' depth interval. This was due to penetration of an asphalt cover. All other spoons are actually 1' deeper than "labelled" spoon interval.

CLEJ-00414-03.13-04/01/92

BORING NO. HPSB29

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-15-91	completed 1-15-91
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~12' below ground	Total Depth 12ft.
Logged by Paul M. Fernberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2' *(1'-3')	6-3 2-2	24/18	[SM] gray-white & black.	BG	Background (BG) = 4.2 ppm Sample Time = 1310 hrs		
#2	2'-4' (3'-5')	2-1 4-3	24/23	[SM] white & brown	BG	Sample Time = 1318 hrs		
	4'-6' (5'-7')	2-2 1-1	24/24	[SM] gray white	BG	Sample Time = 1322 hrs		
	6'-8' (7'-9')	2-3 5-5	24/24	Upper 4" [SM] somewhat cohesive, gray tan Middle 11" [SC] dense, orange Lower 9" [SM] white	BG	BG=4.4 ppm Sample Time = 1328 hrs		
	8'-10' (9'-11')	NOT RECORDED BY MILLER	24/16	Upper 4½" [SM] white Lower 11½" [SM] somewhat cohesive, dense, brown.	BG	Sample Time = 1338 hrs		
#3	10'-12' (12'-14')	6 5 5 2	24/20	[SM] somewhat cohesive, dense light tan & light gray Boring Terminated at 12'.	BG	Sample Time 1354 hrs Water Table @ ≈ 12'.		

*This first spoon is actually closer to the 1'-3' depth interval. This was due to the penetration of an asphalt cover. All other spoons are consequently ≈ 1' deeper than the "labelled" spoon interval. The last spoon interval is actually closer to 12'-14'.

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPSB30

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Soil Borings		Page 1 of 1
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 1-14-91	completed 1-14-9
Method HSA	Casing Size	HNU 11.7/10.2	Protection Level D
Ground El.	Soil Drilled	▼ ~12-13' below ground	Total Depth 13 ft
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU	Comments on Advance of Boring	Monitori HNU	LE
#1	0'-2' * spoon (actual interval 1.5')	4-7 5-5	24/20	Upper 10" [SM] dark brown to black, trace organics Lower 10" [SM] dense, light brown	BG	Background (BG) = 3.7 ppm Sample Time is 1010 hrs		0
#2	2'-4'	3-2 2-3	24/24	Upper 10" [SM] dense, brown Lower 8" [SM] tan	BG	BG = 3.8 ppm Sample Time is 1013 hrs		
	4-6'	2-5 5-7	24/24	[SM] light tan	BG	Sample Time is 1021 hrs		
	6'-8'	7-8 7-8	24/22	[SM] light tan	BG	Sample Time is 1030 hrs		
	8-10'	1-10 11-7	24/19	[SM] light tan	BG	Note HNU needle is shaky. Sample Time is 1037 hrs		
#3	10'-12'	8-7 6-4	24/≈18	[SM] light tan Note that Bottom 5" is brown. Terminate Boring after 6 spoons. In this hole went down to 13 feet.	3.9 ppm	Sample Time is 1046 hrs Note Water Table is between 12' & 13' below land surface.		

* This is 1st spoon, however actual depth interval is approx. 1'-3' - with similar adjustment made for each successive spoon. This was due to an asphalt cover.

APPENDIX C

SHALLOW GROUNDWATER MONITORING WELLS BORING LOGS

Boring No. HPGW1 CLEJ-00414-03.13-04/01/92 Coordinates N _____ E _____

Hole Size 6" Size 0.010

Screen Size 2" Mat'l Sch. 40 PVC Filter Materials Silica Sand

Casing Size 2" Mat'l PVC Grout Type 1' Bentonite Seal

Geologist Paul Conrad Development _____

Date Start 10/31/86 Finish 10/31/86 Static Water Level 20.54'

Contractor Davis Drilling Co Top of Well Elevation 23.04'

Driller Charles Smith Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-1.5			Peat, silt ~20%, dry, med. dense, non-plast, fibrous org. mtrl, color 10 YR 2/1 (black), sand ~5% upper 4" misc. grav. & sand from parking lot.	Pt	6-4-6
1.5-3			same as above Peat	Pt.	4-5-6
3-4.5			at 3.75' the above grades to Silty Fine Sand, silt 25-30%, Clay 10-15%, v. slight plast, moist, med. dense, mottled color 10 YR 6/6 (brnish yllw) and 10 YR 5/2 (gryish brn). Clayey zones are gryish brn.	ML	5-5-5
4.5-6			Silty/clayey Fine Sand, silt 25-30%, clay 10-15%, moist, med. dense, v. slight plast, mottled color 10 YR 6/1 (gry) and 10 YR 6/6 (brnish yllw)	ML	4-4-6

CLEJ-00414-03.13-04/01/92

Boring No. _____ es N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

Casing Size _____ Mat'l _____ Grout Type _____

Geologist Paul Conrad Development _____

Date Start 10/31/86 Finish 10/31/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
6-7.5			Silty Fine Sand, silt 15-20%, saturated, non-plast., med. dense, grains fairly uniform, color uniform 10YR 7/2 (light grey)	SM	6-6-1
7.5-9			Silty Fine Sand, same descr. as above.	SM	8-6-4
9-10.5			Clay, v. fine sand ~5%, plastic, wet, fairly clean, v. soft, uniform color closest to N 5/0 (gry).	CH	3-1-1
14-15.5			Clay, clean, massive, high plast., v. soft, wet, uniform color 5BG 4.5/1 (dark greish gry)	CH	6-2-1

Boring No. _____ Location Coordinates N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start 10/31/86 Finish 10/31/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
19-20.5			Clay, same descript'n as above, 2-4% fine sand.	CH	0-2-
24-25.5			Silty Fine Sand, silt 20-25%, clay ~5-5%, loose density, saturated, non-plast., mottled color 10 yR 6/2 (lglt brnish gry) and 10 yR 5/6 (yllwish brn)	SM	3-4-

Boring No. _____ SHEET 4 OF

6:50 am Arrived at Camp.
Prepared for drilling.

7:50 Began drilling and sampling. Paul logging samples.

8:30 Last spoon taken. Casing assemb
All augers pulled out. Hole open (clay's) and casing readily installe

Poured 8 bags silica sand (50 lb. ea
Bentonite placed.

8:40 Well complete. No unusual events.

Cleaning equip. & prepping for next boring.

Standard construction. Hole 27' de

10/31/86 Paul D. Conrad
DATE SIGNED

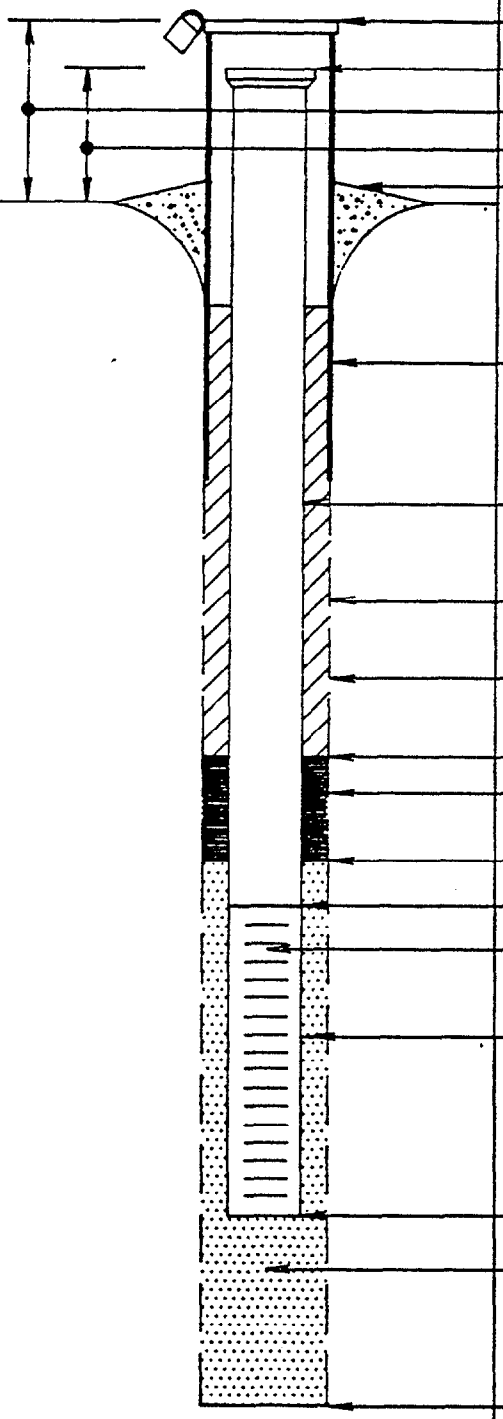
SOURCE: Environmental Science and Engineering, Inc., 19

WELL NO. HP-GW1

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune HP1A
PROJECT NO. 49-02036 BORING NO. HP-GW1
ELEVATION DATE 10/31/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 32.57'
ELEVATION OF TOP OF RISER PIPE: 32.39'
STICK-UP TOP OF SURFACE CASING: 1.98'
STICK-UP RISER PIPE: 1.80'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: PVC (Schedule 40)
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 25'
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW 1

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER U.S. Navy
ADDRESS Camp Le Jeune, N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 10/31/86 USE OF WELL monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 20.54' FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2.50' FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

Depth From	To	DRILLING LOG Formation Description
0.0	3.0	Sandy Peat
3.0	4.5	Silty Fine Sand
4.5	6.0	Silty Clayey Fine Sa
6.0	9.0	Silty Fine Sand
9.0	20.5	Clay
24.0	25.5	Silty Fine Sand

If additional space is needed use back of form.

10. CASING:

From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
+2.5'	-5.0		2"	1/8"	PVC

11. GROUT:

From	To	Ft.	Material	Method
0.0	-2.0		Concrete	
-2.0	-3.0		Clay	

12. SCREEN:

From	To	Ft.	Diameter	in.	Slot Size	in.	Material
-5.0	-25.0		2"		0.01		PVC

13. GRAVEL PACK:

From	To	Ft.	Size	Material
-3.0	-25'		Coarse	Sand

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See sketch attached to handout (2-5).

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/9/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HPG

Hole Size 6" Slot

Screen Size 2" Mat'l Schd. 40 PVC

Casing Size 2" Mat'l PVC

Geologist Paul Conrad

Date Start 11/4/86 Finish 11/4/86

Contractor Davis Drilling Co.

Driller Charles Smith

Coordinates N

E

Filter Materials Silica Sand

Grout Type 1' Bentonite Seal

Development

Static Water Level 18.90'

Top of Well Elevation 21.40'

Drill Type Hollow Stem Auger.

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
0-1.5			Fine Sandy Peat, sand 5-10%, non-plast, moist, organic debris at top, color 10YR 2/1 (black) stains hands (oily?), loose.	Pt	3-2-3
1.5-3			Silty fine sand, silt 20-25%, non-plast, loose, moist, sand fairly uniform, color 10YR 7/2 (light gry) mottled w/ 10YR 7/6 (yllw)	SM	3-3-3
3-4.5			Silty Fine Sand, silt 20-25%, non-plast., med. dense, moist, color 10YR 6.5/6 (brnish yllw) mottled w/ 10YR 7/2 (light gry).	SM	4-4-10
4.5-6			Fine sand, silt 10-12%, med. dense, moist, non-plast, some clay ~5%, color unif. 10YR 8/1 (White), qtz grains uniform.	SP	5-7-13

Boring No. _____ tes N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

(using Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start _____ Finish 11/4/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
6-7.5			Silty fine sand, same as above	SP	5-7-!
7.5-9			Silty fine sand, v. loose, silt 5-10%, same as above, v. [illegible]	SP	2-1-
9-10.5			Clayey fine sand, v. loose, saturated, clay 35-40%, slight plast., uniform color 2.5Y 4/0 (dk gry)	ML	0-3
14-15.5			Clay, clean, massive, high plast. [illegible] color 2.5Y 4/0 (dk. gry)	CL	

Boring No. _____ Location Coordinates N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

Casing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start _____ Finish 11/4/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
19-20.5			Clayey silty sand, silt 15-20%, clayey ~ 5-10%, mottled color sand: 10YR 8/1 (white) clay: 10YR 7/1.5 (light gray) silt: 10YR 6/7 ([illegible]) sand - loose, clay concentrated at 20.5', plast., soft.	SP	3-5
24-25.5			Silty fine sand, silt 12-15%, wet, med. dense, non-plast, color fairly uniform 9.5YR 6/8 (reddish yellow). at 25.5' grades to marle (color white).	SP/ Marle	10-12

Boring No. _____ SHEET 4 OF 4

1:5 Finished washing rig

10:50 am. Began drilling & sampling.

11:45 am Last spoon. Pulled augers → hole stayed open. Casing installed and silica sand pou
Five 1 hundred lb. bags used. No unusual events.

12:00 Well complete. Began washing rig.

Standard well construction. Hole 27 feet

4/86 Paul D. Carlson

DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc.

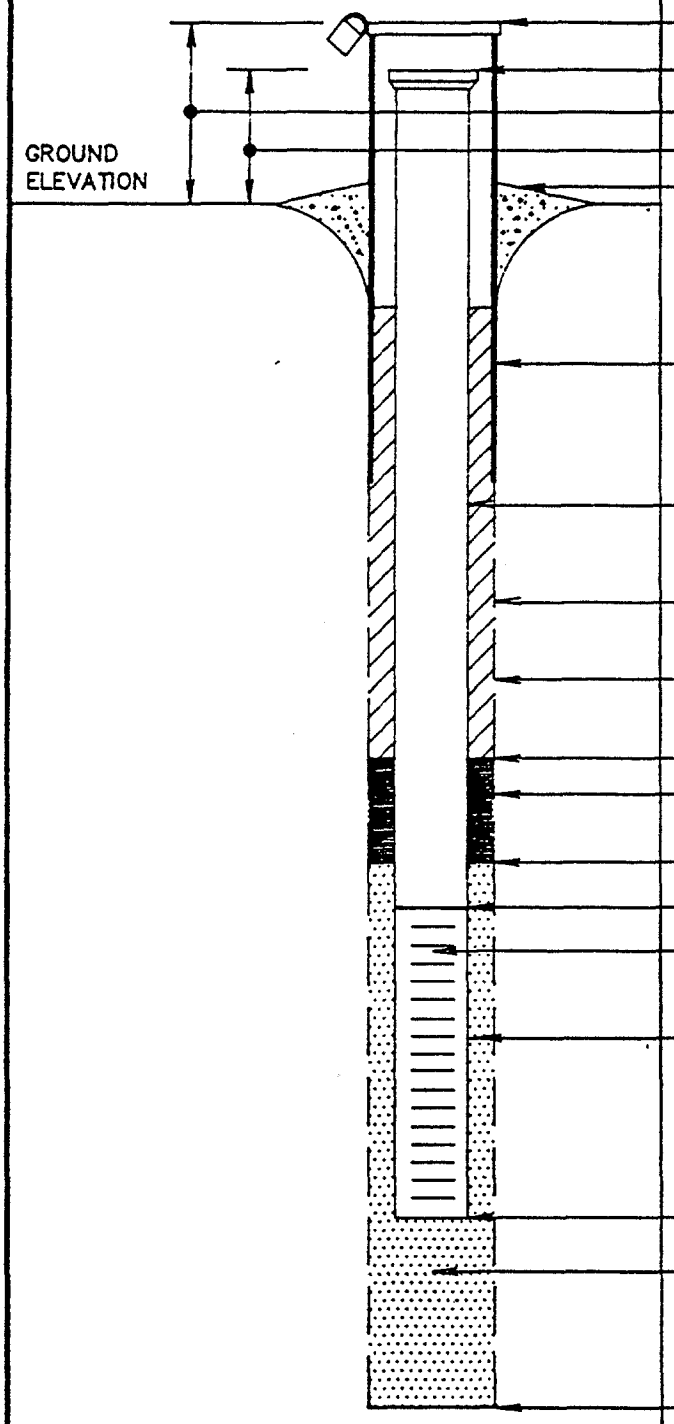
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW2

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune HPIA
PROJECT NO. 41-C2C36 BORING NO. HPGW2
ELEVATION DATE 11/4/88
FIELD GEOLOGIST Paul Conrad (E3E)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 32.43'
ELEVATION OF TOP OF RISER PIPE: 32.23'
STICK-UP TOP OF SURFACE CASING: 2.44'
STICK-UP RISER PIPE: 2.24'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 15'
TYPE OF SAND PACK: Course silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 20'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 25'
TYPE OF BACKFILL BELOW OBSERVATION WELL: Sand pack ?

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW2 **WELL CONSTRUCTION RECORD**

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER U.S. Navy
ADDRESS Camp LeJeune (Street or Route No.)
28542
City or Town State Zip Code

3. DATE DRILLED 11/4/86 USE OF WELL Monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 18.90 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	Sch 40	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-20'	2"	0.01 in.	PVC
				in.	
				in.	

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS:

DRILLING LOG

Depth From - To	Formation Description
0.0 - 1.5	Fine Silty Peat
1.5 - 4.5	Silty Fine Sand
4.5 - 6.0	Fine Sandy Silt
6.0 - 9.0	Silty Fine Sand
9.0 - 10.5	Clayey Fine Sand
14 - 15.5	Clay
19.0 - 20.5	Clayey Silty Sand
24 - 25.5	Silty Fine Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Sketch attached to (Fig 2-5).

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Carl H. Billings 2/9/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Page 1 of

Boring No. HP6W A

Coordinates N

Hole Size 6"

Slot 0.010"

E

Screen Size 2"

Mat'l Sched. 40 PVC

Filter Materials Silica Sand

Casing Size 2"

Mat'l PVC

Grout Type 1' Bentonite Seal

Geologist Paul Conrad

Development

Date Start 11/4/86

Finish 11/4/86

Static Water Level 19.17'

Contractor Davis Drilling Co.

Top of Well Elevation 21.67'

Driller Charles Smith

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-1.5			Fine Sandy silt, sand 25-30%, organic debris & misc. gravel, appears oily or Peaty, color 10 YR 3/1 (v. drk gry), moist, non-plast, loose.	ML Pt	2-3-3
1.5-3			~~Fine Sandy~~ Peat, sand 5-10%, appears v. oily, stains hands, moist, non-plast, v. loose, color 10YR 2/1 (Black), slight oil sheen when placed in water.	Pt	2-2-3
3-4.5			Silty fine sand, silt 30-35%, moist, loose, oily appearance, stains hands, non-plast., color 5Y 2.5/1 (Black).	SM	4-3-3
4.5-6			Silty fine sand, silt 30-35%, v. moist, v. loose, non-plast., stains hands, color 5Y 2.5/1 (Black).	SM	2-2-1

Boring No. _____ Location Coordinates N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

Casing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start 11/4/86 Finish 11/4/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
6-7.5			silty fine sand, silt 15-20%, sat'd, non-plast, fairly unif. sand, med. dense, color 10YR 5/2 (grayish brn), slight foul odor.	SM	5-8-
7.5-9			silty Fine Sand, silt 15-20%, foul odor (swamp gas?), color change to uniform 5GY 6/1 (greenish gry), non-plast, med. dense, sat'd.	SM	5-11-1
9-10.5			fine sandy clay, sand ~5%, plastic, sat'd, color unif. closest to N 4/0 (drk grey w/ grnish tint)	CH	2-1-2
14-15.5			Clay, clean, massive, high plast, wet, v. soft, unif. color 5GY 4.5/1 (drk greenish grey), foul odor not evident	CH	0-1-

Boring No. 70 [illegible] SHEET 3 OF 4

Depth (ft)	Lithology Color	USCS	SPT
19-20.5	19'-19.75': Fine Sandy Clay, sand 15-20%, wet, low plast., color closest to 5Y 5/1 (grnish gry), soft.	CL	2-3-
	19.75'-20.5': silty Fine Sand, silt 10-15%, non-plast., sat'd, color mottled 10YR 7/2 (light gry) and 10YR 6/8 (brnish yllw) ~25%. Trace clay.	SM	
24-25.5	Silty Fine Sand, calcareous cemented, silt ~10%, shell fragments ~20%, color 10YR 6/4 (light yllwish brn). v. moist, appears gravelly due to cementation.	SP	7-14-

7/4/86
DATE

SIGNED

SOURCE: Environmental Science and Engineering, Inc.

Boring No. [illegible] SHEET 14 OF 4

4:30am Left for airport to take Mike Snar. (No Bkst. I
8:00am Arrived Camp Lejeune. Met drillers.
8:45 Began Drilling & Sampling. No unusual event
9:40 Well complete. *Truck back to w.w.t. area for water.
Washed rig. Began Well 17.

*Augurs pulled before silica sand poured. Hole stayed open.

Standard well construction.. Hole depth 30'.

Note: At ~ 29' depth auger bit picked up rock (driller reported hard drilling). Massive, har silica/calc. (no acid) cementing large intack shell fragments (shells partially lithified). Possibly bedrock r.o. float.

11/4/86 Paul D. Conrad
DATE SIGNED

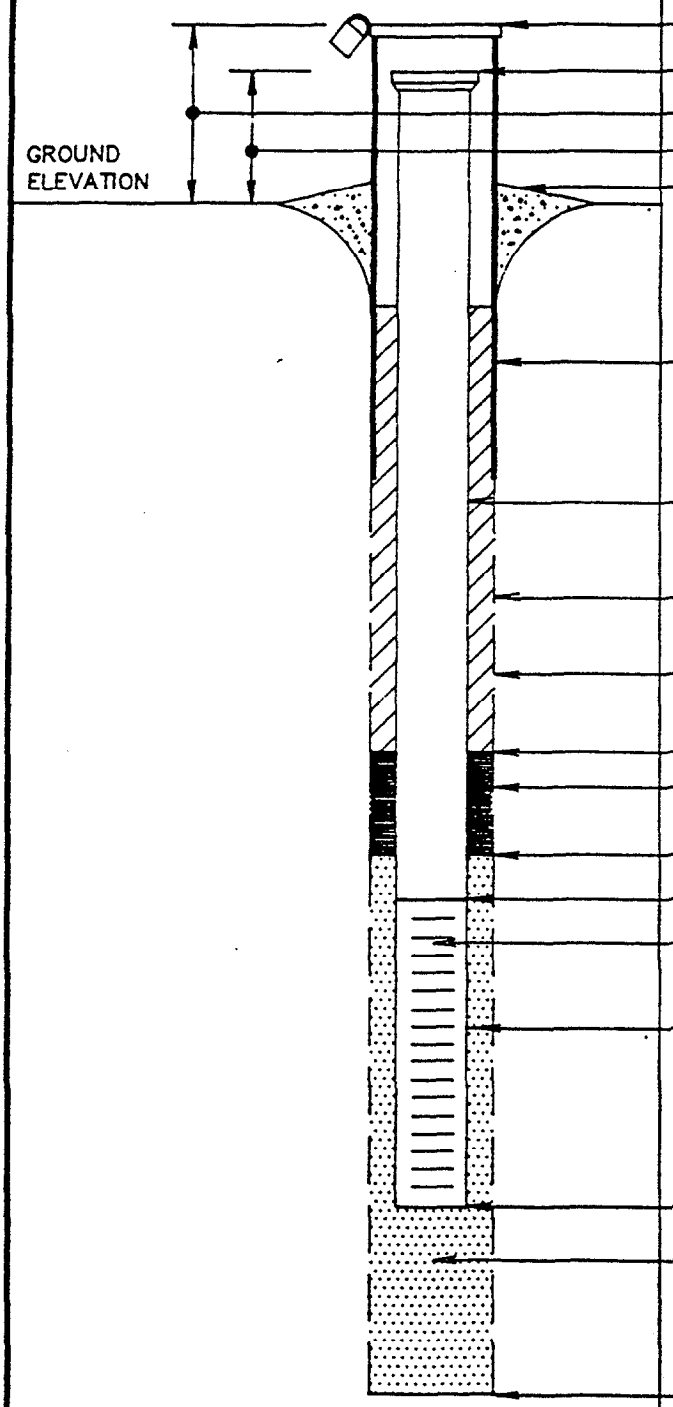
SOURCE: Environmental Science and Engineering, Inc., I

WELL NO. HP-GW3

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-C2E56 BORING NO. HP-GW3
ELEVATION DATE 11/4/86
FIELD GEOLOGIST Paul Conrad (E3E)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 32.07'
ELEVATION OF TOP OF RISER PIPE: 31.89'
STICK-UP TOP OF SURFACE CASING: 2.38'
STICK-UP RISER PIPE: 2.20'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 25'?
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 30'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HP6W3

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code
3. DATE DRILLED 11/4/86 USE OF WELL monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 19.17 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS _____ FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25'	Course	Sand

14. REMARKS:

DRILLING LOG

Depth From	To	Formation Description
0.0	-1.5	Fine Sandy Silt
1.5	-3.0	Fine Sandy Peat
3.0	-9.0	Silty Fine Sand
9.0	-10.5	Fine Sandy Clay
10.0	-15.5	Clay
19.0	-20.5	Fine Sandy Clay an Fine Silty Sand
20.5	-25'	Silty Fine Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See sketch attached to fig (2.5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE 2/9/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HPGW 4 7 | Coordinates N _____ E _____

Hole Size 6" | Slot 0.010"

Screen Size 2" | Mat'l Schd. 40 PVC | Filter Materials Silica Sand

Casing Size 2" | Mat'l PVC | Grout Type 1' Bentonite Seal

Geologist Paul Conrad | Development _____

Date Start 11/4/86 | Finish 11/4/86 | Static Water Level 18.08'

Contractor Davis Drilling Co. | Top of Well Elevation 20.58'

Driller Charles Smith | Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0-1.5			Peat, sand ~5%, non-plast., loose, s. moist, color 10YR 2/2 (v. drk. brown).	Pt	2-3-
1.5-3			Silty Fine Sand, silt 30-35%, loose, s. moist, non-plast., color 10YR 4/2 (drk greyish brn) some lighter mottling.	ML	3-3-4
3-4.5			Silty Fine Sand, silt 15-20%, moist, med. dense, non-plast., color unif. 10YR 6/2.5 (light brnish gry), grains uniform.	SM	4-6-
4.5-6			Clayey Fine Sand, clay ~5-10%, silt ~5%, med. dense, slight plast, unif color 10YR 7.5/1 (light gry).	ML	7-7-6

CLEJ-00414-03.13-04/01/92

Boring No. I

Coordinates N

Hole Size Slot

E

Screen Size Mat'l Filter Materials

Casing Size Mat'l Grout Type

Geologist Development

Date Start Finish 11/4/86 Static Water Level

Contractor Top of Well Elevation

Driller Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
6-7.5			fine sandy clay, sand 15-20%, v. moist, v. soft, color unif. 5GY 5.5/1 (greenish gry).	ML	3-2
7.5-9			fine sandy clay, sand 10-15%, sat'd, v. soft, color unif. 5GY 5.5/1 (grnish gry)	ML	1-0-
9-10.5			silty clayey fine sand, silt ~12%, clay ~12%, soft, sat'd, sand uniform, color uniform 5GY 5.5/1 (grnish gry)	ML	1-2-
14-15.5			clay, clear [illegible] v. high [illegible] soft, [illegible] color 5GY 5/1 (grnish [illegible])	CH	[illegible]

Boring No. D

:es N

Hole Size Slot

E

Screen Size Mat'l Filter Materials

using Size Mat'l Grout Type

Geologist Development

Date Start Finish 11/4/86 Static Water Level

Contractor Top of Well Elevation

Driller Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
19-20.5			Marl, large shell fragments, one 30 mm x ~~20~~ mm rounded black gravel, overall color 10YR 6/8 (brnish yllow), silty ~20%, clayey ~10%, loose, sat'd.	Marl	2-3-4
24-25.5			Marl, same as above, more cemented, appears to be cherty cement but because softness is probably calcitic. Sat'd, high % shells, dense.	Marl	26-26.

Boring No. ~~TX~~ HYGW4 SHEET 4 OF 4

— 20' Lunch Break. —

1:15 pm Began drilling & sampling. Location selected by Bob & Alexander & Paul on 11/3/86. Too many utilities near 1704 (Bldg.).

1:55 pm Well complete. 6 100 lbs bags of silica sand used. Casing installed directly in the hole. No heaving. 1' bentonite. No unusua events.

Construction: Stick up - 2.5'
Bottom of casing at 24.5' (casing floated up, so 6" removed from top)
Hole - 27' deep.
Standard construction otherwise.

2:30 Left Location.

11/4/86 Paul D. Conrad
DATE SIGNED

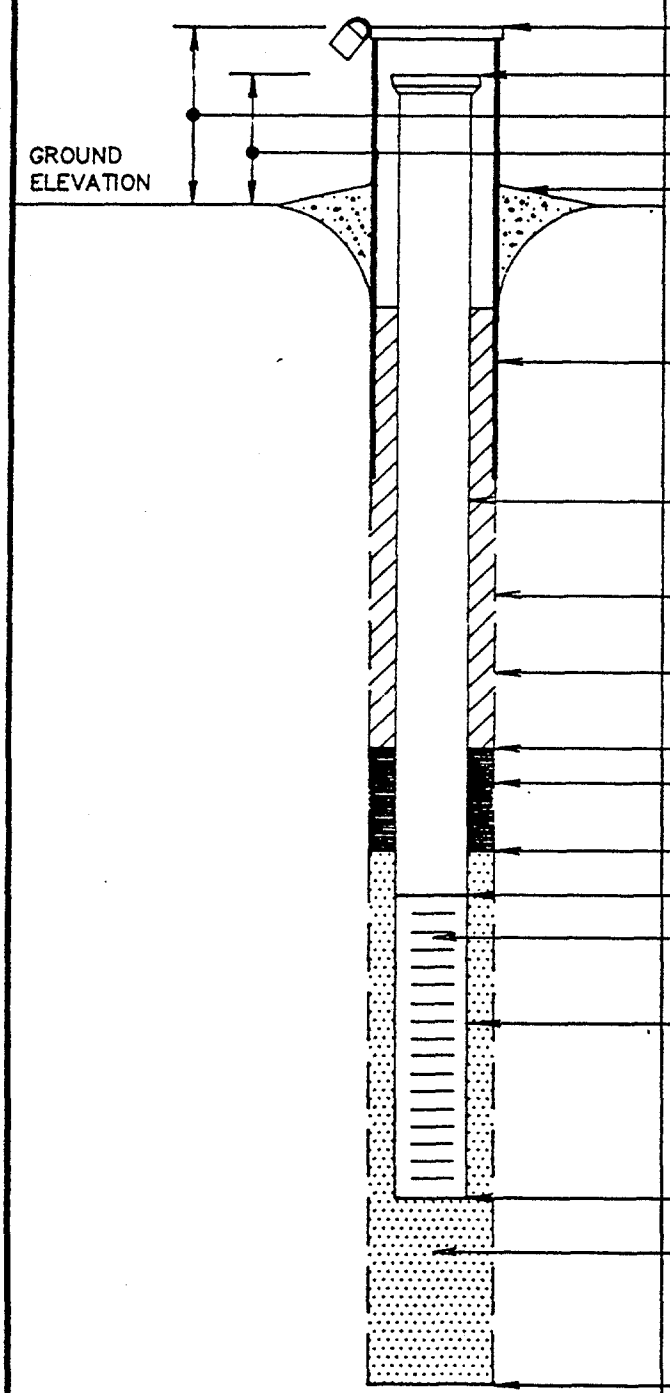
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW4

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-02036 BORING NO. HP-GW4
ELEVATION DATE 11/4/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 31.80'
ELEVATION OF TOP OF RISER PIPE: 31.66'
STICK-UP TOP OF SURFACE CASING: 2.74'
STICK-UP RISER PIPE: 2.60'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5'
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 4.5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 24.5'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

MP 6W 4

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, NC County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp Lejeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/4/86 USE OF WELL monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 18.03 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.5' FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0		2"	1/8"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		Concrete	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	-5.0	-25		2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25'		Coarse	Sand

DRILLING LOG

Depth From - To	Formation Description
0.0 - 1.5	Silty Peat
1.5 - 4.5	Silty Fine Sand
4.5 - 6.0	Clayey Fine Sand
6.0 - 9.0	Fine Sandy Clay
9.0 - 10.5	Silty Clayey Fine San
14.0 - 15.5	Clay
19.0 - 25.5	Marl

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See sketch attached to Fig (2.5).

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/9/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Page 1 of 4

Boring No. HPGW5 Coordinates N

Hole Size 6" Slot 0.010" E

Screen Size 2" Mat'l Sch 40 PVC Filter Materials Silica Sand

Casing Size 2" Mat'l PVC Grout Type 1' Bentonite Seal

Geologist Paul Conrad Development

Date Start 11/4/86 Finish 11/4/86 Static Water Level 16.13'

Contractor Davis Drilling Co. Top of Well Elevation 18.63'

Driller Charles Smith Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
0-1.5			Peat, sand ~5%, moist, non-plast, loose, organics, roots, color 10YR 3/1 (v.drk. gry).	Pt	2-3--
1.5-3			fine sandy silt, sand 15-20%, some roots, moist, non-plast, color 10YR 3/1 (v.drk gry); Loose	ML	3-5-5
3-4.5			fine sandy silt, sand ~10%, moist, non-plast., color, med. dense, color 10YR 3/1 (v. drk gry) w/ thin bands of 10YR 5/3 (brown).	ML	3-5--
4.5-6			fine sandy silt, sand 10-15%, moist, loose, non-plast., color 10YR 7/2 (light gry), some mottling of 10YR 7/6 (yllw).	ML	2-3-3

CLEJ-00414-03.13-04/01/92

Boring No. _____ tes N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start _____ Finish 11/4/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
6-7.5			fine sandy silty clay, sand 5-10%, silt <5%, slight plast., moist, color 5Y 6.5/1 (gray), 5% mottled w/ 10YR 8/8 (yllw).	CL	1-2-
7.5-9			fine sandy silty clay, sand 20-25%, silt ~15%, slight plast, v. moist, soft, color 10YR 7/2 (light gry), heavily mottled w/ 10YR 6/8 (brnish yllw).	CL	2-2-3
9-10.5			Silty fine sand, silt 12-15%, clay zones 5-10%, non-plast. (except clays), loose, v. moist, color 10YR 7/2 (light gry), mottled w/ 10YR 6/8 (brnish yllw).	SM	3-5-[illegible]
14-15.5			Clay, clean, massive, high plast, wet, color 5GY 5.5/1 (greenish gry), soft.	CH	6-2-3

CLEJ-00414-03.13-04/01/92

Boring No. _____ Coordinates N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

Casing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start _____ Finish 11/4/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
19-20.5			Same description as above, med. stiff.	CH	3-3-:
24-25.5			silty fine sand, silt 10-15%, saturated, unif. sand grains, v. loose, color 2.5 Y 6/4 (light yllwish brn), mottled w/ 7.5 YR 5/6 (strong brn).	SM	2-2-.

Boring No. ~~X~~ MRGW3 SHEET 4 OF 4

i ? Washing rig.

Began sampling & drilling.

3:35pm Drilling finished. Pulled all augers out. Hole open. Pouring silica sand.

3:40pm Well complete. Four 100 lb bags silica sand used.

Standard construction configuration. Hole 27' deep.

Dismantling augers and cleaning up.

4:30pm Left site.

11/4/86 DATE

Paul D. Conrad SIGNED

SOURCE: Environmental Science and Engineering, Inc., 19

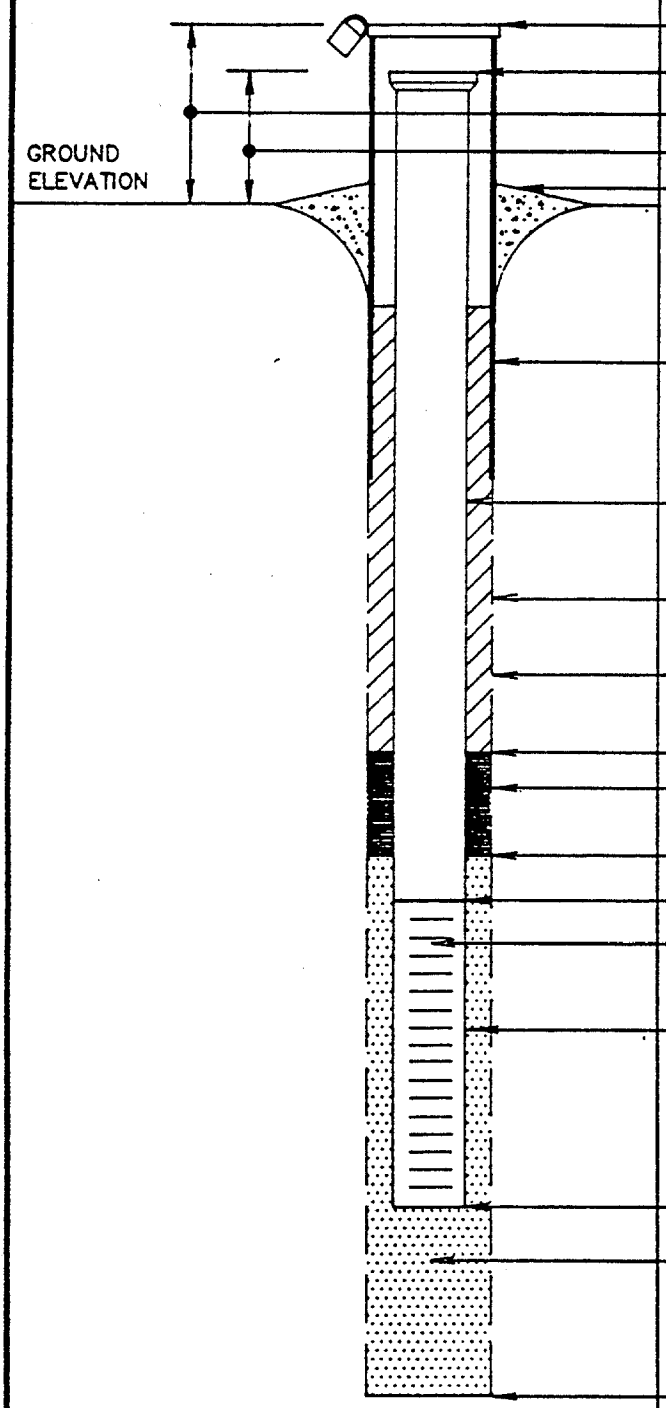
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW5

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune HP1A
PROJECT NO. 49-02236 BORING NO. HP-GW5
ELEVATION DATE 11/4/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 28.70'
ELEVATION OF TOP OF RISER PIPE: 28.49'
STICK-UP TOP OF SURFACE CASING: 2.18'
STICK-UP RISER PIPE: 1.97'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

PGW 5

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C.
(Road, Community, or Subdivision and Lot No.)
County: Onslow

2. OWNER US Navy
ADDRESS Camp Lejeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/4/86 USE OF WELL monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 16.13 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0		2"	40"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		Concrete	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size in.	Material
	-5.0	-25		2"	0.01	PVC

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25'		Coarse	Sand

14. REMARKS: _____

DRILLING LOG

Depth From	To	Formation Description
0.0	1.5	Silty Peat
1.5	6.0	Fine Sandy Silt
6.0	9.0	Fine Sandy Silty Clay
9.0	14.0	Silty Fine Sand
14.0	15.5	Clay
19.0	20.5	Clay
24.0	25.5	Fine Silty Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See sketch attached to Fig. (2-5).

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Edward A. Smith 2/9/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

Boring No. HP 6U **CLEJ-00414-03.13-04/01/92** s N _____

Hole Size 6" Slot 0.01 E _____

Screen Size 2" Mat'l PVC Filter Materials Silica Sand

asing Size 2" Mat'l PVC Grout Type Bentonite Pellets

G logist David Brentlinger Development —

Date Start 11/18/86 Finish 11/18 Static Water Level 16.25'

Contractor ESE Top of Well Elevation 18.75'

Driller Davis Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			10YR 6.5/3 Pale- Very Pale Brown, Silty Fine Sand (silt 30%), Organic matter top 3", Loose, moist, non plastic	SM	3 4 7
1.5-3.0			2.5Y 5.5/4 light olive Brown, Silty Clayey Fine Sand, (silt+Clay 45%), loose - Slightly dense, moist, slightly plastic	SM/SC	4 2 4
3.0-4.5			10YR 6/4 light Yellow Brown same as above (1.5-3.0)	SM/SC	3 4 7
4.5-6.0			10YR 6/8, Brown Yellow, Silty Clayey Fine Sand (silt+ Clay 35%), non plastic, moist, slightly dense	SM	4 7 8
6.0-7.5			10YR 6.5/1 Grey- Light grey with Red oxide streaks throughout, clean clay, firm, dense, plastic, moist	CL	2 2 3

Boring No. HP6W1 **CLEJ-00414-03.13-04/01/92** N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

Ge ogist _____ Development _____

Date Start _____ Finish _____ Static Water Level _____

Contractor _____ Top of Well Elevation _____

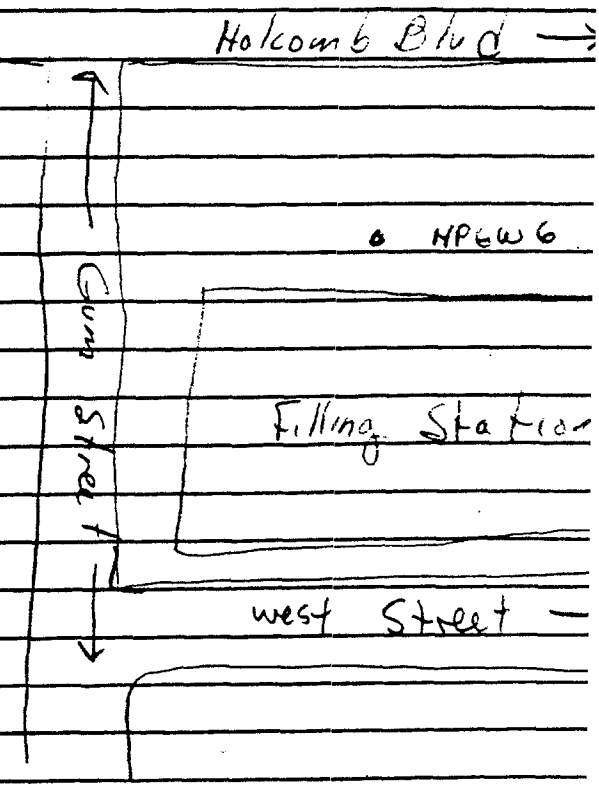
Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			Sump as above (6.0-7.5) Bottom 6" non plastic	CL	3 6 8
9.0-10.5			10YR 6.5/1 light grey, ultra fine - Fine Sand with 10% silt, loose, moist, non plastic	SW	5 9 12
14.0-15.5			10YR 6.5/3, Pale - very Pale Brown silty fine Sand, (silt 15-20%) moist - wet, slightly dense, non plastic	SM	7 11 13
19.0-20.5			10YR 7/4.5 very Pale yellow - yellow, silty Sandy Clay (silt + Sand 70%), sticky, Plastic, wet, slightly dense	SC	12 13 8
24.0-25.5		24.0-24.80	10YR 7.5/1 light grey soft clean, very plastic clay wet, slightly dense	CL	5 7 9
		24.8-25.5	10YR 7.5/2 light grey - very pale white brown, wet, sticky med. Sandy Clay Sand 30%	SC	

Boring No. HPC-- SHEET 1 OF

On Site 730 am 11/18/86
1st Spoon 735
1st Spoon 815
Well Complete 840

Standard Well Space



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., I

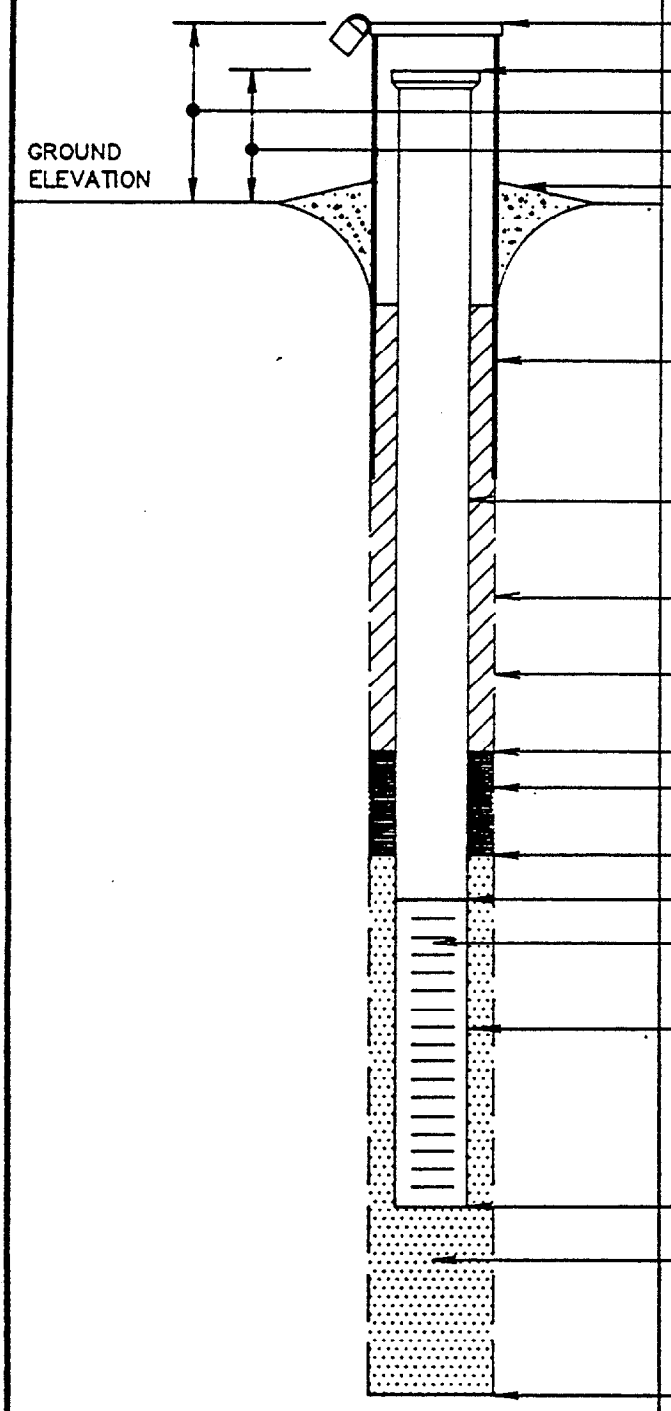
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW6

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune HP1A
PROJECT NO. 49-02036 BORING NO. HP-GW6
ELEVATION DATE 11/18/86
FIELD GEOLOGIST David Brentlinger (ESE)

DRILLER Davis Drilling Co
DRILLING METHOD Hollow stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 28.05'
ELEVATION OF TOP OF RISER PIPE: 27.92'
STICK-UP TOP OF SURFACE CASING: 2.51'
STICK-UP RISER PIPE: 2.38'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" X 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW6

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 06-0135-WM-0140

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/18/86 USE OF WELL monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☐ No
6. STATIC WATER LEVEL: 16.25 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.5' FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0		2"	1/8"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		concrete	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	-5.0	-25'		2" in.	0.01 in.	PVC
				in.	in.	
				in.	in.	

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25		Coarse	Sand

14. REMARKS: _____

DRILLING LOG

Depth From	To	Formation Description
0.0	1.5	Silty fine sand
1.5	6.0	Silty Clayey fine Sand
6.0	9.0	Clay
9.0	10.5	ultra fine Sand
14.0	15.5	Silty fine Sand
19.0	20.5	Silty Sandy Clay
24.0	24.8	Clay
24.8	25.5	Sandy Clay

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Sketch attached to fig. (2-5).

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT [signature] DATE 2/10/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HP 61
Hole Size 6"
Slot 0.01
Screen Size 2"
Mat'l PVC
asing Size 2"
Mat'l PVC
Ge ogist David Brentlinger
Date Start 11/18/86
Finish 11/18
Contractor ESE
Driller Davis

N
E
Filter Materials Silica Sand
Grout Type Bentonite Pellets
Development —
Static Water Level 14.33'
Top of Well Elevation 16.83'
Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			10YR 6.5/3 Pale - Very Pale Brown, Silty Fine Sand (silt 30%), loose, moist, non plastic, organic matter top 6"	SM	6 10 10
1.5-3.0			10YR 5.5/4 Light Yellow Brown, Silty Fine Sandy Clay (silt+Sand 40%) moist, slightly plastic, med. dense	SC	3 5 5
3.0-4.5		3.0-3.9	Same as above (1.5-3.0)		
		3.9-4.5	10YR 8/1 white ultra fine - fine sand, loose, dry - moist, non plastic	SC/SW	6 5 5
4.5-6.0		4.5-5.5	Same as above (3.9-4.5)		
		5.5-6.0	10YR 5.5/8 yellow brown - yellow, silty Clayey Fine Sand (Clay + silt 45%) Slightly plastic, moist, mod. dense	SW/SM	8 10 8
6.0-7.5			2.5Y 6.5/4 light yellow brown - Pale yellow, Silty Clayey Fine Sand (silt + Clay 38%), moist Slightly dense, non plastic	SM	8 10 15

Boring No. HP

CLEJ-00414-03.13-04/01/92

s N

E

Hole Size _____ Slot _____

Screen Size _____ Mat'l _____

asing Size _____ Mat'l _____

G 'ogist _____

Date Start _____ Finish _____

Contractor _____

Driller _____

Filter Materials _____

Grout Type _____

Development _____

Static Water Level _____

Top of Well Elevation _____

Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			10YR 6.5/8 yellow brown - brown yellow, silty Clayey Fine Sand (Silt + Clay 30%), moist, non plastic, slightly dense	SM	5 6 6
9.0-10.5			10YR 7.8/8, yellow, very silty ultra fine sand, (Silt 30-40%), loose, moist non plastic	SM	8 7 6
14.0-15.5			10YR 6.5/4 very pale yellow Brown, Same as above (9.0-10.5) with more density	SM	9 12 15
19.0-20.5			2.5Y 8/2 white - pale yellow, silty fine - med. sand (silt 10-15%), wet, Slightly dense	SW	6 8 10
24.0-25.5			2.5Y 7.5/2 light grey - pale yellow, silty Clayey med. Sand (silt + Clay 40%), sticky and plastic in Clay layers, wet, slightly dense	SM / SC	3 3 3

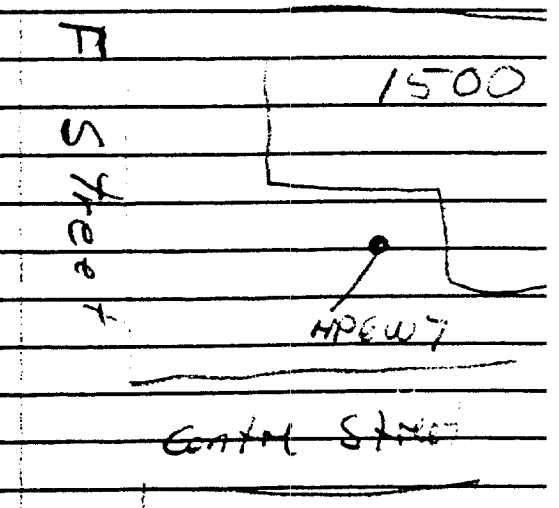
CLEJ-00414-03.13-04/01/92

Boring No. HF

SHEET 1 OF

On Site 855 Am 11/18/86
1st Spoon 900
last Spoon 940
Well Complete 1040

Standard Well Specs



DATE

SIGNED

SOURCE: Environmental Science and Engineering, Inc., 1

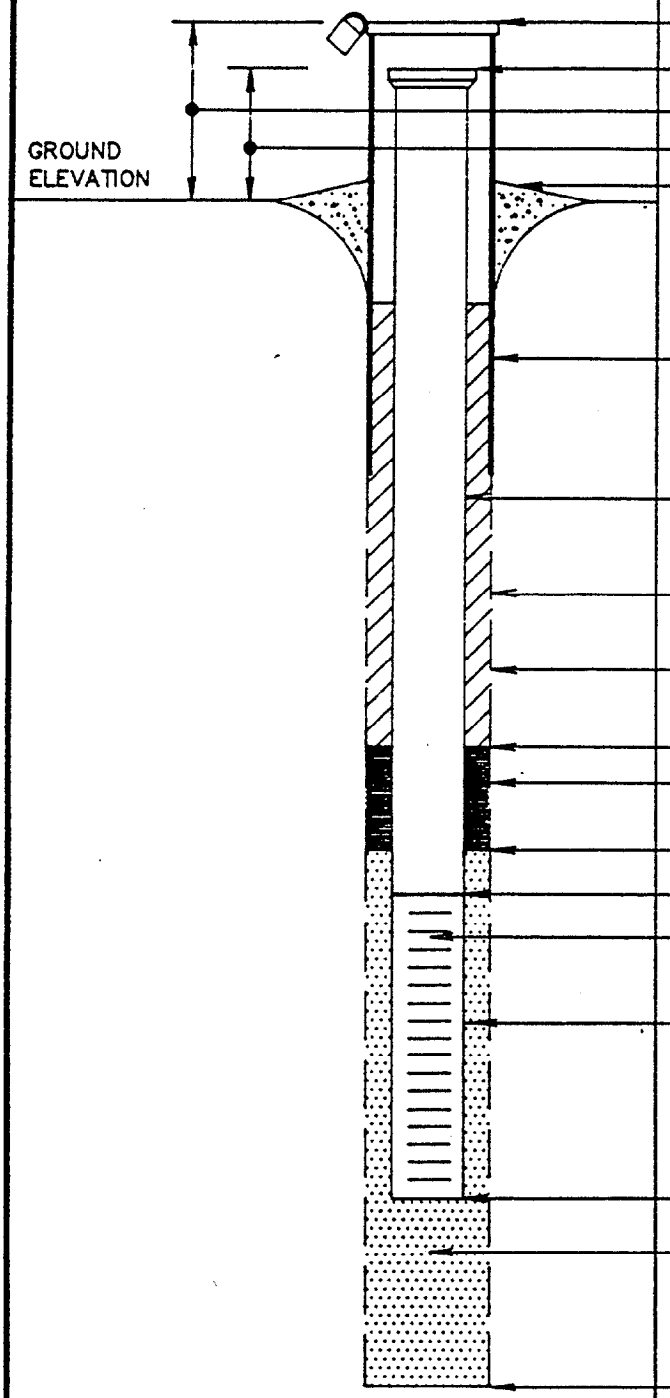
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW 7

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune HPIA
PROJECT NO. 49-C2036 BORING NO. HP-GW 7
ELEVATION DATE 11/6/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 27.98'
ELEVATION OF TOP OF RISER PIPE: 27.81'
STICK-UP TOP OF SURFACE CASING: 2.26'
STICK-UP RISER PIPE: 2.09'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

P6W7

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C.
(Road, Community, or Subdivision and Lot No.)

County: _____

2. OWNER US Navy
ADDRESS Camp Lejeune, NC 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/18/86 USE OF WELL monitor
4. TOTAL DEPTH 25' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 14.33 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25'	Coarse	Sand

DRILLING LOG

Depth From	Depth To	Formation Description
0.0	3.9	Silty Fine Sand
3.9	5.5	Ultra Fine Sand
5.5	9.0	Silty Clayey Fine Sand
9.0	10.5	Very Silty Ultra Fine Sand
14.0	15.5	Very Silty Ultra Fine Sand
19.0	20.5	Silty Fine-Med. Sand
24.0	25.5	Silty Clayey Med. Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See fig. (2-5)

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE ~~WITH 15~~ NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Dave Pendley 2/10/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HPGW8 ~~[illegible]~~ | Coordinates N _____ | Page 1 of [illegible]

Hole Size 6" | Slot 0.010 | E _____

Screen Size 2" | Mat'l PVC | Filter Materials Silica Sand

Casing Size 2" | Mat'l PVC | Grout Type Bentonite Seal - 1'

Geologist Paul Conrad | Development _____

Date Start 11/6/86 | Finish 11/6/86 | Static Water Level 13.33

Contractor Davis Drilling | Top of Well Elevation 15.83'

Driller Charlie Smith | Drill Type Hollow Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-1.5			Silty Fine Sand, silt 15-20%, moist, med. dense, non-plast, color mottled around 10YR 5/3 (brown). Top 2" black & organic.	SM	4-6-10
1.5-3			Silty Fine Sand, silt 12-17%, moist, loose, non-plast., color 2.5Y 6.5/4 (light yellowish brn) mottled w/ cleaner sand 2.5Y 8/2 (white), occ. clayey (soft) nodules (small).	SM	3-3-6
3-4.5			Silty Fine Sand, silt ~15-20%, ~3% clay, loose, non-plast, color uniform 2.5Y 6.5/2 (light gry), S. moist.	SM	5-4-
4.5-6			Sandy Clay, sand 15-20%, med. [illegible], moist, low plast, color [illegible] 5.5/2 (light brnish gry) [illegible] 10YR 6/2 (brnish yellow) [illegible]	CL	2-4-

CLEJ-00414-03.13-04/01/92

Boring No. _____ Coordinates N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

Casing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start _____ Finish 10/6/86 Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
6-7.5			Fine Sand, silt 5-10%, fainly clean, s. moist, non-plast, med. dense, mottled color clean white and 10YR 7/2 (light grey) silty zones are light grey.	SP	5-6-10
7.5-9			Fine Sand, silt 10-12%, moist, non-plast, [illegible] dense, color 2.5Y 7/2 (light grey), mottled with slightly lighter shade.	SP	5-7-1
9-10.5			Silty Clayey Fine Sand, silt 12-15%, clay ~5-10%, moist, small soft clayey nodules (plast.), silty sand non-plast, med. dense, color mottled - 2.5Y 7/4 (pale yllw) ~ 85% 10YR 8/2 (white) ~ 5% 7.5YR 6/8 (reddish yllw) ~ 10%	ML	5-5-[illegible]
14-15.5			Peat, massive, fibrous, [illegible] under not under, fine sand 5-10%, trace [illegible] fragments non-plast, [illegible] 10YR 2/1.5 (v. d. brown) [illegible]	Pt	[illegible]

Boring No. 4

Hole Size _____ Slot _____

Screen Size _____ Mat'l _____

Casing Size _____ Mat'l _____

Geologist _____

Date Start _____ Finish _____

Contractor _____

Driller _____

Location Coordinates N _____

E _____

Filter Materials _____

Grout Type _____

Development _____

Static Water Level _____

Top of Well Elevation _____

Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
19-20.5			Silty Fine Sand, silt 15-20%, clay ~5%, non-plast, small soft clayey zones slightly plast., dense, sat'd., color unif. 5Y 6/5/2 (light olive gry).	SM	8-12-2[illegible]
24-25.5			Fine Sand, silt 5-8%, unif. qtz grains, non-plast, med. dense, sat'd, color 2.5Y 7/2 (light gry) uniform.	SP	5-8-10

Boring No. 4 HFQW0 SHEET 4 OF 4

— Charlie drilling w/ helper hired yesterday (no exp

7:30am Arrived at Camp Lejeune.
Prep'd. for drilling.

8:25am Began drilling & sampling. Location moved from near Bldg. 1500 to 1401' to avoid buried utilities. App'd. by Bob Alera

9:15 am Last spoon. Assembled Casing.
2 5' auger sections pulled out,
pouring silica sand thru augers.

9:45 am Augers out. 1½ bags silica sand in hol
Hole staying open.

10:00 am. Well complete. 4+ bags (100 lb each) si
sand used. 1' Bentonite Seal. placed.

Standard construction (27' hole, 25' cas
below ground, 2.5' stick up, 5" point at cas
bottom, bottom 20 ft. is screen).

Washing rig. Prepping for next hole

4/1/92 [illegible] Conrad
DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc.

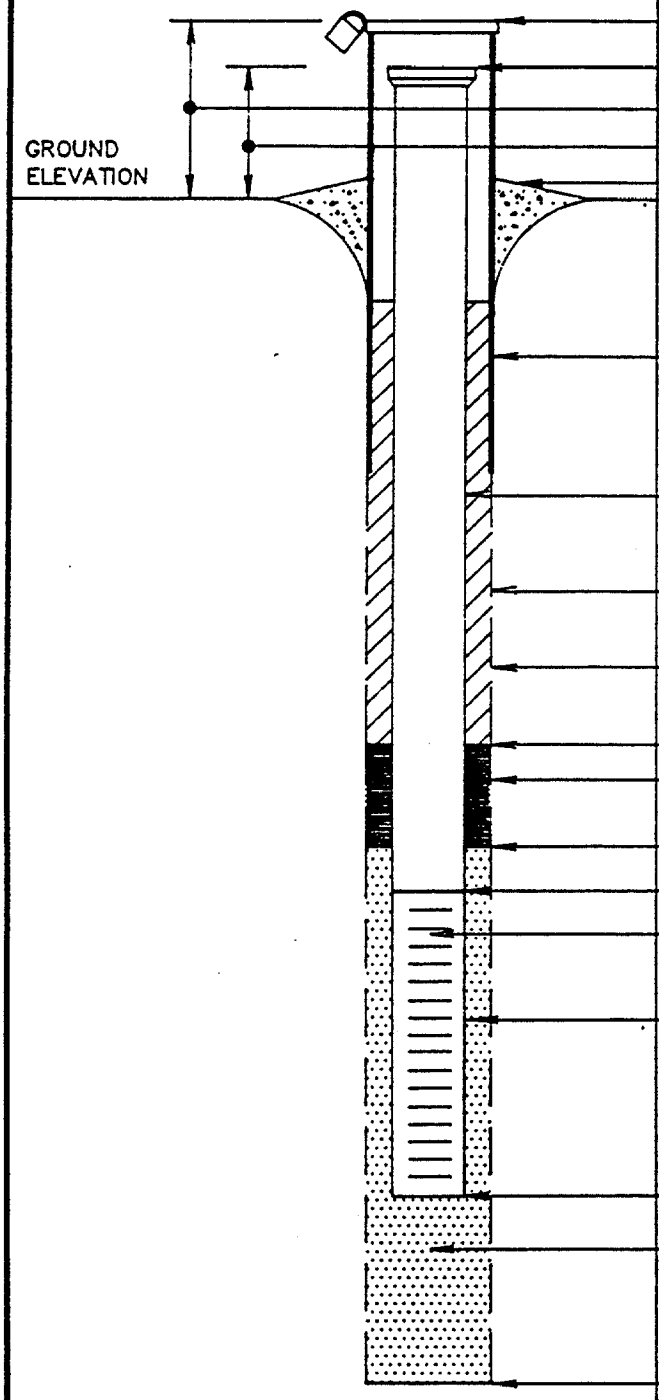
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW8

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune HP1A
PROJECT NO. 99-C2C36 BORING NO. HP-GW8
ELEVATION DATE 11/6/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 28.78'
ELEVATION OF TOP OF RISER PIPE: 28.61'
STICK-UP TOP OF SURFACE CASING: 3.23'
STICK-UP RISER PIPE: 3.12'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HGW 8

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 06-035-WM-016

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune (Street or Route No.) 28542
City or Town State Zip Code
3. DATE DRILLED 11/6/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 13.33 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25	2"	0.01	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25	Course	Sand

DRILLING LOG

Depth From - To	Formation Description
0.0-4.5	Silty Fine Sand
4.5-6.0	Fine Sandy Clay
6.0-9.0	Fine Sand
9.0-10.5	Silty Clayey Fine Sand
14.0-15.5	Peat
19.0-20.5	Silty Fine Sand
24.0-25.5	Fine Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig (2-5)

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 2/10/87

Submit original to Division of Environmental Management and copy to well owner.

GW-1 Revised 11/84

CLEJ-00414-03.13-04/01/92

Boring No. HPGW9

Hole Size 6" Slot 0.010

Screen Size 2" Mat'l PVC

Casing Size 2" Mat'l PVC

Geologist Paul Conrad

Date Start 11/6/86 Finish

Contractor Davis Drilling

Driller Charlie Smith

Coordinates N

E

Filter Materials Silica Sand

Grout Type Bentonite Seal - 1'

Development

Static Water Level 15.63'

Top of Well Elevation 18.13'

Drill Type Hollow Stem Auger -

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-1.5			Top 8" - mixture Peat, clay, silt, organic debris, roots, misc. gravel.		3-4-
			Silty Fine Sand, silt ~25%, non-plast, moist, color 10YR 5/3 (brown), trace mottling of 10YR 6/6 (brnish yellow), loose.	SM	
1.5-3			Silty Fine Sand, silt 20-25%, clay 3-5%, non-plast, s. moist, loose, color 10YR 5.5/4 (light yllwish brn) Trace mottling of 7.5YR 5/8 (strong brn), strong brown better cemented, several small frag's. of baked clay (float from sewer installn?)	SM	3-4-4
3-4.5			Silty Fine Sand, silt 20-25%, clay-trace, non-plast., v. loose, s. moist, color 10YR 6/4 uniform. (light yllwish brn), sand uniform	SM	1-2-2
4.5-6			Silty Fine Sand silt 20-25%, clay ~5%, s. moist, loose, sand uniform, non-plast. (except clayey zones), color 10YR 6/4 (light yllwish brn)	SM	3-5-

2 of

Boring No. 41 | Location Coordinates N _____ E _____

Hole Size _____ Slot _____

Screen Size _____ Mat'l _____ | Filter Materials _____

Casing Size _____ Mat'l _____ | Grout Type _____

Geologist _____ | Development _____

Date Start _____ Finish _____ | Static Water Level _____

Contractor _____ | Top of Well Elevation _____

Driller _____ | Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
6-7.5			Silty Fine Sand, ~50% fairly clean loose sand, ~50% silty fine sand (~3% clay), med. dense, s. moist, mottled color 10YR 8/2 (white) sand and 10YR 6/6 (brnish yllw), silt in silty sand ~20-25%.	SM	3-5-
7.5-9			Silty Fine Sand, silt ~20%, moist, med. dense, color 10YR 6/6 (brnish yllw), s. lighter mottling	SM	5-7
9-10.5			Silty Fine Sand, moist, non-plast, med. dense, color 2.5Y 6/5 (light yllwish brn) mottled w/ lgt brnish gry and rdish yllw, cluster of fine black fibres noted (fragile) - blk roots?	SM	5-6-
~~14~~-15.5			Clayey Fine S[illegible], clay 5-[illegible] strong [illegible] color [illegible]	SP	6-[illegible]

Boring No. H HPGW9 SHEET 3 OF

9-20.5 Fine Sand, ~5% fines, color 10YR 8/1 (white), saturated, v. foul odor (as above) uniform grain size, med. dense. 7-13-

SP

24-25.5 Clayey fine sand, clay ~5%, unif. grains, non-plast (slight in trace zones), v. foul odor (as above), med. dense, color 10 YR 8/2 (white), uniform. 7-12-

DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc.

Boring No. K HPGW9 SHEET 4 OF 4

11:05 am Began drilling & sampling.

12:05 pm Last spoon. Began backing augers an pouring silica sand. Odor rising from hole. Casing installed. Odor resembles natural gas(?), solventz *

12:30 All augers out. Pouring sand. Hole open.

12:45 Bentonite in. Well complete.

Standard construction. Hole 27' deep. 4 bags silica sand used.

Driller back to W.W.T. plan to load up sand. Paul to Base Telephone to locate next site's cables. Also coordinate w/ other rig.

15 min. lunch Brk.

* Driller did not notice any drilling difficulty. Geologist found no metal shavings or other indications of hitting pipeline. Propane tank ~30' away, but odor not exactly like propane. Observed no change in propane tank gauge. Evident from soil gas results that the odor is probably from solvents.

Because of near completion of well and the odor level, judgement was made to quickly complete the well.

DATE SIGNED

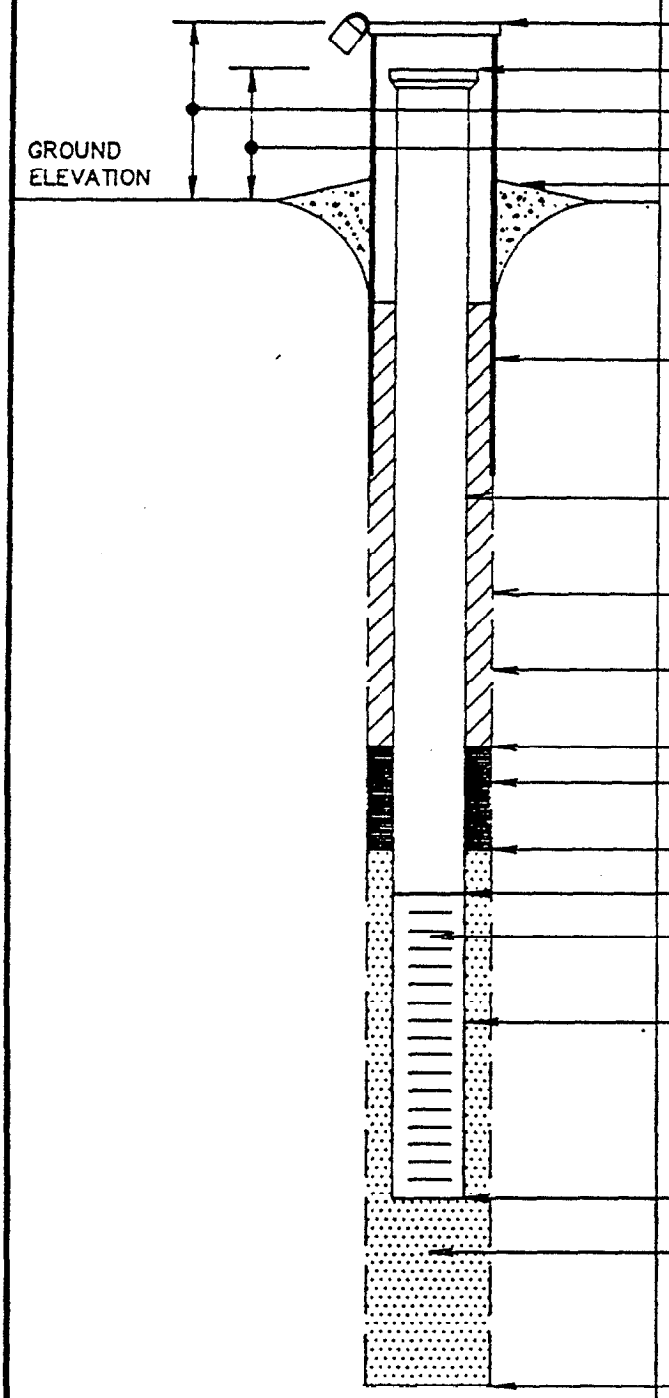
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW9-1

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-C2C36 BORING NO. HP-GW9-1
ELEVATION DATE 11/6/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 29.26'
ELEVATION OF TOP OF RISER PIPE: 29.16'
STICK-UP TOP OF SURFACE CASING: 2.45'
STICK-UP RISER PIPE: 2.35'
TYPE OF SURFACE SEAL: cement

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: cement

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN:
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

MW-9

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/6/86 USE OF WELL monitor

4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No

6. STATIC WATER LEVEL: 15.63 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): _____ METHOD OF TEST _____

8. WATER ZONES (depth): _____

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0 Ft.	2"	1/8"	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0 Ft.	Concrete	
	-2.0	-3.0 Ft.	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25' Ft.	2" in.	0.01 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25' Ft.	Coarse	Sand
		Ft.		

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
0.0	10.5	Silty Fine Sand
14.0	15.5	Clayey Fine Sand
19.0	20.5	Fine Sand
24.0	25.5	Clayey Fine Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See sketch attached to Fig. (2-5).

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/10/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

Geologist: [illegible]th,
Date: 11/6/86 Davis Drilling Co. Sheet 1 of
Well: #3 (near [illegible]) TOC - 15.00'
static - 12.50'

Depth (ft)	Lithology & color	USCS	SPT (BPF)
0-1.5	Top six inches. Peat w/ fine sand 10-15% roots & organic [illegible], color 10YR 2/1 (blk)	Pt	3-3-6
	Fine Sandy silt, sand 15-20%, high root content, non-plast, loose, color 10YR 4/2 (drk. grayish brn), moist.	ML	
1.5-3	Silty Fine Sand, silt ~10-15%, trace clay, color 10YR 6/4 (light yllwish brn), trace mottling of 10YR 6/8 (brnish yllw), s. moist, non-plast. (except trace clayey zones), med. dense.	SM	6-9-6
3-4.5	Same as above	SM/CL	3-3-2
	2" Fine Sandy Clay bed at 4', sand 25-30%, low plast., moist, color 10YR 5.5/4 (light yllwish brn), mottled w/ blck zones		
	4'-4.5': Silty Fine Sand, very light weight, (sand?), color 10YR 3.5/1 (drk gry), loose.		
4.5-6	Silty Clayey Fine Sand, silt 10-15%, clay ~10%, v. slight plast. in clayey zones, otherwise non-plast., v. loose, moist, color mottled 10YR 5/3 (brwn) and 10YR 7/8 (yllw)	ML	1-1-1

6'-7': Same as above. (ML)

6-7.5 7-7.5': Silty Fine Sand, silt ~12-15%, v. loose, (SM) 1-1-
non-plast., moist, mottled → clean
white 10%; 7.5YR 6/8 (reddish yllw) ~15%,
and 2.5Y 6/4 (light yllwish brn)

7.5-9 Silty Fine Sand, silt ~15%, trace (SM) 2-2-
clay, moist, mottled color, clean
sand 10YR 8/1 (wht), silty sand 7.5YR
5/8 (strong brn) to white, v. loose.

9-10.5 Silty Fine Sand, silt 15-20%, loose, (SM) 2-4-
same descript. as above except
Strong brwn color dominant ~ 75%.

14-15.5 Peat, massive, v. soft, saturated, (Pt) 3-2-
sand ~ 10%, color 10YR 2/1.5 (v.
drk brn), stains hands, foul odor not
evident, non-plast.

WELL #3 HP GW 10

30

19-20.5 Silty Fine Sand, silt 15-20%, trace clay, sat'd, med. dense, grains uniform, unif. color 2.5Y 7/2 (light gry); occ sprinkling of strong brown or v. thinly bedded reddish yllw silts, v. slight plast. to none. (SM) 6-7-7

24-25.5 Silty V. Fine Sand, silt 15-20%, trace clay, sat'd., dense, grains uniform, color unif. 5Y 8/2 (white), non-plast. (SM) 12-20-

~~WELL #5~~ HPGW10

11/6/36 Log

:50 pm. Began drilling & sampling.

3:05 Last Spoon. Backing out inner tri-cone string, and then augurs. Assembling and installing casing.

3:30 All augers out. Hole open. No foul odor evident.

3:45 Well complete. 4 bags of silica sand used (100 lb. each). 1' bentonite placed.
Standard Construction. Hole 27' deep.
No unusual events.

1:15 Back at w.w.t. plant. Rig washed. Quit for day.

9:00 pm - 12:15 a.m. Constructed master maps of Industrial Area, which included all soil gas and locations of the ~18 characterization wells. Maps hung on Beach house wall for Bob Gregory's use in siting new wells, and general reference purposes.

1/2 hour spent coordinating on well development.

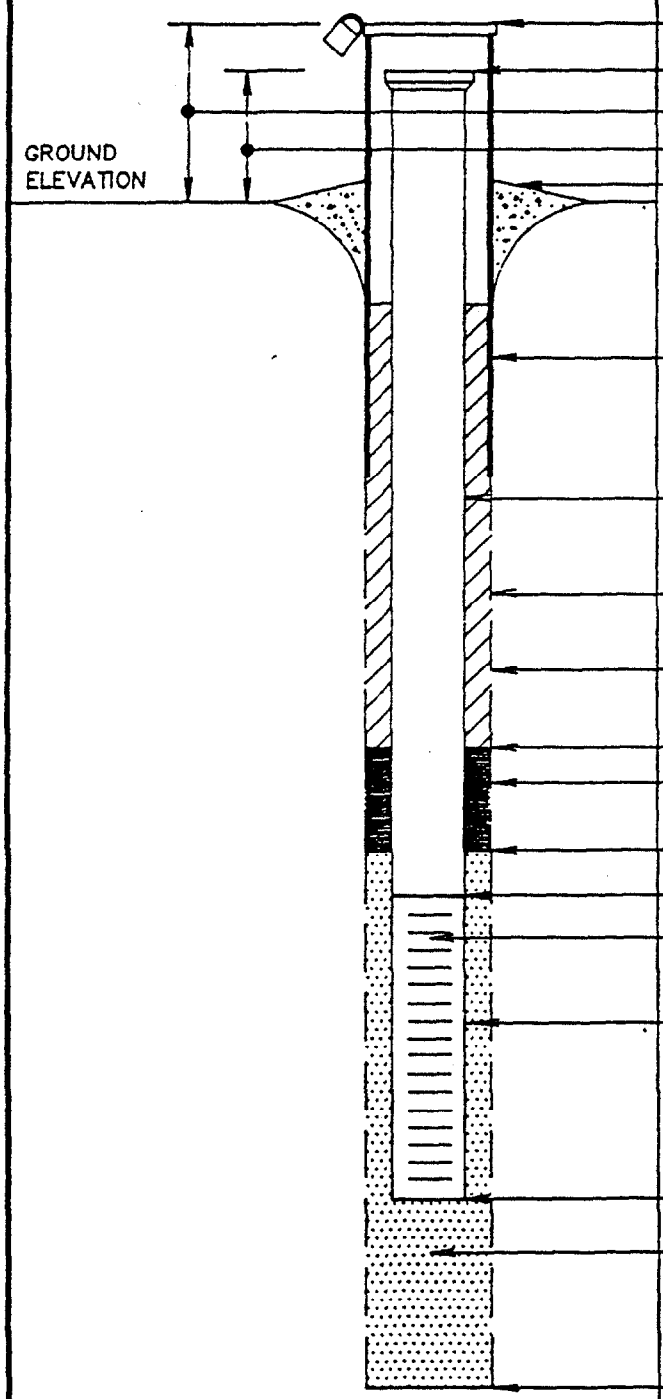
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW10

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-02636 BORING NO. HP-GW10
ELEVATION DATE 11/6/86
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Davis Drilling Co
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 28.68'
ELEVATION OF TOP OF RISER PIPE: 28.17'
STICK-UP TOP OF SURFACE CASING: 2.73'
STICK-UP RISER PIPE: 2.22'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 27'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HPGW 10

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp Lejeune NC 28542
(Street or Route No.) City or Town State Zip Code
3. DATE DRILLED 11/6/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 12.50 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

Depth From	To	DRILLING LOG Formation Description
0.0	1.5	Silty Peat
1.5	3.0	Silty Fine Sand
3.0	4.5	Silty Fine Sand and Sandy Clay
4.5	6.0	Silty Clayey Fine Sand
6.0	10.5	Silty Fine Sand
14.0	15.5	Peat
19.0	20.5	Silty Fine Sand
24.0	25.5	Silty Vi Fine Sand

If additional space is needed use back of form.

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0 Ft.	2"	1/8"	PVC
		Ft.			
		Ft.			

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0 Ft.	Concrete	
	-2.0	-3.0 Ft.	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25' Ft.	2" in.	0.01 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25' Ft.	Coarse	Sand
		Ft.		

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 2/11/8

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HP6 N

Hole Size 6" Slot 0.01 E

Screen Size 2" Mat'l PVC Filter Materials Silica Sand

Casing Size 2" Mat'l PVC Grout Type Bentonite Pellets

Geologist David Brentlinger Development —

Date Start 11/18/86 Finish 11/18 Static Water Level 13.57'

Contractor ESE Top of Well Elevation 16.07'

Driller Davis Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0 - 1.5			2.5Y 6.5/6 yellow - olive yellow, silty fine sand (silt 25%), organic matter top 2", loose, moist, non plastic	SM	5 3
1.5 - 3.0			10YR 7.8/5.5 very pale brown yellow, silty fine sand (silt 10-15%), loose, moist, non plastic, Brown mottles throughout	SM	2 3 3
3.0 - 4.5			10YR 5.25/8 Brown yellow-yellow Brown, silty clayey fine sand (silt + clay 35%) slightly dense, moist, non plastic	SM	3 3 6
4.5 - 6.0			10YR 7.8/6, yellow, silty fine sand, (silt 30%) loose, moist, non plastic	SM	3 5 8
6.0 - 7.5			7.5YR 7/8, Red yellow, silty fine sand (silt 30%) loose, moist, non plastic	SM	4 5 8

Boring No. HP

CLEJ-00414-03.13-04/01/92

N

E

Hole Size Slot

Screen Size Mat'l

Filter Materials

asing Size Mat'l

Grout Type

Ge ogist

Development

Date Start Finish

Static Water Level

Contractor

Top of Well Elevation

Driller

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			7.5YR 5.25/8 Strong Brown, Silty fine Sand with 10% Clay mottles throughout (silt 25%), slightly dense-moist, non plastic	SM	3 6 8
9.0-10.5		9.0-9.75	10YR 6.5/6 yellow Brown, Silty Clayey fine Sand (silt + clay 40%), slightly dense, moist, non plastic	SC	15 8
		9.75-10.5	10YR 7.5/1 light grey white, silty fine Sand (silt 10-15%) loose, dry-moist, non plastic	SW	8
14.0-15.5			10YR 5.25/3 Pale brown-brown silty fine Sand (silt 25%), slightly dense, moist, non plastic	SM	15 8 13
19.0-20.5			10YR 5.5/4 Brown-light yellow Brown, same as above (14.0-15.5)	SM	14 8 8
24.0-25.5			10YR 7.25/4, very pale brown, Clayey fine-med. Sand (clay 40%), sticky plastic clay layers throughout, wet, slightly dense, 10% Coarse material	SC / SW	3 4 4

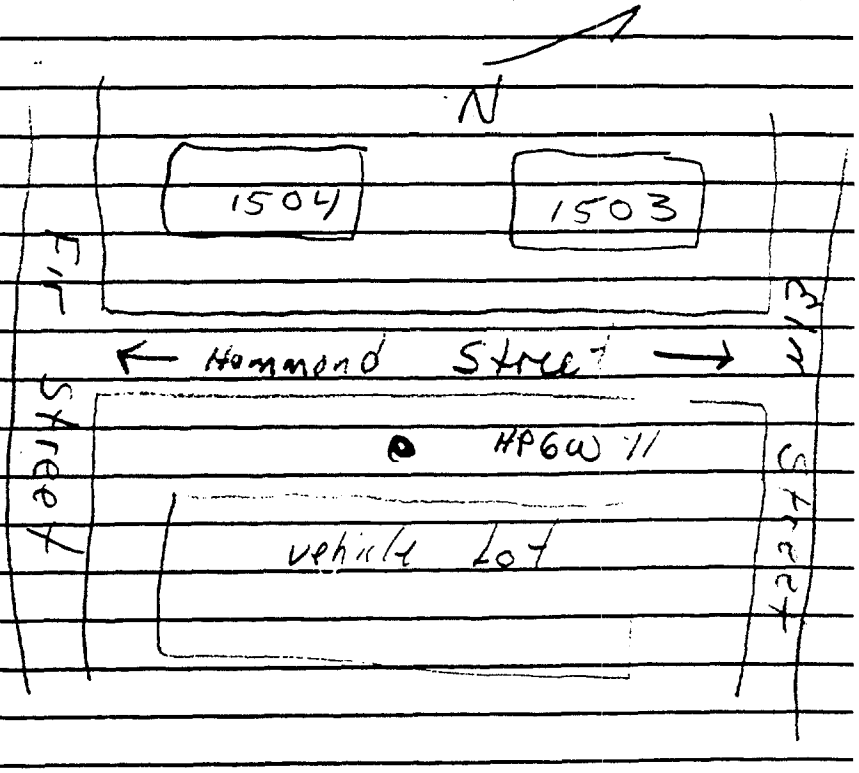
CLEJ-00414-03.13-04/01/92

Boring No. HP6W 11 SHEET 1 OF

11/18/86

On Site 1110 am
1st Spoon 1120
last Spoon 1220
Well Complete 110

Standard Well Specs



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 19

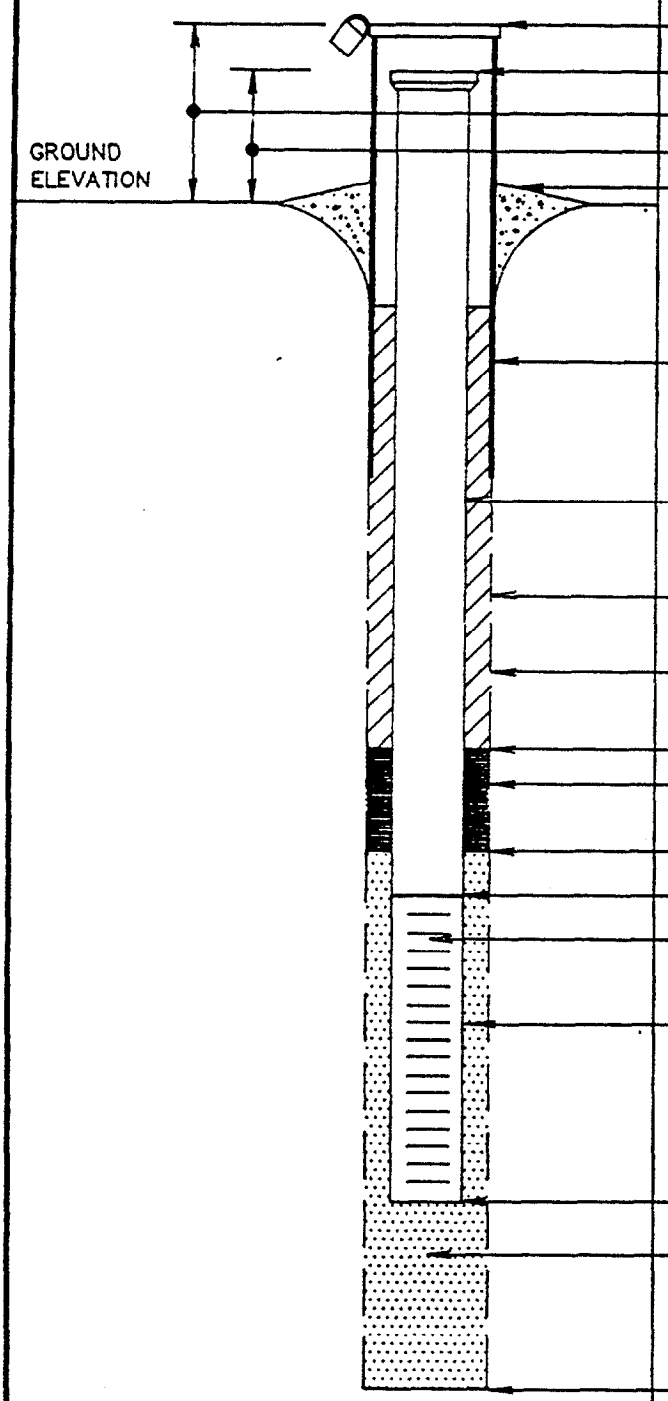
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW11

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-02030 BORING NO. HP-GW11
ELEVATION DATE 11/18/86
FIELD GEOLOGIST David Breithinger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 28.28'
ELEVATION OF TOP OF RISER PIPE: 28.26'
STICK-UP TOP OF SURFACE CASING: 2.51'
STICK-UP RISER PIPE: 2.49'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" X 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HP6W11

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune N.C 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/18/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 13.57 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0		2"	1/8"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		Concrete	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	in.	Slot Size	in.	Material
	-5.0	-25.0		2"		0.01		PVC

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25'		Coarse	Sand

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
0.0	3.0	Silty Fine Sand
3.0	4.5	Silty Clayey Fine San
4.5	10.5	Silty Fine Sand
14.0	15.5	Silty Fine Sand
19.0	20.5	Silty Fine Sand
24.0	25.5	Clayey Fine-Med. San

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

Boring No. HPGU

CLEJ-00414-03.13-04/01/92

N

E

Hole Size 6"

Slot 0.01

Screen Size 2"

Mat'l PVC

Filter Materials Silica Sand

Casing Size 2"

Mat'l PVC

Grout Type Bentonite Pellets

Geologist David Brentlinger

Development

Date Start 11/18/86

Finish 11/18

Static Water Level 11.70'

Contractor ESE

Top of Well Elevation 14.20'

Driller Davis

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			5Y 3.75/1, very dark grey, Silty Clayey Fine Sand, (Silt + Clay 40%), Slightly dense moist, Clay plastic	SM / SC	4 5 6
1.5-3.0			2.5Y 4.5/4 Brown-light olive Brown, Silty Fine Sand with Silty Clay layers, (Silt + Clay 20-30%), Slightly dense, Clay is plastic, moist	SM	3 2 3
3.0-4.5			10YR 7.8/2, White-very Pale Brown, Silty Fine Sand, (Silt 20%), loose, moist, non plastic	SM	3 3 6
4.5-6.0			10YR 7/7.5 very Pale Brown-yellow, Silty Fine Sand, (Silt 20%), Bright Yellow Brown mottles throughout, moist, slightly dense, non plastic	SM	6 8 10
6.0-7.5			10YR 6/8 Brown Yellow, Silty Fine Sand, (Silt 35%), moist, Slightly dense, non Plastic	SM	7 9 9

CLEJ-00414-03.13-04/01/92

Boring No. HP 6(

Hole Size _____ Slot _____

Screen Size _____ Mat'l _____

asing Size _____ Mat'l _____

Ge ogist _____

Date Start _____ Finish _____

Contractor _____

Driller _____

N _____

E _____

Filter Materials _____

Grout Type _____

Development _____

Static Water Level _____

Top of Well Elevation _____

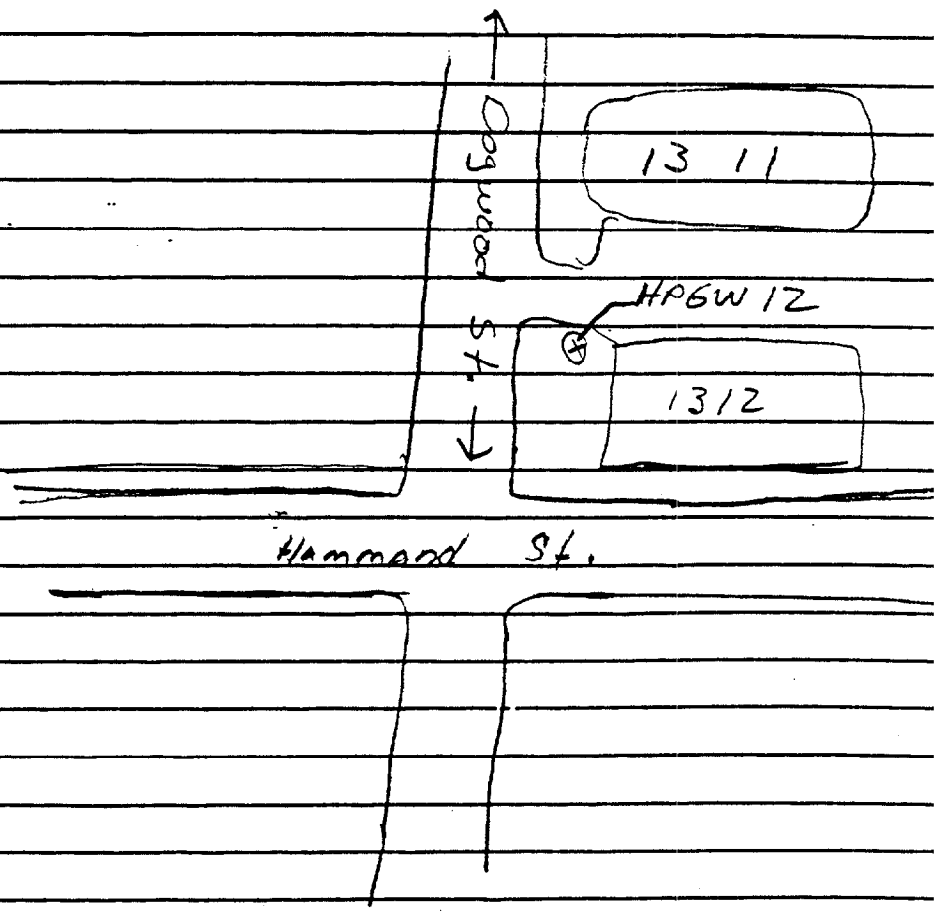
Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			Same as above (6.0-7.5)	SM	9 6 7
9.0-10.5			10 YR 7.5/2, Very Pale Brown, Silty Clayey Sand, (silt + clay 40%) Slightly plastic, moist-wet, Slight-mod. dense	SM / SC	7 3 6
14.0-15.5			10 YR 8/2 white - Very Pale Brown, Silty fine - med. Sand, (silt 10-15%), 10% hard silt - mottles, Sand is wet, mod. dense, non plast.	SW	10 [illegible] 10
19.0-20.5			10 YR 7.25/8, yellow, med. Sand with (10-15%) Coarse material, loose, wet, non plastic	SW	11 10 6
24.0-24.5			10 YR 8/1 white Silty Clayey med. Sand, (silt + Clay layers 25%), 10% Coarse Sand, wet, Clay plastic, mod. dense - dense	SC / SW	5 16 7

Boring No. HP GW 12 SHEET 1 OF

On Site 135 pm 11/18
1st Spoon 140 pm
last Spoon 230 pm
Well Complete 330pm

Standard Well Specs



DATE SIGNED

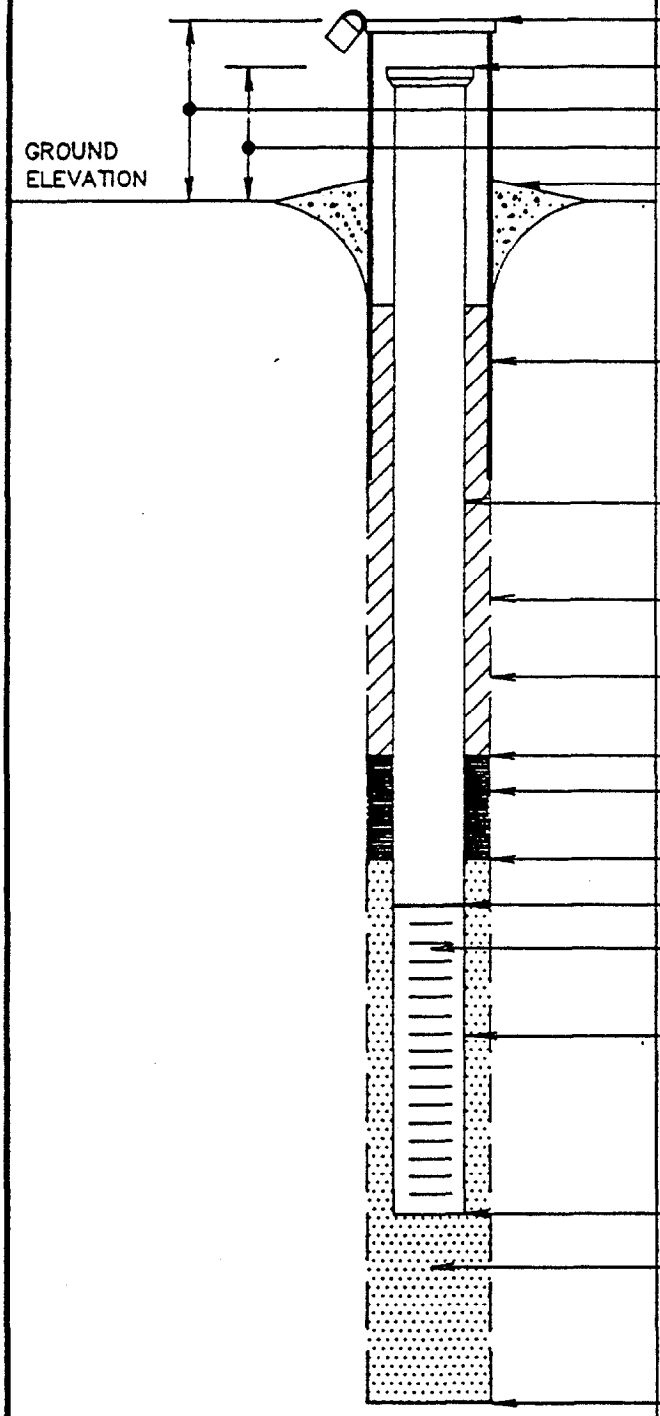
SOURCE: Environmental Science and Engineering, Inc., 198

WELL NO. HP-GW12

OVERBURDEN MONITORING WELL SHEET

PROJECT: Camp Lejeune - HP1A
PROJECT NO.: 49-02236 BORING NO.: HP-GW12
ELEVATION: DATE: 11/18/86
FIELD GEOLOGIST: David Brentlinger (ESE)

DRILLER: Davis Drilling Co.
DRILLING METHOD: Hollow Stem Auger
DELVELOPMENT METHOD:



ELEVATION OF TOP OF SURFACE CASING: 30.20'
ELEVATION OF TOP OF RISER PIPE: 30.09'
STICK-UP TOP OF SURFACE CASING: 2.50'
STICK-UP RISER PIPE: 2.39'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Sched. 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW12

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0035-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: _____
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune, N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/18/86 USE OF WELL monitor

4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No

6. STATIC WATER LEVEL: 11.70 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): _____ METHOD OF TEST _____

8. WATER ZONES (depth): _____

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01	PVC

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS: _____

Depth From	Depth To	DRILLING LOG Formation Description
0.0	1.5	Silty Clayey Fine Sand
1.5	9.0	Silty Fine Sand
9.0	10.5	Silty Clayey Sand
14.0	15.5	Silty Fine-Med. Sand
19.0	20.5	Med-Coarse Sand
24.0	25.5	Silty Clayey Med. Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH ~~15NCAC~~ 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Paul A. Smallwood 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HPGu

Hole Size 6" Slot 0.01

Screen Size 2" Mat'l PVC

asing Size 2" Mat'l PVC

Ge 'ogist David Brentlinger

Date Start 11/17/86 Finish 11/17

Contractor ESE

Driller Davis

N

E

Filter Materials Silica Sand

Grout Type Bentonite Pellets

Development —

Static Water Level 12.00

Top of Well Elevation 14.50'

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			10YR 5.5/3 Brown-Pale Brown, silty fine Sand (silt 30%), organic matter + Gravel (all throughout, 40%), Mod. dense, moist, non plastic	SM	4 8 14
1.5-3.0			10YR 3.5/1 very dark grey, silty fine Sand with 10% grey mottles throughout slightly-dense, moist, non plastic	SM	6 4 6
3.0-4.5			5Y 5.5/2, light Olive Grey, silty fine Sandy Clay (silt + Sand 45%), slightly Plastic, slightly dense, moist	SC	6 3 3
4.5-6.0			2.5Y 5.6/4, light olive yellow Brown with oxide streaks throughout, silty Sandy Clay (silt + Sand 40%) slightly plastic, firm, dense, moist	SC/CL	2 3 6
6.0-7.5			2.5Y 5.6/4, light olive yellow Brown, silty Clay (silt 30%) firm + Dense, moist, plastic	CL	4 8 6

Boring No. HP 6u **CLEJ-00414-03.13-04/01/92** N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

G logist _____ Development _____

Date Start _____ Finish _____ Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			2.5Y 6.5/0, Grey Brown - light grey brown, silty clay same as above (6.0-7.5)	CL	3 3 5
9.0-10.5			2.5Y 6.5/4 pale Yellow - Light Yellow Brown, silty clay same as above (6.0-7.5), less dense	CL	2 2 2
14.0-15.5			10YR 8/3, Very Pale Brown, silty Med. Sand, (silt 15-20%), wet, slightly dense, non plastic	SM/SW	2 2 4
19.0-20.5			5Y 4.5/1, grey-olive grey (green tint), silty med. Sand, (silt 20%), wet, loose, non plastic	SM/SW	2 2 0
24.0-25.5			2.5Y 4.5/0 grey Clean Medium Sand, wet, loose, non plastic	SW	2 1 4

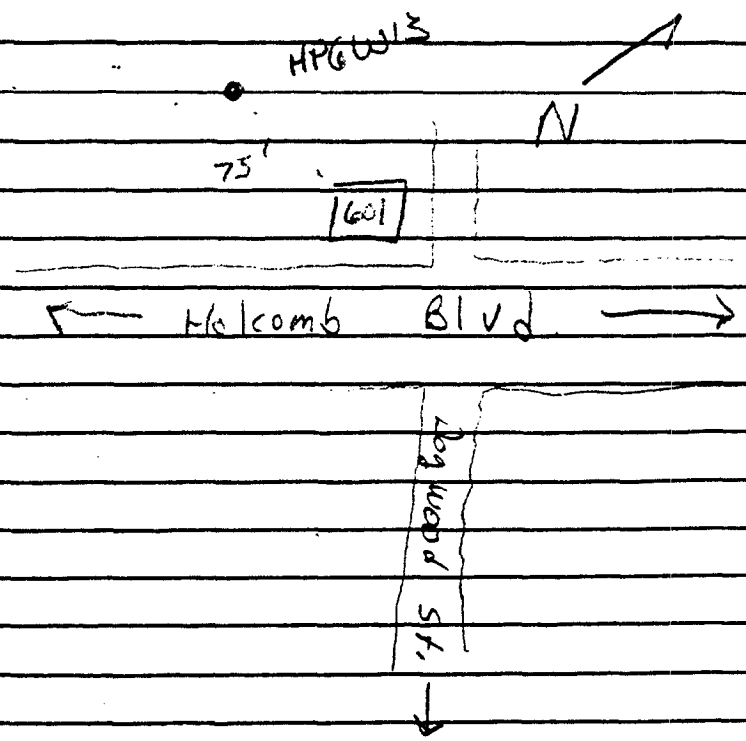
CLEJ-00414-03.13-04/01/92

Boring No. HP 61 SHEET 1 OF

onsite 120 PM 11/17/86

1st Spoon 130
last Spoon 120
well Complete 250

Standard Space



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 19

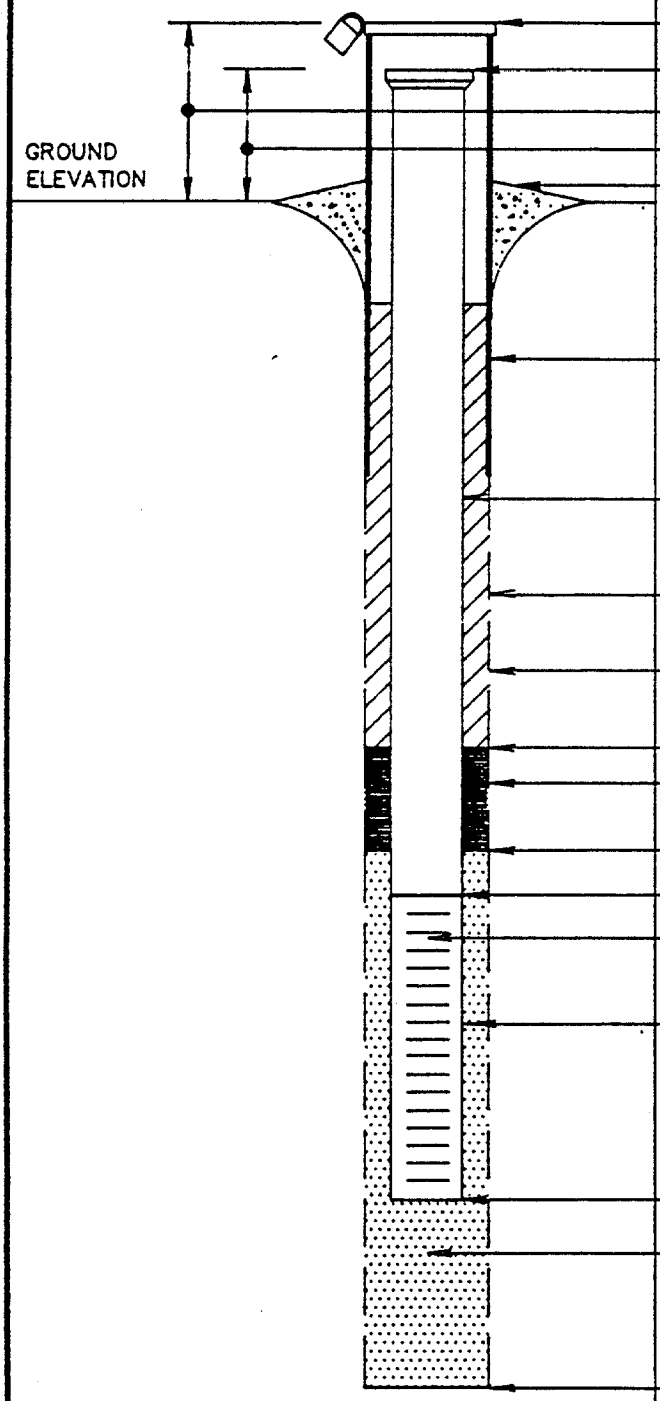
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW13

PROJECT Camp Lejeune - HP/A
PROJECT NO. 49-C2236 BORING NO. HP-GW13
ELEVATION DATE 11/17/86
FIELD GEOLOGIST David Brantinger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 25.89'
ELEVATION OF TOP OF RISER PIPE: 25.78'
STICK-UP TOP OF SURFACE CASING: 2.32'
STICK-UP RISER PIPE: 2.21'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" X 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HP6W13

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-wm-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/17/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 12.00 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

Depth From	Depth To	DRILLING LOG Formation Description
0.0	3.0	Silty Fine Sand
3.0	4.5	Silty Fine Sandy Clay
4.5	6.0	Silty Sandy Clay
6.0	10.5	Silty Clay
14.0	15.5	Silty Med. Sand
19.0	20.5	Silty Med. Sand
24.0	25.5	Med. Sand

If additional space is needed use back of form.

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	12.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25'	Coarse	Sand

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. _____ Coordinates N _____ E _____

Hole Size 6" Slot 0.010

Screen Size 2" Mat'l PVC Filter Materials Silica Sand

Casing Size 2" Mat'l PVC Grout Type 1' Bentonite Seal

Geologist Paul Conrad Development _____

Date Start 11/5/86 Finish 11/5/86 Static Water Level 10.81'

Contractor Davis Drilling Co. Top of Well Elevation ~~10.31~~ 13.31'

Driller Charlie Smith Drill Type Mobile 33 ATV - Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0-1.5			Peat, sand 5-10%, silty, roots & org. debris, s. less pt. at 1.5', color 10 YR 3/1.5 (v. drk brn), mottled w/ 2.5Y 6/4 (light yllwish brn), med. dense, s. moist, non-plast.	Pt	3-4
1.5-3			Fine Sandy silt, sand 15-20%, organics ~35-40%, some clay (trace), non-plast., s. moist, color 10YR 6.5/4 (light yllwish brown) mottled w/ 10 YR 3/1.5 (v. drk brn), loose density.	ML	4-4-
3-4.5			fine sandy silty clay, sand 15-20%, silt 5-10%, s. moist, Low plast., med stiff, color mottled 7.5 YR 5/8 (strong brn) and 10YR 6/4 (light yllwish brn), thin roots encountered.	CL	3-4-
4.5-6			Fine Sand, silt ~3%, clay ~3%, unif. grains, moist, med. dense, color uniform 10 YR 7.5/2 (light gry to white).	SP	4-6-1

CLEJ-00414-03.13-04/01/92

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.
P.O. Box ESE
GAINESVILLE, FLORIDA 32602-3053
(904) 332-3318 TWX 810-825-6310

#5 HPGW14 2 of 4

SHEET NO. 11/5/86

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

Depth (ft)	Lithology / Color	USCS	SPT (BL/FT)
6-7.5	Silty Fine Sand, silt 25-30%, clay ~ 5%, color mottles from 10YR 8/2 (white) to 10YR 6/8 (brnish yllw), non-plast., loose, moist.	SM	6-6-4
7.5-9	Clayey Fine Sand, clay 15-20%, moist, loose, non-plast. unless sat'd., color 10YR 7/2 (light grey), s. yllwish mottling.	ML	2-3-3
9-10.5	Fine Sandy Clay, sand 5-10%, silt-trace, plastic, moist, color 10YR 7/2 (light grey) with distinct black lines (5%) haloed by 7.5YR 5/8 (strong brown), soft.	CL	3-2-3
14-15.5	Peat, ~5% fine sand, saturated, s. foul odor, wood fragment (~~fibrous~~), ✓ soft, non-plast., color 10YR 2/1 (black)	Pt	1-0-1

PRODUCT 204-1 NEBS Inc., Dover, Mass. 02471

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.
P.O. Box ESE
GAINESVILLE, FLORIDA 32602-3053
(904) 332-3318 TWX 810-825-6310

JOB ~~[illegible] #5~~ HP6W14 3 of 4
SHEET NO. 11/5/86 OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

		USCS	SPT (BL/FT)
19-20.5	Silty Fine Sand, silt ~15%, sand uniform, non-plast, sat'd., v. slight odor, color uniform 2.5Y 6.5/2 (light brnish gry).	SP	8-5-9
24-25.5	Clayey Sand, clay 5-10% (in small clusters), clr qtz grains, saturated, v. slight foul odor, non-plast (except clusters), med. dense, color 5Y 7/1 (light gry). 3" sandy clay layer at ~24.75', Plastic, (CH) color same as above, sand 0-5%	SC	6-9-15

Boring No. B HPGW14 SHEET 4 OF 4

12:30pm New helper found. Travel to w.w.t. to get truck. Washed rig. Filled tank.

1:40 pm. Began sampling & drilling. Location between two paved roads (asphalt) - grass strip ~ 8' wide.

2:35pm Last spoon. Backed out 2 auger sects. (5') before pouring silica sand. Casing installed.

3:15 All augers out. Poured silica sand. Hydraulic fluid running from fitting when mast tilted over. Apparently none w/in 3 feet of hole.

Hole taking much sand. Has drilling mud consistency in annulus, probably due to in-situ clay. (see comment following)

3:25 Well complete. 5 bags sand used (100lb). Bentonite seal in place. Sand somewhat suspended in annulus when finished but not signi[illegible] Standard construction.

3:30 Began washing rig, etc.

4:00 Traveled back to w.w.t. area. End of day

11/5/86 Paul D. Conrad

DATE SIGNED

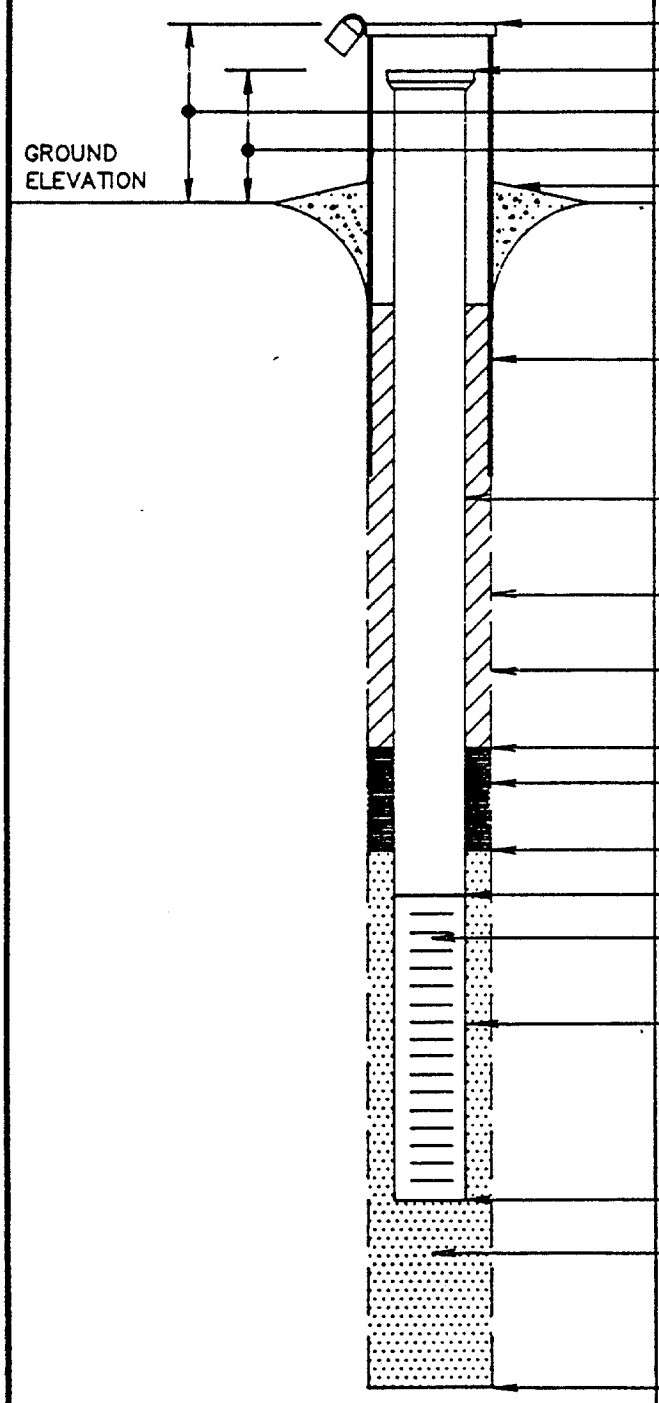
SOURCE: Environmental Science and Engineering, Inc.

WELL NO. HP-GW14

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 4-[illegible]
BORING NO. HP-GW14
ELEVATION
DATE 11/5/96
FIELD GEOLOGIST Paul Conrad (ESE)

DRILLER Dave Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 27.15'
ELEVATION OF TOP OF RISER PIPE: 26.99'
STICK-UP TOP OF SURFACE CASING: 2.08'
STICK-UP RISER PIPE: 1.92'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" X 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HPGW 14

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C.
(Road, Community, or Subdivision and Lot No.)
County: _____

2. OWNER US Navy
ADDRESS Camp LeJeune NC (Street or Route No.)
28542 (City or Town, State, Zip Code)

3. DATE DRILLED 11/5/86 USE OF WELL Monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 10.81 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

10. CASING:

From	To	Diameter	Wall Thickness or Weight/Ft.	Material
+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

From	To	Material	Method
0.0	-2.0	Concrete	
-2.0	-3.0	Clay	

12. SCREEN:

From	To	Diameter	Slot Size	Material
-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

From	To	Size	Material
-3.0	-25'	Course	Sand

14. REMARKS: _____

DRILLING LOG

Depth From	To	Formation Description
0.0	1.5	Sandy Peat
1.5	3.0	Fine Sandy Silt
3.0	4.5	Fine Sandy Silty Clay
4.5	6.0	Fine Sand
6.0	7.5	Silty Fine Sand
7.5	9.0	Clayey Fine Sand
9.0	10.5	Fine Sandy Clay
14.0	15.5	Peat
19.0	20.5	Silty Fine Sand
24.0	25.5	Clayey Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. 6t

Hole Size 6" Slot 0.01

Screen Size 2" Mat'l PVC

asing Size 2" Mat'l PVC

ologist David Brentlinger

Date Start 11/6/86 Finish 11/6

Contractor ESE

Driller Davis

...tes N

E

Filter Materials Silica Sand

Grout Type Bentonite Pellets

Development

Static Water Level 12.21'

Top of Well Elevation 14.71'

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0.0-1.5		0.0'	Cement - Asphalt	/	/
1.5-3.0		1.9'	Cement - Asphalt		
		1.9-3.0'	10YR 6.5/3, light grey Brown, Silty fine sand (30% Silt), loose, dry-moist, non plastic	SM	13 22 24
3.0-4.5			2.5Y 6.5/8, olive yellow silty fine Sand, (Silt 30%) loose, dry-moist, non plastic	SM	3 6 4
4.5-6.0			10YR 7/8+, yellow, Silty Clayey Sand (Silt + Clay 40%), loose-Slightly dense, slightly plastic	SM / SC	4 5 5

CLEJ-00414-03.13-04/01/92

Boring No. 6

tes N

Hole Size _____ Slot _____

E

Screen Size _____ Mat'l _____

Filter Materials _____

asing Size _____ Mat'l _____

Grout Type _____

ologist _____

Development _____

Date Start _____ Finish _____

Static Water Level _____

Contractor _____

Top of Well Elevation _____

Driller _____

Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
6.0-7.5			10YR 7.5/6 yellow - light brown, Silty fine Sand (silt 10-15%), loose, moist	SC	6 8 8
7.5-9.0			10YR 7.5/8, yellow, silty fine Sand (silt 10-15%), Clay + Silty Sand top 6", moist, loose - slightly dense, non plastic	SW	8 8 7
9.0-10.5			2.5Y 7.5/2, light grey-pale yellow, silty fine Sand (silt 15-20%), loose, moist - wet, non plastic	SM	8 10 8
14.0-15.5			2.5Y 7.5/2, light grey, ultra fine sand with 30% uncemented Clastics, wet, loose, non plastic	SW	0 0 3
19.0-20.5			10YR 7.5/1, light Grey, silty fine-med. Sand, wet, loose, non plastic (silt 10-15%)	SW	0 3 6

CLEJ-00414-03.13-04/01/92

Boring No. 6

:es N

Hole Size _____ Slot _____

E

Screen Size _____ Mat'l _____

Filter Materials _____

asing Size _____ Mat'l _____

Grout Type _____

ologist _____

Development _____

Date Start _____ Finish _____

Static Water Level _____

Contractor _____

Top of Well Elevation _____

Driller _____

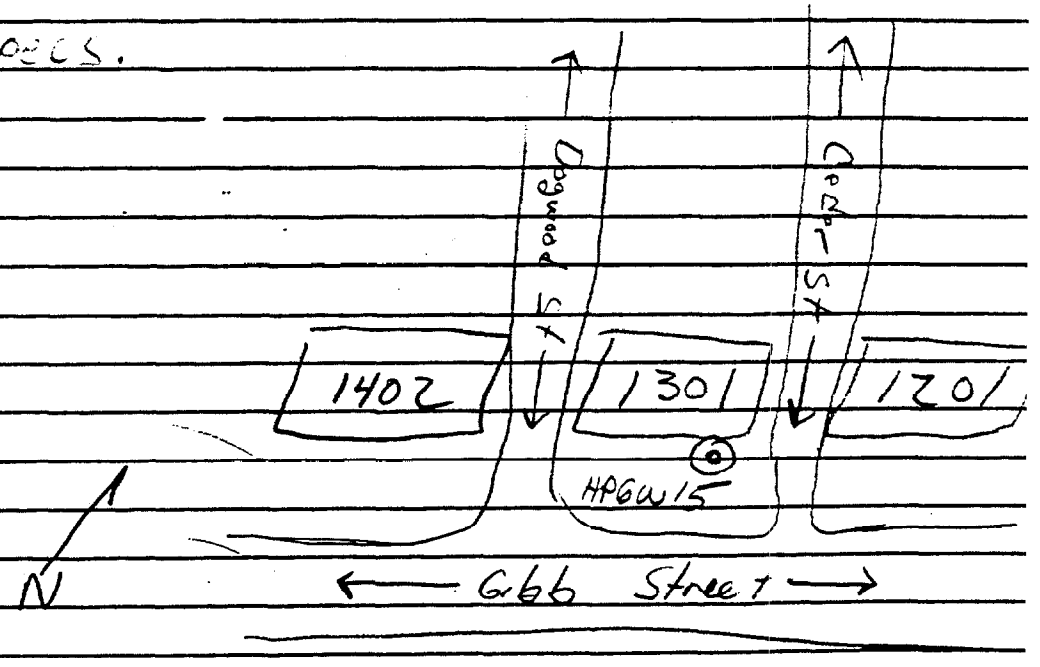
Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
24-25.5		24-24.9	10YR 7.5/1, light grey, medium - fine sand little/ no silt, wet, loose	SW	6 2 1
		24.9-25.5	Same color as above (24-24.9), medium sand 40% coarse pea gravel sand 60%		

Boring No. ~~GW 10~~ HP GW 15 SHEET ____ OF ____

On Site 930 am 11/6/86
1st Spoon 940
last Spoon 1040
Well finished 1055

Standard Well Specs.



DATE SIGNED

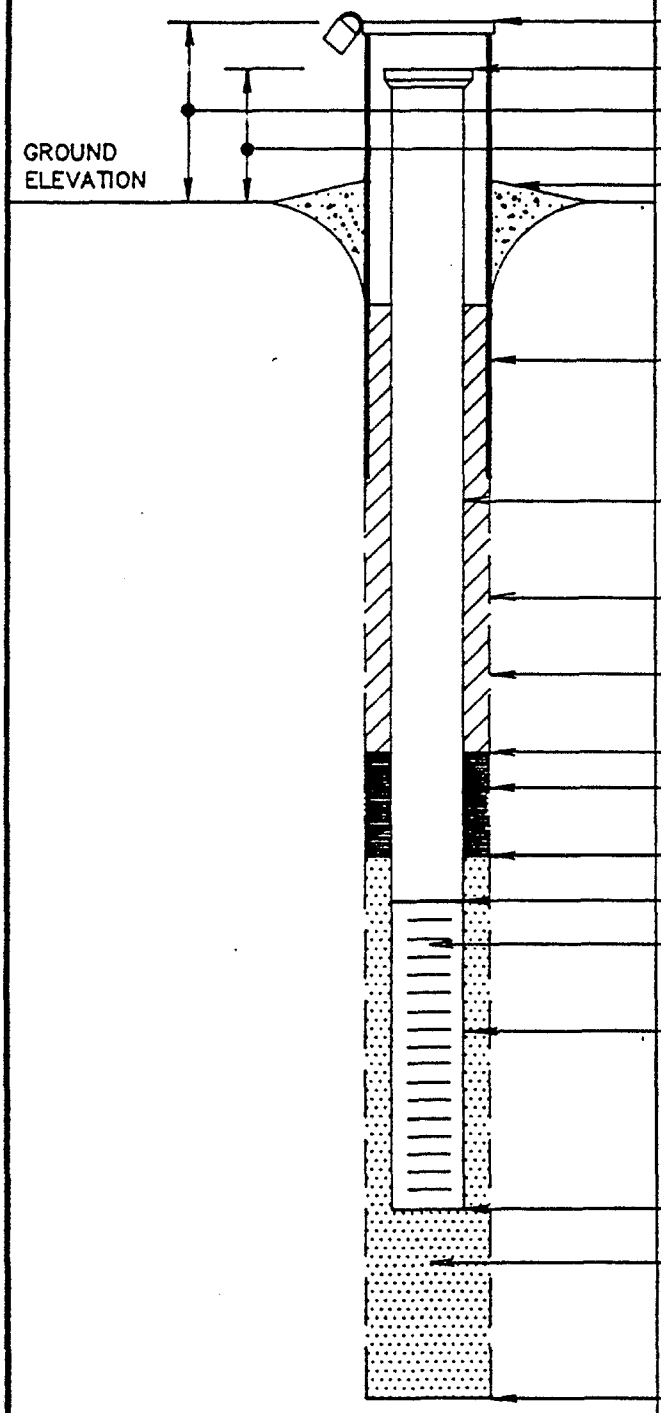
SOURCE: Environmental Science and Engineering, Inc.,

WELL NO. HP-GW15

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune HPIA
PROJECT NO. 49-C2036 BORING NO. HP-GW15
ELEVATION DATE 11/6/96
FIELD GEOLOGIST David Brentlinger (ESC)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 27.15'
ELEVATION OF TOP OF RISER PIPE: 26.89'
STICK-UP TOP OF SURFACE CASING: 0.34'
STICK-UP RISER PIPE: 0.08'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5" (?)
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Cemcrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HPGW 15

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135 - WM - 014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 10/6/86 USE OF WELL Monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 12.21 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 0.00 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
0.0	1.9	Road Fill
1.9	4.5	Silty Fine Sand
4.5	6.0	Silty Clayey Sand
6.0	70.5	Silty Fine Sand
14.0	15.5	Ultra Fine Sand
19.0	20.5	Silty Fine-Med. Sand
24.0	25.5	Medium - Coarse Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points).

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Earl A. Bentley 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submit original to Division of Environmental Management and copy to well owner.

GW-1 Revised 11/84

CLEJ-00414-03.13-04/01/92

Boring No. HP6W
Hole Size 6"
Slot 0.01
Screen Size 2"
Mat'l PVC
Casing Size 2"
Mat'l PVC
Geologist David Brentlinger
Date Start 11/19/86
Finish 11/19
Contractor ESE
Driller Davis

N
E
Filter Materials Silica Sand
Grout Type Bentonite & Fe[illegible]
Development —
Static Water Level 12.04'
Top of Well Elevation 14.54'
Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			10YR 3.25/1, Very Dark Grey, Silty Fine Sand (silt 30%) organic matter top 8", loose, moist, non plastic	SM	3 3 5
1.5-3.0			2.5Y 5/6, light Olive Brown, Silty Sandy Clay (silt + Sand 45%) Slightly Plastic, Moist, Slightly dense	SC	3 15 2
3.0-4.5			2.5Y 6/6 olive Yellow, Silty Clayey Fine Sand (silt + Clay 45%), Non Plastic, moist, Slightly dense	SM/SC	3 12 3
4.5-6.0			10YR 6.75/4 Yellow - Very Pale Yellow, Silty Fine Sand (silt 30%), loose, moist, non plastic	SM	3 6 3
6.0-7.5	Alternating 2-3" layers throughout	50% each	10YR 8/8 yellow Silty Fine Sand loose, moist, non plastic	SM	5 9
			10YR 8/1 white ultra fine sand, loose, moist, little to no silt	SW	12

CLEJ-00414-03.13-04/01/92

Boring No. HP 6

s N

Hole Size Slot

E

Screen Size Mat'l Filter Materials

asing Size Mat'l Grout Type

G ogist Development

Date Start Finish Static Water Level

Contractor Top of Well Elevation

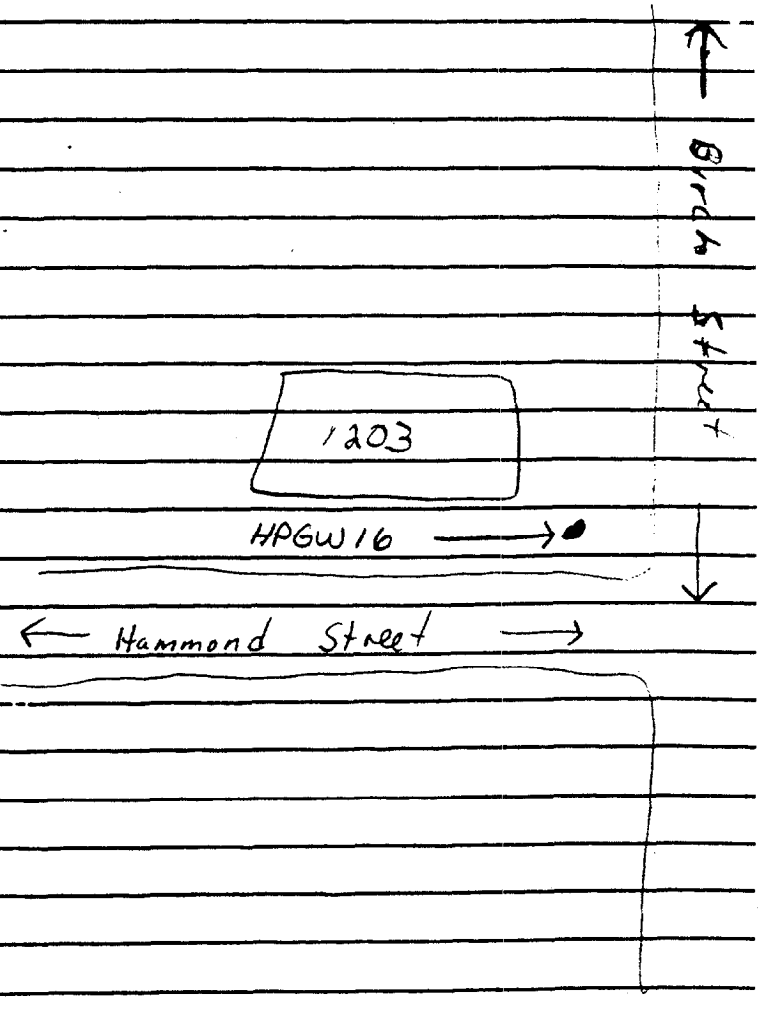
Driller Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			10YR 7.5/6 Yellow - Very Pale Yellow, Silty Ultra Fine Sand (silt 20%), loose - slightly dense, moist, non plastic	SM/SW	4 12 10
9.0-10.5			Same as above (7.5-9.0) with less silt	SW	10 12 15
14.0-15.5			10YR 7.25/1 Light Grey White Silty Fine Sand, (Silt 25%), moist-wet, loose, non Plastic, 10% Clay layers	SM	6 6 4
19.0-20.5			10YR 5.5/8, Yellow Brown, silty fine-med. Sandy Clay, (Silt + Sand 45%) wet, sticky + Plastic, clay very plastic, Slightly dense	SC	3 6 10
24.0-25.5			10YR 7.5/1 white - light Grey, Silty Clayey Fine - Med. Sand, (silt + Clay 45%) Clay layers plastic, wet, Slightly dense	SC/SW	3 8 16

Boring No. HPGW 10 SHEET ___ OF ___

on site 1050 11/19/86
1st Spoon 1100
last Spoon 1130
Well Complete 1150

Standard Well Specs
* there is no well point rather sliding cap at base of casing



DATE SIGNED

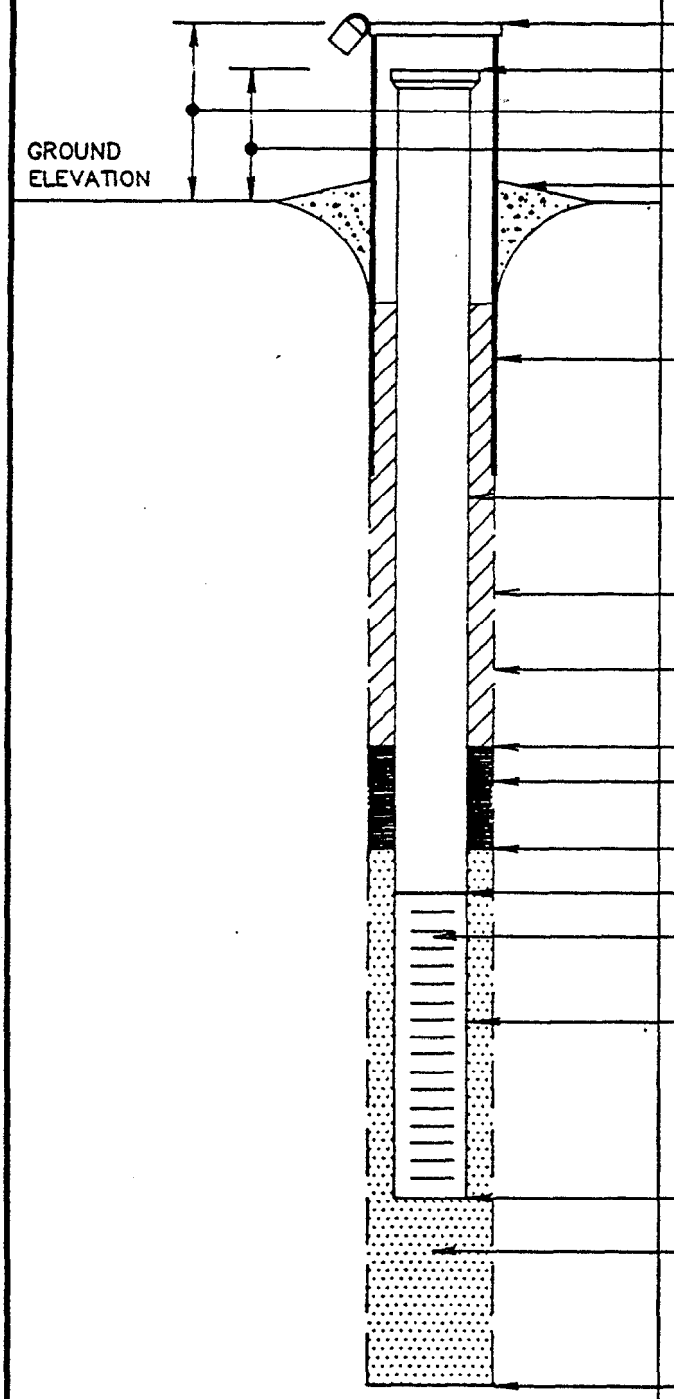
SOURCE: Environmental Science and Engineering, Inc., 1

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW16

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-C2036 BORING NO. HP-GW16
ELEVATION DATE 11/19/86
FIELD GEOLOGIST David Brent Unger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 32.57'
ELEVATION OF TOP OF RISER PIPE: 32.39'
STICK-UP TOP OF SURFACE CASING: 2.37'
STICK-UP RISER PIPE: 2.19'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: bentonite pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

#PGW 16

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/19/86 USE OF WELL Monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 12.04 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

DRILLING LOG

Depth From	To	Formation Description
0.0	1.5	Silty Fine Sand
1.5	3.0	Silty Sandy Clay
3.0	4.5	Silty Clayey Fine Sa.
4.5	6.0	Silty Fine Sand
6.0	7.5	50% layers of Silty Fine and Silty V. Fine Sand
7.5	10.5	Silty ultra Fine Sa.
14.0	15.5	Silty Fine Sand
19.0	20.5	Silty Fine-Med Sand
24.0	25.5	Silty Clayey Fine-Med. Sand.

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0	Cement	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. 64 | es N
Hole Size 6" | Slot 0.01 | E
Screen Size 2" | Mat'l PVC | Filter Materials Silica Sand
asing Size 2" | Mat'l PVC | Grout Type Bentonite Pellets
ologist David Brentlinger | Development
Date Start 11/6/86 | Finish 11/6 | Static Water Level 11.08'
Contractor ESE | Top of Well Elevation 13.58'
Driller Davis | Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			10YR 2.5/2, very dark brown, silty fine sand (silt 30%), organic matter top 6", loose-slightly dense, moist non plastic	SM	2 2 4
1.5-3.0			10YR 6/3, light yellow brown silty clayey fine sand, (silt + clay 40%), mod. dense-loose, slightly plastic	SC/SM	5 6 6
3.0-4.5			Same as (1.5-3.0)	SC/SM	4 4 4
4.5-6.0			10YR 7.2/1 light grey, ultra fine-fine sand, (silt 30%) little/no silt bottom 6", moist, slightly dense	SM	3 4 3
6-7.5			10YR 7.8/1 light grey-white, silty fine sand (silt 30%), moist, loose-slightly dense, non plastic	SM	3 5 7

CLEJ-00414-03.13-04/01/92

Boring No. C

tes N

Hole Size Slot

E

Screen Size Mat'l

Filter Materials

asing Size Mat'l

Grout Type

ologist

Development

Date Start Finish

Static Water Level

Contractor

Top of Well Elevation

Driller

Drill Type

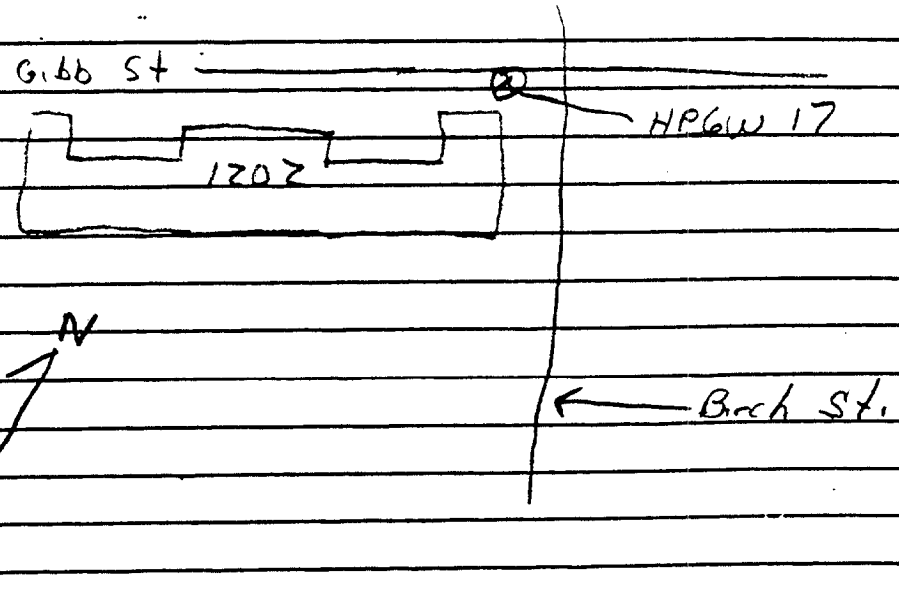
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
7.5-9.0			Same as (6-7.5)	SM	5 6 5
9.0-10.5			10Y 7.5/1 light grey, silty sandy clay, (silt + sand 30%) wet, sticky, slightly plastic, mid. dense	SC	2 10 11
14.0-15.5			5Y 7.5/1 light grey, silty clayey sand (silt + clay 45%), 20% coarse sand, loose, slightly plastic, wet,	SM/SC	4 4 8
19.0-20.5			2.5Y 6.5/2 light brown grey silty fine-med. sand (silt 20%), wet, mod. dense - dense, non plastic, 20% coarse sand	SM	4 10 12
2 0-25.5			10YR 7.5/1, light grey-white, silty medium sand with 20% clay, silt 20%, loose - slightly dense, wet, clay mottles very plastic	SW/SM	2 3 5

Boring No. [illegible] SHEET 1 OF

On Site 12:00 PM 11/6/86

1st Spoon 1230
last Spoon 125
well Complete 200

located at the corne of
Gibb and Birch Street



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 1

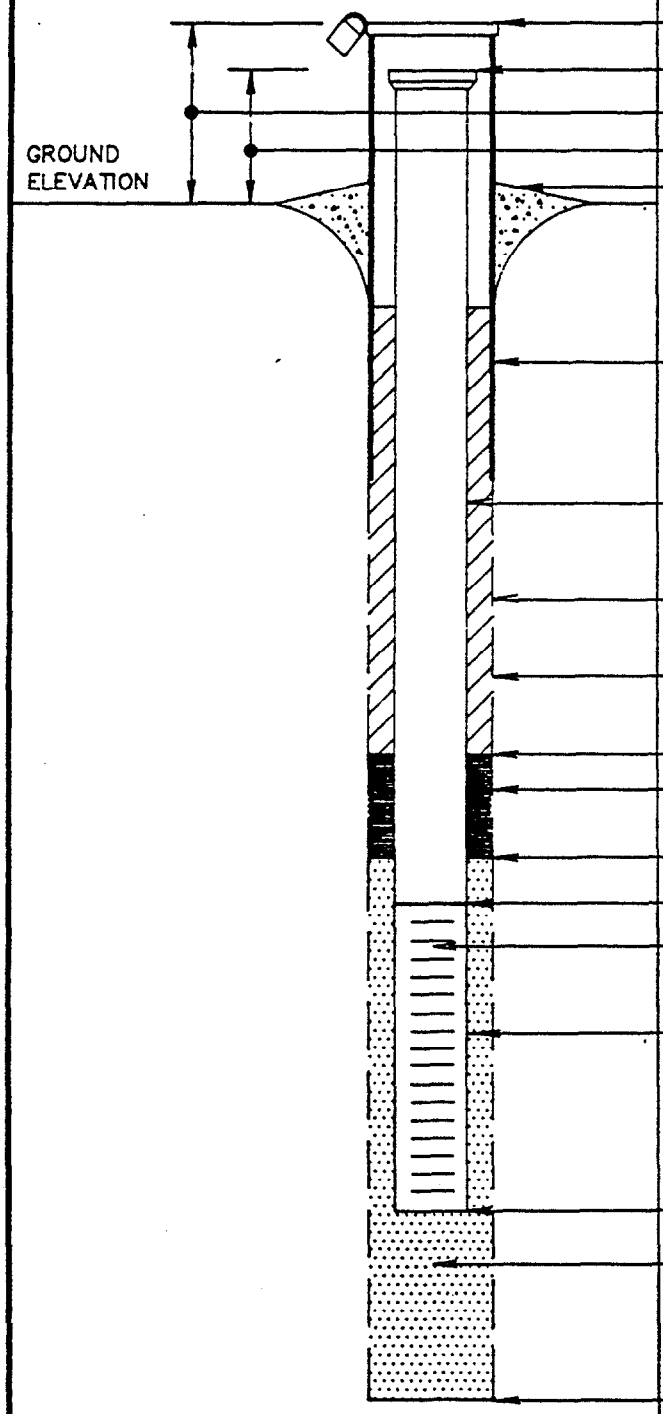
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW17-1

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 41-02036 BORING NO. HP-GW17
ELEVATION DATE 11/6/86
FIELD GEOLOGIST David Breitlinger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 30.20'
ELEVATION OF TOP OF RISER PIPE: 30.06'
STICK-UP TOP OF SURFACE CASING: 2.30'
STICK-UP RISER PIPE: 2.16'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" X 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HPGW 17

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-035-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code
3. DATE DRILLED 11/6/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 11.08 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS:

DRILLING LOG

Depth From - To	Formation Description
0.0 - 1.5	Silty Fine Sand
1.5 - 4.5	Silty Clayey Fine Sand
4.5 - 6.0	Ultra Fine Sand
6.0 - 9.0	Silty Fine Sand
9.0 - 10.5	Silty Sandy Clay
14.0 - 15.5	Silty Clayey Sand
19.0 - 20.5	Silty Fine - Med. Sand
24.0 - 25.5	Silty Med. Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE 2/11/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

Boring No. HP 6u **CLEJ-00414-03.13-04/01/92** N

Hole Size 6" Slot 0.01 E

Screen Size 2" Mat'l PVC Filter Materials Silica Sand

asing Size 2" Mat'l PVC Grout Type Bentonite Pellets

G 'ogist David Brentlinger Development —

Date Start 11/19/86 Finish 11/19 Static Water Level 11.00

Contractor ESE Top of Well Elevation 13.50'

Driller Davis Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			Roadside Gravel Fill		8 15 11
1.5-3.0			10YR 6.5/4 Light Yellow Brown, Silty Clayey Sand, (Clay + silt 40%), moist, Plastic Very dense	SC	8 10 12
3.0-4.5			10YR 7.5/3 Very Pale Brown, Silty Fine Sand, (Silt 40%), 10% Clay Mottles, moist, mod. dense, non plastic	SM	5 13 13
4.5-6.0			10YR 7.5/1 Light Grey, Silty Clayey Fine Sand, (Silt + Clay 40%), Bright Orange-Brown mottles throughout, moist, Slightly Plastic, Mod. dense	SM/SC	8 6 5
6.0-7.5	alternating layers → throughout	50%	10YR 7/1 light grey Same as above (4.5-6.0)	SC	4 6 6
		50%	10YR 6/8, Brown Yellow, Silty Fine Sandy Clay Plastic, mod. dense, loose		

CLEJ-00414-03.13-04/01/92

Boring No. HP 6 | s N

Hole Size | Slot | E

Screen Size | Mat'l | Filter Materials

asing Size | Mat'l | Grout Type

G ogist | Development

Date Start | Finish | Static Water Level

Contractor | Top of Well Elevation

Driller | Drill Type

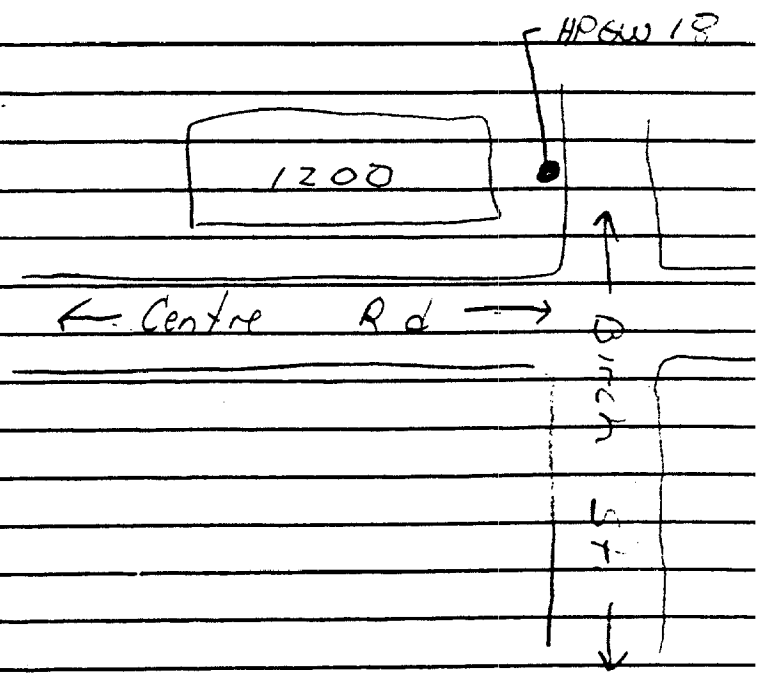
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			10YR 7.5/1 Light Grey, Silty Fine Sandy Clay (silt + sand 30%) Brown Yellow mottles throughout Plastic, mod. dense, moist	SC	2 3 10
9.0-10.5			10 YR 6.5/8 Yellow-Brown Yellow, Silty Clayey Fine-med. Sand (silt-clay 40%), moist, slightly Plastic, slightly dense	SC/SM	7 7 8
14.0-15.5			10 YR 8/1 white Silty fine-med. Sand, (silt 30%), dense, moist, non plastic	SM	12 17 18
19.0-20.5			10 YR 8/1 white Fine-medium Sand, little to no silt, loose, wet, non plastic	SW	5 1 1
24.0-25.5			10YR 8/4.5 Very Pale Brown Yellow, Fine-medium Sand Little to no silt, wet, med. dense-dense, 10% Coarse material	SW	15 15 15

Boring No. HPGW SHEET 1 OF

On Site 830 Am 11/19
1st Spoon 845
last Spoon 945 ← Problem with augers locking up
Well Complete 1040

Standard Well Specs

* no well point on base of casing rather a sliding cap!



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 19

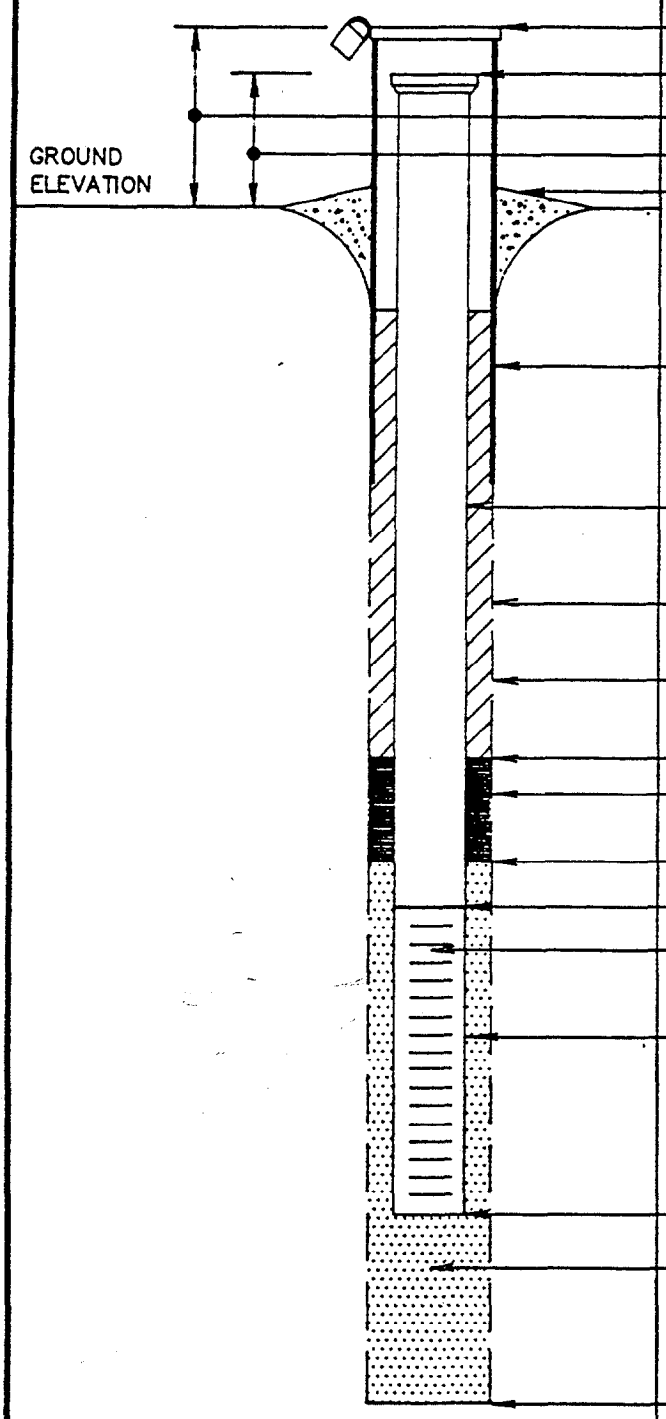
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW18

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-00034 BORING NO. HP-GW18
ELEVATION DATE 11/19/86
FIELD GEOLOGIST David Breathinger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING:
ELEVATION OF TOP OF RISER PIPE:
STICK-UP TOP OF SURFACE CASING:
STICK-UP RISER PIPE: Flush Mount
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5" ?
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: bentonite pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW18

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, NC County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code
3. DATE DRILLED 11/19/86 USE OF WELL Monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 11.00 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 0.00 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	-5.0		2"	1/8"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		Concrete	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	-5.0	-25'		2" in.	0.01 in.	PVC
				in.	in.	
				in.	in.	

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25'		Coarse	Sand

14. REMARKS: _____

DRILLING LOG

Depth From - To	Formation Description
0.0 - 1.5	Road Fill
1.5 - 3.0	Silty Clayey Sand
3.0 - 4.5	Silty Fine Sand
4.5 - 6.0	Silty Clayey Fine Sand
6.0 - 7.5	50% layers of Silt Fine Sand and Sandy
7.5 - 9.0	Silty Fine Sandy Clay
9.0 - 10.5	Silty Clayey Fine - Med Sand
14.0 - 15.5	Silty Fine - Med Sand
19.0 - 20.5	Fine - Med Sand
24.0 - 25.5	Fine - Med Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE 2/11/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. ~~GW~~ | tes N

Hole Size 6" | Slot 0.01 | E

Screen Size 2" | Mat'l PVC | Filter Materials Silica Sand

(asing Size 2" | Mat'l PVC | Grout Type Bentonite Pellets

(ologist David Brentlinger | Development

Date Start 11/6/86 | Finish 11/6 | Static Water Level 9.08'

Contractor ESE | Top of Well Elevation 11.58'

Driller Davis | Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0.0-1.5			10YR 7.5/3 very pale Brown Organic Matter top 6", Silty Fine Sand, loose, moist silt 30%	SM	2 4 4
1.5-3.0			10YR 6.5/2, light Brown Grey Silty Fine Sand (Silt 25%), 10% clay, Clay mottles Slightly plastic, mod. dense, moist	SM / SC	2 6 3
3.0-4.5			10YR 5.5/1 grey - light grey, Silty Sandy Clay, (silt + Sand 30%), dense - mod. dense, slightly plastic, moist	SC / CH	4 5 6
4.5-6.0			Same as above (3.0-4.5) less silt + Sand, Very Plastic	CH	3 4 5
6.0-7.5			Same as above 4.5-6.0	CH	3 4 3

CLEJ-00414-03.13-04/01/92

Boring No. 6A

Location Coordinates N

Hole Size Slot

E

Screen Size Mat'l

Filter Materials

Casing Size Mat'l

Grout Type

Geologist

Development

Date Start Finish

Static Water Level

Contractor

Top of Well Elevation

Driller

Drill Type

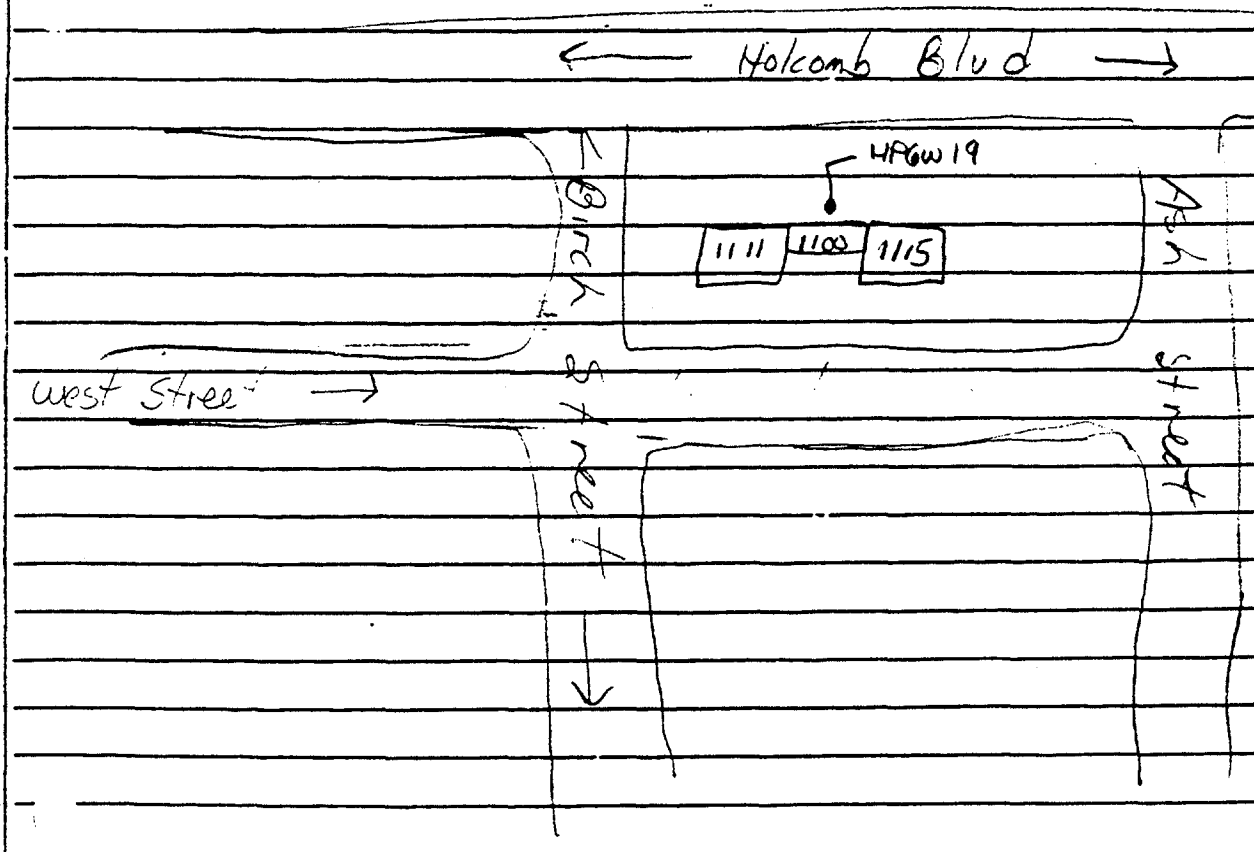
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			Same as above (4.5-6.0)	CH	2 3 2
9.0-10.5 water table 10'			10YR 5/1, gray silty clay, plastic, moist-wet mod. dense, silt 40%,	ML	1 1 2
14.0-15.5			7.5YR 5.5/0, light grey-grey, silty clayey fine-medium sand, (25-30% silt + clay), clay mottles very sticky, mod. dense, wet	SM	14 7 8
19.0-20.5		19.0-19.5	Same as above (14.0-15.5)		8 5 4
		19.5-20.5	7.5YR 3.75/0 dark-very dark grey, very plastic wet, very sticky clay with 20% silt + sand	MH	
24.0-25.5			2.5Y 2/-0, Black Dry-moist Organic clay with 20% silt, slightly Dense, slightly plastic	OL	1 2 1

Boring No. ~~EW~~ , ... SHEET ___ OF ___

11/6/86

on site 230 PM
1st Spoon 240 PM
last Spoon 345 PM
Well complete 415 PM

Standard Well specs



DATE ___ SIGNED ___

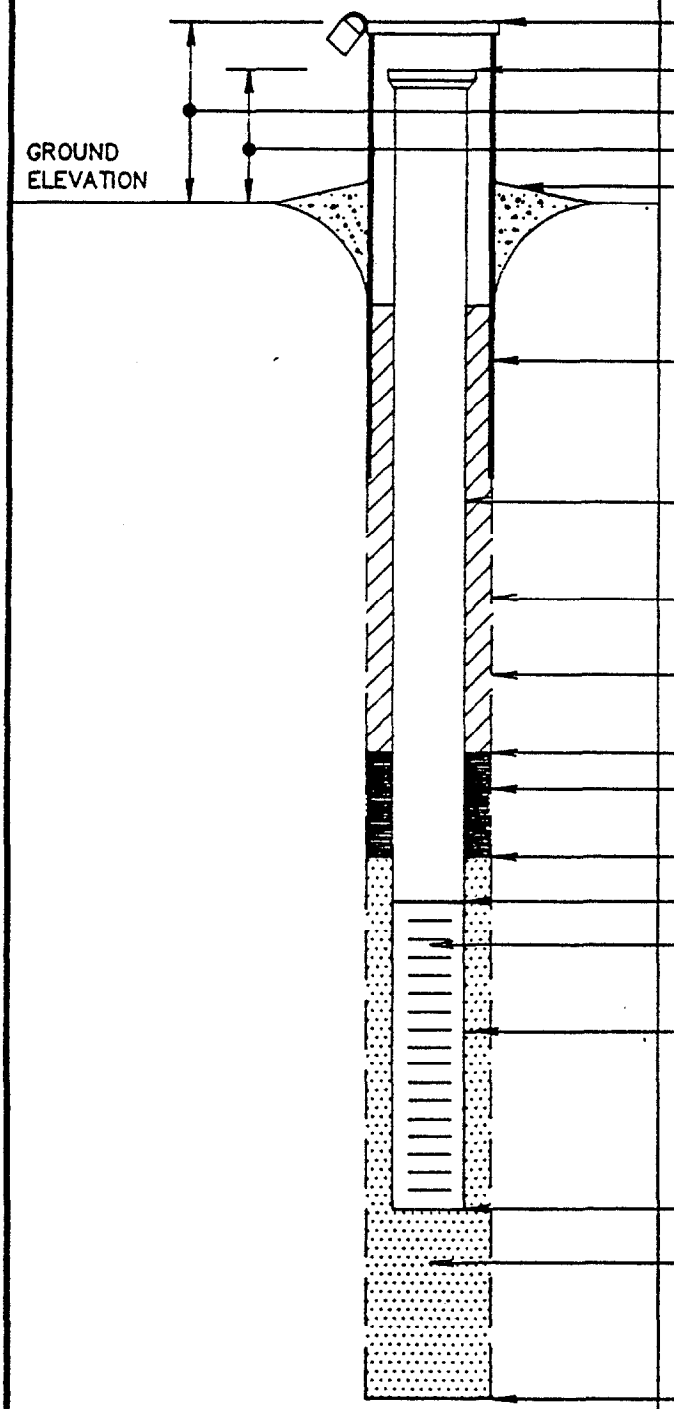
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW19

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-C0256 BORING NO. HP-GW19
ELEVATION DATE 1/6/86
FIELD GEOLOGIST David Brentlinger (ESE)

DRILLER Davis Drilling Co
DRILLING METHOD
DELVELOPMENT METHOD Hollow Stem Auger



ELEVATION OF TOP OF SURFACE CASING: 29.25'
ELEVATION OF TOP OF RISER PIPE: 29.20'
STICK-UP TOP OF SURFACE CASING: 2.24'
STICK-UP RISER PIPE: 2.19'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW 1/9

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune NC (Street or Route No.)
28542
City or Town State Zip Code

3. DATE DRILLED 11/6/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 9.08 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

DRILLING LOG

Depth From	To	Formation Description
0.0	3.0	Silty Fine Sand
3.0	9.0	Silty Sandy Clay
9.0	10.5	Silty Clay
14.0	15.5	Silty Clayey Mud Sand
19.0	20.5	Clay
24.0	25.5	Organic Clay

If additional space is needed use back of form.

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	2.5	5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	2.0	Concrete	
	2.0	3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	5.0	25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	3.0	25'	Coarse	Sand

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 2/11/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. GW
Hole Size 6"
Slot 0.01
Screen Size 2"
Mat'l PVC
asing Size 2"
Mat'l PVC
eologist David Brentlinger
Date Start 11/6/86
Finish 11/6
Contractor ESE
Driller Davis

es N
E
Filter Materials Silica Sand
Grout Type Bentonite Pellets
Development
Static Water Level 8.17
Top of Well Elevation 10.67'
Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			2.5Y 2.5/0 very dark grey-black very dense Clay, organic mottles top 6", plastic, moist	CL/MH	1 2 1
1.5-3.0			10YR 5.5/1 grey-light grey, very dense-dense Clay, Moist, Softer than above (0.0-1.0), V. Plastic	CH	2 3 5
3.0-4.5			10YR 6.5/1, light Grey, Silty Clayey Sand (Silt+ Sand 40%), moist-wet, Plastic in Clay layers	SC	3 4 5
4.5-6.0			Very dense Clay Same as above (1.5-3.0), Bright yellow mottles	CH	4 6 7
6.0-7.5			7.5YR 6.5/2, Brown-light Brown, Silty Clayey Sand, Silt + Clay 40%, Sticky, Slightly Plastic, dense, moist	SC	4 6 7

CLEJ-00414-03.13-04/01/92

Boring No. 6

Hole Size _____ Slot _____

Screen Size _____ Mat'l _____

asing Size _____ Mat'l _____

eologist _____

Date Start _____ Finish _____

Contractor _____

Driller _____

es N _____

E _____

Filter Materials _____

Grout Type _____

Development _____

Static Water Level _____

Top of Well Elevation _____

Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			10YR 7.5/1, light grey, Silty Clayey Sand, (Silt+ Clay 40%), moist, slightly plastic, mod. dense, Coarse material 10%	SC	3 3 3 3
9.0-10.5 water table 10'			Same as above (7.5-9.0) with less Clay	SC / SM	3 4 6
14.0-15.5			10YR 4.25/1 grey-dark grey, very dense, massive Clay, Plastic, moist	CH	13 18 21
19.0-20.5			10YR 7.5/1, light grey, Silty Clayey Sand (40% medium sand, 10% Coarse Sand), wet, slightly dense, Clay layers sticky + very plastic	SC / SM	2 6 7
1.0-25.5			2.5Y 4.5/0 grey-dark grey, Silty med. Sand (silt 10-15%), wet, loose, non plastic	SW / SM	3 2 3

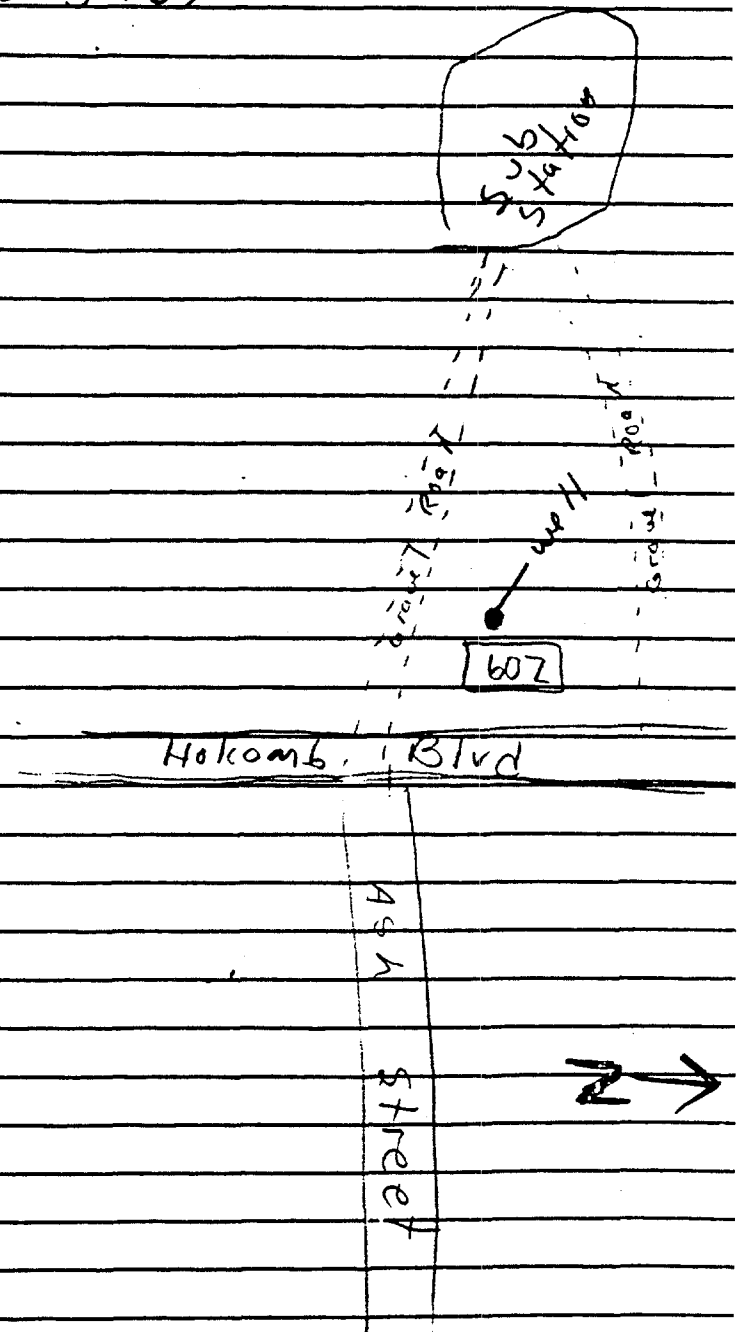
Boring No. ~~Gt~~ [illegible]

SHEET 1 OF

On Site 210 PM 11/5/86

1st Spoon 215
20 minute Break (320-340)
last spoon 340
Well Complete 350

Standard Well Specs



DATE SIGNED

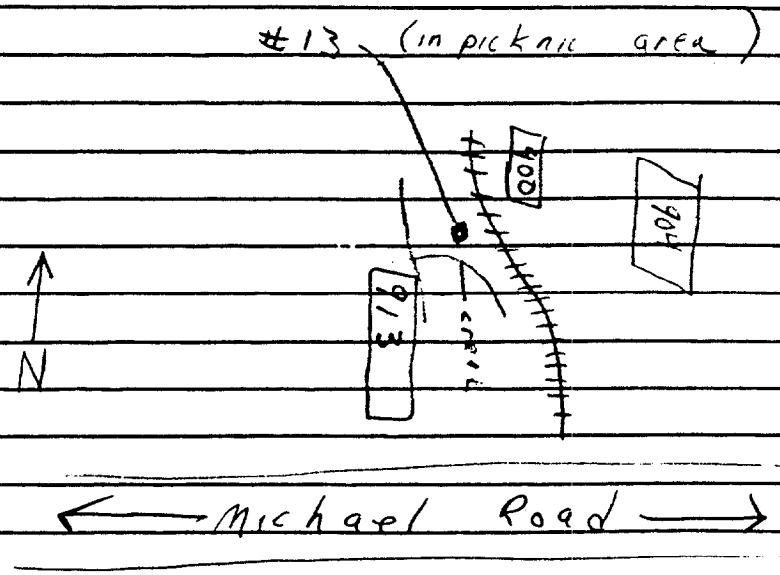
SOURCE: Environmental Science and Engineering, Inc., 1

Boring No. ~~GW~~ 13 HPGW CC SHEET ____ OF ____

11/4/86

On Site 150 Pm
First Spoon 210
last Spoon 305
well Complete 325

Standard Well Specs



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 19

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HP6W22

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, NC County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/4/86 USE OF WELL Monitor

4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☒ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 8.17 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): _____ METHOD OF TEST _____

8. WATER ZONES (depth): _____

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS: _____

DRILLING LOG

Depth From	To	Formation Description
8.0	18.5	Silty Fine Sand
14.0	15.5	50% Silty Sandy Peat
		50% Silty Sandy Clay
19.0	20.5	Silty Sandy Clay
24.0	25.0	Silty Sandy Clay

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Carl F. Duffy Jr. 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. GW

Hole Size 6" Slot 0.01

Screen Size 2" Mat'l PVC

Casing Size 2" Mat'l PVC

Geologist David Brentlinger

Date Start 11/5/86 Finish 11/6

Contractor ESE

Driller Davis

Coordinates N

E

Filter Materials Silica Sand

Grout Type Bentonite Pellets

Development

Static Water Level 11.08'

Top of Well Elevation 13.58'

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			10YR 6.5/4, Yellow - very Pale yellow, Silty fine Sand, little/No organic matter, Silt (25%), strong petroleum smell, loose, moist, mod. dense	SM	8 8 6
1.5-3.0			10YR 3.5/2, Grey Brown - Dark Grey Brown, Silty fine Sand, Silt 25%, Strong smell of petroleum, moist, mod. dense, non plastic, Gravel fill 10-15%	SM	8 8 6
3.0-4.5		3.0-4.0	Same as above (1.5-3.0)		
		4.0-4.5	10YR, 2/1, Black, Silty Peat, moist, mod. dense-loose, organic matter 70%	SM ↓ Pt	2 3 4
4.5-6.0			Same as above (4.0-4.5) more silt than above	Pt	5 6 5

CLEJ-00414-03.13-04/01/92

Boring No. _____ Location Coordinates N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

Casing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start _____ Finish _____ Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
6.0-7.5			7.5YR 3.5/3, Strong Brown, Silty Fine Sand (Silt 30%), 10% Clay, Mod. dense, non plastic, moist-wet	SM	4 4 5
7.5-9.0			10YR 4.5/3 Silty Clayey Fine Sand (Silt + Clay 45%), Brown-Dark Brown, moist mod. dense, slightly plastic	SM ↓ SC	6 6 8
9.0-10.5			10YR 4.5/3, Brown-dark Brown, Silty Fine Sand, (Silt 30%), moist-wet, mod. dense	SM	6 6 8
14.0-15.5			10YR 4.5/1, Grey-Dark Gray, Silty Clayey Fine Sand, (Silt + Clay 20-30%), moist, sticky in clay layers, slightly plastic, slightly dense.	SM / SC	3 5 8
19.0-20.5		19.0-20.0	2.5YR 4.5/2, weak pale red Silty Clayey fine Sand, (Silt + Clay 40%), wet, slightly dense, slightly plastic	SC / SM	4 7 7
		20.0-20.5	Silty Fine-Med. Sand, Same Color, loose, non plastic (Silt 10-15%)	SW	

Boring No. ~~6~~ **CLEJ-00414-03.13-04/01/92**

tes N _____

Hole Size _____ Slot _____ E _____

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

ologist _____ Development _____

Date Start _____ Finish _____ Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
24.0-25.5			10YR 7.5/1 white-light grey, silty fine-medium sand silt 10-15%, wet, loose, non plastic 10-15% coarse sand + pebbles	SW	3 3 5

Boring No. ~~GW 17~~ HPGW 23 SHEET ____ OF ____

on Site 400 PM 11/5/86

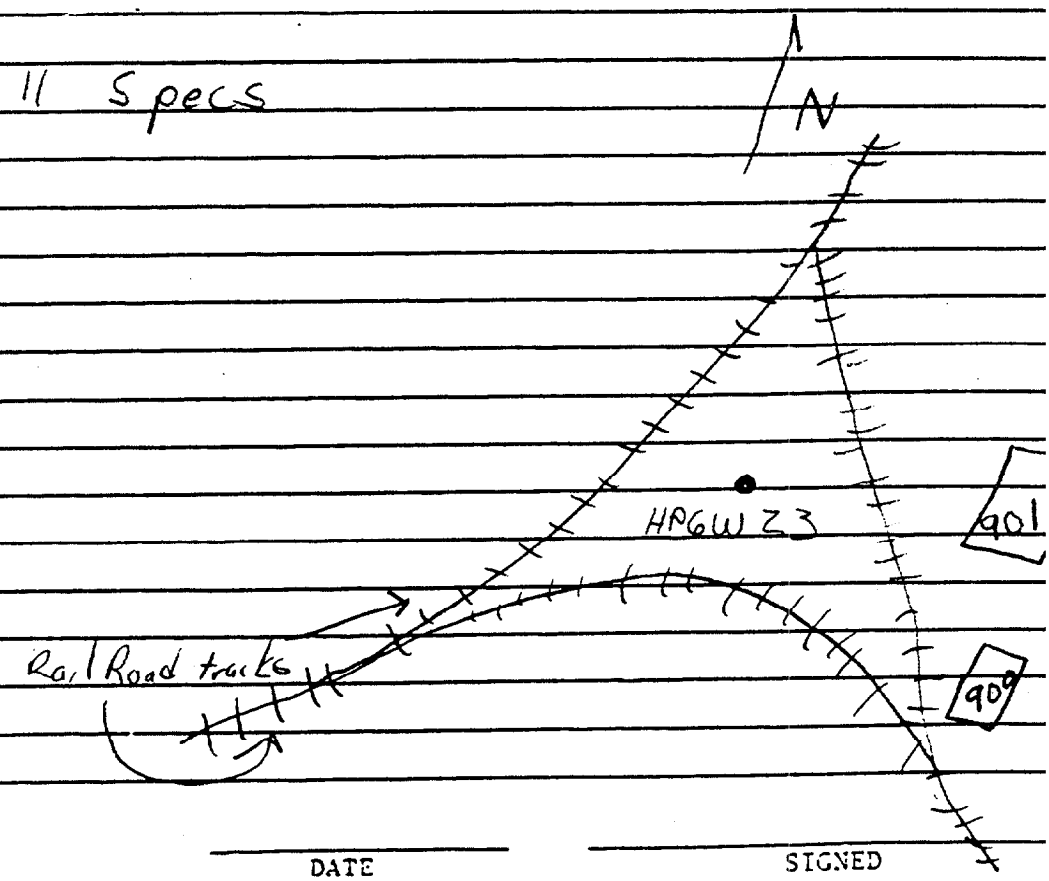
Continuous Spoon to 10'
Sampling over at 10' 430 PM

11/6/86

On Site 730 Am

Re-Sampling begins 735
last Spoon 825
well Complete 845

Standard Well Specs



DATE SIGNED

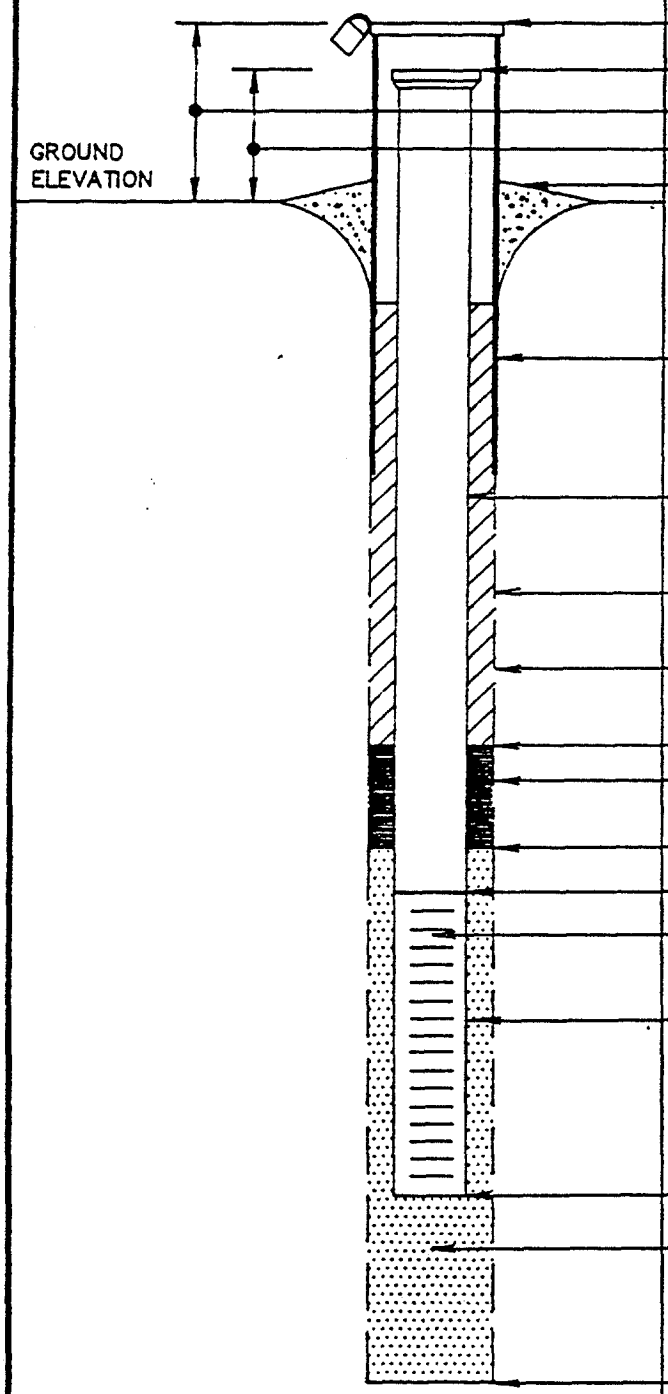
SOURCE: Environmental Science and Engineering, Inc., 1

CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW023

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A	DRILLER Davis Drilling Co
PROJECT NO. 49-0026	BORING NO. HP-GW023	DRILLING METHOD Hollow Stem Auger
ELEVATION	DATE 11/5/86 - 11/6/86	DELVELOPMENT METHOD
FIELD GEOLOGIST David Brentlinger (ESE)	



ELEVATION OF TOP OF SURFACE CASING: 32.26'

ELEVATION OF TOP OF RISER PIPE: 32.09'

STICK-UP TOP OF SURFACE CASING: 1.99'

STICK-UP RISER PIPE: 1.82'

TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"

TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"

TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'

TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'

ELEVATION/DEPTH TOP OF SCREEN: 5'

TYPE OF SCREEN: Schedule 40 PVC

SLOT SIZE X LENGTH: 0.010" x 20'

TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'

ELEVATION/DEPTH BOTTOM OF SAND PACK:

TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HP6W23

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, NC County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code
3. DATE DRILLED 11/5/86 USE OF WELL Monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 11.08 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Cement	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01	PVC

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25'	Coarse	Sand

DRILLING LOG

Depth From - To	Formation Description
0.0 - 4.0	Silty Fine Sand
4.0 - 6.0	Silty Peat
6.0 - 7.5	Silty Fine Sand
7.5 - 9.0	Silty Clayey Fine Sand
9.0 - 10.5	Silty Fine Sand
14.0 - 15.5	Silty Clayey Fine Sand
19.0 - 20.5	Silty Clayey Fine Sand
24.0 - 25.5	Silty Fine - Med Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE 2/11/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HPG

Hole Size 6" Slot 0.01

Screen Size 2" Mat'l PVC

asing Size 2" Mat'l PVC

ologist David Brentlinger

Date Start 11/13/86 Finish 11/12

Contractor ESE

Driller Davis

tes N

E

Filter Materials Silica Sand

Grout Type Bentonite Pellets

Development

Static Water Level 6.83'

Top of Well Elevation 9.33'

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0.0-1.5		0.0-0.75	10YR 2.5/1 Black, Silty fine Sand 50% organic matter, saturated H_2O	SM	4
		0.75-1.5	10YR 6.5/3 Pale - Very Pale Brown Silty fine Sand (silt 25%), loose, wet, slightly dense		3 4
1.5-3.0			Same as (0.75-1.5) less wet	SM	4 8 6
3.0-4.5			10YR 5/3, light Brown with Black-grey silty clay mottles throughout, silty fine Sand (silt 30%), moist, non-plastic, slightly dense	SM	5 9 7
4.5-6.0			10YR 4.5/2, Grey - dark grey Silty Clayey Sand, (silt+Clay 45%), slightly dense - mod. dense, moist, slightly plastic	SC/SM	2 3 4
6.0-7.5			10YR 4.5/4 Yellow Brown - dark yellow Brown, Silty Clayey Sand, (silt+Clay 45%), slightly plastic - plastic, moist, slightly dense	SC/SM	3 4 7

CLEJ-00414-03.13-04/01/92

Boring No. HP

es N

Hole Size Slot

E

Screen Size Mat'l Filter Materials

asing Size Mat'l Grout Type

ologist Development

Date Start 11/12 Finish 11/12 Static Water Level

Contractor Top of Well Elevation

Driller Drill Type

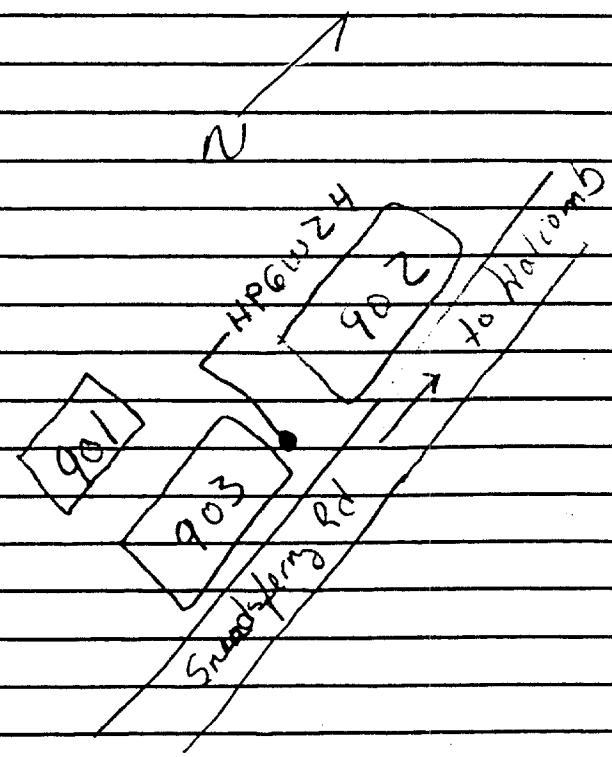
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			10YR 4/1, dark Grey, Silty-Clayey Sand, (Silt+ Clay 45%), moist, slightly plastic, mrd. dense-dense	SC / SM	5 10 26
9.0-10.5			10YR 6.5/1, Grey-light Grey, Silty Fine Sand (silt 10-15%) loose, slightly dense, moist-wet, Top 5" Black Silty Sand	SW	8 12 15
14.0-15.5			2.5Y 4.5/6 Grey-dark Grey, Silty Fine Sandy Clay (silt+ sand 30%) sticky, slightly dense, slightly plastic, wet	SC	2 1 1
19.0-20.5			7YR 2/0, Black, Silty Organic Clay (organic matter 45%), firm, dense, moist, slightly plastic	ML / Pt	2 3 5
24.0-25.5			10YR 2.5/1 Black Silty Sandy Peat (silt+ sand 30%, dry, mod. dense	Pt	5 6 10

Boring No. HPGW 24 SHEET ____ OF ____

On Site 1215 PM 11/12/86

1st Spoon 1220
last Spoon 120
Well Complete 150

Standard Well Specs.



DATE SIGNED

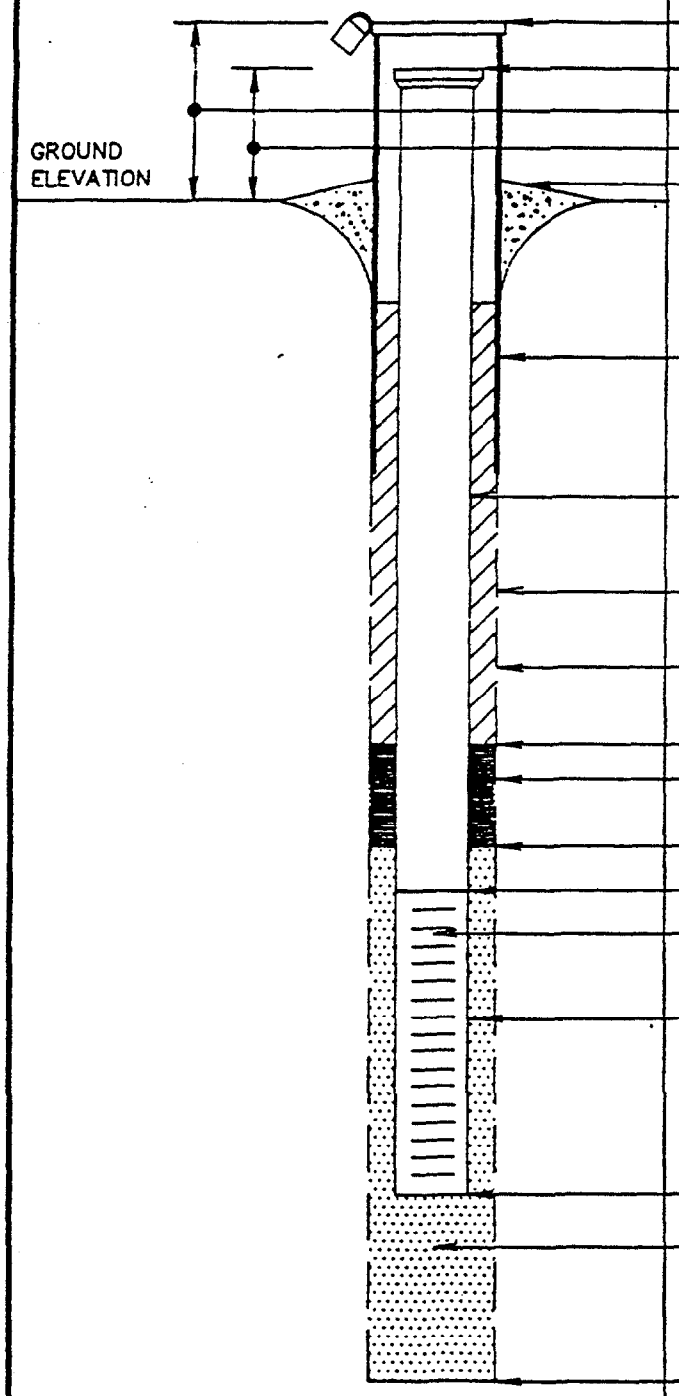
SOURCE: Environmental Science and Engineering, Inc., 1

WELL NO. HP-GW24-1

OVERBURDEN
MONITORING WELL SHEET

PROJECT: Camp Lejeune - HPIA
PROJECT NO.: 49-02036
BORING NO.: HP-GW24
ELEVATION:
DATE: 11/12/96 - 11/13/96
FIELD GEOLOGIST: David Brentlinger (ESE)

DRILLER: Davis Drilling Co.
DRILLING METHOD: Hollow Stem Auger
DELVELOPMENT METHOD:



ELEVATION OF TOP OF SURFACE CASING: 33.46'
ELEVATION OF TOP OF RISER PIPE: 32.31'
STICK-UP TOP OF SURFACE CASING: 2.70'
STICK-UP RISER PIPE: 1.55'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

WPGW 27

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville NC County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune (Street or Route No.) 28542
City or Town State Zip Code
3. DATE DRILLED 11/12/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 6.83 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0		2"	1/8"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		Concrete	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	-5.0	-25'		2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25'		Coarse	Sand

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
0.0	-4.5	Silty Fine Sand
4.5	-9.0	Silty Clayey Sand
9.0	-10.5	Silty Fine Sand
14.0	-15.5	Silty Fine Sandy Clay
19.0	-20.5	Silty Clay
24.0	-25.5	Silty Sandy Peat

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 2/11/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. GW

Hole Size 6" Slot 0.01

Screen Size 2" Mat'l PVC

Casing Size 2" Mat'l PVC

Geologist David Brentlinger

Date Start 11/5/86 Finish 11/5

Contractor

Driller

Coordinates N

E

Filter Materials Silica Sand

Grout Type Bentonite Pellets

Development

Static Water Level 9.00'

Top of Well Elevation 11.50'

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			2.5Y 7.5/4, Pale Yellow, Silty fine Sand, (Silt 25%) organic matter top 6", loose, moist, non plastic	SM	1 2 5
1.5-3.0			2.5Y 6.5/2, light Brown, Silty fine Sand, (Silt 20%) loose, moist, non plastic	SM	5 5 6
3.0-4.5			2.5Y 7.5/2, white-pale yellow, silty fine Sand, Silt 10-15%, Bright Yellow mottles, loose, moist, non plastic	SM/SW	4 6 12
4.5-6.0			10YR 8.0/1, white, Silty fine Sand, (Silt 10-15%) loose, moist, non plastic	SW	8 16 12
6.0-7.5		6.0-7.0	Same as Above (4.5-6.0)		
		7.0-7.5	2.5Y 7.5/6, yellow Silty Clay (little sand) Silt 30%, moist, mod. dense, non plastic, sticky when wet	SW/ML	2 3 4

CLEJ-00414-03.13-04/01/92

Boring No. 6 | Coordinates N ____ E ____

Hole Size ____ Slot ____

Screen Size ____ Mat'l ____ | Filter Materials ____

Casing Size ____ Mat'l ____ | Grout Type ____

Geologist ____ | Development ____

Date Start ____ Finish ____ | Static Water Level ____

Contractor ____ | Top of Well Elevation ____

Driller ____ | Drill Type ____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			2.5Y 7.5/4 yellow, Silty fine-med. Sand, top 6" very silty clay, silt (20%) moist, mod. dense, non plastic	SW/SM	4 8 6
9.0-10.5			2.5Y 7.5/4 yellow, Silty Clayey med. Sand, (silt + clay 30%), 3" of firm clay in middle of sample, slightly dense, plastic in clay layers, moist - wet	SC/SW	3 1 2
14.0-15.5		14.0-14.5	10YR 6/3 Silty Sandy Clay top 6"	SC/CH	4 3 5
		14.5-15.5	7.5YR 7.5+/0 Grey-white, very firm Silty Clay, with Coarse Sand bottom 2", plastic - V. plastic, dense, wet		
19.0-20.5			10YR 8/1, white, med. sand with 30% clay, wet, slightly dense, plastic in clay mottles	SC	5 6 8

CLEJ-00414-03.13-04/01/92

Boring No. 66 Coordinates N

Hole Size Slot E

Screen Size Mat'l Filter Materials

asing Size Mat'l Grout Type

ologist Development

Date Start Finish Static Water Level

Contractor Top of Well Elevation

Driller Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
24.0-25.5			Silty Medium-Coarse Sand (10-15% silt), 20% clay layers throughout, slightly plastic, wet, loose - slightly dense	SW / SC	2 / 4 / 1
			10YR 8/1, white		

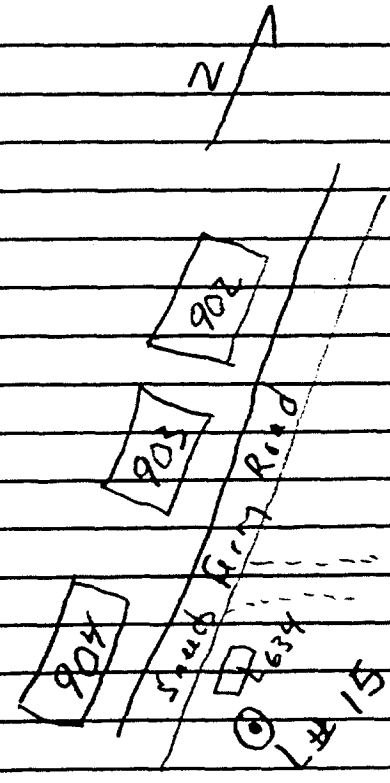
CLEJ-00414-03.13-04/01/92

Boring No. ~~GW 10~~ HP6W 25 SHEET ____ OF ____

on site 930 am 11/5/86

1st Spoon 945
last Spoon 1040
Well Complete 1115

Standard Well Specs



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 1

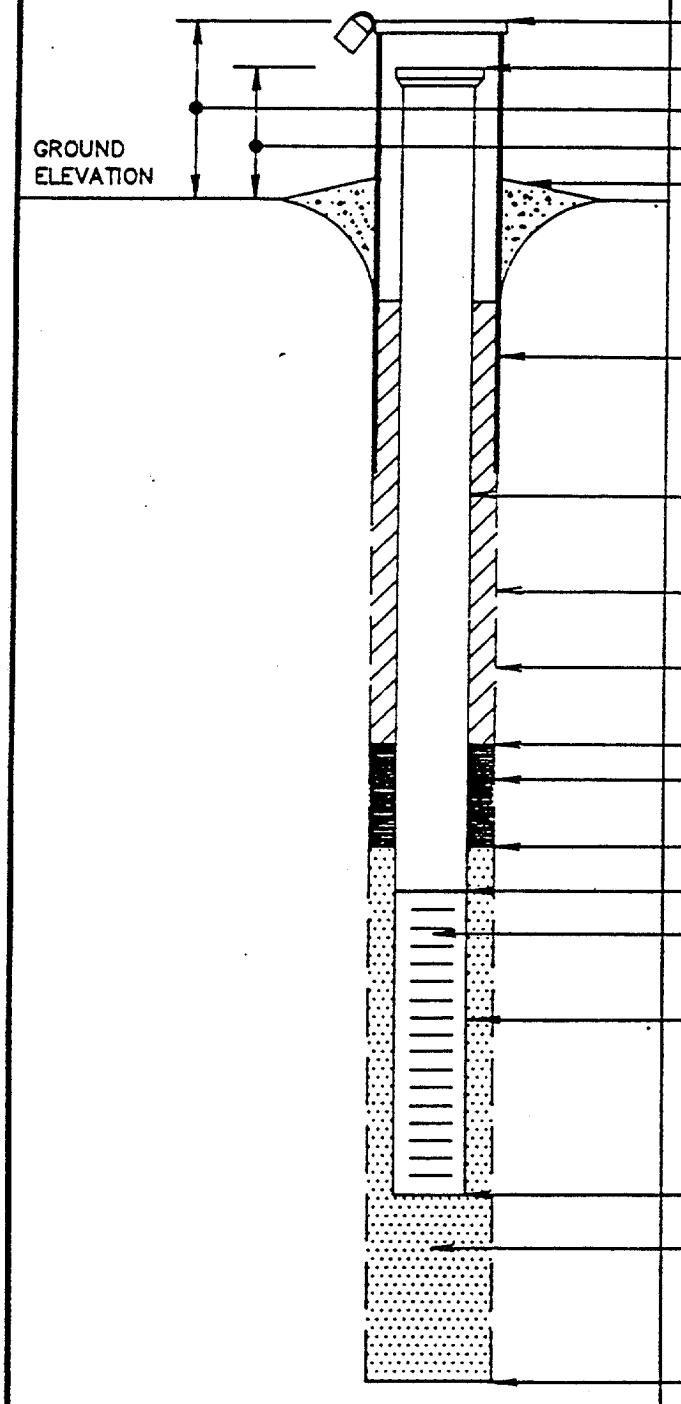
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW25

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-02036 BORING NO. HP-GW25
ELEVATION DATE 11/5/86
FIELD GEOLOGIST David Brentlinger (ESC)

DRILLER Davis Drilling
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 32.65'
ELEVATION OF TOP OF RISER PIPE: 32.53'
STICK-UP TOP OF SURFACE CASING: 2.24'
STICK-UP RISER PIPE: 2.17'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HP GW 25

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C.
(Road, Community, or Subdivision and Lot No.)
County: Onslow

2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/5/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 9.00 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0		2"	1/8"	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0.0	-2.0		Cement	
	-2.0	-3.0		Clay	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	-5.0	-25'		2"	in 0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	-3.0	-25'		Course	Sand

14. REMARKS: See Fig. (2-5)

Depth From	To	DRILLING LOG Formation Description
0.0	7.0	Silty Fine Sand
7.0	9.0	Silty Clay
9.0	10.5	Silty Clayey Med. Sand
14.0	15.5	Silty Sandy Clay
19.0	20.5	Med. Sand
24.0	25.5	Silty Med-Coarse Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT — DATE 2/11/87

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. G[illegible] Location Coordinates N

Hole Size 6" Slot 0.01 E

Screen Size 2" Mat'l PVC Filter Materials Silica Sand

Casing Size 2" Mat'l PVC Grout Type Bentonite Pellets

Geologist David Brentlinger Development

Date Start 11/5/86 Finish 11/5 Static Water Level 17.96'

Contractor ESE Top of Well Elevation 20.46'

Driller Davis Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			5YR 2.8/1 Black - dark grey, silty fine sand, silt 25%, loose, moist non plastic, organic matter top 6"	SM	1 1 2
1.5-3.0			7.5YR 4.5/6, strong Brown - Reddish Yellow silty fine sand (silt 20%), loose, moist	SM	2 2 3
3.0-4.5			7.5YR 5.5/2, Brown - Pink grey, silty fine sand (silt 20%, loose moist, non plastic	SM	3 4 5
4.5-6.0 water table 6'			7.5YR 5/2 Brown, silty fine sand, (silt 20%), 10% clay mottles, wet, slightly dense, non plastic	SM	3 5 5
6.0-7.5			7.5YR 8/0 white (blue tint), silty fine sand, (20% silt), 20% clay mottles, wet, clay very plastic, slightly dense	SM	4 8

CLEJ-00414-03.13-04/01/92

Boring No. 6 — Location Coordinates N ____ E ____

Hole Size ____ Slot ____

Screen Size ____ Mat'l ____ Filter Materials ____

Casing Size ____ Mat'l ____ Grout Type ____

Geologist ____ Development ____

Date Start ____ Finish ____ Static Water Level ____

Contractor ____ Top of Well Elevation ____

Driller ____ Drill Type ____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.5-9.0			10YR 7.5/2, light grey-pale white, silty fine-med. sand, 45% silt + clay mottles, moist, slight plastic clay, [illegible]	SM	[illegible] 6
9.0-10.5			10YR 6.25/1 grey-light grey, silty fine sand with 10-15% clay throughout, moist, non plastic-slight plastic	SM SC	4 9 11
14.0-15.5			very soft sticky clay 2.5Y 4.5/0 dark grey, very plastic, wet	MH / CH	3 1 2
19.0-20.5			5Y 5.5/2 olive-pale olive, silty clay with 10-15% medium-coarse sand layers, mod. dense, wet, plastic	SC / MH	4 4 4
24.0-25.5			5Y 5.5/1 grey-light grey, medium-coarse sand, 10-15% fines, loose, wet, non plastic	SW	[illegible] 5 6

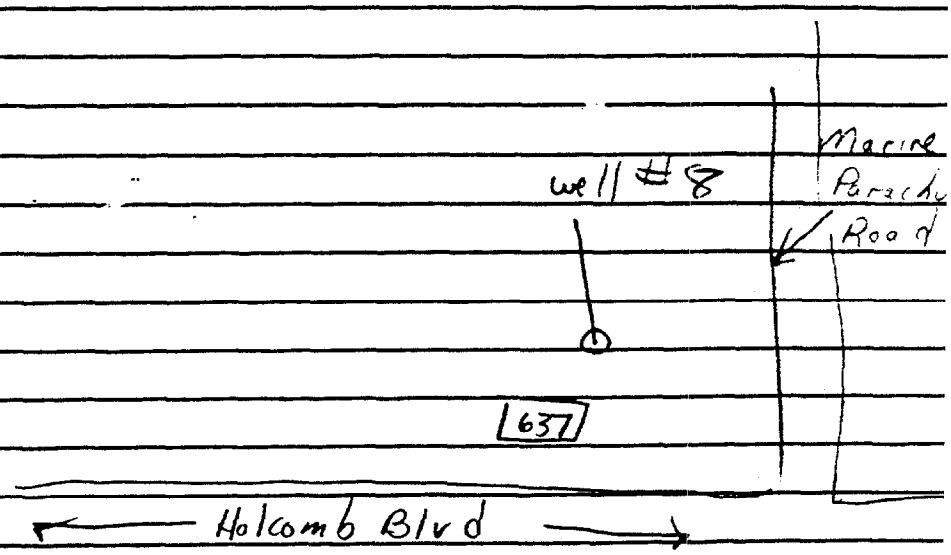
Boring No. ~~GW 8~~ HP GW 26 SHEET ____ OF ____

11/5/86

On Site 1215 pm

1st spoon 1220
last spoon 115
well complete 200

Standard Specs



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 1

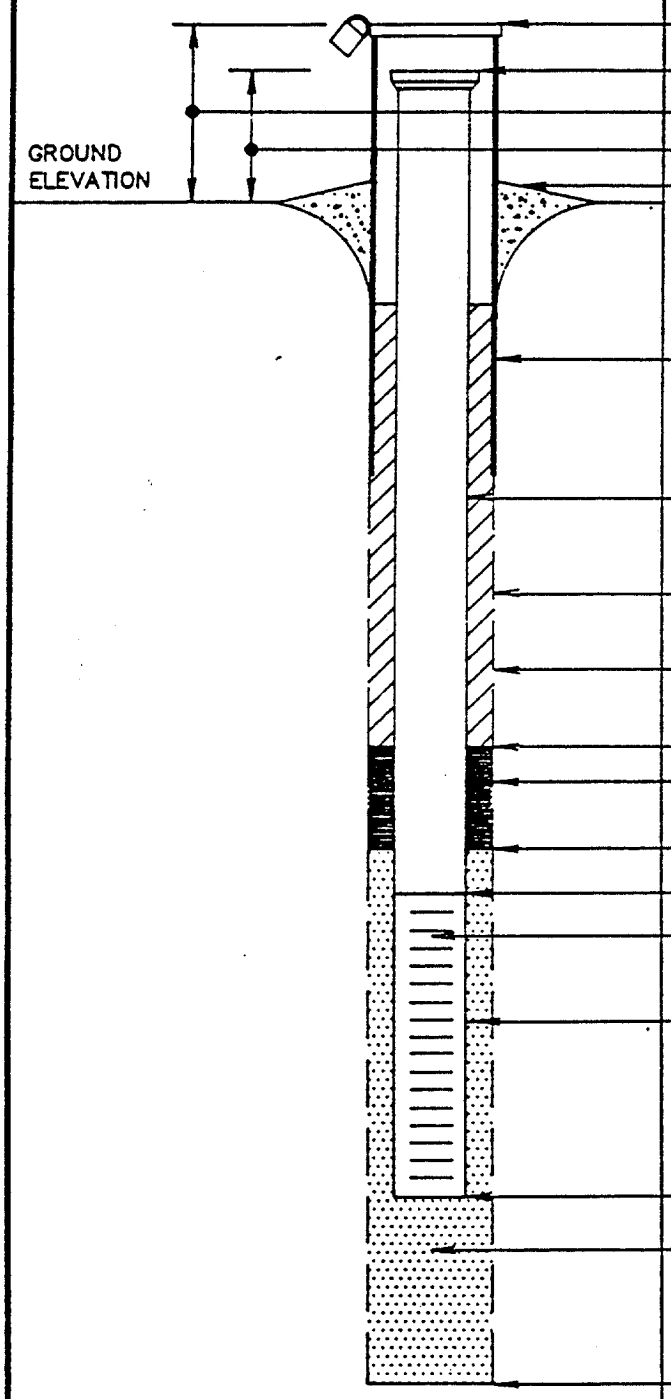
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW26

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-6126-36 BORING NO. HP-GW26
ELEVATION DATE 11/5/86
FIELD GEOLOGIST David Brent Unger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 35.16'
ELEVATION OF TOP OF RISER PIPE: 34.95'
STICK-UP TOP OF SURFACE CASING: 2.54'
STICK-UP RISER PIPE: 2.33'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

HPGW26

FOR OFFICE USE ONLY	
Quad. No.	Serial No.
Lat.	Long. / Pc
Minor Basin	
Basin Code	
Header Ent.	GW-1 Ent.

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.

DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune N.C. 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/5/86 USE OF WELL Monitor

4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☒ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 17.96 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): _____ METHOD OF TEST _____

8. WATER ZONES (depth): _____

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Cement	
	-2.0	-3.0	Clay	

See Fig. (2-5)

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25'	Coarse	Sand

14. REMARKS:

DRILLING LOG Depth From	Depth To	Formation Description
0.0	7.5	Silty Fine Sand
7.5	9.0	Silty Fine - Med. Sand
9.0	10.5	Silty Fine Sand
14.0	15.5	Soft Clay
19.0	20.5	Silty Clay
24.0	25.5	Med.-Coarse Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Paul M. Emblyn 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HP6W
Hole Size 6"
Slot 0.01
Screen Size 2"
Mat'l PVC
Casing Size 2"
Mat'l PVC
Geologist David Brentlinger
Date Start 11/17/86
Finish 11/17
Contractor ESE
Driller Davis

s N
E
Filter Materials Silica Sand
Grout Type Bentonite Pellets
Development —
Static Water Level 19.8'
Top of Well Elevation 22.3'
Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0 - 1.5			10YR 5.5/4 yellow Brown, silty fine Sand with 30% Cement fill (silt 30%), organic matter 40%, slightly dense, moist, non plastic	SM	3 10 13
1.5 - 3.0		1.5 - 2.2	Same as above (0.0 - 1.5)		
		2.2 - 3.0	2.5Y 7/4, Pale Yellow - Yellow, firm silty Clay, silt 30%, dense, plastic, moist	SM CL	10 11 11
3.0 - 4.5			10YR 6/8 Brown Yellow Silty Clayey fine Sand, (silt + clay 40%), mod. dense, non plastic, moist	SM SC	9 10 12
4.5 - 6.0			Same as above (3.0 - 4.5) less silt	SC	9 10 8
6.0 - 7.5		6.0 - 6.5	Same as above (4.5 - 6.0)		
		6.5 - 7.5	10YR 7.5/4 very pale Brown, (silt 25%), loose, moist, non plastic, less Clay	SC SM	7 8 10

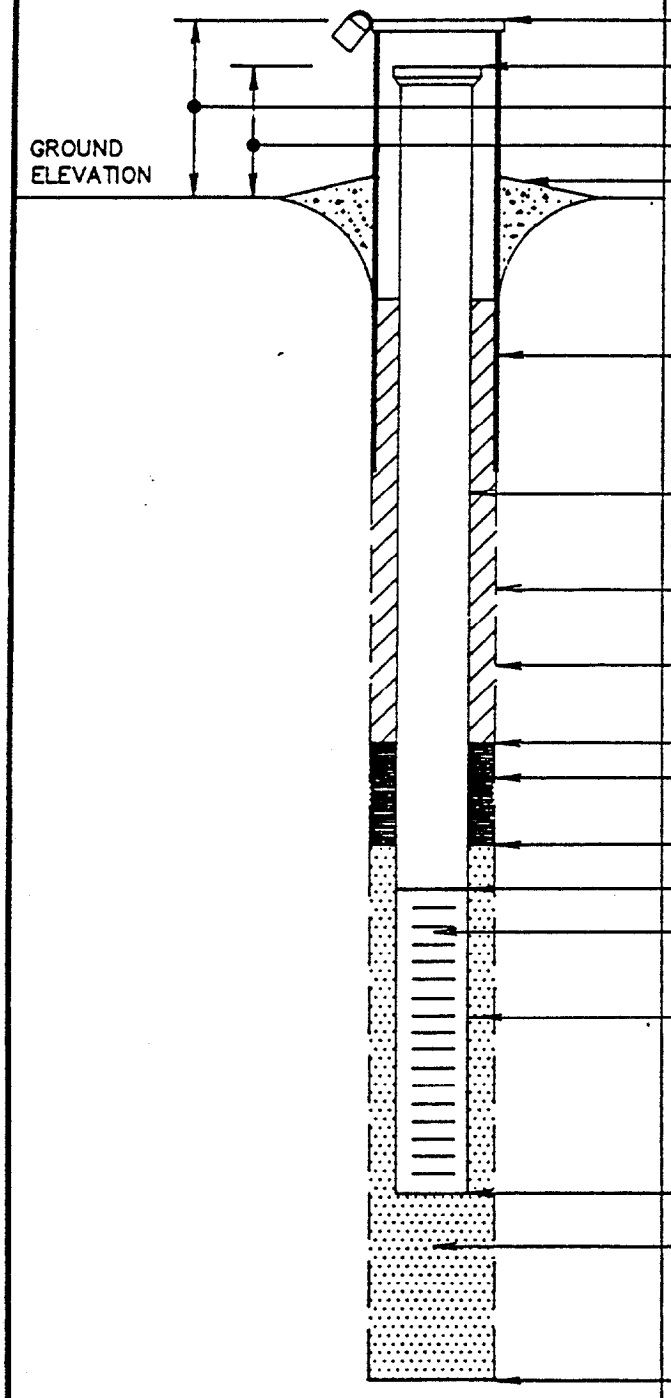
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW29

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-02030 BORING NO. HP-GW29
ELEVATION DATE 11/17/86
FIELD GEOLOGIST David Brent Unger (ESE)

DRILLER Davis Drilling Co
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 28.83'
ELEVATION OF TOP OF RISER PIPE: 28.82'
STICK-UP TOP OF SURFACE CASING: 2.40'
STICK-UP RISER PIPE: 2.39'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN:
SLOT SIZE X LENGTH: 0.010' x 20'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

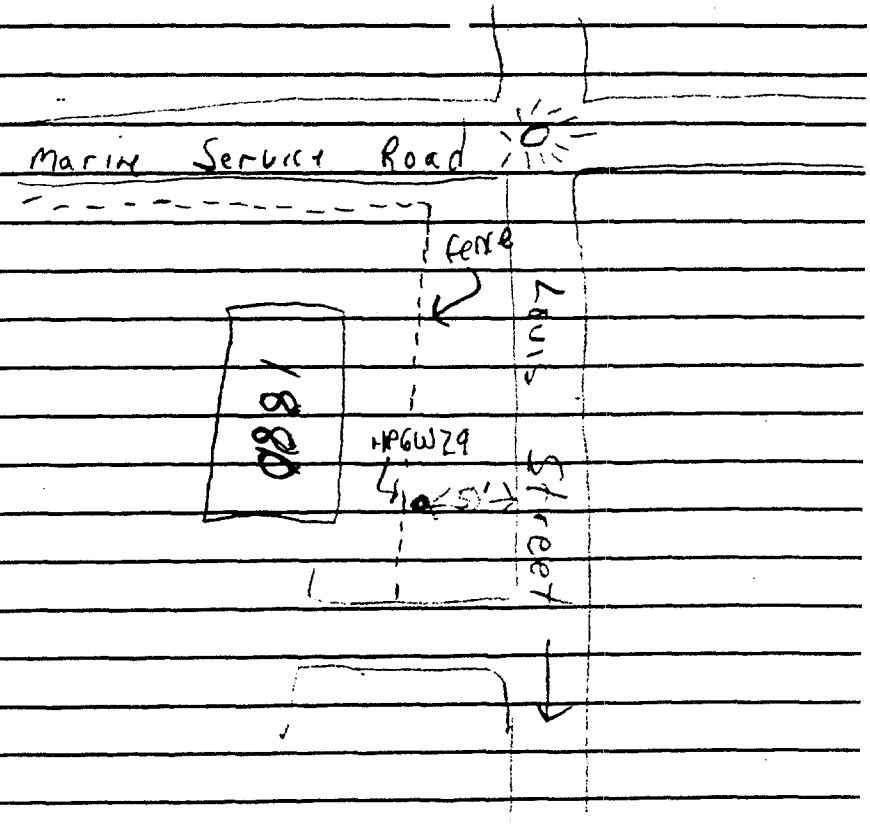
OVBDMW.DWG

Boring No. HPGW α 1 SHEET ____ OF ____

onsite 930 Am 11/17/86

1st Spoon 935
Rain delay 1000
Drilling resumes 1115
last spoon 1130
Well Complete 1225

Standard Well Specs



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc.,

Boring No. HPGW

CLEJ-00414-03.13-04/01/92

N

Hole Size Slot E

Screen Size Mat'l Filter Materials

asing Size Mat'l Grout Type

Ge ogist Development

Date Start Finish Static Water Level

Contractor Top of Well Elevation

Driller Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
7.0 - 9.0			10YR 7.5/6 yellow Silty fine Sand, (silt 25%) Slightly dense, non plastic, moist	SM	4 6 5
9.0 - 10.5			10YR 8/1 white Silty fine Sand, (silt 10-15%), loose, dry-moist, non plastic	SW	10 12 20
14.0 - 15.5			10YR 8/1 white Silty fine Sand with 10% Clay layers (silt 15%), loose, Moist, non-plastic	SM	9 7 11
19.0 - 20.5			10YR 7.5/6 yellow Silty Clayey Sand, (silt + Clay 40%), wet, slightly dense, slightly plastic	SC	5 7 10
24.0 - 25.5			10YR 5.75/8, yellow Brown, Silty Fine - Med. Sand, (silt 10-15%), wet, slightly dense, non plastic, 3" clean medium sand on top	SW	4 7 8

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

NPGW 29

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Davis Drilling Co
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, NC
County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code

3. DATE DRILLED 11/17/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 19.80 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Cement	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25	Coarse	Sand

DRILLING LOG

Depth From - To	Formation Description
0.0 - 2.25	Silty Fine Sand
2.25 - 3.0	Silty Clay
3.0 - 6.5	Silty Clayey Fine Sand
6.5 - 10.5	Silty Fine Sand
14.0 - 15.5	Silty Fine Sand
19.0 - 20.5	Silty Clayey Sand
24.0 - 25.5	Silty Fine-Med. Sand

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points).

See sketch attached to Fig. (2-5)

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 2/11/8

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

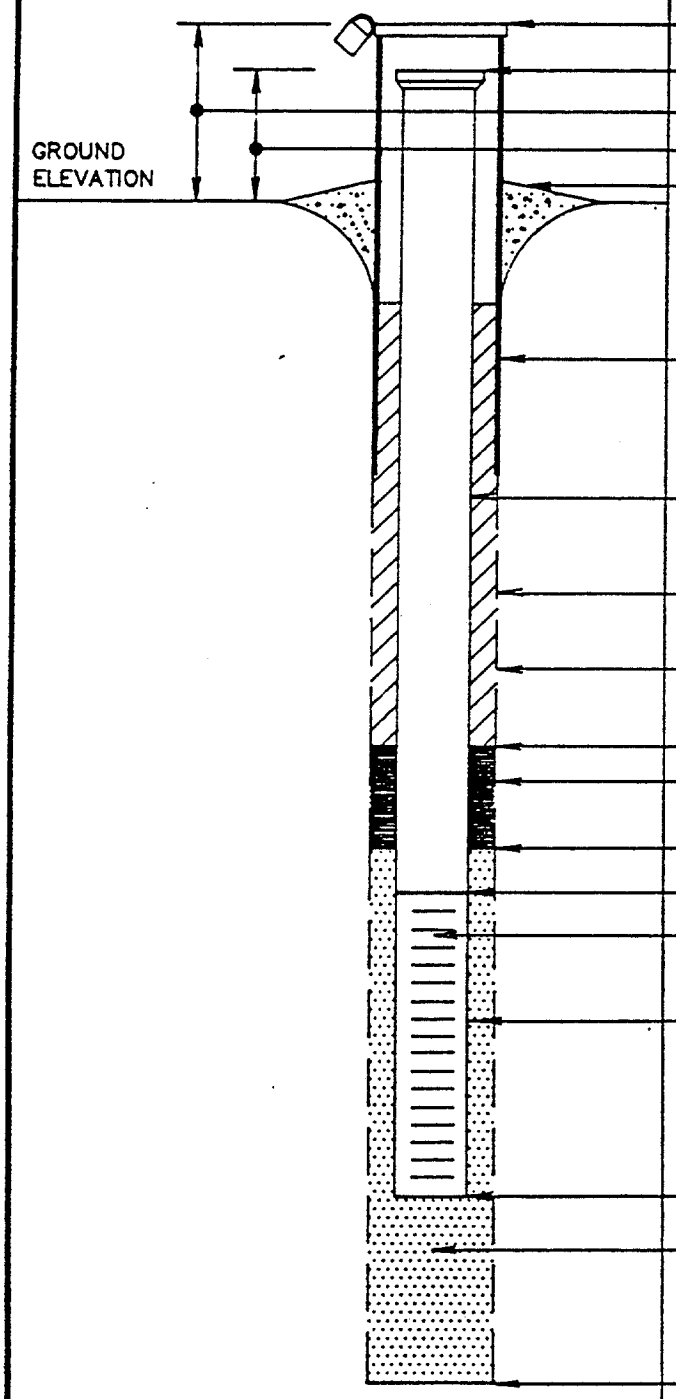
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW20

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-[illegible]
BORING NO. HP-GW20
ELEVATION
DATE 11/6/86
FIELD GEOLOGIST David Forest Unger (ESE)

DRILLER Dave Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 25.77'
ELEVATION OF TOP OF RISER PIPE: 25.10'
STICK-UP TOP OF SURFACE CASING: 2.44'
STICK-UP RISER PIPE: 2.27'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" X 20'
TYPE OF SAND PACK: Quartz silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

HPGW20

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending
STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-0141

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, N.C. County: Onslow
(Road, Community, or Subdivision and Lot No.)

2. OWNER US Navy
ADDRESS Camp LeJeune NC
(Street or Route No.) 28542
City or Town State Zip Code

3. DATE DRILLED 11/6/86 USE OF WELL Monitor
4. TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 8.17 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

DRILLING LOG

Depth From	To	Formation Description
0.0	3.0	Clay
3.0	4.5	Silty Clayey Sand
4.5	6.0	Clay
6.0	10.5	Silty Clayey Sand
14.0	15.5	Clay
19.0	20.5	Silty Clayey Sand
24.0	25.5	Silty Med Sand

If additional space is needed use back of form.

10. CASING:

Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
+2.5	-5.0 Ft.	2"	1/8"	PVC

11. GROUT:

Depth From	To	Material	Method
0.0	-2.0 Ft.	Concrete	
-2.0	-3.0 Ft.	Clay	

See Fig. (2-5)

12. SCREEN:

Depth From	To	Diameter	Slot Size	Material
-5.0	-25 Ft.	2" in.	0.01 in.	PVC

13. GRAVEL PACK:

Depth From	To	Size	Material
-3.0	-25 Ft.	Coarse	Sand

14. REMARKS: _____

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Lamar H. Sullivan 2/11/87
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84
Submit original to Division of Environmental Management and copy to well owner.

CLEJ-00414-03.13-04/01/92

Boring No. HP 6W

Hole Size 6" Slot 0.01

Screen Size 2" Mat'l PVC

asing Size 2" Mat'l PVC

G ogist David Brentlinger

Date Start 11/19/86 Finish 11/19

Contractor ESE

Driller Davis

N

E

Filter Materials Silica Sand

Grout Type Bentonite Pellets

Development -

Static Water Level 9.08

Top of Well Elevation 11.58'

Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0.0-1.5			Cement Fill + Gravel	/	6 6 6
1.5-3.0			2.5Y 2.5/8, Olive yellow-light olive Brown, Silty fine sandy Clay, (Silt + Sand 45%), Slightly plastic, mod. dense, moist	sm / sc	4 15 12
3.0-4.5			10YR 5/6, Yellow Brown, Silty Clayey Fine Sand (Clay + silt 45%), Non plastic slightly dense, moist	sc / sm	5 [illegible] 6
4.5-6.0			5YR 8/1 white - light grey, silty ultra fine - fine sand, silt 20-30%), loose, moist non plastic	sm	[illegible]
6.0-7.5			Same as Above (4.5-6.0)	sm	6 10 8
7.5-9.0			2.5Y 7/5.5 Yellow - Pale yellow, Silty fine Sandy Clay, (Silt + Sand 35%), [illegible] + plastic moist [illegible] dense	sc	[illegible]

CLEJ-00414-03.13-04/01/92

E

Hole Size HPGW

Screen Size _____ Mat'l _____

asing Size _____ Mat'l _____

Geologist _____

D: Start _____ Finish _____

Contractor _____

Driller _____

Filter Materials _____

Grout Type _____

Development _____

Static Water Level _____

Top of Well Elevation _____

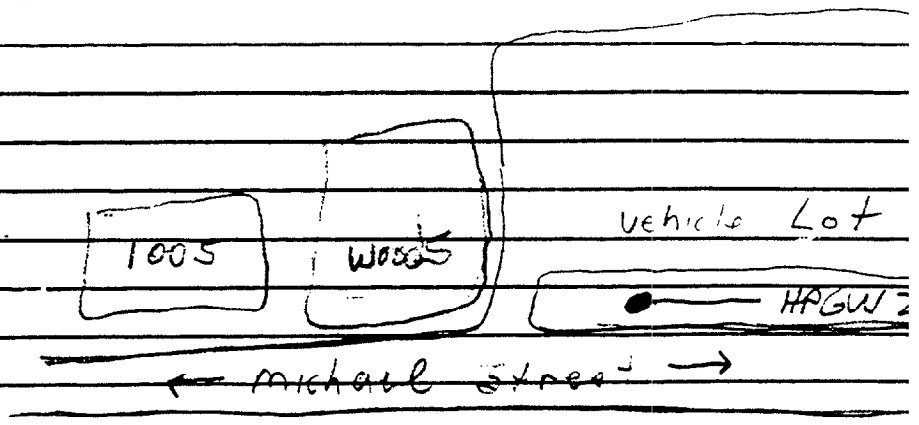
Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
9.0-10.5		9.0-10.0	10YR 8/1, white-Light Grey, Silty fine sandy Clay, wet same as above (7.5-9.0)	SC	3
		10.0-10.5	2.5Y 8/4, Yellow-Pale Yellow, Silty Med. Sand (Silt 10-15%), wet, Slightly dense	SW	4 6
14.0-15.5			2.5Y 4/0, dark grey, very Soft, sticky Clay with 30% Silt, plastic wet not dense	CH	1 1 1
19.0-20.5			7.5YR 7/0, light Grey, Fine-Med. Sand with 10% Clay layers throughout, wet, Slightly dense, Clay is plastic	SW	7 4 8
24.0-25.5			2.5Y 6/0, Light Grey, Sandy Silty Marl, 50% Cemented Clastics, (Sand+ silt 30%), Very dense, wet	GC	35 50~3"

Boring No. HPGW 21 SHEET ____ OF ____

On Site 1245 PM 11/19/21
1st Spoon 1250
last Spoon 145
Well Completed 250

Standard Well Specs
[illegible] no well point
on base of casing
rather a slide-
on Cap



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., I

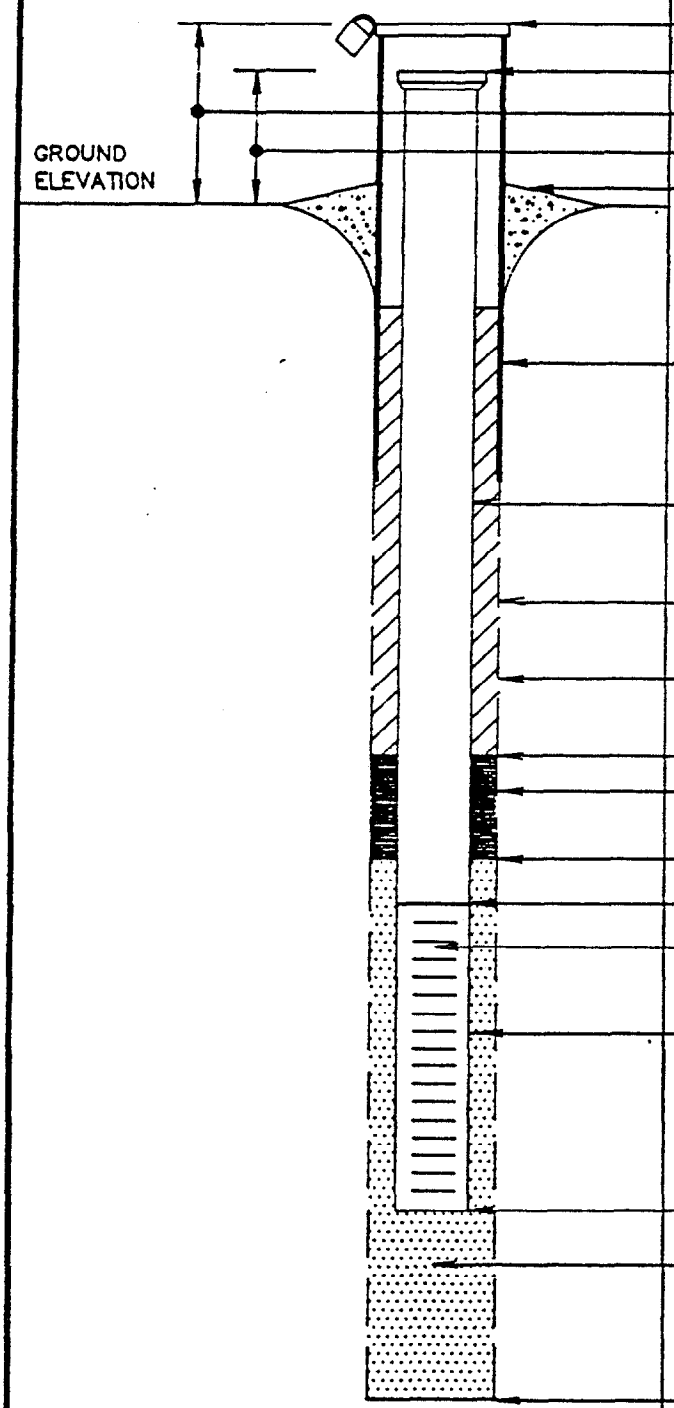
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW21

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-C2236 BORING NO. HP-GW21
ELEVATION DATE 11/19/86
FIELD GEOLOGIST David Brentinger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Hollow Stem Auger
DELVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 33.51'
ELEVATION OF TOP OF RISER PIPE: 33.59'
STICK-UP TOP OF SURFACE CASING: 2.42'
STICK-UP RISER PIPE: 2.20'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 3'
ELEVATION/DEPTH TOP OF SCREEN: 5'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

MPGW21

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Davis Drilling Co.
DRILLER REGISTRATION NUMBER Pending

STATE WELL CONSTRUCTION PERMIT NUMBER: 66-0135-WM-014

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Jacksonville, NC County: Onslow
(Road, Community, or Subdivision and Lot No.)
2. OWNER US Navy
ADDRESS Camp LeJeune NC 28542
(Street or Route No.) City or Town State Zip Code
3. DATE DRILLED 11/19/86 USE OF WELL monitor
4. TOTAL DEPTH 25.5' CUTTINGS COLLECTED ☑ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☑ No
6. STATIC WATER LEVEL: 9.08 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2.50 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	-5.0	2"	1/8"	PVC

11. GROUT:

	Depth From	Depth To	Material	Method
	0.0	-2.0	Concrete	
	-2.0	-3.0	Clay	

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	-5.0	-25'	2"	0.01 in.	PVC
				in.	
				in.	

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	-3.0	-25	Coarse	Sand

14. REMARKS: _____

DRILLING LOG

Depth From - To	Formation Description
0.0 - 1.5	Cement Fill
1.5 - 3.0	Silty Fine Sandy Clay
3.0 - 4.5	Silty Clayey Fine Sand
4.5 - 7.5	Silty Ultra Fine Sand
7.5 - 10.0	Silty Fine Sandy Clay
10.0 - 10.5	Silty Med. Sand
14.0 - 15.5	Soft Clay
19.0 - 20.5	Fine - Med Sand
24.0 - 25.5	Sandy Silty Clay

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Fig. (2-5)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

David A. Crumlyn 2/11/88
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

Boring No. 4 **CLEJ-00414-03.13-04/01/92** tes N

Hole Size 6" Slot 0.01 E

Screen Size 2" Mat'l PVC Filter Materials Silica Sand

asing Size 2" Mat'l PVC Grout Type Bentonite Pellets

ologist David Brentlinger Development

Date Start 11/4/86 Finish 11/4 Static Water Level 8.17'

Contractor ESE Top of Well Elevation 10.67'

Driller Davis Drill Type Hollow Stem Auger

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0.0-1.5			2.5Y 2.5/0, Black - dark grey silty fine sand (silt 25%) 20% organic matter, loose, moist, non plastic	SM	2 2 2
1.5-3.0			(lost sample ?) was not in spoon!		2 1 0
3.0-4.5			2.5YR 3.5/4 Reddish Brown silty fine sand (silt 30%) over 50% organic matter + Roots	SM	0 0 2
4.5-6.0			5Y 2.75/2 dark Red Brown, silty fine sand, (silt 30%) organic matter 60%, loose moist, nonplastic	SM	6 12 16
6.0-7.5			10YR 7.5/1 light grey-white, silty fine sand Tree roots 90% of sample, loose, moist, non plastic	SM	21 44 46

CLEJ-00414-03.13-04/01/92

Boring No._____ tes N _____

Hole Size_____ Slot_____ E _____

Screen Size_____ Mat'l_____ Filter Materials_____

(asing Size_____ Mat'l_____ Grout Type_____

(ologist_____ Development_____

Date Start_____ Finish_____ Static Water Level_____

Contractor_____ Top of Well Elevation_____

Driller_____ Drill Type_____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
7.5-9.0			Same as above (6.0-7.5) with less Roots	SM	15 14 16
9.0-10.5			10YR 6.5/1, light grey silty fine sand, (silt 30%), organic matter 40% moist, loose, non plastic	SM	8 9 9
14.0-15.5		14.0-14.75	5YR 2.75, Black- very dark grey (red tint), silty sandy organic peat (organics 60%)	SM	4
		14.75-15.5	5Y 8/1 white (blue tint), silty sandy clay (silt + sand 25%), sticky, slightly plastic, moist	SC	6 8
19.0-20.5		Repetitive sand-silt-clay layers	10YR 6.5/2 Pale - very pale brown, silty sandy clay, silt + sand 30%, more sand than silt bottom 6", wet, plastic - v. plastic in clay layers, slightly dense	CH ↓ SC	7 5 8
24.0-25.5			10YR 2.5/1 very dark grey-black, silty sandy clay slightly plastic, wet, slightly dense, clay is soft silt + sand 30%	CH / SC	1 3 6

APPENDIX D

INTERMEDIATE AND DEEP WELLS BORING LOGS

CLEJ-00414-03.13-04/01/92

BORING NO. HP-MW-4-5

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells		Page 2 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-9-90	completed 12-11-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 29.07'/28.63'	Soil Drilled	▼ ___ below ground	Total Depth 83'/63
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitori HNU	LE
	31' - 36'		5'/.5'	"coquina"-like pcs (med gray)			BG≈ 4.6ppm	
	36'-41'		5'/	same as above (med gray)				
	41' - 44'		5'/	same as above (med gray)				
	44 - 49'		5'/	same as above (med gray & light brown)				
	49' - 51'		2'/2'	upper 1.0' f-m silty sand, trace shells, trace clay (slightly cohesive) [SM] (med gray)			3.7ppm	
	51 - 53'			lower 2' "coquina"-like pcs (med gray & light brown)				
	53' - 5'		5'/9	"coquina" pcs (med gray & light brown)				
			5'/6"	same as above				
	64 - 69'		5'/	1 pc. "coquina" (med. gray)		Note: During 61'-63' interval, hole started losing water, so cut down to 64'.		
	69'-74'		5'/5"			Note: Because we are apparently in sand now, the particular shoe we had did not return any samples		
	74 - 77'		5'/5'	f-m silty sand [SM] (med. gray)				

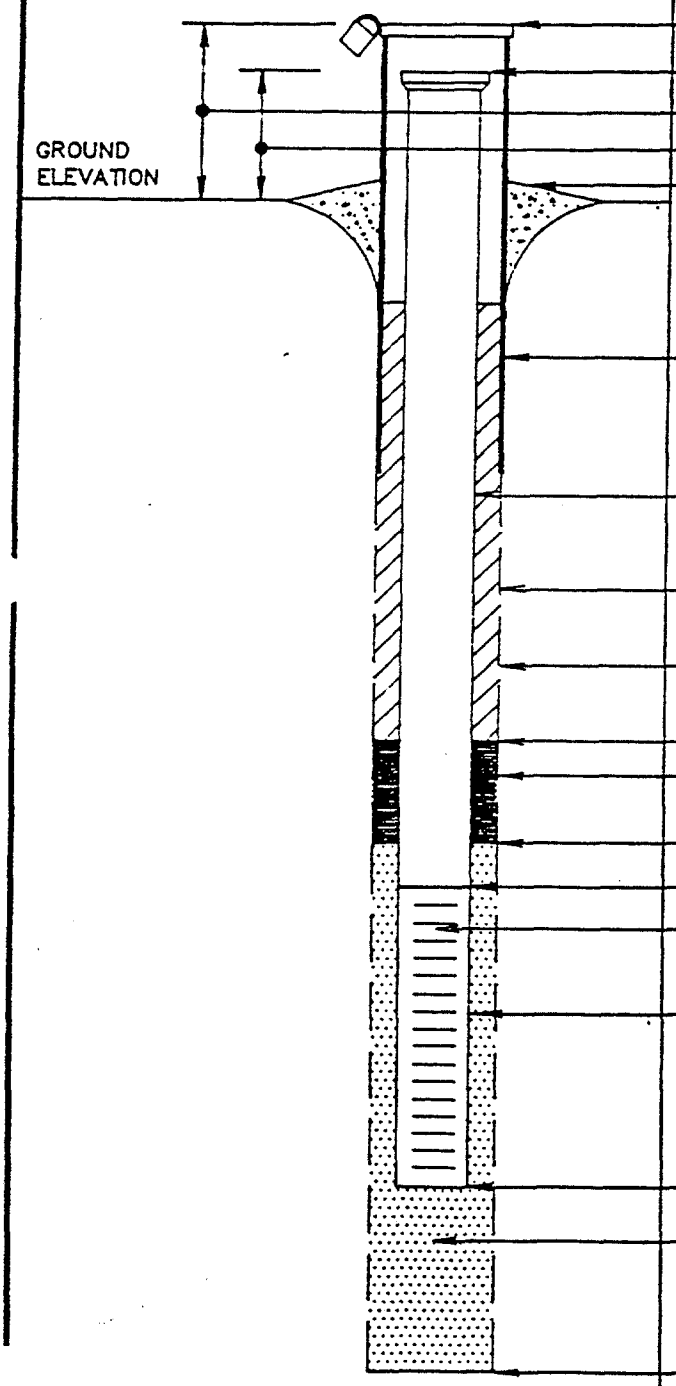
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW4-2

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - LDA
PROJECT NO. 49-02036
BORING NO. HP-GW4-2
ELEVATION
DATE 12/11/91
FIELD GEOLOGIST Paul M. Fenberg

DRILLER Environmental Monitoring & Testing
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 31.52
ELEVATION OF TOP OF RISER PIPE: 31.03
STICK-UP TOP OF SURFACE CASING: 2.45
STICK-UP RISER PIPE: stick-up 1.96
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: ≈ 6" diam (actually square shape)
TYPE OF SURFACE CASING: [illegible]

RISER PIPE I.D. 4'
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: [illegible]

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 58'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 62.5'
ELEVATION/DEPTH TOP OF SCREEN: 65'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: [illegible] x 10'
TYPE OF SAND PACK: Coarse [illegible] sand

Note: 3' sump/stick up

ELEVATION/DEPTH BOTTOM OF SCREEN: 78'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 83'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPSW 4-2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point-Monitoring Wells	Page 3 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-9-90 completed 12-11-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 29.07'/29.68'	Soil Drilled	▼ ___ below ground	Total Depth 83'/103'
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	Monitoring LE
	90 77'-84'		5'/27"	Same as previous interval			Back ground (BG)	
	84-89'		5'/42"	Silty sand, trace shell pcs dense (med. gray)			3.2 ppm BG	
	90 89-94'		5'/0"			core barrel accidentally not loaded in dark		
	95'-97'		2'/24"	dense silty sand, trace shell material 2 Hard carbonate pcs (med. gray)			BG = 3.0 ppm	
	97-97.8'		2'/4"	pcs of "coquina" (med. gray)		We lose circulation + not cutting.		
	100 97'-8"-102'8"		5'/22"	pcs of "coquina", some silty, m-f sand, trace coarse-grained sand (med. gray)				
	102'8"-107'8"		5'/20"	f-c silty sand, little shell pcs (closer to 1%) [SM] (med gray)			BG	
	107'8"-109' 110		14"/13"	f-c silty sand, some shell material (20-30%) [SM] (med gray)			BG	
	109-114'		5'/17"	f-c silty sand, shells [SM] (med. gray)			BG = 38 ppm	
	114'-119' 120		5'/<1"	f silty sand & shell material [SM] (med. gray)				
	119'-124'		5'/<1"	same as above.				
	124'-126		2'/24"	f-c silty sand [SM] (med. gray)				

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPGW4 [illegible]

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells	Page 4 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-9-90 completed 12-11-9[illegible]
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 29.07'/28.68'	Soil Drilled	▼ ___ below ground	Total Depth 83'/163'
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU jar	Comments on Advance of Boring	Monitori HNU	LE
	120 126'-129'		3'/21"	f-m silty sand & shells [SM] med gray			B[illegible] Supe[illegible]	
	130 129'-13[illegible]		5'/4[illegible]	f-m silty sand, little shell material [SM] med gray			BG	
	13[illegible]-13[illegible]		5/3[illegible]	f-m-c silty sand, trace shell material [SM] med gray			BG	
	140 13[illegible]-14[illegible]		5/9[illegible]	f-c silty sand, trace shell material. [SM] med gray				
	144-14[illegible]		5/27	f-m silty sand med gray [SM]				
	150			Sampling completed at 149'. Borehole reamed to 163'.				

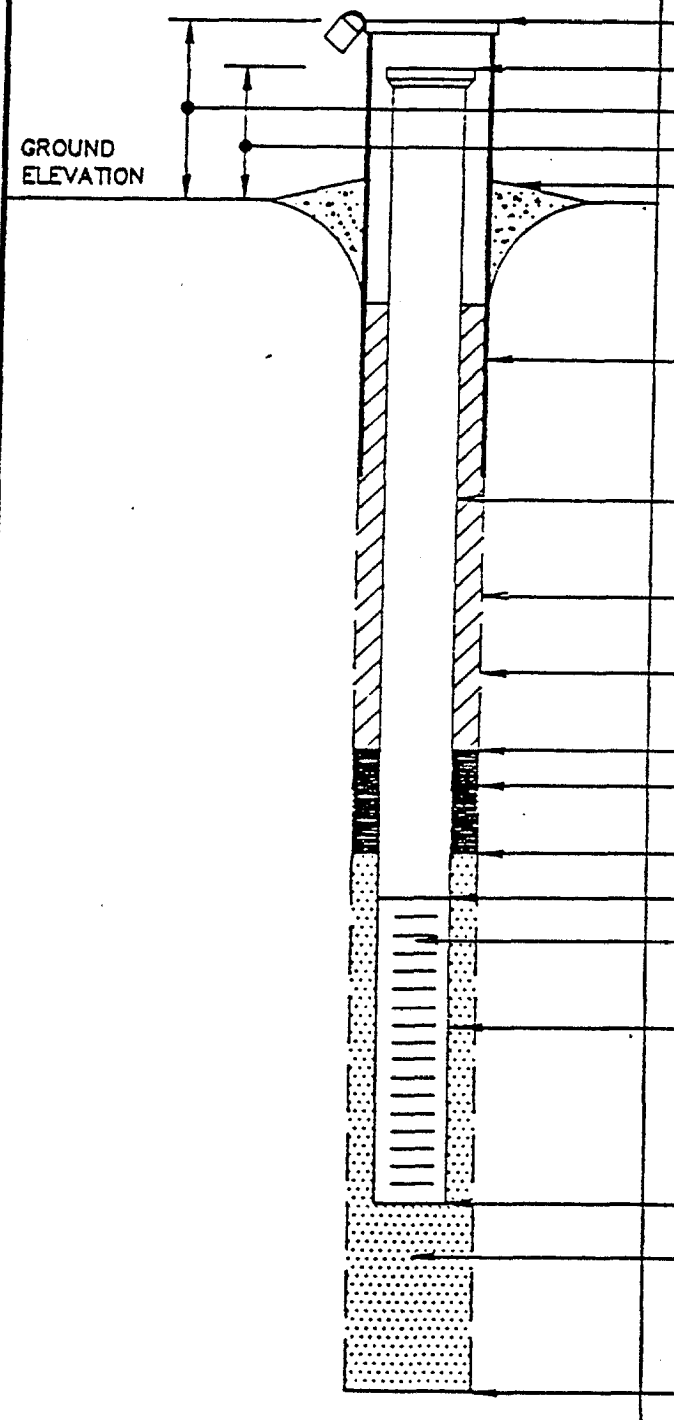
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW4-3

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-03036
BORING NO. HP-GW4-3
ELEVATION
DATE 12/9/91
FIELD GEOLOGIST Paul M. Feinberg

DRILLER Environmental Monitoring Testing
DRILLING METHOD Mud-Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 28.77
ELEVATION OF TOP OF RISER PIPE: 28.47
STICK-UP TOP OF SURFACE CASING: 0.99
STICK-UP RISER PIPE: Flush mount -0.24
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10"

TYPE OF BACKFILL: concrete

ELEVATION/DEPTH TOP OF SEAL: 132'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 138'
ELEVATION/DEPTH TOP OF SCREEN: 140'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010 slot x 10'
TYPE OF SAND PACK: Coarse silica sand

Note: 3' sump/end cap
ELEVATION/DEPTH BOTTOM OF SCREEN: 153'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 163'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

Hole Size 5 ⅞"

E HPGW 9-2

Screen Size 2" Mat'l PVC

Filter Materials Med. Sand

asing Size Mat'l PVC

Grout Type Portland #1

G logist David Brentlinger

Development Cent. Pump

Date Start 6/29/87 Finish 6/29

Static Water Level ~~15.90' TOC~~ 13.6

Contractor ATEC

Top of Well Elevation 2.25'

Driller Sweeting

Drill Type Rotary-Mud

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
0-5			Silty fine-very fine sand. little/no organic material		
5-10			same as above (0-5)		
10-15			same as above (0-5)		
15-20			Silty fine sand with light grey clay peds		
20-25			Silty fine-med. sand with light grey clay peds		
25-30			silty fine sand little/no clay or coarse material		
30-35			silty med. sand little/no coarse sand		
35-40			silty med sand		

CLEJ-00414-03.13-04/01/92

Hole Size 5"

E HPGW 9-2

Screen Size 2" Mat'l PVC

Filter Materials

asing Size 2" Mat'l PVC

Grout Type Portland #1

Geologist David Brentlinger

Development

Date Start 6/29/87 Finish 6/29/87

Static Water Level —

Contractor ESE

Top of Well Elevation

Driller Sanford Sweeting (ATEC)

Drill Type

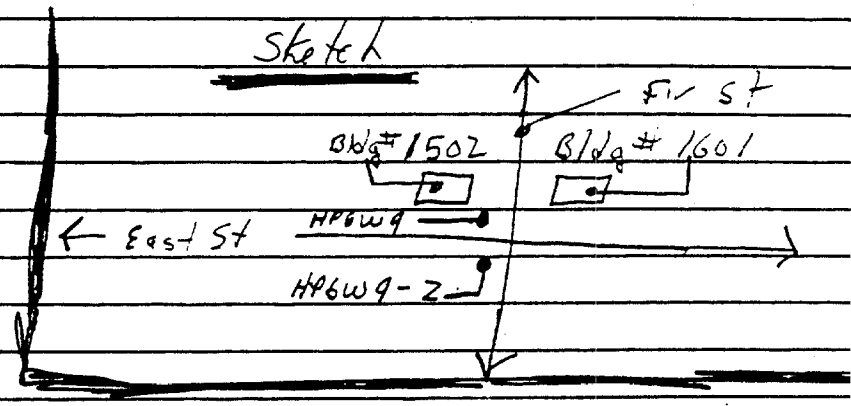
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
40-45			silty fine-med sand some coarse, angular sand throughout		
45-50			Same as above (40-45)		
50-55			Coarse sand, shells and cemented clastics, sand well rounded.		
55-60			Coarse well-rounded pebbles and sand, shells and uncemented clastics.		
60-65			cemented clastics little/no sand or shells		
65-70			same as (60-65)		
70-75			Same as above (65-70)		

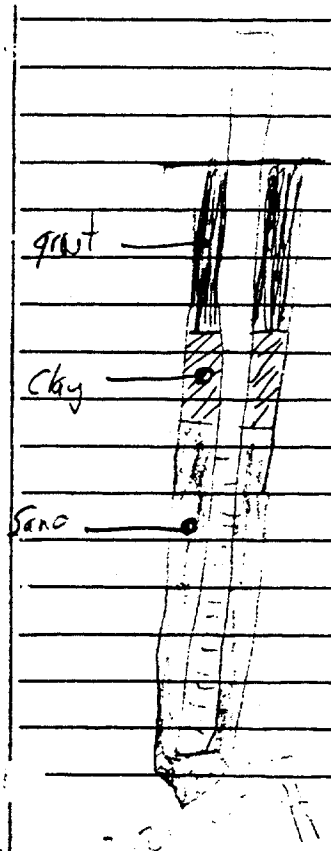
Boring No. HP6W 9-2 SHEET ____ OF ____

On site 0800, Drillers arrive 0815 set up and drilling 0900, driller needs more water and runs out of gas at 0930, at 1030 drillers goes to get water returns 1100 and Resumes drilling. At depth of 60' Rods get clogged (1 hr delay) 1400 rods unclogged, 1500 drilling again, 80' drilled 1600 Screen + Casing in 1630, Sand pack and seal in 1645, grouted and complete 1715; drillers clean up till 1730.

6/30/87 0800 14.58' TOC
stick-up ~ 2.50'
static ~ 12.33' BGL
DBW ~ 70.00' TOC

Sketch





55.29' Riser
(75' Bentonite, 50' grout)

77.79' total length TOC
74.00' DBW

20' of Screen
(25' of [illegible])

Sediment

DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

WELL FACT SHEET

Well No. HP6W 9-2 Date 7/1/87 Start ~~7~~ 6/30 Finish 6/30

Total Depth of Boring Prior to Well Installation (79 - 80)'

Diameter of Boring 5"

Water Level 10.5'

Total Length of Well at Installation ~~75.29'~~ 77.79

Height of Well Above Ground Level 2.50'

Total Depth of Well Below Ground Level ~~77.79~~ 75.29

Total Length of Screen	20'	from	75.29'	BGL to	55.29	BGL
Total Length of Riser	55.29	from	55.29	BGL to	2.50	AGL
Sand Heave. Total Interval		from		BGL to		BGL
Filter Pack Total Interval	25.00'	from	75.29	BGL to	50.29	BGL
Bentonite Seal Total Interval	5'	from	50.29	BGL to	45.29	BGL
Grout Total Interval	43'	from	45.29	BGL to	2.29	BGL
Protective Casing Total Interval		from		BGL to		AGL

Well Screen Dia. 2" Schedule #40 Slot Size 0.01"

Well Riser Dia. 2" Schedule #40

Filter Material Med Sand.

Seal Bentonite

Backfill Portland #1 Cement ✓ Bentonite ____ Water ____

Protective Casing Dia. ____ Material ____

Well Development

Date 7/1/87 Time 1000 Start ~~[illegible]~~ 7/1 Complete 7/2

Water Level at Start 15.90 TOC Finish ____

Conductivity Start ✓ Finish ✓

Water Color Start Muddy Brown Finish Clear

0.43 gpm ← Bail 130 gal Start 7/1 ~~1000~~ 0800 Finish 7/1 ~~1600~~ 1500

Surge Start ____ Finish ____

Pump Start 7/2/87 (0900) Finish 7/2 (~~0400~~ 1300) Volume 7/2 1200

~~55 gal~~ 80 gal Type Cent. Rate (.3 - .4 gpm)

total purged 2

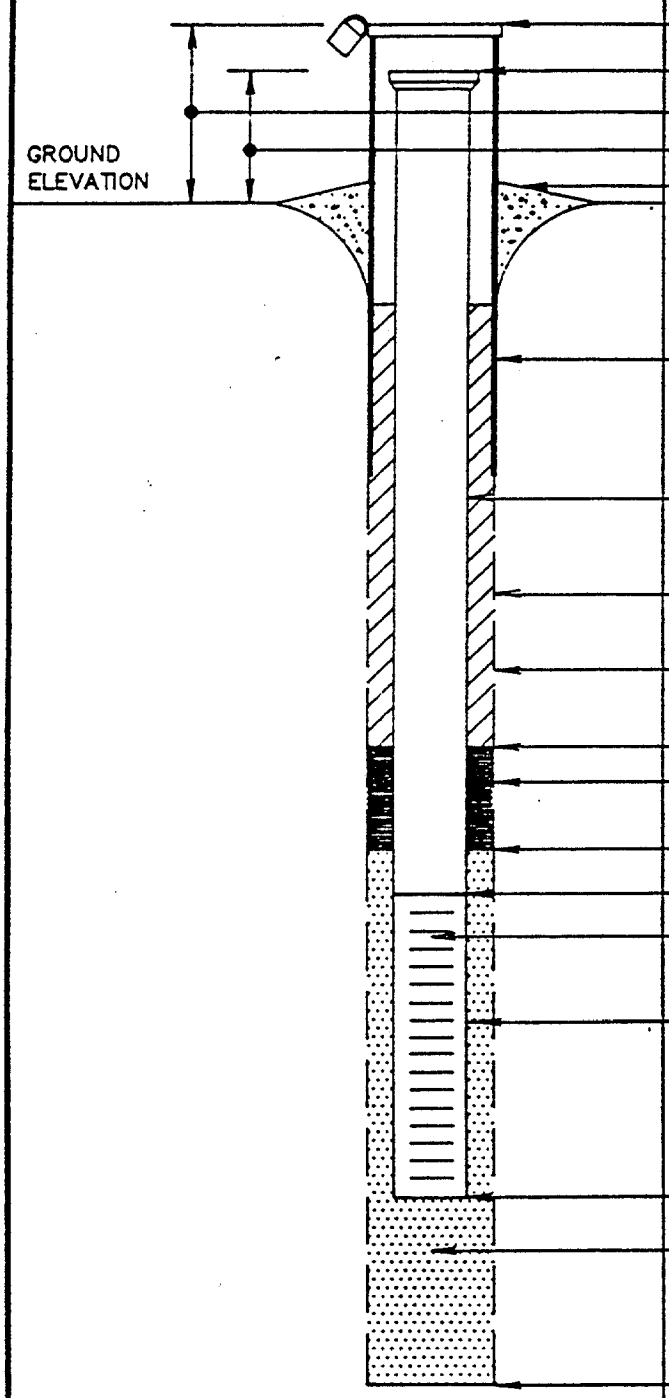
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW9-2

OVERBURDEN
MONITORING WELL SHEET

PROJECT: Camp Lejeune - HPIA
PROJECT NO.: 49-C2C3L
BORING NO.: HP-GW9-2
ELEVATION:
DATE: 6/29/87 - 6/30/87
FIELD GEOLOGIST: David Brentlinger

DRILLER: ATEC
DRILLING METHOD: Mud Rotary
DELVELOPMENT METHOD: Centrifugal Pump + Bailing



ELEVATION OF TOP OF SURFACE CASING: 28.16'
ELEVATION OF TOP OF RISER PIPE: 27.48'
STICK-UP TOP OF SURFACE CASING: 2.54'
STICK-UP RISER PIPE: 1.92'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 5"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 5"

TYPE OF BACKFILL: Portland #1 cement

ELEVATION/DEPTH TOP OF SEAL: 45.29
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 52.29
ELEVATION/DEPTH TOP OF SCREEN: 55.29'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Medium sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 75.29'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 80'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

Hole Size 10" (0-14...

E HPGW 9-3

Screen Size 2" Mat'l PVC

Filter Materials Med-Coarse Sand

asing Size 2" Mat'l PVC

Grout Type #1 Portland

G logist David Brentlinger

Development Bailer

Date Start 7/17/97 Finish 7/18

Static Water Level ~~15.50'~~ — 12.83

Contractor ESE

Top of Well Elevation 15.50'

Driller Davis Drilling Co. (Clayton Davis)

Drill Type Mud-Rotary

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-15			Silty fine sand with 50% clay throughout top 4' Road fill		
15-20			Silty Clayey fine-med. sand		
20-25			Silty fine-med sand (more fines than sand), clay layers.		
25-30			Silty med. sand little/no clay sand very angular		
30-35			fine sandy clay		
35-40			silty fine sand with clay layers 10% med. sand		

CLEJ-00414-03.13-04/01/92

Hole Size _____ E HP6W9-3

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

G logist _____ Development _____

Date Start _____ Finish _____ Static Water Level _____

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
40-45			Same as Above 35-40		
45-50			Silty Fine - Med sand little/no Clay		
50-55			Fine - med Sandy marl Cemented Clastics 50% lots of shells		
55-60			Cemented Clastics - shells less sand than 50-55		
60-65			Silty Med. - uno with less sand little cement		
65-70			Silty fine sand with Some Rock + Shells		
			Si		

CLEJ-00414-03.13-04/01/92

E HPGW9-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

G logist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FI
70-75			Rock + Shells little to no Sand or Fines		
75-80			silty med. Sand and shells, lots of fossils (teeth, bones...)		
80-85			Med. Sand with shells cemented clastics 20% some clay throughout		
85-90			fine - med sand More shells and more cemented clastics than 80-85		
90-95			Cemented Clastics little / no fines + Sand lots of shells		
95-100			Same as above 90-95		

CLEJ-00414-03.13-04/01/92

E HP(GW) 9-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

G logist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
100-105			Same as 90-95 less shells, more sand		
105-110			Silty med Sand with shells, little/no clastics		
110-120			Silty fine - med sand		
120-125			Same as (110-120)		
125-130			Same as (110-120)		
130-135			Silty med sand with some cemented clastics + shells		

CLEJ-00414-03.13-04/01/92

E MPG009-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

G logist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

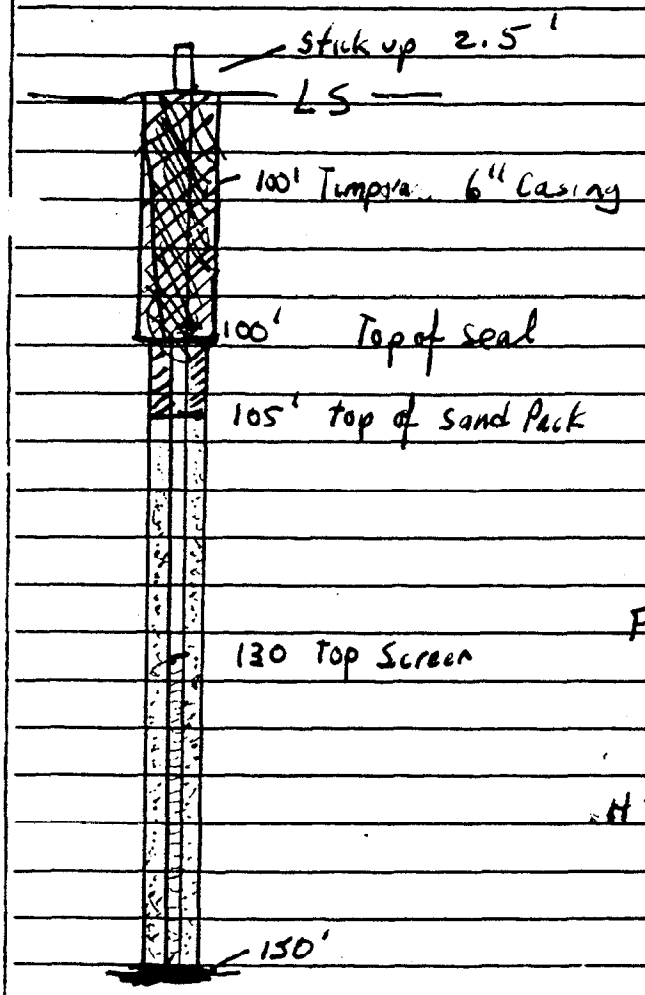
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
135-140			Silty Fine sand and Shells, Some med-Coarse Sand.		
140-145			Silty Clayey Med. Sand with no shells		
145-150			Silty Clayey Fine-med. Sand		

Boring No. HPGW 9-3 **DAVIS** SHEET ____ OF ____

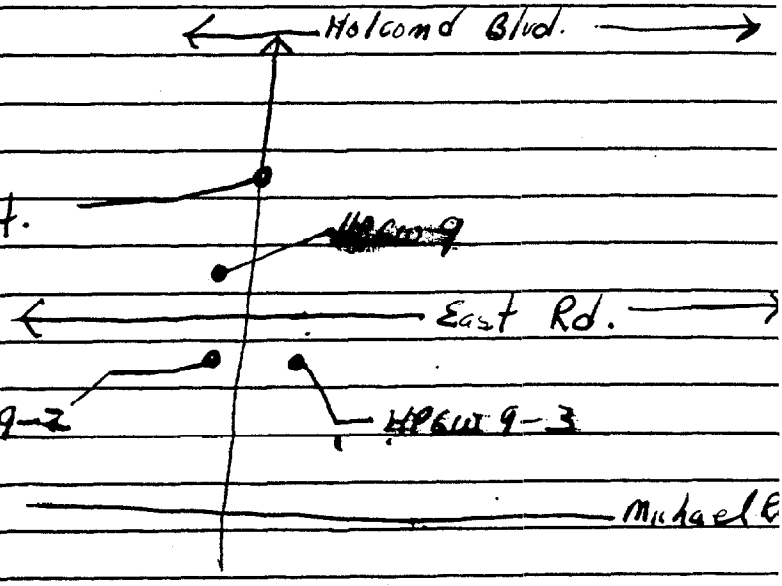
On site 7/17/87 at 1150; drillers take 1 hr to set up and begin drilling at 1300. Hole bored to 105' at 1600, driller wastes out and begins to set 6" Casing 1615. Well grouted at 1730; Drillers clean-up.

7/18/87

On site HPGW 9-3 0700, driller gets to 152' at 1030 sand pack + seal at 1100; Driller grouts hole, finish at 12:00.



Sketch



0-100' 10" hole
100-152' 6" hole

7/18/87 DATE

SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

WELL FACT SHEET

Well No. HPEW 9-3 Date 7/20/87 Start 7/19/87 Finish 7/20/87

Total Depth of Boring Prior to Well Installation 152'

Diameter of Boring (10" 25 → 104', 6" 104 - 152')

Water Level 16.50' TOC

6" 5 7/8 bit from 100'-150'

Total Length of Well at Installation 152.50

Height of Well Above Ground Level 2.50

Total Depth of Well Below Ground Level 150.00

Total Length of Screen	20'	from	150'	BGL to	130'	BGL
Total Length of Riser	132'	from	130.	BGL to	2.5	AGL
Sand Heave. Total Interval	45'	from	150	BGL to	105	BGL
Filter Pack Total Interval		from		BGL to		BGL
Bentonite Seal Total Interval	5'	from	105'	BGL to	100'	BGL
Grout Total Interval	100'	from	100	BGL to	0.00	BGL
Protective Casing Total Interval		from		BGL to		AGL

Well Screen Dia. 2" Schedule #40 Slot Size 0.01"

Well Riser Dia. 2" Schedule #40

Filter Material Med Sand

Seal Bentonite Pellets 0.25"

Backfill Cement Bentonite Water

Protective Casing Dia. 4" Material Steel

Well Development

Date 7/19/87 Time 0800 Start 0800 7/19 Complete 1700 7/20

Water Level at Start 16.50 TOC Finish 40' TOC

Conductivity Start Finish

Water Color Start turbid grey Finish Clear

Bail Start Finish

Surge Start — Finish —

Pump Start — Finish — Volume —

Type — Rate —

Add 375 gals using 0.75 gal backer at rate of 1 gpm

Cent Pump will Not work!

LAB

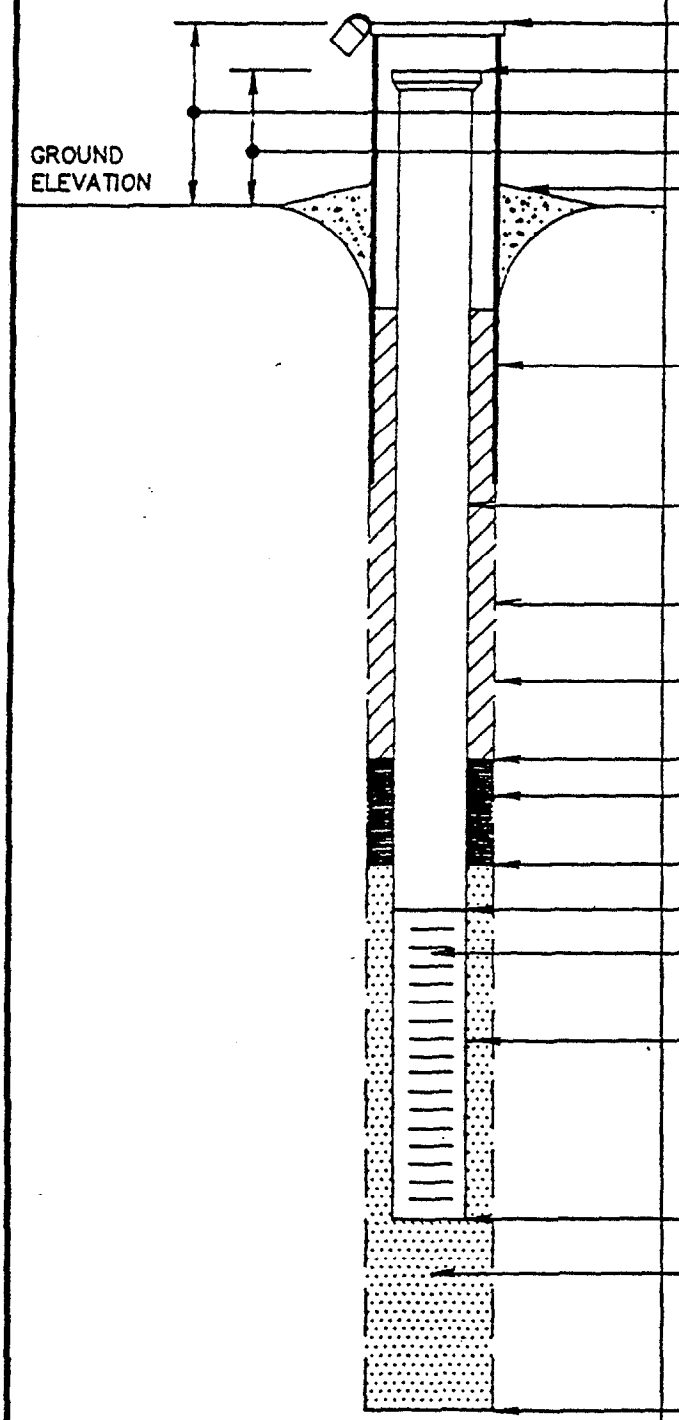
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW9-3

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP 1A
PROJECT NO. 49-C2C36 BORING NO. HP-GW9-3
ELEVATION DATE 7/17/87 - 7/ /87
FIELD GEOLOGIST David Brentlinger (E3E)

DRILLER Davis Drilling Co.
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Bailing



ELEVATION OF TOP OF SURFACE CASING: 27.26'
ELEVATION OF TOP OF RISER PIPE: 27.07'
STICK-UP TOP OF SURFACE CASING: 2.49'
STICK-UP RISER PIPE: 2.25'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10" (0-100') 6" (100-152')

TYPE OF BACKFILL: Portland # 1 Cement

ELEVATION/DEPTH TOP OF SEAL: 100'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 105'
ELEVATION/DEPTH TOP OF SCREEN: 130'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Medium Sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 150'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 152'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

E HPGW 17-2

Hole Size

Screen Size Mat'l

Casing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
50-55			Silty clayey Med sand with well Rounded coarse sand grains + Pebbles		
55-60			Same as above (50-55)		
60-65			Med. Sand [illegible] coarse sand + pebbles are well rounded		
65-70			Coarse, Rounded sand + Pebbles with some [illegible] shells		
70-75			[illegible]		
75-80			Same as above (70-75)		

Boring No. _____ ATEC SHEET ___ OF ___

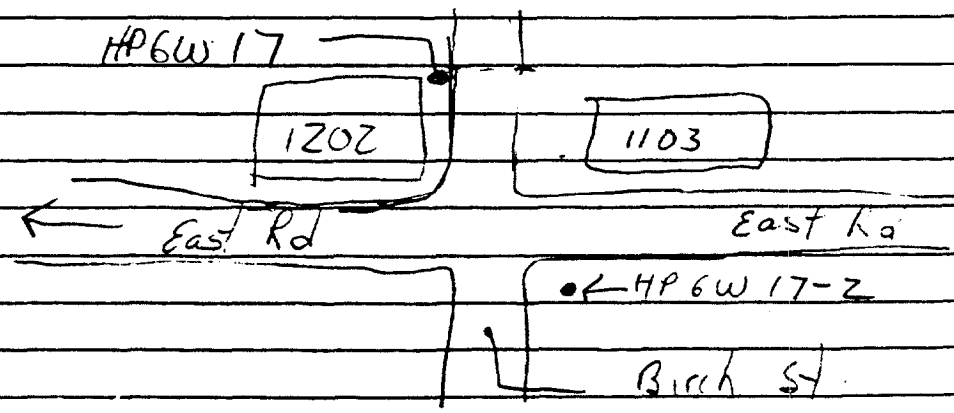
HPGW 17-2 6/18/87

on site 1230 ; Set up and drilling
1300 : 1430 well drilled ; Rods out.
Driller works for casing (for about 20 minutes) meanwhile
hole badly closes, driller attempts to get casing
in by force, successful in doing so and
achieves depth of about 74', however hole
has closed to 30' LS and sand [illegible]
[illegible] up to 30'. Hole must be
Re-drilled. End of day ; off post at 1630

HPGW17-2 6/19/87

[illegible] 0800 ; drillers arrive 0830 ; must
[illegible] other [illegible] on site [illegible]
[illegible] Attempt to inject a Bentonite
slurry at 50' LS to seal the well; they are successful
and then attempt to install a Bentonite-Cement grout
from 40' to LS ; they are successful [illegible]
this completed ; Day End off post [illegible].

sketch



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

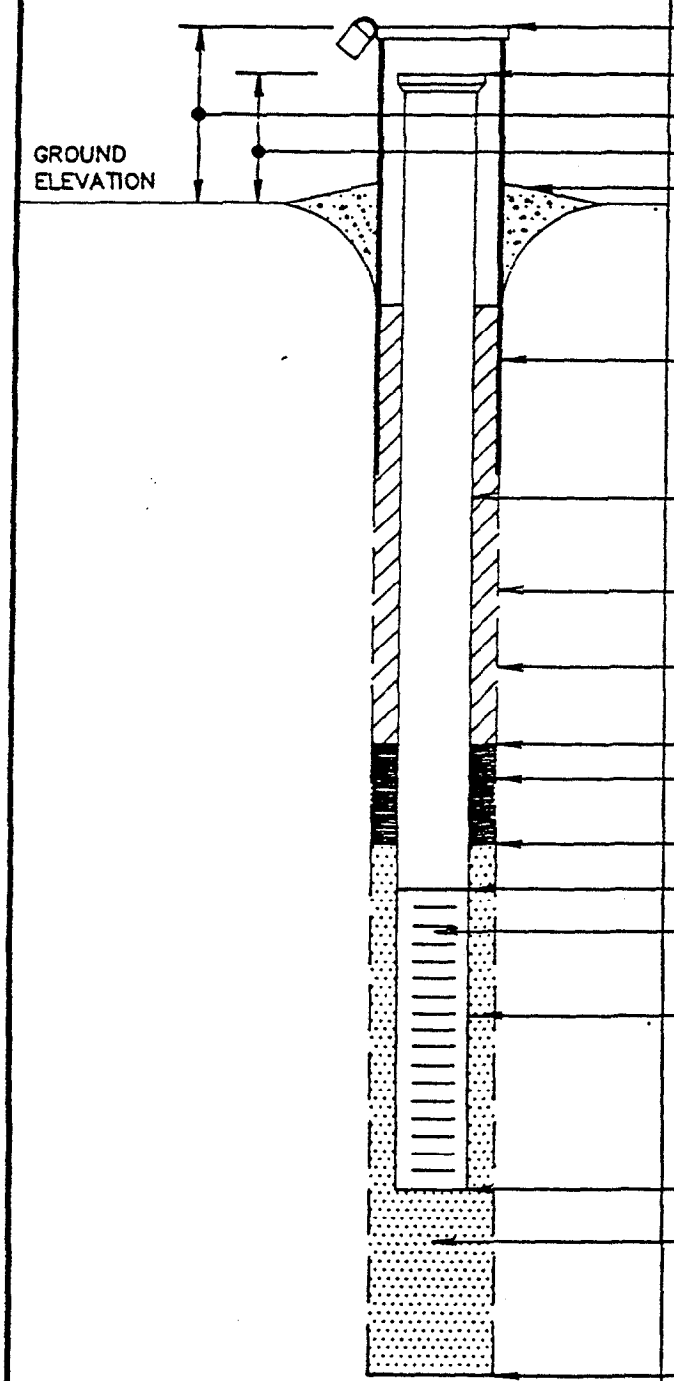
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW17-2

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-C2C3.6 BORING NO. HP-GW17-2
ELEVATION DATE 6/18/87 - 6/24/87
FIELD GEOLOGIST David Brentlinger (ESE)

DRILLER ATEC
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD PVC Bailer



ELEVATION OF TOP OF SURFACE CASING: 32.49'
ELEVATION OF TOP OF RISER PIPE: 32.15'
STICK-UP TOP OF SURFACE CASING: 2.80'
STICK-UP RISER PIPE: 2.46'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 5"

TYPE OF BACKFILL: Portland #1 Cement

ELEVATION/DEPTH TOP OF SEAL: 43'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 48.33'
ELEVATION/DEPTH TOP OF SCREEN: 53.33'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: natural formation (silty medium sand)

ELEVATION/DEPTH BOTTOM OF SCREEN: 73.33'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 80'

NOT TO SCALE

OVBDMW.DWG

WELL FACT SHEET

Well No. HP6W17-2 Date 6/24/87 Start 6/22/87 Finish 6/24/8

Total Depth of Boring Prior to Well Installation 80.0'

Diameter of Boring 5"

Water Level 10' (± 1')

Total Length of Well at Installation 74' (± 0.25') (73.33 BGL)

Height of Well Above Ground Level 2.67'

Total Depth of Well Below Ground Level 73.33

Total Length of Screen	~~49.33~~ ~~73.33~~ 20.00'	from	73.33'	BGL to	53.33	BGL
Total Length of Riser	49.33'	from	53.33'	BGL to	2.67	AGL
Sand Heave. Total Interval	Natural formation	from	73.33'	BGL to	48.33	BGL
Filter Pack Total Interval	None	from		BGL to		BGL
Bentonite Seal Total Interval	5'	from	48.33'	BGL to	43.00'	BGL
Grout Total Interval	42.50'	from	43.00'	BGL to	0.50'	BGL
Protective Casing Total Interval		from		BGL to		AGL

Well Screen Dia. 2" Schedule 40 Slot Size 0.01

Well Riser Dia. 2" Schedule 40

Filter Material Natural formation (silty med Sand)

Seal Bentonite

Backfill Portland #1 Cement ✓ Bentonite ____ Water ____

Protective Casing Dia. ____ Material ____

Well Development

Date 6/22/87 Time 0700 Start 0700 (6/22) Complete 1400 (6/24)

Water Level at Start 15.33' TOC Finish 37.00' TOC

Conductivity Start ——— Finish ———

Water Color Start turbid Finish clear

Bail Start ____ Finish ____

Surge Start ____ Finish ____

Pump Start 6/22 Finish 6/24 Volume $ ~~260~~ 260 gallo

Type PVC pipe Rate 1/2 gpm

CLEJ-00414-03.13-04/01/92

Hole Size 6"

E HP6W 17-3

Screen Size 2" Mat'l PVC

Filter Materials

asing Size 2" Mat'l PVC

Grout Type Portland #1

ologist David Brentlinger

Development Bailer 1" PVC

Date Start ~~6/22/87~~ 7/16/87 Finish 7/17/87

Static Water Level (~~15.17 2.50~~) - 12

Contractor SSE

Top of Well Elevation ~~12.67~~ 15.

Driller ~~ATEC & Associates~~ Davis Drilling (Clayton Davis)

Drill Type Rotary Mud

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/F
0.0-5.0			Silty Clayey fine sand, much organic matter		
5.0-10.0			Silty fine sandy Clay Clay dark brown - black		
10.0-15.0			Same as above (5-10)		
15.0-20.0			Silty fine - med sand coarse sand - gravel - some clay upper parts Pebbles well rounded		
20.0-25.0			Silty Clayey med sand little/no coarse material organic matter 24-25'		
25.0-30.0			Silty fine sand some med.-coarse material		
30.0-35.0			Silty fine - med Sand with Clay layers Coarse sand well rounded		
35.0-40.0			med - Coarse sand - pebbles some silt - fine - light grey Clay beds with well rounded pebbles		

CLEJ-00414-03.13-04/01/92

E HPGW 17-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
40.0 - 45.0			Silty med. Sand		
45.0 - 50.0			silty med sand with clay layers little/no coarse material		
50.0 - 55.0			Silty fine - med. sand		
55.0 - 60.0			silty fine sand to 58' 58' coarse sand, stells semi - cemented clastics		
60.0 - 65.0		Rock 64' ↓ 70'	Cemented clastics		
65.0 - 70.0			cemented clastics less dense after 68' lots of stells, pebbles		
70.0 - 75.0			Silty med- coarse sand little/no stells or fine sand [illegible]		

CLEJ-00414-03.13-04/01/92

E HPGW17-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
75.0 - 80.0			silty fine sand		
80.0 - 85.0			silty fine sand		
85.0 - 90.0			silty fine sand with light clay peds		
90.0 - 95.0			Coarse sand and shells with some well rounded pebbles and clay peds		
		95-97	Rock layer (Hard!)		
95.0 - 100.0			Silty med. sand some coarse sand + pebbles		
100.0 - 105.0			Silty Med sand and shells, some cemented clastics on bottom		
105.0 - 110.0			cemented clastics with shells and coarse sand		

CLEJ-00414-03.13-04/01/92

E HPGW 17-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
110-115.0			Same as Above 105-110		
115.0-120.0			Cemented clastics w sand and shells; little no fines		
120.0-125.0			Same as Above 115-120		
125.0-130.0			silty fine to med sand		
130.0-135.0			Same as Above (125-130).		
135.0-140.0			Same as Above (125-130)		
140.0-145.0			silty fine sand		
145.0-150.0			silty fine sand		

Boring No. HP6W 17-2 **ATSC** SHEET ____ OF ____

Onsite HP6W 17-3 0700 6/22/87
Beginning of well development of HP6W 17-2

Drillers Arrive 0830 set up at HP6W 17-3 1000
Break to go to town Back at 1300 (2hrs O.T.)
work top to go to lunch 1330. Drillers Return
1500 Can't finish hole, have drill rods that are
too small for the bit. have new rods in
the morning. Begin to clean up bailing materials
And Meet with Flick Acosta at Airstation 1600.

HP6W 17-3 6/23/87
On site 0800, drillers not arrived, beginning
to bail 17-2. Drillers arrive 0900, Parts for Rig
won't be in till 1200, Meet back at 1:30-2:00; go to
bail HP6W 17-3. (Drillers do not Return).

HP6W 17-3 6/24/87
On site at 0800 drillers arrive 0900
Drilling 0930. Problem 1030, down until 1130.
Lunch 1300-1400; Rest of afternoon, there seems
to be minor difficulty pulling rods (sub piece and
threads of new rods bit working) 20' of rods
out of ground by 1542; 60' remains in hole.
1630 drill rods out, driller attempts to sin
ing Casing, gets down to 45' hole bec-
comes, driller quits 1715 off post 1730.

HP6W17-3 6/25/87
Drillers arrive 0930; have to make fitting for
rig be back (gone to town 10:00); drillers return
1130 get drill rig circulating at 1200; lunch break
till 100, drillers cant get 4" casing up-down
they try till 300. Hole lost. Drillers quit 300 PM

DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

Boring No. _____ SHEET _____ OF _____

HPGW 17-3 ATEC

6/26/87

Drillers on site 0930; discuss items on next wells till 1000. 1080 Drillers begin to gather materials for grouting hole which is lost and to be grouted to land surface. Weather slows drillers down. Finish grouting hole 1245 pm, break for lunch. Drillers Return 1355. Too late to start Next hole HPGW 9-2, I get driller to move rig to HPGW 9-2 and also tell him to get everything over there and be ready to drill 0700 on monday. I go to HPGW 24-3 to bail 25 gallons of 1430

Materials Used: 200 4" threaded PVC pipe was ordered and 50' was used and remained in hole. no sand or bentonite was used, only clay for mud.

DATE _____ SIGNED _____

SOURCE: Environmental Science and Engineering, Inc., 198

Boring No. HP6W 17-3 SHEET ____ OF ____

Davis

7/15/87 0800

Arrive on site, drillers organizing - working on rig. 0900 mud is made, drilling begins. Drilling complete 1215; driller attempts to place temporary casing 1230, driller cannot get casing past 75', Driller pulls casing out 1300, Attempts to wash out hole and thunderstorms set in 1315 and general rain follows until 1400; Call it off till morning.

CAG

7/16/87 0700 drillers on site + drilling out hole, takes all morning to set 6" casing in place. Grouting casing until 1300; crew [illegible] stay inside, painting of unpainted wells done remainder of day, driver goes to town and gets supplies while helper paints.

7/17/87 On site 0700; drillers begin drilling out grout from casing; Setting 2" PVC casing in well installed 1400, grouted and complete 1130.

25' stick up

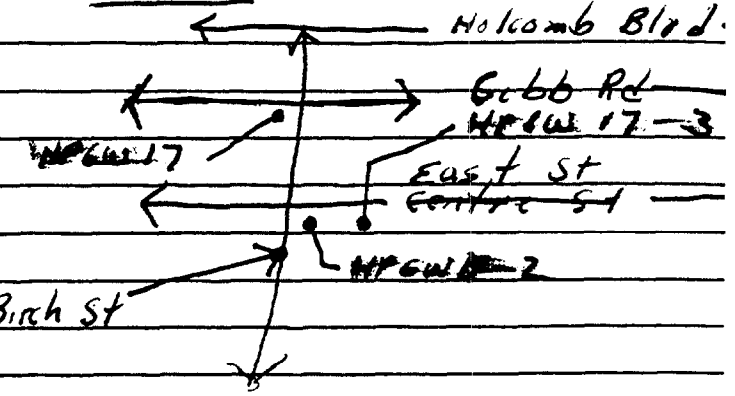
top of clay 115'

top sand pack 125'

top screen 130

150'

sketch



DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 19

WELL FACT SHEET

Well No. MPGW 17-3 Date 7/20/87 Start 7/15/87 Finish 7/16/87

Total Depth of Boring Prior to Well Installation 152'

Diameter of Boring 6"

Water Level 15.50 ±(1/4")

Total Length of Well at Installation 150' (152.5 with stickup)

Height of Well Above Ground Level 2.50'

Total Depth of Well Below Ground Level 150'

Total Length of Screen	20'	from	150	BGL to	130	BGL
Total Length of Riser	132.5	from	130	BGL to	2.5	AGL
Sand Heave. Total Interval		from		BGL to		BGL
Filter Pack Total Interval	25'	from	150	BGL to	125	BGL
Bentonite Seal Total Interval	10'	from	125	BGL to	115	BGL
Grout Total Interval	110	from	115	BGL to	05	BGL
Protective Casing Total Interval	4'	from	1.0	BGL to	3.0	AGL

Well Screen Dia. 2" Schedule #40 Slot Size 001"

Well Riser Dia. 2" Schedule #40

Filter Material Med. Sand

Seal Bentonite Pellets

Backfill Cement ✓ Bentonite Water

Protective Casing Dia. 3" Material Steel

Well Development

Date 7/19/87 Time 0800 Start 0800 (7/19) Complete 1400 (7/20)

Water Level at Start 15.65 Finish 32'

Conductivity Start — Finish —

Water Color Start — Finish —

Bail Start 0800 (7/19) Finish 1400 (7/20)

Surge Start — Finish —

Pump Start — Finish — Volume —

Type — Rate —

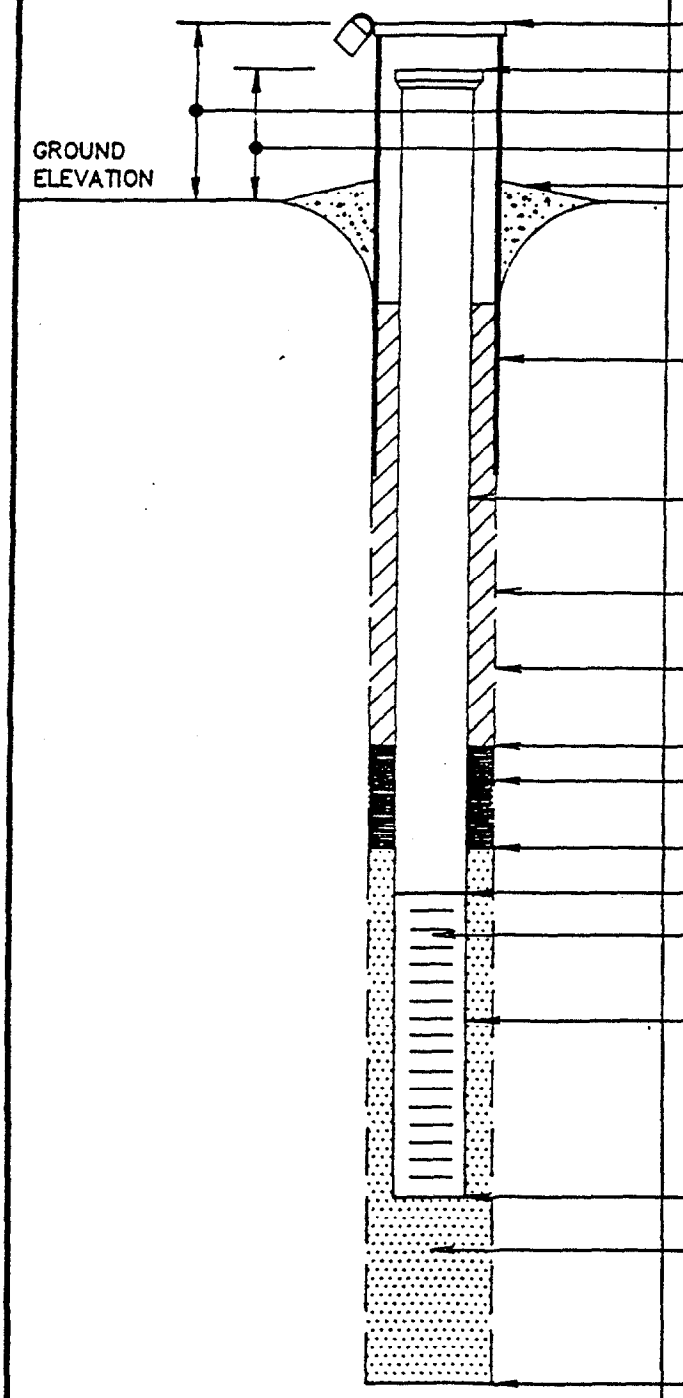
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW17-3

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - IT-1A
PROJECT NO. 49-02036
BORING NO. HP-GW17-3
ELEVATION
DATE 7/15/87 - 7/17/87
FIELD GEOLOGIST David Brechtlinger (ESE)

DRILLER Davis Drilling Co.
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Bailing



ELEVATION OF TOP OF SURFACE CASING: _____
ELEVATION OF TOP OF RISER PIPE: _____
STICK-UP TOP OF SURFACE CASING: _____
STICK-UP RISER PIPE: _____
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 3"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 6

TYPE OF BACKFILL: Portland #1 Cement

ELEVATION/DEPTH TOP OF SEAL: 115'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 125'
ELEVATION/DEPTH TOP OF SCREEN: 130'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Medium Sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 150'
ELEVATION/DEPTH BOTTOM OF SAND PACK: _____
TYPE OF BACKFILL BELOW OBSERVATION WELL: _____

ELEVATION/DEPTH OF HOLE 152'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

E

Hole Size 5"

Screen Size 2" Mat'l PVC

Casing Size 2" Mat'l PVC

Geologist David Brentlinger

Date Start 6/8/87 Finish 6/9/87

Contractor ESE

Driller ATEC & Associates (Don Sweeting)

Filter Materials Coarse Sand

Grout Type #1 Portland

Development Bailed (184 gallons.

Static Water Level ~~4.67' TOC~~ 11.42

Top of Well Elevation ~~3.34'~~ 3.25' stic

79.90 TOC

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0 - 5			Silty fine sand		
5 - 10			Silty fine sand		
10 - 15			Silty fine sand		
15 - 20			Silty very fine sand		
20 - 25			very fine sand		
25 - 30			very fine sand, some coarse sand, white fines, coarse material well rounded		
30 - 35			very fine sand same as above		
35 - 40			very ~~fine~~ silty-clayey fine sand		
40 - 50			same as above 35 - 40 with more clay in peds		

CLEJ-00414-03.13-04/01/92

Hole Size _____

Screen Size _____ Mat'l _____

asing Size _____ Mat'l _____

Geologist _____

Date Start _____ Finish _____

Contractor _____

Driller _____

E _____

Filter Materials _____

Grout Type _____

Development _____

Static Water Level _____

Top of Well Elevation _____

Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
50-55			Silty Sand - fine Sandy silt with Clay + small shells		
55-60			Clayey Silty fine sand mostly fine sand some med.-Coarse sand with small Clastics (shells)		
60-65			same as above 55-60 more shells		
65-70		hard layer	Silty med Sand with Coarse Sand and uncemented Clastics + Cemented (lots of shells)	Rock	
70-75		semi lithified limestone?	Same as above 70-75	Rock	

Comments:

Rock layer is not very hard, driller went through easilly.

Boring No. HPGW24-C **ATEC** SHEET 01 OF 04

on-site and Ready 1:45 PM 6/8/87 — Start – 6/8/87, Finish – 6/9/87

Drilling Stops 300 PM, hole closing, mud pump breaking down

HPGW24-2

On site 700 Am 6/9/87

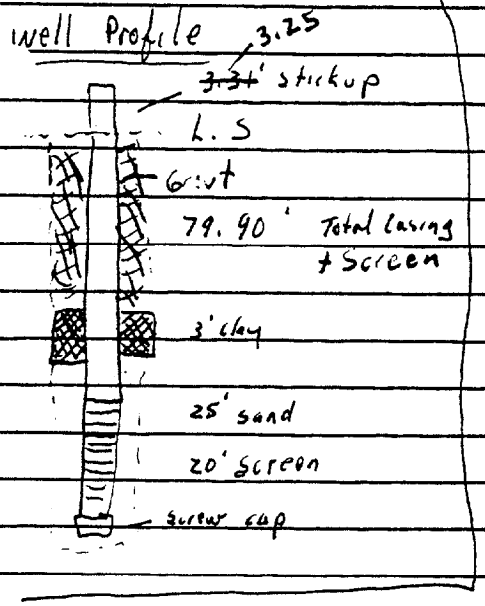
well Drilling complete – 1030 lunch 1130 - 100 PM

Casing + Screen in – 1038

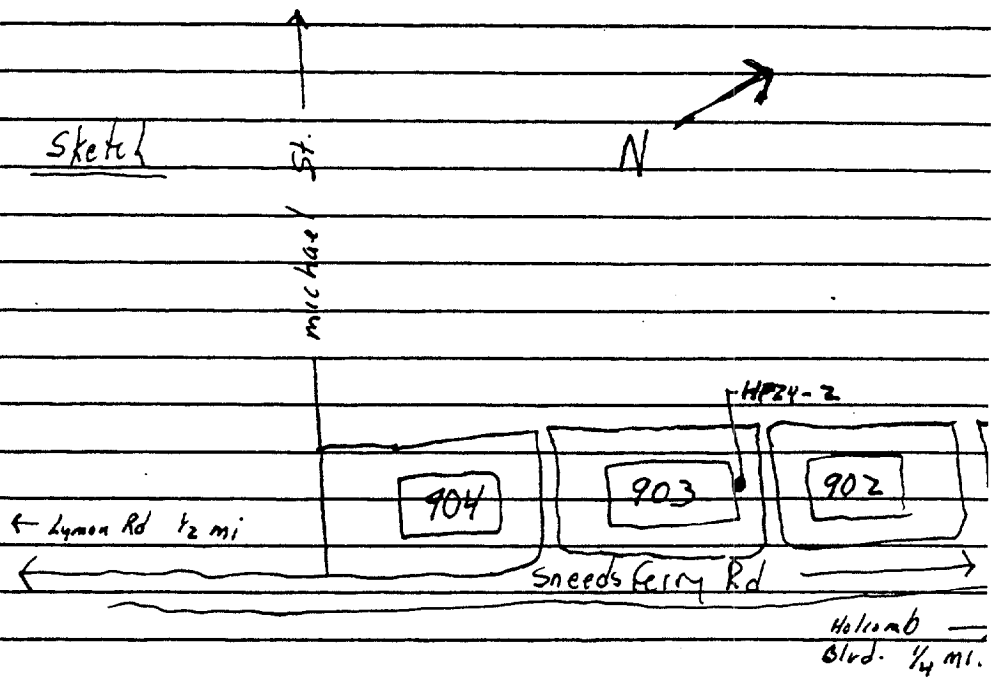
well complete – 2:30

Comments: Drillers worked very well, hole remained open during casing installation (soft fine sand most of hole)

well Profile



Sketch



6/8/87 DATE

David A. Bottinger SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

WELL FACT SHEET

Well No. HP6W24-2 Date 6/9/87 Start 6/8/87 Finish 6/9/87

Total Depth of Boring Prior to Well Installation 80' ± 1'

Diameter of Boring 5"

Water Level 14.67 (TOC 0800 6/9/87)

Total Length of Well at Installation 79.90'

Height of Well Above Ground Level 3.31'

Total Depth of Well Below Ground Level 76.59'

Total Length of Screen	20'	~~76.59~~'	from	76.59'	BGL to	56.59'	BGL
Total Length of Riser		59.90	from	56.59'	BGL to	3.31'	AGL
Sand Heave. Total Interval			from	3	BGL to		BGL
Filter Pack Total Interval		25'	from	~~51.59~~ 76.59'	BGL to	51.59'	BGL
Bentonite Seal Total Interval		3'	from	51.59'	BGL to	48.59'	BGL
Grout Total Interval	48'	~~51.00~~'	from	48.59'	BGL to	0.59'	BGL
Protective Casing Total Interval			from		BGL to		AGL

Well Screen Dia. 2" Schedule 40 Slot Size 0.01

Well Riser Dia. 2" Schedule 40

Filter Material Coarse Sand

Seal Bentonite

Backfill Concrete (Cement) X Bentonite ____ Water ____

Protective Casing Dia. ____ Material ____

Well Development

Date 6/10/87 Time 1315 Start 1330 6/10/87 Complete 1730 6/13/87

Water Level at Start 14.67' TOC Finish 75.00' TOC after bail

Conductivity Start ——— Finish ———

Water Color Start turbid grey Finish Clear

(Bail) Start 6/10/87 Finish 6/13/87

Surge Start ——— Finish ———

Pump Start 6/10/87 Finish 6/15/87 Volume 185.0 gallons

Type Bailer (PVC Sch. 40) Rate 0.15 gpm

LAB

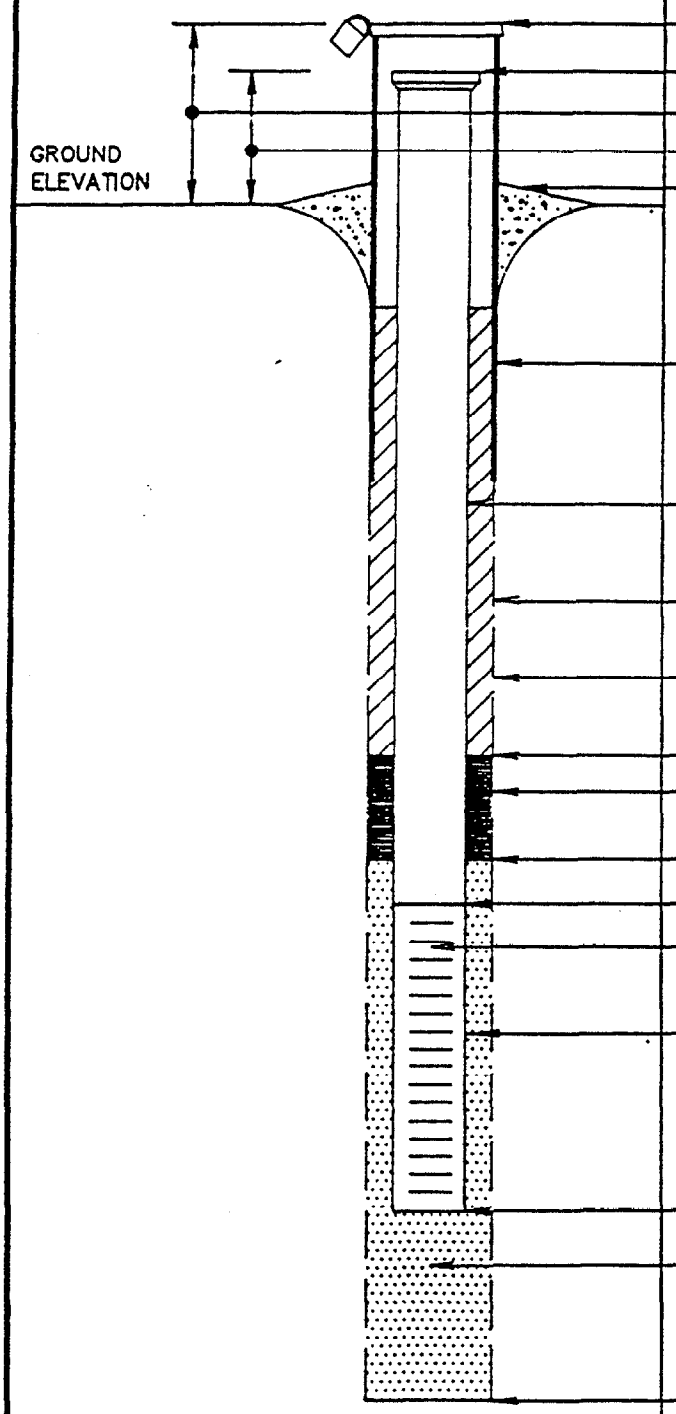
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW24-2

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HP1A
PROJECT NO. 49-6W036 BORING NO. HP-GW24-2
ELEVATION DATE 6/8/87 - 6/9/87
FIELD GEOLOGIST David Brentlinger (ESE)

DRILLER ATEC
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Bailing



ELEVATION OF TOP OF SURFACE CASING: 34.35'
ELEVATION OF TOP OF RISER PIPE: 33.73'
STICK-UP TOP OF SURFACE CASING: 3.50'
STICK-UP RISER PIPE: 2.88'
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 5"

TYPE OF BACKFILL: Portland #1 Cement

ELEVATION/DEPTH TOP OF SEAL: 45.59'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 51.59'
ELEVATION/DEPTH TOP OF SCREEN: 56.59'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: Coarse sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 76.59'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 80' ± 1'

NOT TO SCALE

OVBDMW.DWG

CLEJ-00414-03.13-04/01/92

E HPGW 24-3

Hole Size 5"

Screen Size 2" Mat'l PVC

asing Size 2" Mat'l PVC

Geologist David Brentinger

Date Start 6/10/87 Finish 6/18/87

Contractor ESE

Driller Don Sweeting (ATEC)

Filter Materials Natural formation

Grout Type Portland #1

Development Bailer

Static Water Level 11.97' BGL

Top of Well Elevation 1.81'; 150' TOC

Drill Type Rotary - Mud

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-10			silty fine sand with organic matter top 5', some clay layers		
10-15			silty fine sand and organic clay throughout.		
15-20			silty fine - med. sand with coarse sand + pebbles bottom 3'		
20-25			coarse sand top 5', silty clayey fine sand		
30-35			silty fine sand		
35-40			silty med sand with clay layers (clay brown with coarse sand)		
40-50			same as above (35-40) little/no coarse material		
50-60			silty med.-coarse sand. Rock at 58' (cemented clastics + shells).		

CLEJ-00414-03.13-04/01/92

E HP24-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level —

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT
60 - 70	Sand Silt Rock	68-70'	Silty fine - med sand, v. little clay, coarse sand well rounded + small shells cemented clastics, limestone + shells	very	hard
70 - 75			Rock (uncemented clastics) shells and coarse sand (well rounded). fine silty sand (74-75)' with less rock and shells		
75 - 80			[illegible] fine sand with [illegible] clay pebbles [illegible]		
[illegible]	soft	85-88 Rock (1'2') sand	fine silty sand; Rock layer (83→84)', silty fine sand		
[illegible] - 90			silty very fine sand with small shells and rounded v. coarse sand pebbles		
90 - [illegible]			silty med. sand with more shells and coarse sand + pebbles		
95 - 100			Same as above (90-95)		
100 - 103		100-103	silty fine sand		
		103-104	solid cemented layer		
		[illegible]	silty fine sand		

CLEJ-00414-03.13-04/01/92

E HP6W24-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
105-110			Silty fine - Vc fine sand with shells + rock fragments		
110-115			Silty fine sand and coarse sand with cemented clastics, shells Coarse sand angular, clear		
115-120			med. sand, 50% semi cemented clastics (gray) and fossils, shells		
120-125			Same as above (115-120)		
125-130			Silty fine Sand with lots of shells + fossils, Coarse rounded sand		
130-135			Same as Above (125-130)		
135-140			silty med sand (angular) with cemented clastics loosely filled of sand		

CLEJ-00414-03.13-04/01/92

E HP6W24-3

Hole Size

Screen Size Mat'l

asing Size Mat'l

ologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

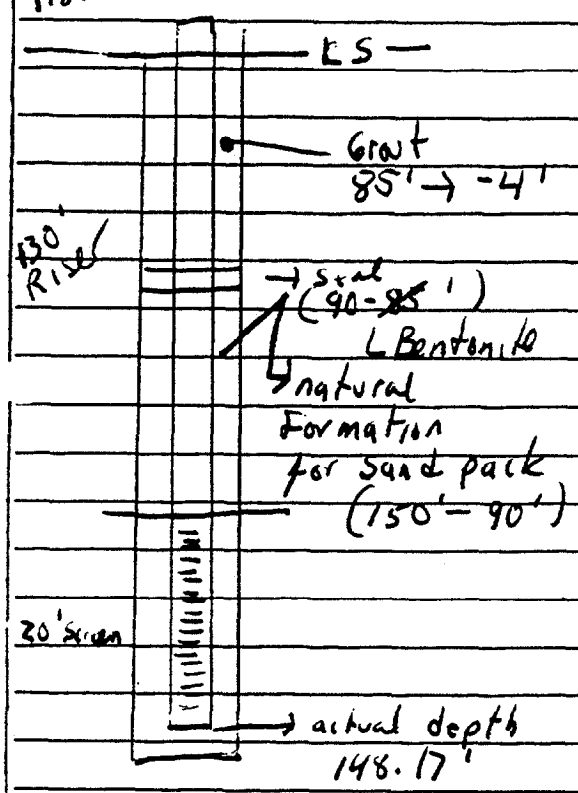
Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
140-145			Silty fine-med. Sand with less shells + Rocks, not much coarse sand		
145-150			Same as above (140-145)		
150-155			Silty fine-med. Sand little shell + rock		

Boring No. _____ **ATEC** SHEET ____ OF ____

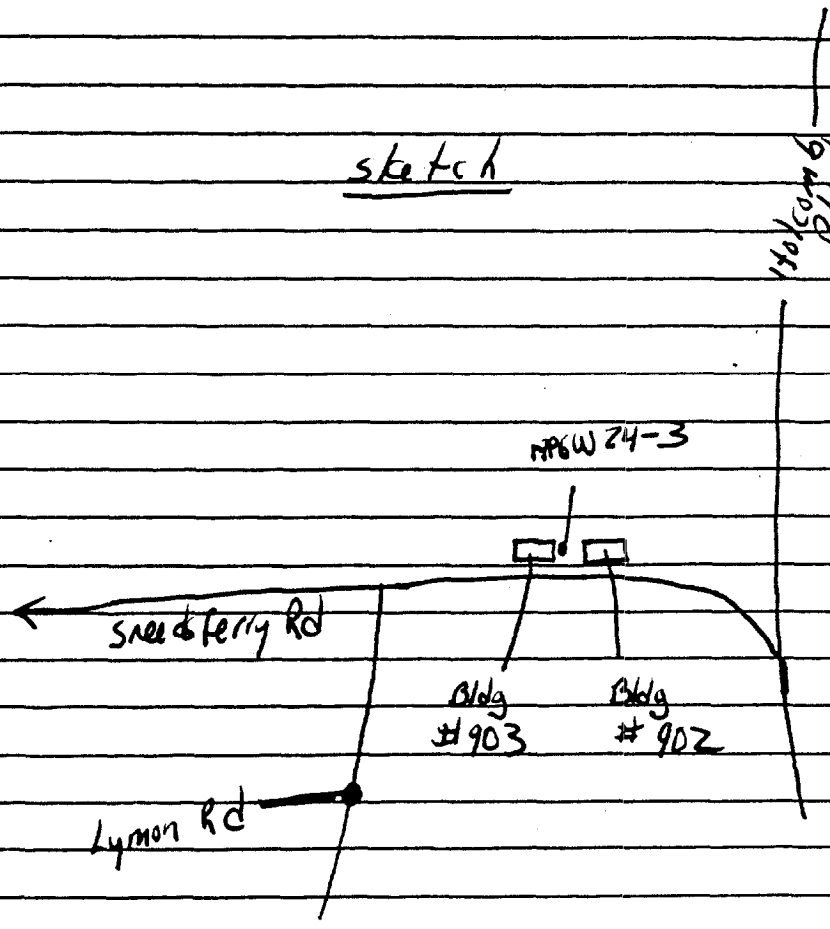
6/18/87 HPGW24-3

On site 0730, drillers arrive 0800. Begin pulling casing 0830 (hole caves to 90') Bentonite (90→80) cement portion ±1 to LS well complete 1130. Drillers Breaking down - heading to next hole.

Comments: Strong chemical smell at 50' Broke down consistency of drill mud!



sketch



7/1/87 DATE

David A. Brittyn SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

Boring No. HPGW [illegible] A166 SHEET ___ OF ___

6/18/87
onsite 700 Am ; drilling begins 715
Problem
1030 Am Pump breaks down ; hole 60'

6/15/87 (HPGW24-3)
On site 0700 Am Drillers arrive 0730
Rig set up and drilling 0815 ; (40' hole closes in).
0930 - Rig's Rods clogged, Helper gets water
1030 - Drilling Resumes
1130 - Drill breaks down ; Mud pump broke
need new pump ; get from Rodeo
start up Tuesday ?

6/16/87 (HPGW 24-3)
On site 0830 . drillers arrive
0900 begin working on rig , drilling Begins
1200 pm , 1330 drilling stops at 150' begin pulling Rods.
130'-1500 1500 Screen + casing into hole, at 70' hole
closes , casing stuck , after 1 hour driller
pulls casing + screen out ; 1630 off post.

6/17/87
Onsite 0700 Drilling begins 0800 ; hole
Closed badly overnight , driller trys to set the
casing but fails at 1045 . 1200 pm after 1hr break
driller sets 75' casing (temporary) casing in place
1350 ; driller begins drilling past casing and
by 1600 bores down to 150' , pulls out and
finally gets screen + casing in hole 1630 ;
off post 1700

DATE SIGNED

SOURCE: Environmental Science and Engineering, Inc., 198

WELL FACT SHEET

Well No. 642-2 Date 3/31 Start 3/28 Finish 3/30

Total Depth of Boring Prior to Well Installation 204'

Diameter of Boring 10" to 100' 6" to 204'

Water Level ~ 15' BGS

Total Length of Well at Installation 202.5

Height of Well Above Ground Level ~ 2.5

Total Depth of Well Below Ground Level 200'

Total Length of Screen	100'	from	100	BGL to	200	BGL
Total Length of Riser	102.5 ~~[illegible]~~	from	100	BGL to	2.5	AGL
Sand Heave. Total Interval	—	from	—	BGL to	—	BGL
Filter Pack Total Interval	105.5	from	94.5	BGL to	200	BGL
Bentonite Seal Total Interval	5.5	from	~~[illegible]~~ 90	BGL to	~~[illegible]~~ 94.5	BGL
Grout Total Interval	84	from	0	BGL to	84	BGL
Protective Casing Total Interval	5'	from	2.3	BGL to	2.7	AGL

Well Screen Dia. 2" Schedule 40 Slot Size 0.010

Well Riser Dia. 2" Schedule 40

Filter Material 20-30 silica sand

Seal Bentonite Pellets

Backfill natural seal to 84' BGS Cement ✓ Bentonite ____ Water ____

Protective Casing Dia. 4" Material Steel

Well Development

Date 4/1 Time 1300 Start 1145 Complete 1600

Water Level at Start ____ Finish ____

Conductivity Start ____ Finish ____

Water Color Start gray black Finish sl cloudy gray

Bail Start ____ Finish ____

Surge Start ____ Finish ____

Pump Start ____ Finish ____ Volume ____

Type Centr. Sub Rate ____

CLEJ-00414-03.13-04/01/92

E 642 - 2

Hole Size 10 to 100', 6"

Screen Size 2" Mat'l PVC

Casing Size 6" to 100', 2" to 200' Mat'l PVC

Geologist David Brentlinger

Date Start 3/28/87 Finish 3/30

Contractor ESE

Driller Davis; James Davis

Filter Materials Silica Sand 100-200

Grout Type Portland #1

Development

Static Water Level —

Top of Well Elevation 10' ± 2'

Drill Type Tri Comb, Rotary

10" to 100' 5⅞" to 200'

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0 - 25			Silty Clayey fine Sand, Sand white in color, Clay clumps, grey in color		
25 - 50			very Coarse sandy silty Clayey formation 35' otherwise, silty Clayey very fine Sand coarse material in sand mix - Color dark grey - grey		
50 - 75			Very fine sand with silty clay throughout little to no coarse material sand at about 70', formations are grey-white		
75 - 105			fine Silty Sand with shells and Cemented Clastics more shells + clastics last 10' (90 - 100)'. Coarse sand green 10% throughout grey color & cement sand grains clear - white fines		
	Comments:		642-2 has overall, less Clay than 642-1; the 1st 100' hole closes badly especially at (60-70)'		

CLEJ-00414-03.13-04/01/92

Hole Size _____ _____ E 662-2

Screen Size _____ Mat'l _____ Filter Materials _____

asing Size _____ Mat'l _____ Grout Type _____

Geologist _____ Development _____

Date Start 3/28/87 Finish 3/30/87 Static Water Level —

Contractor _____ Top of Well Elevation _____

Driller _____ Drill Type _____

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
100-125		Original limestone →	Shells are cemented [illegible] fine silty sand, sand is dark gray in color, cement also dark gray, chert found at [illegible]		
125-[illegible]			[illegible] color, sand [illegible] coarse sand [illegible]		
[illegible]			very fine sand and [illegible] peas [illegible] clay peas light brown in color.		
175-200			Very fine [illegible] sand [illegible] fines gray [illegible] very little coarse material.		
			Well Complete 500 pm 3/30		

WELL FACT SHEET

Well No. 6421 Date 3/27 Start 3/26 Finish 3/27

Total Depth of Boring Prior to Well Installation 210' 109

Diameter of Boring 10" to 100' 6" to 210'

Water Level ~13' BLS

Total Length of Well at Installation 202.5

Height of Well Above Ground Level 2.5

Total Depth of Well Below Ground Level 200'

Total Length of Screen	100'	from	100'	BGL to	200'	BGL
Total Length of Riser	102.5	from	100	BGL to	2.5	AGL
Sand Heave. Total Interval	—	from	—	BGL to	—	BGL
Filter Pack Total Interval	104	from	96'	BGL to	200	BGL
Bentonite Seal Total Interval	5	from	91'	BGL to	96'	BGL
Grout Total Interval	[redacted]	from	0	BGL to	[redacted] 72'	BGL
Protective Casing Total Interval	5'	from	2.3	BGL to	2.7	AGL

Well Screen Dia. 2" Schedule 40 Slot Size 0.010

Well Riser Dia. 2" Schedule 40

Filter Material 20-30 silica

Seal Bentonite pellets

Backfill natural sand to 72' Cement ✓ Bentonite ____ Water ____

Protective Casing Dia. 4 Material steel

Well Development

Date 3/30 Time 0915 Start 0930 Complete 1300

Water Level at Start ____ Finish ____

Conductivity Start ____ Finish ____

Water Color Start cloudy gray Finish slt cloudy

Bail Start ____ Finish ____

Surge Start ____ Finish ____

Pump Start ____ Finish ____ Volume ____

Type Centrifugal Rate ____

CLEJ-00414-03.13-04/01/92

E 642 - 1

Hole Size 10" (to 100

Screen Size 6" (100-210') Mat'l PVC

asing Size 6" to 100' Mat'l PVC

Geologist David Brentlinger

Date Start 3/26 Finish 3/27

Contractor ESE

Driller James Davis

Filter Materials Coarse Sand

Grout Type Cement (Porter)

Development

Static Water Level 12.75 ± .25

Top of Well Elevation

Drill Type Rotary (10 and 6)" tricomb bits

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
0-5			silty fine sand (30% fines) organic material abundant		
5-10		Clay is tan color	silty & clayey fine sand clay very abundant, less of organics		
10-15		Clay is tan color	silty clay - silty v. fine sandy clay much more clay than 5-10		
15-20		Clay is Blue-Grey in color	very silty clay little/no sand		
20-25			Same as 15-20		
25-30			less clay ~ very silty fine sandy clay		
30-35			Very sandy silty clay - very silty sandy clay		
35-40			very clayey silty fine sand less 10% coarse sand		
40-45			silty clayey fine sand coarse material 10%		
45-50			silty very fine sand with 30% coarse material		
50-60			very silty fine sand 30% shells + cemented clastics 70%		

CLEJ-00414-03.13-04/01/92

E 642-1

Hole Size

Screen Size Mat'l

asing Size Mat'l

Geologist

Date Start Finish

Contractor

Driller

Filter Materials

Grout Type

Development

Static Water Level

Top of Well Elevation

Drill Type

Depth (feet)	Sample	Sketch	Lithology, Color	USCS	SPT (BL/FT)
60-70		silt/sand 50%	very silty very fine sand 50% Shells + Cemented Clastics 50% less 10% Clay		
70-80		silt/sand 50%	very silty very fine sand 60% Shells + Cemented Clastics 30% 10% Coarse rounded Sand 10%		
80-100			Same as above (70-80) with more shells than clastic Cement		
	1045/AM		Quit Drilling, Cement 6" Casing in place		
100-125			very silty very fine shelly sand with [illegible] 10% Coarse Sand (fines Gray in Color)		
125-150			Same as above (100-125)		
150-175			Shelly fine-med sand with Clay fines Gray-blue [illegible] Sand		
175-200			very fine Sand + Shells with some Clay, fines are blue gray in color less shells than above (150-175)		
	Finish drilling Hole 945 Am				

WELL FACT SHEET

Well No. HPGW24-3 Date 7/1/87 Start 6/19 Finish 7/1

Total Depth of Boring Prior to Well Installation 155'

Diameter of Boring 5"

Water Level 10.5'

Total Length of Well at Installation 150'

Height of Well Above Ground Level 1.83'

Total Depth of Well Below Ground Level 148.17' → 148.17

Total Length of Screen	20'	from	~~150~~'	BGL to	128.17	BGL
Total Length of Riser	130' ~~128.17~~'	from	128.17'	BGL to	1.83'	AGL
Sand Heave. Total Interval	NONE	from	—	BGL to	—	BGL
Filter Pack Total Interval	NONE	from	—	BGL to	—	BGL
Bentonite Seal Total Interval	5-7'	from	90'	BGL to	84'	BGL
Grout Total Interval	80'	from	84'	BGL to	4	BGL
Protective Casing Total Interval		from		BGL to		AGL

Well Screen Dia. 2" Schedule #40 Slot Size 0.01"

Well Riser Dia. 2" Schedule #40

Filter Material Natural Formation (silty Fine-Med. Sand)

Seal Bentonite Pellets

Backfill Portland #1 Cement ✓ Bentonite Water

Protective Casing Dia. Material

Well Development

Date 6/19 Time 1600 pm Start 6/19 Complete 7/1

Water Level at Start 14.07' TOC Finish 13.67' TOC

Conductivity Start — Finish —

Water Color Start — Finish —

Bail all Start 6/19 Finish 7/1

Surge Start — Finish —

Pump Start — Finish — Volume 300 gal

Type — Rate —

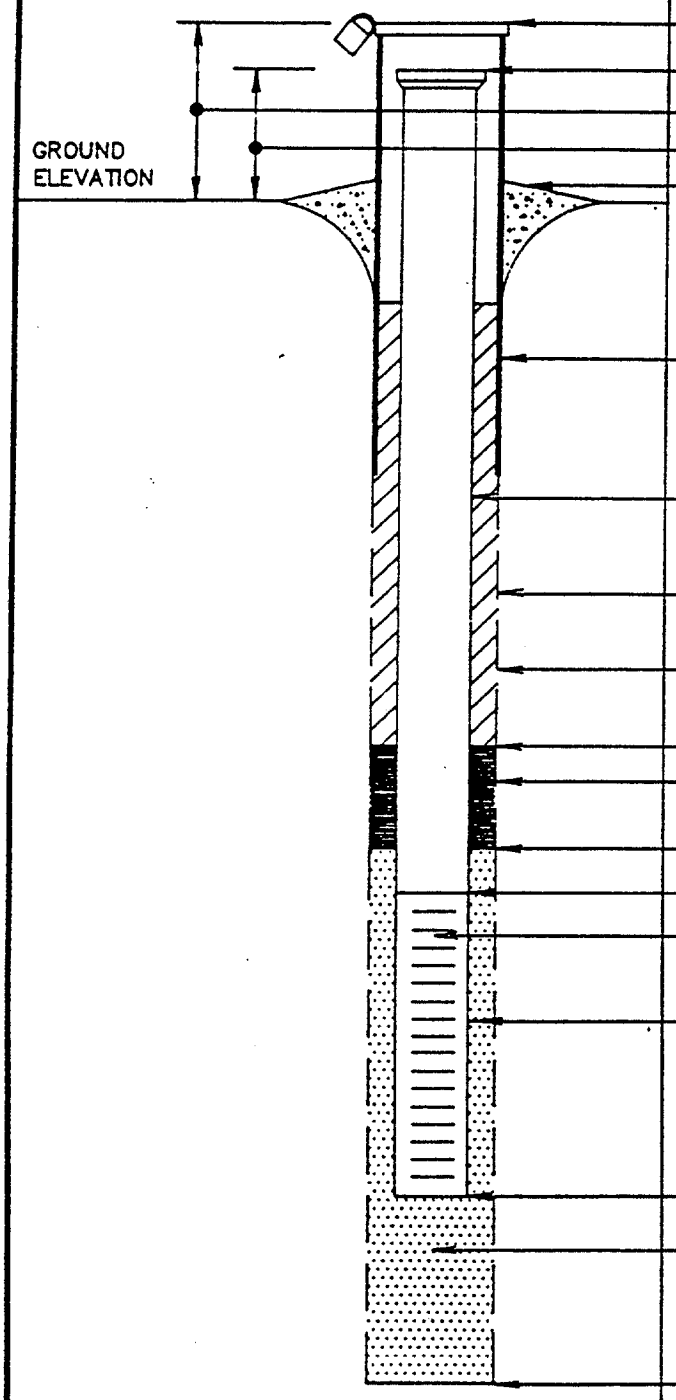
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW24-3

OVERBURDEN
MONITORING WELL SHEET

PROJECT Camp Lejeune - HPIA
PROJECT NO. 49-C0036 BORING NO. HP-GW24-3
ELEVATION DATE 6/10/87 - 7/1/87
FIELD GEOLOGIST David Brentlinger (FJC)

DRILLER ATEC
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Bailing



ELEVATION OF TOP OF SURFACE CASING: 32.92'
ELEVATION OF TOP OF RISER PIPE: 32.80'
STICK-UP TOP OF SURFACE CASING: 2.36'
STICK-UP RISER PIPE: 2.24'
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: carbon steel

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 5"

TYPE OF BACKFILL: Portland #1 cement

ELEVATION/DEPTH TOP OF SEAL: 84'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 90'
ELEVATION/DEPTH TOP OF SCREEN: 128.17'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 20'
TYPE OF SAND PACK: natural formation (silty fine-medium sand)

ELEVATION/DEPTH BOTTOM OF SCREEN: 148.17'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 155'

NOT TO SCALE

OVBDMW.DWG

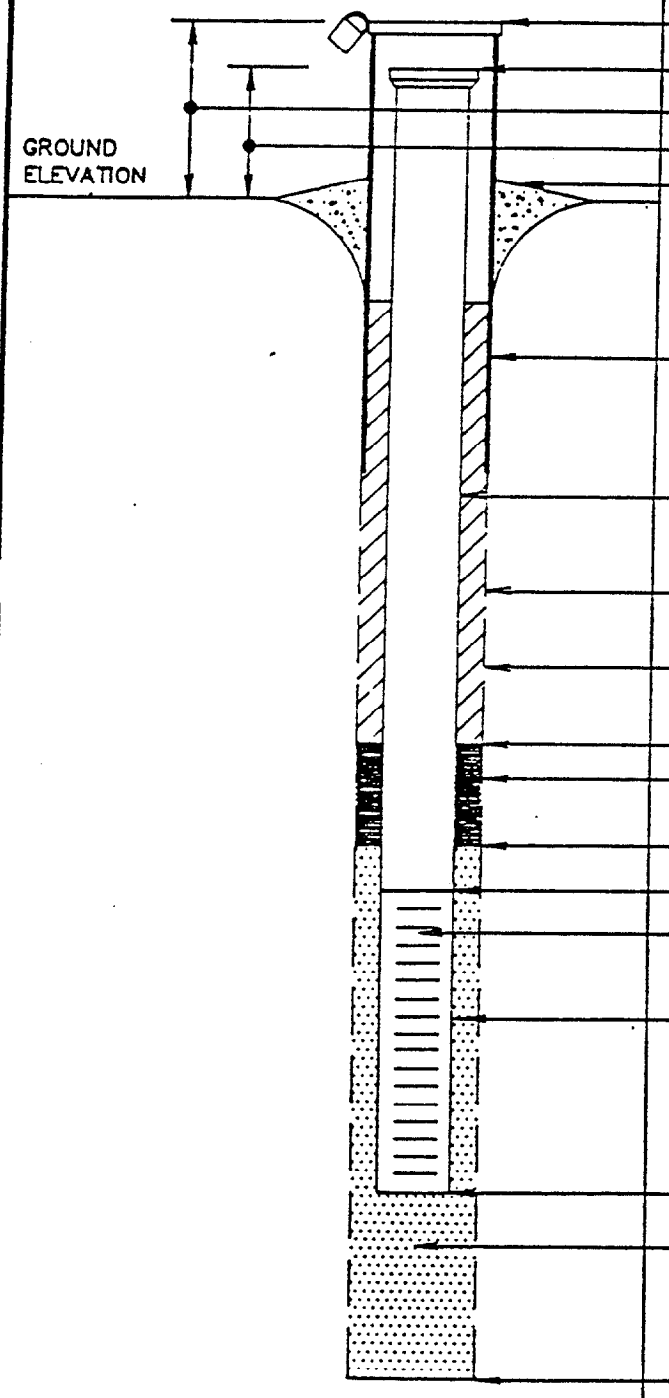
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW30-2

PROJECT Camp Lejeune - HPIA
PROJECT NO. 47-02056 BORING NO. HP-GW30-2
ELEVATION DATE
FIELD GEOLOGIST Paul M Feinberg

DRILLER Environmental Monitoring & Testing
DRILLING METHOD Mud-Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 32.03
ELEVATION OF TOP OF RISER PIPE: 29.75
STICK-UP TOP OF SURFACE CASING: 0.07
STICK-UP RISER PIPE: Flushmount -0.21
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: [illegible]

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: [illegible]
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: [illegible]
ELEVATION/DEPTH TOP OF SCREEN: 65'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 10'
TYPE OF SAND PACK: Coarse silica sand

Note: 3' sump/footer

ELEVATION/DEPTH BOTTOM OF SCREEN: 78'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 83'

NOT TO SCALE

OVBOMW.DWG

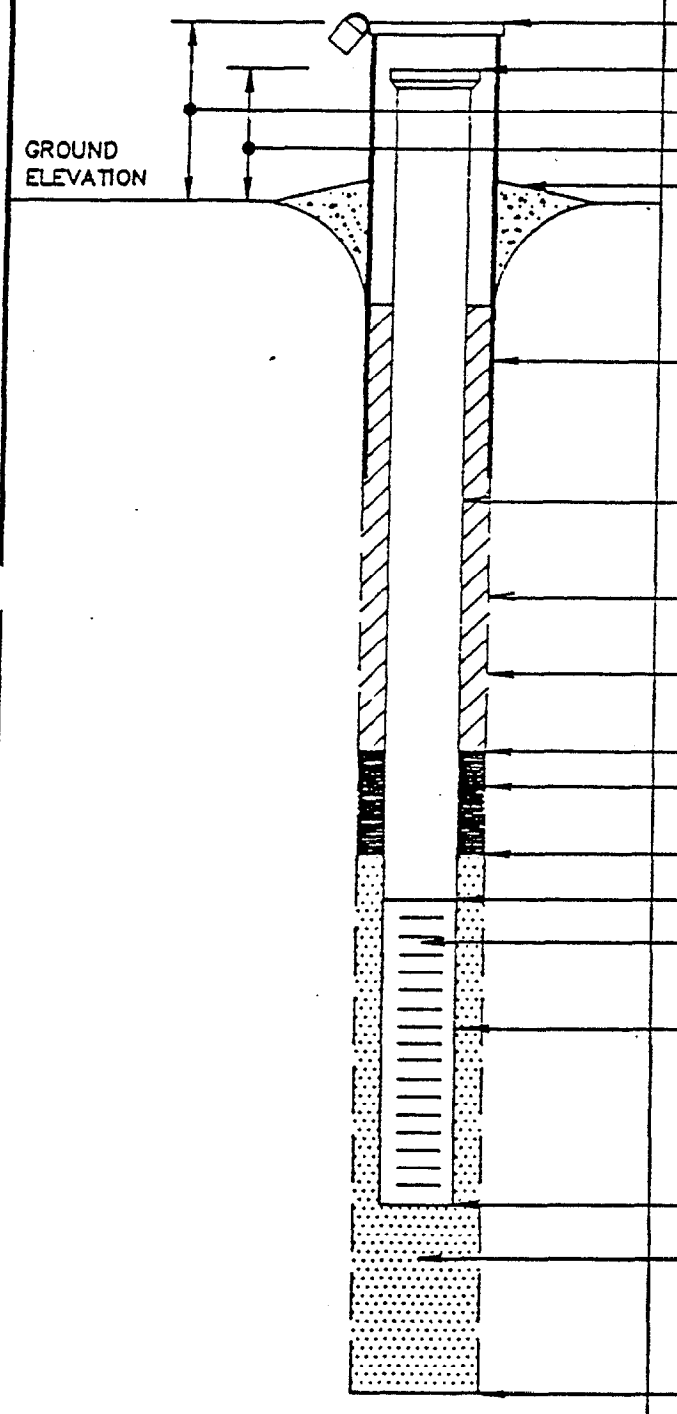
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW30-3

PROJECT Camp Lejeune - HPIA
PROJECT NO. 42-0205
BORING NO. HP-GW30-3
ELEVATION
DATE
FIELD GEOLOGIST Paul M. Feinberg

DRILLER Environmental Monitoring (Tony)
DRILLING METHOD Mud - Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 30.00
ELEVATION OF TOP OF RISER PIPE: 29.72
STICK-UP TOP OF SURFACE CASING: 0.04
STICK-UP RISER PIPE: Flushmount -0.24
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: Carbon steel

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 132'
TYPE OF SEAL: Pellets Pelletone

DEPTH TOP OF SAND PACK: 136'
ELEVATION/DEPTH TOP OF SCREEN: 140'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 10'
TYPE OF SAND PACK: Coarse silica sand

Note - 3' sump/bottom cap
ELEVATION/DEPTH BOTTOM OF SCREEN: 153'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 160'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPGW31-2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells		Page 1 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-12-90	completed 12-17-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 20.52' / 20.44'	Soil Drilled	▼ ___ below ground	Total Depth 93' / 158'
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitorin HNU	LEL
				f-m silty sand, trace pebbles (brown) [SM]		O/M Mud	Back ground -32ppm	
	9 - 10		5'/5"					
	10			f-m silty sand, little pebbles (gray tan) [SM]			BG	
	19 - 20		5/2"	f-c clayey sand, trace pebbles (gray tan) [SC] cohesive				
	20							
	24 - 27'		5'/1"	clayey f-m silty sand [SC] cohesive (gray tan)				
	29 - 34'		5'/20"	0"-12" f-m silty sand (gray tan) [SM]			BG	
	30			12"-16" clayey silty sand, some pebbles (gray tan) [SC]				
	34 - 39'			16"-20" f-m silty sand, some pebbles (gray tan) [SM]				
	39' - 44'		5/6"	f-m silty sand, little clay somewhat cohesive. (gray tan) [SM]			BG	
	40							
			-/0"					

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPGWS1-2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells		Page 2 of 4
Contractor ESC, Inc.	Driller Environmental Monitoring & Testing	Date started 12-12-90	completed 12-17-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 20.52'/20.44'	Soil Drilled	▼ ___ below ground	Total Depth 83'/158'
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitorin HNU	LEL
	44'-49'		5'/5"	f-m silty sand, trace pebbles (gray tan) [SM]			BG	
	49'-54'		5'/5"					
	54'-59'		5'/60"	f-m silty sand [SM] (dark gray)				
	59'-64'		5'/44"	upper ⅓ f-m silty sand (dark gray) lower ⅔ peat [Pt]				
	64'-69'		5'/55"	peat / f-m silty sand, little shells (med gray) [Pt]				
	69'-74'		5'/12"	f-m silty sand & "shelly" limestone pcs (med gray) [SM]		"shelly" = fossiliferous		
	74'-79'		5'/2"	shelly limestone (2 pcs)		Note presumably sand washed out. ∴ Most of interval may consist of sand		
	79'-84'		5'/<1"	f-m silty sand, trace shell material. (med. gray) [SM]		We change shoes again on core barrel in attempt to assist recovery.	BG	
	84'-89'		5'/14"	f-m silty sand, trace shell material. (med. gray) [SM]			BG	

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPGW31-2/3

Project No. 4702036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells		Page 3 of 4
Contractor ESE, Inc	Driller Environmental Monitoring & Testing	Date started 12-12-90	completed 12-17-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 2052/2044'	Soil Drilled	___ below ground	Total Depth 83'/158'
Logged by Paul F. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU jar	Comments on Advance of Boring	Monitorin HNU	LEL
	90 93'-94'		5'/55	f-m silty sand, trace shells [SM]			BG 30ppm	
	94-99'		5'/44"	upper 2½' peat f-m silty sand, little shells, some shelly limestone [SM] med. gray			BG	
	99'-104'		5'/[illegible]	upper 2" shelly limestone pcs f-m silty sand, little shells [SM] med. gray				
	[illegible]		5'/24"	upper 2" shelly limestone pcs middle 8 f-m silty sand, little shells lower 14" f-m silty sand & shells [SM] med gray lowest 2" shelly limestone pc.				
	108'-[illegible]		5'/8"	upper 8" shelly limestone pcs lower 10" f-m silty sand & shell material [SM] med gray				
	111'-113' 113'-119' 120		5'/24	f-m silty sand, little shells [SM] med gray				
	119'-124'		3'/<1"	pcs of shell material				
			5'/<1"	pcs of shell material.				
	124'-129' 130		5'/<1"	f-m silty sand [SM] med. gray				
	[illegible]		5'/14"	f-m silty sand, little shells [SM] med. gray				
	134-139'		5'/33"	f-m silty sand, little shells [SM] med. gray				

CLEJ-00414-03.13-04/01/92

BORING LOG

BORING NO. HPGW 3-2/

Project No. 4903396	Project Name Camp Lejeune Hadnot Point - Monitoring Wells	Page 4 of 4
Contractor ESC, Inc.	Driller Environmental Monitoring & Testing	Date started 12-12-90 completed 12-17-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 26.52'/26.44	Soil Drilled	▼ ___ below ground	Total Depth 83'/158
Logged by Paul M. Fenning	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU jar	Comments on Advance of Boring	Monitori HNU	LE
	140							
	159'-144'		5'/36	F-c silty sand, little shell [SM] (med. gray) Note: black particulate matter permeate entire core.				
	144-149'		5'/5[illegible]	m-f silty sand, tr. shell material Note: clay component - cohesive. [SM]			[illegible]	
				Sampling completed at 149'. Borehole reamed to 158'				

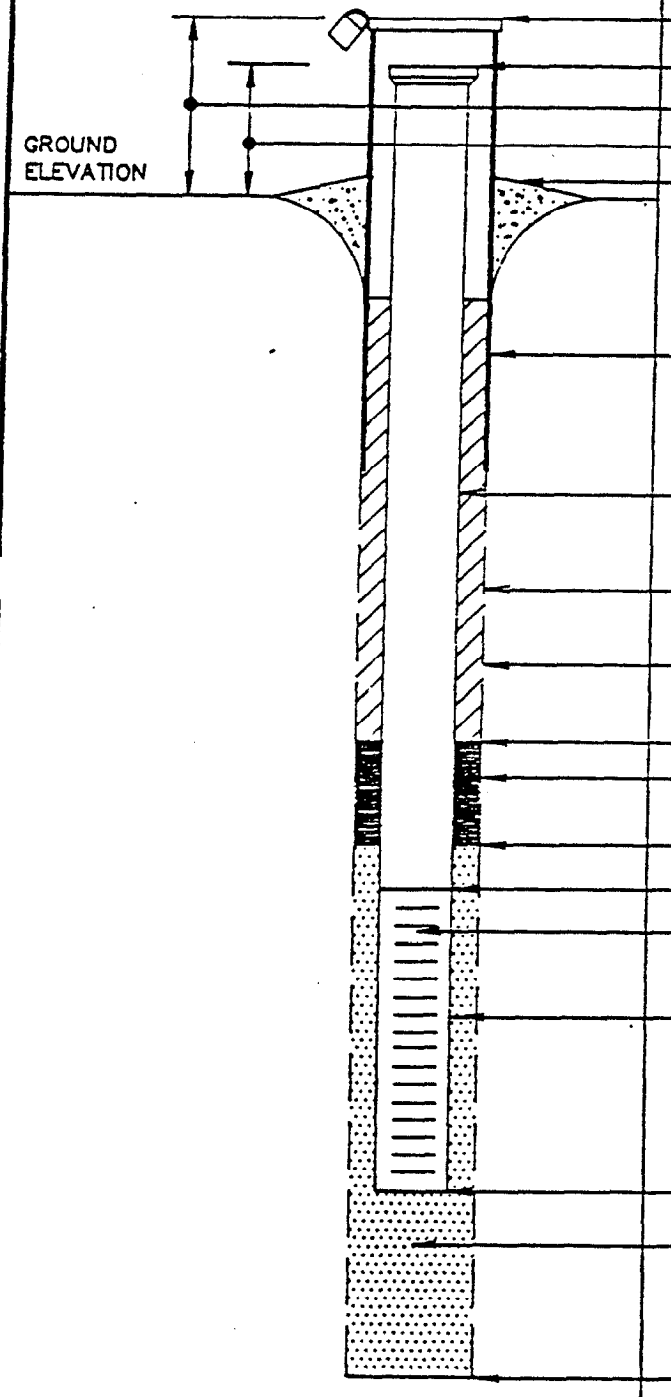
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW31-2

PROJECT Camp Lejeune - HPIA
PROJECT NO. 4[illegible]-[illegible]
BORING NO. HP-GW31-2
ELEVATION
DATE
FIELD GEOLOGIST Paul M. Feeney

DRILLER Environmental Monitoring & Testing
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 26.58
ELEVATION OF TOP OF RISER PIPE: 26.23
STICK-UP TOP OF SURFACE CASING: 0.06
STICK-UP RISER PIPE: Flushmount -0.29
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: [illegible]

RISER PIPE I.D. [illegible]
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: [illegible]

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 60'8"
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 62'11"
ELEVATION/DEPTH TOP OF SCREEN: 65'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 1.010 x 10'
TYPE OF SAND PACK: Coarse silica sand

Note: 3' sump/drop

ELEVATION/DEPTH BOTTOM OF SCREEN: 78'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 83'

NOT TO SCALE

OVBDMW.DWG

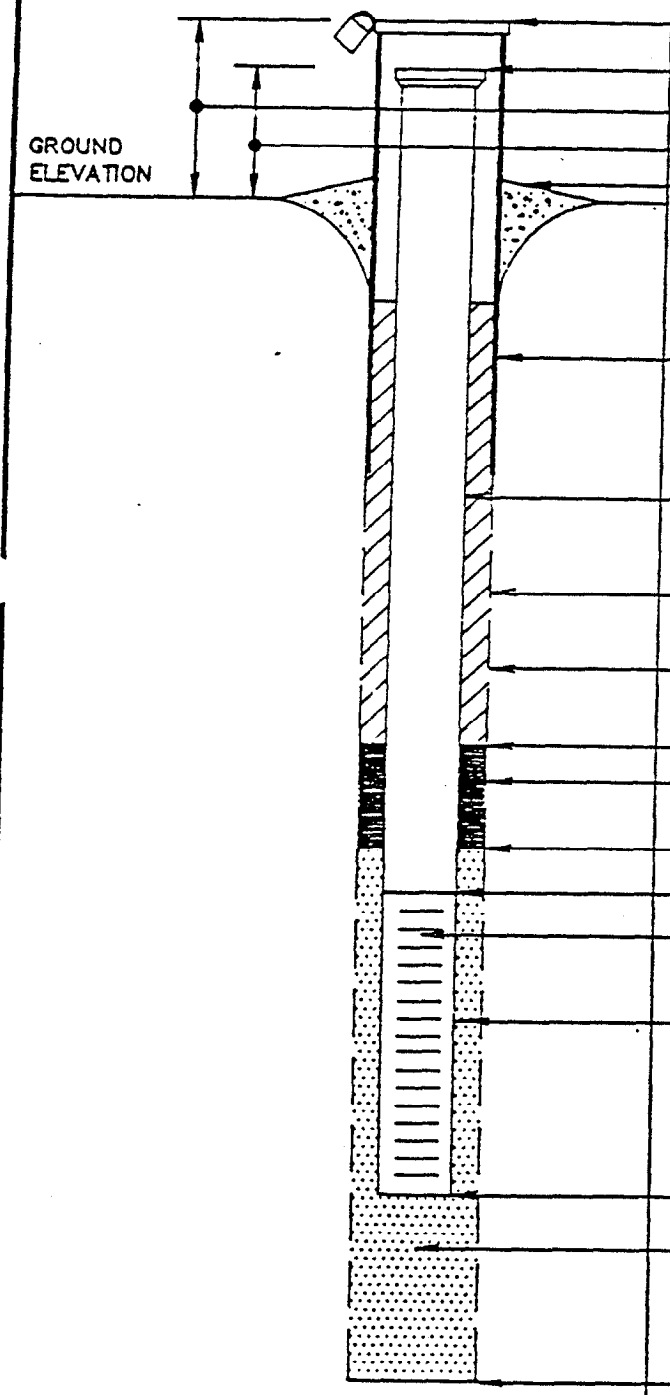
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-GW31-3

PROJECT Camp Lejeune - HPA
PROJECT NO. 42-02336 BORING NO. HP-GW31-3
ELEVATION DATE
FIELD GEOLOGIST Paul M Feinberg

DRILLER Environmental Monitoring & Testing
DRILLING METHOD Mud-Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 26.55
ELEVATION OF TOP OF RISER PIPE: 25.98
STICK-UP TOP OF SURFACE CASING: 0.11
STICK-UP RISER PIPE: Flushmount -0.46
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: Carbon Steel

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 133'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 136.5'
ELEVATION/DEPTH TOP OF SCREEN: 140'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010" x 10'
TYPE OF SAND PACK: Commercial sand

Note: 3' sump/end cap

ELEVATION/DEPTH BOTTOM OF SCREEN: 153'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 158'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPGW32-2

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells		Page 1 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-18-91	completed 12-20-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 27.01'/27.28'	Soil Drilled	▼ ___ below ground	Total Depth 83'/157
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitor HNU	LE
							Bkgd ground = 2.6 ppm	
	9-14'		5'/22"	upper 4" clayey silty sand, some pebbles [SC] (med gray); next 5" silty sand [SM]; next 5" silty clay [ML]; next 5" peat (brown) [Pt]; lowest 3" peat & silty clay [Pt] + [SC] (brown)			Bkgd ground = 2.0 ppm	
	14-19'		5'/29"	upper 7" peat & silty clayey sand (dark brown & med gray); dense silty sand; little wood chips (med gray & dark brown) [Pt & SC]			5.6	
	19-24'		5'/22"	upper 7" silty sand, little clay [SM] (light gray); lower 5" dense silty clayey sand [SC] (med gray)		diesel smell	10.2 ppm; lower 13.4 ppm	
	24-29'		5'/7"	silty, f-m sandy clay [SC] (med gray)			5.6	
	29-34'		5'/5"	f-m silty sand & clay [SC] (med gray)			Clean	
	34-39'		5'/<1"	wood chips (light brown)				
	39-44'		5'/<1"	wood chips (orangey brown)				
	44-45½'		1½'/3½"	shelly limestone pcs (med gray)		shelly = fossil fragments	5.4 ppm	
	45½-49'		3½'/8"	same as above (light gray)			5.4 ppm	

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPG-032 2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point		Page 2 of 4
Contractor ESE, Inc	Driller Environmental Monitoring & Testing	Date started 12-18-91	completed 12-20-91
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 27.01'/27.28	Soil Drilled	▼ ___ below ground	Total Depth
Logged by Paul M. Fenberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU jar	Comments on Advance of Boring	Monitori HNU	LE
	5? 49'-54'		5'/18"	Upper 4" shelly limestone pcs (med gray) middle 5" f-m silty sand c shelly limestone, little clay (cohesive) [SM] lower 9" f-m silty sand, little clay, [SM] trace organic material (possibly from seashell)			BG - 3-ppm BG	
	54'-59'		5'/2"	silty clayey sand, [SC] some shelly limestone (med gray)			5?	
	59'-64'		5'/49"	Upper 1/3 f-m silty sand, little shell/organic material [SM] Below 1/3, shell material increases to near 35% This continues to half-way point of core Lower half - fossiferous limestone, little f-m silty sand (med gray)				
	64'-69'		5'/5"	shelly limestone; little m-f silty sand (med. gray)				
	69'-74'		5'/6"	shelly limestone, little f-m silty sand. (med gray)				
	74'-79'		5'/<1"	shelly limestone				
	79'-84'		5'/<1"	f-m silty sand, trace particles of shell material [SM] (med gray)				
	84'-89'		5'/2"	f-m silty sand [SM] (med gray)				
	89'-94'		5'/42"	f-m silty sand, trace shell material Some semi-consolidated [SM] (med. gray)			BG 3-ppm	
	94'-97'		3'/25"	f-m silty sand, little shell material (med gray) some semi-consolidated. [SM]			BG 3-ppm	

CLEJ-00414-03.13-04/01/92

BORING NO. HPGW32-2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point	Page 3 of 4
Contractor ESE, Inc.	Driller Environmental Drilling Company	Date started 12-18-91 completed 12-20-91
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 27.01'/27.28	Soil Drilled	▼ ___ below ground	Total Depth 83'/157'
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitori HNU	LE
	100 97'-102'		5'/ No samp					
	104'-109'		5'/9"	shelly limestone, (med gray) little f-m silty dense sand (blue-gray)				
	110 109-114'		5'/17"	f-m silty sand, little shell material [SM] (light gray tan)				
	114'-119'		5'/17"	f-m silty sand, little shell material [SM] (light gray tan)				
	120 119-124		5/20	f-m silty sand, trace shell material [SM] (light gray tan)			Rot Lam	
	124-129'		5'/8"	f-c silty sand, trace shell material [SM] (gray tan)				
	130 129'-134'		5'/3"	same material as previously [SM] (gray)				
	134'-139'		5'/8"	f-c silty sand, some shell material [SM] (gray)			BG	
	140 139-141½		2½'/25"	f-c silty sand, trace shells lowest 6" shelly limestone pcs [SM] (light gray)			BG Lam BG	
	144'-149'		5'/34"	f-m silty sand, trace shell material [SM] (gray)				

Sampling Completed at 149'. Borehole reamed to 157'.

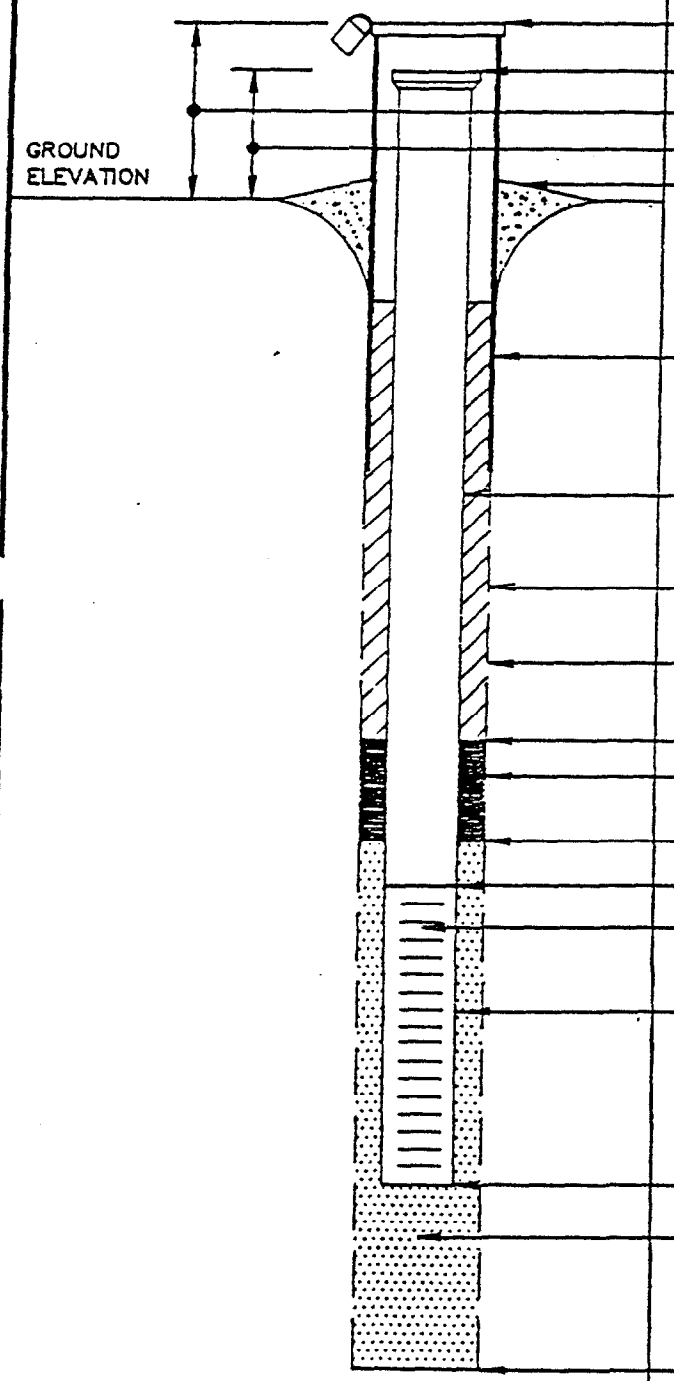
CLEJ-00414-03.13-04/01/92

OVERBURDEN MONITORING WELL SHEET

WELL NO. HP-SW32-2

PROJECT Camp Lejeune
PROJECT NO. 49-22-036 BORING NO. HP-SW32-2
ELEVATION DATE
FIELD GEOLOGIST Paul M Fenwick

DRILLER Environmental Monitoring Testing
DRILLING METHOD Mud-Rotary
DEVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 27.05
ELEVATION OF TOP OF RISER PIPE: 26.77
STICK-UP TOP OF SURFACE CASING: 0.04
STICK-UP RISER PIPE: Flushmount -0.24
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: Concrete

RISER PIPE I.D. 4
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10"

TYPE OF BACKFILL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 57'
TYPE OF SEAL: Tremie Grout

DEPTH TOP OF SAND PACK: 61'
ELEVATION/DEPTH TOP OF SCREEN: 64'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: 0.010 x 10'
TYPE OF SAND PACK: Coarse silica sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 77'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 83'

NOT TO SCALE

OVBDMW.DWG

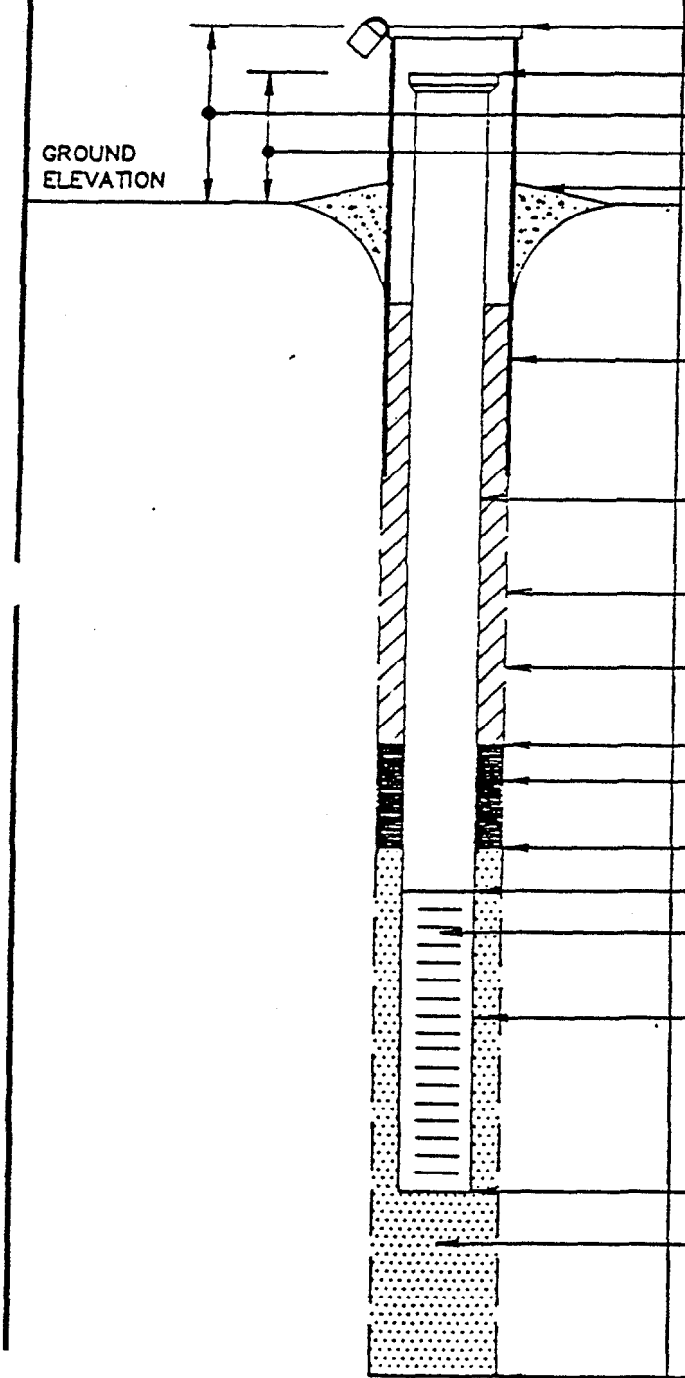
CLEJ-00414-03.13-04/01/92

WELL NO. HP-GW32 3

OVERBURDEN MONITORING WELL SHEET

PROJECT Camp Lejeune - HPIA
PROJECT NO. [illegible] BORING NO. HP-GW32-3
ELEVATION DATE
FIELD GEOLOGIST Paul N. Feinberg

DRILLER Environmental Monitoring & Testing
DRILLING METHOD Mud Rotary
DELVELOPMENT METHOD Air Lift



ELEVATION OF TOP OF SURFACE CASING: 27.35
ELEVATION OF TOP OF RISER PIPE: 27.11
STICK-UP TOP OF SURFACE CASING: 0.07
STICK-UP RISER PIPE: Flushmount -0.17
TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: [illegible]

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10"

TYPE OF BACKFILL: [illegible]

ELEVATION/DEPTH TOP OF SEAL: 133'
TYPE OF SEAL: Bentonite Pellets

DEPTH TOP OF SAND PACK: 137½'
ELEVATION/DEPTH TOP OF SCREEN: 140'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE X LENGTH: [illegible] x 10'
TYPE OF SAND PACK: [illegible]

Note: 3' sump/[illegible]

ELEVATION/DEPTH BOTTOM OF SCREEN: 153'
ELEVATION/DEPTH BOTTOM OF SAND PACK:
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION/DEPTH OF HOLE 157'

NOT TO SCALE

OVBOMW.DWG

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPGW30-2

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells		Page 1 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring Testing	Date started 12-5-90	completed 12-7-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 29.96' / 29.96'	Soil Drilled	▼ ___ below ground	Total Depth 83' / 160
Logged by Paul M. Feinberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitorr HNU	LE
							(OVM)	
	8½ - 15½' (10)		5'/15"	Silty clayey m. sand [SM] more silt than clay. med grey		OVM = 0.0ppm Note: OVM functioning erratically. Cohesiveness similar to clay Not very dense	0.0 ppm	
	15½ - 18½'		5'/5'	Same as above [SM]			0.0 ppm	
	18½ - 22½' (20)		4'/3'	Upper 1½ same material as above [SM] Lower 1½' dense silty clayey med. sand black [SM]		Note: peat-like material at bottom tip.		
	22½ - 27½		5'/≈5'	Low density "peat" black wood chips at bottom. [Pt]		Low spec. grav., but densely packed		
	27½ - 29½' (30)		2'/10"	Silty-clayey f-m grained "peat-like" material. black Trace stems visible throughout. [Pt]				
	29½ - 34½'		5'/37"	f-m-c sand & "peat-like" material stem/plant-wood material permeates [Pt] Light grey to med grey & Black				
	34½ - 36½' (40)		2'/12"	c-vc gravel-size carbonate material. [SM] gray-white				
	36½' - 41½'		5'/7"	Lg. pcs gravel-size clastic carbonate. [GW] gray white				

CLEJ-00414-03.13-04/01/92

FIELD BORING LOG

BORING NO. HPGW3J-2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point Monitoring Wells		Page 2 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-5-90	completed 12-7-90
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 29.96 / 29.96'	Soil Drilled	▼ ___ below ground	Total Depth 93' / 150
Logged by Paul M. Fenoberg	Checked by	Date	

Sample No.	Depth in Feet	Blows per 6"	Pen. Rec.	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	Monitoring LE
	40 4½'-44'		2½'/20"	clastic carbonate shells [GW] (gray white)				
	44 - 44½'		0.5'/6"					
	44½' - 46½'		2'/20"	same material as previously [GW]				
	46½' - 49½'		3'/36"	same material as previously				
	50 49½'-51'		1½'/13"	same material as previously				
	51'-56'		4'/4"	silty clayey f-grained material. Seems to be dense, clayey silt, trace shells (dark brown) [ML]				
	56'-61'		5'/10"	Upper 12" m sand (dark brown) trace shell material [SM]				
	60			Lower 4" f-m clayey dense silt, little f-m sand [ML] (dark brown)				
	61'-62'		1'/5"	f-grained "peat-like" material compact. (med. gray) [PT]				
	62'-67'		5'/56"	dense "peat"-like material w/ shells. (med gray) [PT]				
	70			Lowest 8" - clastic carbonate rock. (med gray)				
	67'-69'		2'/11"	clastic carbonate w/ shells (med gray) [GM] Note: "peat-like" matrix is more prevalent in upper 5".				
	69'-74'		5'/50"	f-m silty sand, trace shells very dense; (med gray) [SM]				
	80 79'-84'			Lowest inch is clastic carbonate. (med. gray)				
			6'/32"	f-m silty sand (med gray) [SM]				

CLEJ-00414-03.13-04/01/92

F

BORING NO. HPSW03-2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells	Page 3 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-5-90 completed 12-7-9
Method Mud Rotary	Casing Size 4"	HNU 11.7/10.2	Protection Level D
Ground El. 29.96' / 29.96'	Soil Drilled	▼ ___ below ground	Total Depth 83' / 83'
Logged by Paul M. Feinberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	LEL
	84'-89'		5'/3'	f-m silty sand (med. gray) trace shell material [SM]			0.0 ppm	
	89-94'		5'/40"	f-m silty sand, trace shells (med. gray) [SM]		Note: Upper 12" has some very dense nodules of compacted sand		
	94'-99'		5'/19"	f-m silty sand, little shells (med gray) [SM]				
	99'-104'		5'/12"	f-c silty sand, trace shell material (med. gray) [SM]		Note: Bottom 3" very compact, like rock. Also coarser grains in lower 6".		
	104'-109'		5'/54"	f-m silty sand & shell material partially consolidated [SM] (light med gray)				
	114-119'		5'/32"	Upper 16" f-m silty sand, some shell material, some dense clusters [SM] (light med gray) Lower 16" f-m silty sand, trace shell material [SM] (light med. gray)				
	119'-124'		5'/12"	f-c silty sand, trace shell material [SM] (light med gray)				

CLEJ-00414-03.13-04/01/92

BORING NO. HPSW32 2/3

Project No. 4902036	Project Name Camp Lejeune Hadnot Point - Monitoring Wells	Page 4 of 4
Contractor ESE, Inc.	Driller Environmental Monitoring & Testing	Date started 12-5-90 completed 12-7-90
Method Mud Rotary	Casing Size 4	HNU 11.7/10.2	Protection Level D
Ground El. 27.96 / 27.96'	Soil Drilled	▼ ___ below ground	Total Depth 83' / 100
Logged by Tom K. Fenberg	Checked by	Date

Sample No.	Depth in Feet	Blows per 6"	Pen. / Rec.	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	LE
	124 - 127'		5'/20"	f-m silty sand, trace shell material (medium gray) [SM]			0.0ppm	
	129 - 134'		5'/2½"	f-m silty sand, trace shell material (med. gray) [SM]				
	134 - 139'		5'/20"	Upper 12" f-m silty sand [SM] (med gray) Lower 8" f-c silty sand [SM] (med gray)				
	139 - 144'		5'/[illegible]	f-m silty sand (med. gray) [SM]				
	144 - 145'		1'/2½"	f-c silty sand (med. gray) [SM]			0.0ppm	
	145' - 149'			f-c silty sand, (med. gray) [SM] little shell			0.0ppm	
	150'			Sampling completed at 149'. Borehole reamed to 160'				

APPENDIX E

MONITOR WELL DEVELOPMENT LOGS

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW 1 Date: 11/21/86 Time: _____

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: _____

Cut: _____

DTW: -23.04' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	3.22
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	0.71
Total Volume (Volume of A.S. + Volume of Casing)	=	3.93
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	19.66

Method of Purging (pump, bailer, etc.): Bailed

APPROXIMATE FLOW RATE: _____

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

Bailed 11/21 + 11/24 Total purged ~20 gal

NOTES:

Signed/DEVELOPER: JW+DB Date: 11/25/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW2 Date: 11/21/86 Time: _____

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: _____

Cut: _____

DTW: -21.40' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	4.66
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	1.04
Total Volume (Volume of A.S. + Volume of Casing)	=	5.70
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	28.5 gal

Method of Purging (pump, bailer, etc.): Bailed

APPROXIMATE FLOW RATE: —

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

Bailed 11/21, 11/ + 11/25 for total of ~29 gal

NOTES:

Signed/DEVELOPER: [signature] JW & DB Date: 11/25/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: APGW3 Date: 11/21/86 Time: _____

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: _____

Cut: _____

DTW: -21.67' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	4.56
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	1.01
Total Volume (Volume of A.S. + Volume of Casing)	=	5.57
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	27.85

Method of Purging (pump, bailer, etc.): bailed

APPROXIMATE FLOW RATE: —

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT: Bailed 11/21 + 11/24 for total of ~28 gal

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER JW + DB Date: 11/25/86

Signed/Reviewer: _____ Date: _____

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW4 Date: 11/24/86 Time: _____

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: _____

Cut: _____

DTW: -20.58 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	3.91
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	0.87
Total Volume (Volume of A.S. + Volume of Casing)	=	4.78
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	23.90

Method of Purging (pump, bailer, etc.): bailed

APPROXIMATE FLOW RATE: — Bailed 11/24

TOTAL DEVELOPMENT TIME: — for total of 24 gallons

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER JW & DB Date: 11/25/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW5 Date: 11/24/86 Time: _____

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: _____

Cut: _____

DTW: -18.63' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	6.76
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	1.50
Total Volume (Volume of A.S. + Volume of Casing)	=	8.26
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	41.3 gal

Method of Purging (pump, bailer, etc.): bailed

APPROXIMATE FLOW RATE: — Bailed 11/24 for total of 42 gallons

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] for JW + DB Date: 11/25/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

-WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW 6 Date: 11/24/86 Time: 1010.

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -20.00'

Cut: 1.25'

DTW: -18.75' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: 18.75'

Column of Water in Well: 9.25'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	9.25
Volume of Annular Space	=	2.90
Gallons per foot of Casing	=	0.1632
Column of Water	X	9.25
Volume of Casing	=	1.51
Total Volume (Volume of A.S. + Volume of Casing)	=	4.41
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	22 gal

Method of Purging (pump, bailer, etc.): Discontinuous pumping + continuous pum

APPROXIMATE FLOW RATE: ~0.25 gal/minute 2 gal

TOTAL DEVELOPMENT TIME: — Total purged volume = ~22

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset; pumped continuously @ very low flow rate; water clear upon completion of development

Signed/DEVELOPER [signature] Date: 11/24/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

5.

R85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW7 Date: 11/24/86 Time: 1028

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -18.00'

Cut: -1.17'

DTW: -16.83' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -16.83'

Column of Water in Well: 11.17'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	11.17
Volume of Annular Space	=	4.36
Gallons per foot of Casing	=	0.1632
Column of Water	X	11.17
Volume of Casing	=	1.82
Total Volume (Volume of A.S. + Volume of Casing)	=	6.18
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	31 gal

Method of Purging (pump, bailer, etc.): Discontinuous + continuous pumping -

APPROXIMATE FLOW RATE: ~1 gal/min

3 gal
3 gal
6 gal
25 gal
31 total

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset; ~ 12" sediment inside casing @ onset; water + casing clear upon completion of development

Signed/DEVELOPER: [signature] Date: 11/24/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

Temporary # 4

WELL DEVELOPMENT FORM

Well Number: HPGW8 Date: 11/9/86 Time: 1432

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -15.83' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	8.51
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	1.89
Total Volume (Volume of A.S. + Volume of Casing)	=	10.40
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	52 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 1.9 gpm

TOTAL DEVELOPMENT TIME: 29 MIN. (55 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

Temporary # 11

WELL DEVELOPMENT FORM

Well Number: HPGW9 Date: 11/10/86 Time: 1108.

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -18.13 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	6.79
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	1.57
Total Volume (Volume of A.S. + Volume of Casing)	=	8.30
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	41.5 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: ~2.0 gal/min

TOTAL DEVELOPMENT TIME: 29 min. (58 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW10 Date: 11/24/86 Time: 1040

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -16.00'

Cut: 1.00'

DTW: -15.00' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -15.00'

Column of Water in Well: 13.00'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	13.00
Volume of Annular Space	=	5.07
Gallons per foot of Casing	=	0.1632
Column of Water	X	13.00
Volume of Casing	=	2.12
Total Volume (Volume of A.S. + Volume of Casing)	=	7.19
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	36 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~3 gal/minute @ low flow

TOTAL DEVELOPMENT TIME: 15 minutes (~45 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset; ~12" of sand in casing @ onset; water & casing clear upon completion of development

Signed/DEVELOPER [signature] Date: 11/24/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW[redacted]11 Date: 11/24/86 Time: 1050

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -17.00'

Cut: 0.93'

DTW: -16.07' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: 16.07'

Column of Water in Well: 11.93'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	11.93
Volume of Annular Space	=	4.65
Gallons per foot of Casing	=	0.1632
Column of Water	X	11.93
Volume of Casing	=	1.95
Total Volume (Volume of A.S. + Volume of Casing)	=	6.60
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	33 gal

Method of Purging (pump, bailer, etc.): Discontinuous pumping & continuous pumpin

APPROXIMATE FLOW RATE: ~0.9 gal/min

5 gal
2
3
+25
35 gal total

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset, cleared up quickly - Will pump continuously @ low throttle at low flow rate (see above)

Signed/DEVELOPER [signature] Date: 11/24/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW12 Date: 11/21/86 Time: 0930

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -1500'

Cut: 0.80'

DTW: -14.20' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -14.20'

Column of Water in Well: 13.80'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	13.80
Volume of Annular Space	=	5.38
Gallons per foot of Casing	=	0.1632
Column of Water	X	13.80
Volume of Casing	=	2.25
Total Volume (Volume of A.S. + Volume of Casing)	=	7.63
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	38.2 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~2 gal/min @ low throttle

TOTAL DEVELOPMENT TIME: 20 minutes (~40 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset of development; ~6" sediment @ base of casing; water + casing clean upon completion of development.

Signed/DEVELOPER: Mark J. Gardner Date: 11/21/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW13 Date: 11/24/86 Time: 0950

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -16.00'

Cut: 1.50'

DTW: -14.50' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: 14.50'

Column of Water in Well: 13.50'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	13.50
Volume of Annular Space	=	5.27
Gallons per foot of Casing	=	0.1632
Column of Water	X	13.50
Volume of Casing	=	2.20
Total Volume (Volume of A.S. + Volume of Casing)	=	7.47
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	37.4 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~1.5 gal/min

TOTAL DEVELOPMENT TIME: 30 minutes (~45 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset of development, ~6" of sediment in casing @ onset; water + casing clear upon completion of development

Signed/DEVELOPER: [signature] Date: 11/24/86

Signed/Reviewer: _____ Date: _____

TR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW14 Date: 11/9/86 Time: 1207

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -13.31 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	10.60
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.36
Total Volume (Volume of A.S. + Volume of Casing)	=	12.96
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	64.80 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 1.2 gpm

TOTAL DEVELOPMENT TIME: 55 MIN (66 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

Temporary #10

WELL DEVELOPMENT FORM

Well Number: HPGW15 Date: 11/10/86 Time: 1004

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -14.71 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	9.27
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.06
Total Volume (Volume of A.S. + Volume of Casing)	=	11.33
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	56.6 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 1.2 gpm

TOTAL DEVELOPMENT TIME: 47 MIN. (56 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] for JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW16 Date: 11/21/86 Time: 0940

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: - 16.00'

Cut: 1.46'

DTW: -14.54' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -14.54'

Column of Water in Well: 13.46'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	13.46
Volume of Annular Space	=	5.25
Gallons per foot of Casing	=	0.1632
Column of Water	X	13.46
Volume of Casing	=	2.20
Total Volume (Volume of A.S. + Volume of Casing)	=	7.45
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	37.3 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~1 gal/min.

TOTAL DEVELOPMENT TIME: 40 minutes (~40 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset; relatively clear upon completion of development

Signed/DEVELOPER: [signature] Date: 11/21/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

Temporary # 1C

WELL DEVELOPMENT FORM

Well Number: HPGW17 Date: 11/10/86 Time: 0920

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -13.58' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	10.47
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.33
Total Volume (Volume of A.S. + Volume of Casing)	=	12.79
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	63.9 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 1.85 gpm

TOTAL DEVELOPMENT TIME: 36 min. (67 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] for JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW18 Date: 11/21/86 Time: 0950

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -15.00'

Cut: 1.50'

DTW: -13.50' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -13.50'

Column of Water in Well: 14.50'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	14.50
Volume of Annular Space	=	5.66
Gallons per foot of Casing	=	0.1632
Column of Water	X	14.50
Volume of Casing	=	2.37
Total Volume (Volume of A.S. + Volume of Casing)	=	8.03
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	40.2 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~5 gal/min @ high throttle

TOTAL DEVELOPMENT TIME: 20 [redacted] minutes (> 80 gallons)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Very muddy @ onset, approx 12" fine gr. sand inside casing @ onset; neither casing or water came clear during development - sand being pulled thru screen by pump.

Signed/DEVELOPER [signature] Date: 11/21/86

Signed/Reviewer: [signature] Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW24 Date: 11/21/86 Time: 1005

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -11.00'

Cut: 1.67'

DTW: -9.33' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: 9.33'

Column of Water in Well: 18.67'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	18.67
Volume of Annular Space	=	7.28
Gallons per foot of Casing	=	0.1632
Column of Water	X	18.67
Volume of Casing	=	3.05
Total Volume (Volume of A.S. + Volume of Casing)	=	10.33
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	51.7 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~1 gal/min

TOTAL DEVELOPMENT TIME: 55 minutes (~55 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water quite muddy @ onset of development
clear upon completion

Signed/DEVELOPER: [signature] Date: 11/21/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

Temporary #9

WELL DEVELOPMENT FORM

Well Number: HPGW19 Date: 11/9/86 Time: 1131

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -11.58' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	7.10
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	1.58
Total Volume (Volume of A.S. + Volume of Casing)	=	8.68
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	43.4 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 2.6 gpm

TOTAL DEVELOPMENT TIME: 28 min. (73 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

-WR85.1/SAMPFORM.1
03/15/85

Temporary # 1

WELL DEVELOPMENT FORM

Well Number: HPGW20 Date: 11/9/86 Time: 0838

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -10.67' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	12.54
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.79
Total Volume (Volume of A.S. + Volume of Casing)	=	15.33
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	76.6 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 2.6 gpm

TOTAL DEVELOPMENT TIME: 40 min (104 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/Developer: [signature] JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

VR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW21 Date: 11/20/86 Time: 1625

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -15.00'

Cut: 1.25'

DTW: -13.75' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: 13.75'

Column of Water in Well: 14.25'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	14.25
Volume of Annular Space	=	5.56
Gallons per foot of Casing	=	0.1632
Column of Water	X	14.25
Volume of Casing	=	2.33
Total Volume (Volume of A.S. + Volume of Casing)	=	7.89
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	39.5 gal

Method of Purging (pump, bailer, etc.): Continuous pumping (slow rate) and discontinuous (surge) pumpin

APPROXIMATE FLOW RATE: << 0.5 gal/min

TOTAL DEVELOPMENT TIME: —

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

14 gal total @ 1715 11/20

11/21: 4 gal
5 gal
5 gal
14 gal tot
on 11/21 @ 160

11/24 5 gal
5
2
12 total
11/24 @ 1500

NOTES: Water muddy @ onset; slightly cloudy @ completion due to prolonged development period.

Signed/Developer: [signature] Date: 11/24/86

Signed/Reviewer: _____ Date: _____

TOTAL = 40 gal

CLEJ-00414-03.13-04/01/92

-WR85.1/SAMPFORM.1
03/15/85

Temporary #1

WELL DEVELOPMENT FORM

Well Number: HPGW22 Date: 11/7/86 Time: 1500

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -10.67 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	10.44
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.32
Total Volume (Volume of A.S. + Volume of Casing)	=	12.76
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	63.8 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: ~1 gal/min

TOTAL DEVELOPMENT TIME: — (63 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] for JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

Temporary #14

WELL DEVELOPMENT FORM

Well Number: HPGW23 Date: 11/8/86 Time: 1032

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -13.58 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	9.67
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.15
Total Volume (Volume of A.S. + Volume of Casing)	=	11.82
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	59.10

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: ~1 gpm

TOTAL DEVELOPMENT TIME: — (62 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: [signature] JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

Temporary # 15

WELL DEVELOPMENT FORM

Well Number: HPGW25 Date: 11/18/86 Time: 1000

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: -11.50' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	11.88
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	2.64
Total Volume (Volume of A.S. + Volume of Casing)	=	14.52
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	72.60

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: ~1.2 gpm

TOTAL DEVELOPMENT TIME: — (73 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/DEVELOPER: JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

Temporary # [redacted] 8 WELL DEVELOPMENT FORM

Well Number: HPGW26 Date: 11/9/86 Time: 1028

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: _____ Stickup: _____

WATER LEVEL

Held: _____

Cut: _____

DTW: ~20.46 Top of Casing

COLUMN OF WATER IN WELL

Casing Length: _____

DTW Top of Casing: _____

Column of Water in Well: _____

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	
Column of Water or Length of A.S. (whichever is less)	X	
Volume of Annular Space	=	4.13
Gallons per foot of Casing	=	
Column of Water	X	
Volume of Casing	=	0.92
Total Volume (Volume of A.S. + Volume of Casing)	=	5.04
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	25 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: 1.2 gpm

TOTAL DEVELOPMENT TIME: 28 min. (34 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES:

Signed/Developer: [signature] JW Date: 11/19/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW27 Date: 11/20/86 Time: 0930

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -10.00'

Cut: 1.10'

DTW: -8.90' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -8.90

Column of Water in Well: 19.10'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	19.10
Volume of Annular Space	=	7.45
Gallons per foot of Casing	=	0.1632
Column of Water	X	19.10
Volume of Casing	=	3.12
Total Volume (Volume of A.S. + Volume of Casing)	=	10.57
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	52.9 gal

Method of Purging (pump, bailer, etc.): _____

APPROXIMATE FLOW RATE: ~8 gal/min (@ low throttle)

TOTAL DEVELOPMENT TIME: 10 min. (~80 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset, ~12" sediment in casing @ onset, water & casing clear upon completion of development

Signed/DEVELOPER [signature] Date: 11/20/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW28 Date: 11/20/86 Time: 1010

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -8.00'

Cut: -1.52'

DTW: -6.48' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -6.48'

Column of Water in Well: 21.52'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	21.52
Volume of Annular Space	=	8.39
Gallons per foot of Casing	=	0.1632
Column of Water	X	21.52
Volume of Casing	=	3.51
Total Volume (Volume of A.S. + Volume of Casing)	=	11.9
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	59.5 gal

Method of Purging (pump, bailer, etc.):

APPROXIMATE FLOW RATE: ~7.5 gal/min @ low throttle

TOTAL DEVELOPMENT TIME: 10 min (~75 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water very muddy @ onset, odorous (sulfur?) ~12" sediment inside casing @ onset; casing cleaned but water sl. cloudy + sl. odorous @ completion of development

Signed/DEVELOPER [signature] Date: 11/20/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW29 Date: 11/20/86 Time: 1540

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -23.00'

Cut: - 0.70'

DTW: -22.30' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: 22.30'

Column of Water in Well: 5.70'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	5.70
Volume of Annular Space	=	2.22
Gallons per foot of Casing	=	0.1632
Column of Water	X	5.70
Volume of Casing	=	0.93
Total Volume (Volume of A.S. + Volume of Casing)	=	3.15
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	15.75 gal

Method of Purging (pump, bailer, etc.): Discontinuous pumping

APPROXIMATE FLOW RATE: ~ 5 gal / 10 minutes

TOTAL DEVELOPMENT TIME: 35 minutes (>15 gal)

RELATIVELY QUICK RECHARGE

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water muddy @ onset; clean upon completion of development

Signed/DEVELOPER [signature] Date: 11/20/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW30 Date: 11/20/86 Time: 1100

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -12.00'

Cut: 1.15'

DTW: -10.85' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -10.85'

Column of Water in Well: 17.15'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	17.15
Volume of Annular Space	=	6.69
Gallons per foot of Casing	=	0.1632
Column of Water	X	17.15
Volume of Casing	=	2.80
Total Volume (Volume of A.S. + Volume of Casing)	=	9.49
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	47.5 gal

Method of Purging (pump, bailer, etc.): Continuous pumping - water flow discontinuous

APPROXIMATE FLOW RATE: SLOW ~ 0.5 gal/min

TOTAL DEVELOPMENT TIME: 1 hr. 45 min (~ 48 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Very slow pumping; water muddy @ onset; relatively clean upon completion of development

Signed/DEVELOPER [signature] Date: 11/20/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WR85.1/SAMPFORM.1
03/15/85

WELL DEVELOPMENT FORM

Well Number: HPGW31 Date: 11/20/86 Time: 1330

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5

WATER LEVEL

Held: -21.00'

Cut: 1.10'

DTW: -19.90' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -19.90'

Column of Water in Well: 8.10'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	8.10
Volume of Annular Space	=	3.16
Gallons per foot of Casing	=	0.1632
Column of Water	X	8.10
Volume of Casing	=	1.32
Total Volume (Volume of A.S. + Volume of Casing)	=	4.48
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	22.4 gal

Method of Purging (pump, bailer, etc.): Discontinuous pumping

APPROXIMATE FLOW RATE: ~0.3 gal/min

TOTAL DEVELOPMENT TIME: 1 hour 15 min (~23 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Muddy @ onset; water clear @ completion of development - SLOW WELL

Signed/DEVELOPER [signature] Date: 11/20/86

Signed/Reviewer: _____ Date: _____

WELL DEVELOPMENT FORM

Well Number: HPGW32 Date: 11/20/86 Time: 1445

Boring Diameter: 6" Well Casing Diameter: 2"

Annular Space Length: 24' Stickup: 2.5'

WATER LEVEL

Held: -10.00'

Cut: 0.67'

DTW: - 9.33' Top of Casing

COLUMN OF WATER IN WELL

Casing Length: 28.00'

DTW Top of Casing: -9.33

Column of Water in Well: 18.67'

VOLUME TO BE REMOVED

Gallons per foot of A.S. (from chart)	=	0.39
Column of Water or Length of A.S. (whichever is less)	X	18.67
Volume of Annular Space	=	7.28
Gallons per foot of Casing	=	0.1632
Column of Water	X	18.67
Volume of Casing	=	3.05
Total Volume (Volume of A.S. + Volume of Casing)	=	10.33
Number of Volumes to be Evacuated	X	5
Total Volume to be Evacuated	=	57.7 gal

Method of Purging (pump, bailer, etc.): Continuous pumping

APPROXIMATE FLOW RATE: ~3 gal/min

TOTAL DEVELOPMENT TIME: 20 min (~60 gal)

WATER LEVEL - 24 HRS AFTER DEVELOPMENT:

HELD: _____

CUT: _____

DTW: _____ Top of Casing

NOTES: Water v. muddy @ onset; casing had ~24" of sediment (predominantly mud) @ onset; water + casing clear upon completion of development

Signed/DEVELOPER: [signature] Date: 11/20/86

Signed/Reviewer: _____ Date: _____

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036 - 0140

WELL #HPGW 4-2

FIELD PERSONNEL Paul Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS.REMOVED~~	COLOR ~~TURBIDITY (NU)~~	CLARITY ~~DEPTH TO WATER~~	pH	COND.
12-13-90	≈ 0800		Prior to development (≈0810)	muddy brown	OPAQUE	8.0	402
"			≈1hr into development (≈0900)	cloudy, white	transparent	8.5	286
"		≈ 1000	≈2hr into development (≈1000)	cloudy, white	transparent	8.5	275

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036 0140

WELL # HPGW4-3

FIELD PERSONNEL Paul Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS.REMOVED~~	COLOR ~~TURBIDITY~~ (NU)	CLARITY ~~DEPTH TO WATER~~	pH	COND.
12-19-90	≈ 0935		Pre-development (≈ 0945)	Light brown, cloudy	opaque	8.0	378
"			mid-development (≈ 1045)	No tint, slightly cloudy	transparent	8.1	300
"		≈ 1145	post-development (≈ 1145)	No tint, some minute amount of particulate matter	transparent	8.2	294

CLEJ-00414-03.13-04/01/92

Well Development

Well No. HP6W 9-2

Date 7/1/87 Time 0900

Well Installation Date 6/29/87 Screen length 20' ft

Depth of Well ~~77~~ 75.54 ft

Diameter of Well 5" inches

Method of Evacuation Cent. pump + Bailer

Depth from which well was pumped 130 gallons bailed a top ft

Distance from top of pipe to ground 2.50' ft

	Before	After	24 hours After	
Held length	17.00	27.00'		ft
Wet length	1.10'	5.20'		ft
Distance to water	15.90'	21.80		ft
Depth to sediment	70.00'	74.00'		ft
Appearance of water	Muddy brown	Clear		
Approx. pumping rate	0.45	0.45		gpm

Characteristics of sediment Extremely fine sand

Field Analyses	Before	Bucket No.___	Bucket No.___	After
pH	7.0	—	—	7.0
Conductivity	—	—	—	—
Temperature	—	—	—	—

No. of 2-1/2 gal buckets pumped 1 2 3 4 5 6 7 8 9 10 _____

Total well volume before pumping 16.60 gal

Total volume pumped ~~185~~ 210 gal

Sample collected - 1 cubitainer after pumping labeled _____

Description of surge technique _____

Read and Understood By:

David A. Brittyn
Signed

Signed

7/2/87
Date

Well Development Well No. HPGW 9-3

Date 7/19/87 Time 0800

Well Installation Date 7/18/87 Screen length 20' ft

Depth of Well 150' ft

Diameter of Well 2" inches

Method of Evacuation Bailer

Depth from which well was pumped bailed 75% from top ft

Distance from top of pipe to ground _____ ft

flushed out sediment with potable water from fire hydrant 1" water pipe

	Before	After 8hrs	24 hours After	
Held length	18.00'	18.00'	18.00'	ft
Wet length	3.00'	2.50'	2.67'	ft
Distance to water (toc)	15.00'	~~35.00~~ 15.50	15.33 – TOC	ft
Depth to sediment	147'	152.5 NONE	152.5	ft
Appearance of water	muddy brown	Clear		
Approx. pumping rate	1gpm	1.0		gpm

$\bar{x}$ = 12.78' BGL

Characteristics of sediment Drill mud, Ex fine silt + Sand

Field Analyses	Before	Bucket No.___	Bucket No.___	After
pH				
Conductivity				
Temperature				

No. of 2-1/2 gal buckets pumped 1 2 3 4 5 6 7 8 9 10 _____

Total well volume before pumping 27.26 gal

Total volume pumped 375 gal

Sample collected - 1 cubitainer after pumping labeled _____

Description of surge technique Washed well with water from fire hydrant through 1" water pipe (ABS)

Read and Understood By:

David A. Brattyn

Signed _____ Signed _____ Date

CLEJ-00414-03.13-04/01/92

Well Development

Well No. HPGW 17-2

Date 6/24/87 Time 1400

Well Installation Date 6/19/87 Screen length 20 ft

Depth of Well 75.0 ft

Diameter of Well 2.0 inches

Method of Evacuation Bailer ~ 1" PVC

Depth from which well was pumped From Top of Column ft

Distance from top of pipe to ground 2.67' ft

	Before	After	~~24~~ 48 hours After	
Held length	16.00	65.00	17.00	ft
Wet length	1.29	5.00	1.67	ft
Distance to water	14.08	60.00	15.33	ft
Depth to sediment	73.50	73.00	73.00	ft
Appearance of water	turbid	Clear	Clear	
Approx. pumping rate	1/2 gpm	1/2 gpm		gpm

g = 12.04 BH

Characteristics of sediment grey v. fine sand

Field Analyses	Before	Bucket No.___	Bucket No.___	After
pH	6.5-7.0			6.5-7.0
Conductivity				
Temperature				

No. of 2-1/2 gal buckets pumped 1 2 3 4 5 6 7 8 9 10 _____

Total well volume before pumping 16.88 gal

Total volume pumped 260 gal

Sample collected - 1 cubitainer after pumping labeled _____

Description of surge technique _____

David A. Brutlyn
Signed

Read and Understood By:

Signed

7/1/87
Date

Well Development Well No. MPGW 17-3

Date 7/19/87 Time 1130

Well Installation Date 7/16/87 Screen length 20' ft

Depth of Well 150' ft

Diameter of Well 6" inches

Method of Evacuation Bailer 1" PVC

Depth from which well was pumped From Top of Column ft

Distance from top of pipe to ground 2.50' ft

* well was flushed via fire hydrant + water quickly all sediment removed DB

	Before	30 min After	24 hours After	
Held length	18.00'	18.00'	18.00	ft
Wet length	2.83'	2.57'	2.75	ft
Distance to water	15.17'	15.43'	15.25	ft
Depth to sediment	75.00'	75.00'	75.00	ft
Appearance of water	Clear	Clear	Clear	
Approx. pumping rate	1 gpm	1.0		gpm

Characteristics of sediment

Elev = 12.87 BGL

Field Analyses	Before	Bucket No.___	Bucket No.___	After
pH	6.5-7.0			6.5-7.0
Conductivity				
Temperature				

No. of 2-1/2 gal buckets pumped 1 2 3 4 5 6 7 8 9 10 _____

Total well volume before pumping 31.75 gal

Total volume pumped 360 gal

Sample collected - 1 cubitainer after pumping labeled _____

Description of surge technique _____

Read and Understood By:

David A. Brittings — Signed

Signed

7/20/87 — Date

Well Development — Well No. HPGW24-2

Date 6/10/87 Time 1130 am

Well Installation Date 6/9/87 Screen length 20.0 ft

Depth of Well 79.90 (TOC) ft

Diameter of Well 5" bored inches

Method of Evacuation Bailer

Depth from which well was pumped 50% Top, 50% bottom ft

Distance from top of pipe to ground 3.25' ft

	Before	24hrs After	72hrs ~~24 hours~~ After	
Held length (TOC)	16.00'	18.00	18.00	ft
Wet length (TOC)	1.40'	2.67	3.25	ft
Distance to water (TOC)	14.60'	15.33	14.75	ft
Depth to sediment (TOC)	78.15'	78.00'	78.00	ft
Appearance of water	turbid gray	Clear		
Approx. pumping rate	0.15 gpm	0.15 gpm		gpm

$\bar{X}$ = 11.64 BGL

Characteristics of sediment initial (gray), Final (gray fine sand)

Field Analyses	Before	Bucket No.___	Bucket No.___	After
pH	6.0-6.5	(Throughout →		)
Conductivity	N/A	(		)
Temperature	N/A	(		)

No. of 2-1/2 gal buckets pumped 1 2 3 4 5 6 7 8 9 10 _____

Total well volume before pumping 16.93 (volume + 4S) gal — volume 10.43 gal, 4S 6.50 gal

Total volume pumped 184.0 gallons gal

Sample collected - 1 cubitainer after pumping labeled _____

Description of surge technique _____

DAB 6/15/87

Read and Understood By:

David A. Buttyan — Signed

Signed

6/17/87 — Date

CLEJ-00414-03.13-04/01/92

Well Development — Well No. HPGW 24-3

Date 7/1/87 Time 0830

Well Installation Date 6/17/87 Screen length 20 ft

Depth of Well 148.17' BGL ft

Diameter of Well 5" inches

Method of Evacuation Bailer (PVC) 50% bailed air lift 50% bailed bottom

Depth from which well was pumped N/A ft

Distance from top of pipe to ground ~~1.5~~ 1.83' ft

	Before	~~After~~ 24hrs qHV	~~24 hours~~ 72 hrs After	
Held length	16.00' TOC	15.00' TOC	15.00 TOC	ft
Wet length	1.13'	0.83	1.63	ft
Distance to water (BGL)	14.87'	13.17	13.37	ft
Depth to sediment	140.00'	145.00'	145.00'	ft
Appearance of water	muddy brown	Clear - slight grey	Clear	
Approx. pumping rate	0.15 gpm	0.15 gpm	0.15 gpm	

11.97' = BGL

Characteristics of sediment Sediment very very fine silty sand (grey black)

Field Analyses	10 gal Before	Bucket No. ___	Bucket No. ___	After → 300 gal
pH	6.5-7.0	/	/	6.5-7.0
Conductivity	/	/	/	/
Temperature	/	/	/	/

No. of 2-1/2 gal buckets pumped 1 2 3 4 5 6 7 8 9 10 ___

Total well volume before pumping ~~28.55~~ 37.13 gal

Total volume pumped 300 gal gal

Sample collected - 1 cubitainer after pumping labeled ___

Description of surge technique ___

Read and Understood By:

David A. Brittyn — Signed

___ Signed

7/1/87 Date

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036 - 0140

WELL # HPGW30-2

FIELD PERSONNEL Paul Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS. REMOVED~~	COLOR ~~TURBIDITY~~ (NU)	CLARITY ~~DEPTH TO WATER~~	pH	COND.	
12-14-90	≈1300		Prior to development (≈1315)	gray brown, cloudy	opaque	7.8	561	
"		≈1400	Post-development (≈1400)	light brown	opaque to transparent			This sample was not b pH + cond + visual inspec could be rec methodically

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036 - 0140

WELL # HPGW30-3

FIELD PERSONNEL Paul Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS. REMOVED~~	COLOR ~~TURBIDITY (NU)~~	CLARITY ~~DEPTH TO WATER~~	pH	COND.
12-14-90	≈ 1110		Prior to development (≈1118)	Greenish tint, cloudy	opaque	8.1	402
"		≈ 1153	Post-development (≈1153)	whitish, cloudy	transparent	8.3	366

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036 - 0140

WELL # HPGW31-2

FIELD PERSONNEL Paul Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS.REMOVED~~	COLOR ~~TURBIDITY~~ (NU)	CLARITY ~~DEPTH TO WATER~~	pH	COND.
12-19-90	≈ 1250		Pre-development (≈ 1300)	Light brown, cloudy	opaque	8.1	373
"			mid-development (≈ 1400)	No tint, slight amt of particulate matter	transparent	8.1	369
"		≈ 1500	post-development (≈ 1500)	same as above	transparent	8.1	363

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036 0140

WELL # HP GW31-3

FIELD PERSONNEL Paul M. Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS. REMOVED~~	COLOR ~~TURBIDITY~~ (NU)	CLARITY ~~DEPTH TO WATER~~	pH	COND.
12-20-91	≈ 0830		Pre-development (≈ 0840)	Light brown, cloudy	opaque	8.1	374
"			Mid-development (≈ 0910)	Not-tint, some particulate matter floating	Transparent	8.2	328
"		≈ 1000	post-development (≈ 1000)	Not-tint, trace amt of particulate matter floating	Transparent	8.3	323

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANTDIV - Camp Lejeune

JOB # 49-02036-0140

WELL # HP GW 32-2

FIELD PERSONNEL Paul M. Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS.REMOVED~~	COLOR ~~TURBIDITY~~ (NU)	CLARITY DEPTH TO WATER	pH	COND.
12-21-91	≈ 0725		Pre-development (≈0735)	No tint, cloudy	Transparent	8.0	381
"			mid-development (≈0815)	No tint, some particulate matter seen floating	Transparent	8.1	352
"		≈ 0845	post-development (≈0845)	No tint, trace particulate matter - almost none	Transparent	8.1	349

CLEJ-00414-03.13-04/01/92

WELL DEVELOPMENT RECORD

CLIENT LANT DIV - Camp Lejeune

JOB # 49-02036 0140

WELL # HPGW52-3

FIELD PERSONNEL Paul M. Feinberg

DATE	TIME STARTED	TIME STOPPED	TIME SAMPLED ~~GALS. REMOVED~~	COLOR ~~TURBIDITY~~ (NU)	CLARITY ~~DEPTH TO WATER~~	pH	COND.
12-20-90	≈ 1305		Pre development (≈ 1315)	Light brown, cloudy	opaque	8.1	324
"			mid-development (≈ 1400)	No tint, slightly cloudy particulate matter	transparent	8.3	309
"		≈ 1430	post-development (≈ 1430)	No tint, some particulate matter - less than at 1400.	transparent	8.1	310