Received 8/22/2023 HCP&B

April 9, 2000

Larry Hand
Fieldbrook, CA 95519

Subject: Leachfield Suitability Report, APN 525-072-02, Fieldbrook

INTRODUCTION

This report presents the results of my field and laboratory investigation for on site sewage disposal at the referenced site. The site is located south of Fieldbrook Road, and slightly west of Rock Pit Road. Figure One shows the location of monitoring wells, hand auger holes, hand dug pits, percolation test holes, approximate building site, general topography, existing fences, and the proposed sewage disposal system.

The proposed residence will have three bedrooms. Water will be provided by a community water system. The adjoining lots are served by a community water system.

SCOPE OF WORK and METHODS

My scope of work included: determining a suitable area for on site sewage disposal; describing and sampling soils; installing groundwater monitoring wells; monitoring the groundwater table during the wet weather period; performing percolation testing; performing laboratory textural analyses (by hydrometer); providing a proposed system design and layout; and preparing this report.

Soil descriptions follow the guidelines of the USDA soil classification system. I collected samples at selected horizons. Laboratory results are presented on the soil logs. The numbers of the groundwater monitoring wells, and percolation test holes coincides with the number of the soil logs. The monitoring wells were placed in hand auger holes. The percolation test pits were excavated by hand.

Appendix I is the soil logs. Appendix II is a plot of the texture of site soils. Appendix III is the results of percolation testing. Appendix IV is the results of groundwater monitoring. Appendix V contains details of groundwater monitoring wells. Appendix VI is a calculation of the linear feet of leachline trench plus a typical trench cross section.

DESCRIPTION OF SITE

The slope gradient is approximately 3 percent in the proposed absorption area. Vegetation consists of annual grasses. There is an ephemeral creek (Figure One) that is a consequence of water redirected through a culvert under Fieldbrook Road. This creek is greater than 50 feet from the proposed absorption area.

DESCRIPTION OF SITE SOILS AND GROUNDWATER

The soil profile consists of approximately one foot of Silt Loam topsoil over a Silty Clay Loam to Clay Loam. The Color of the subsoil is dark yellowish brown. Distinct mottles are present below a depth of four feet. Structure is well developed granular in the topsoil and moderately developed medium subangular blocky in the subsoil.

During the time of my investigation, the water table rose to 3.5 feet below the ground surface, in Monitor Well Numbers 2 and 3 (Appendix IV).

PERCOLATION TESTING AND TEXTURE

The results of percolation testing ranged from 12-24 minutes per inch (Appendix III).

The texture of site soils falls within zone 3-4 (marginal) of the Humboldt County Soil Percolation Suitability Chart (Appendix II).

CONCLUSION

Due to the seasonally high groundwater table, a low-pressure distribution network, or pressure dosing system, should be installed on this parcel. The proposed pressure dosing system utilizes one and one-half foot deep trenches with one foot of washed pea gravel beneath the distribution pipe (Appendix VI). Effluent is applied under pressure in a series of doses, allowing for uniform distribution and helping to maintain aerobic conditions in the soil.

The total length of distribution line should be 225 feet. I recommend using 5, 45-foot lines, spaced 6 foot on center. This requires an area 24 feet by 45 feet. The replacement area (reserve field) should be of equal area.

GENERAL NOTES

The recommended depth, width, length, and spacing of distribution line trenches are specified in Appendix VI. Gravel should be <u>washed</u> pea gravel. Filter fabric should cover the gravel filled trenches. The filter fabric should be covered by topsoil-based fill.

Force main, or supply line trenches, should be 2.0 feet deep and backfilled with compacted native material.

All trenches for distribution lines should be along contour. Attempt to achieve a zero slope gradient for the base of trenches and distribution pipes.

All trench sidewalls should be raked, or plucked, of smeared surfaces.

Supply lines should be 2-inch diameter pipe. Distribution lines should be 1 ¼ inch diameter pipe. All piping and fittings should be schedule 40 PVC. Irregular bends may be constructed of flexible spa hose, electrical PVC, or equivalent.

A 5/32-inch diameter hole should be drilled in the distribution lines every 3 feet. No holes should be closer than 2 feet from the end of the line. For a 45-foot line length, this spacing allows for 14 holes per line. All burrs from drilling should be removed. Holes should be drilled in a line and placed down in the trench.

A gate valve approved for sewage transmission should be placed at the proximal end of each distribution line. These gate valves will be used to regulate pressure head. At the terminal end of each distribution line, pressure head should be 3 feet. The valves should be placed in a christy box or similar

The end of each distribution line should be equipped with a removable, capped turn-up that provides for above ground access for cleaning or flushing. Using a long sweep elbow will make clean out easier. The capped end should be brought up above or flush with grade. As the trench is filled, the turn-up may be placed inside a short length of 4" or 6" terra cotta or PVC to protect it from lawn mowing damage while still providing easy access.

The pressure head is the height liquid will rise above the turn-up elbow when the pump is running. To measure the pressure head, glue a four-foot length of pipe (preferable clear) to a threaded adapter that will screw onto the turn-up adapters. Replace the turn -up cap with the pipe and adapter. Turn on the pump and adjust the gate valve until the level of water reaches the desired height.

The pump should be capable of supplying the calculated flow rate (Appendix VI) against the total dynamic head (Appendix VI).

The float controls should be set to the dosing volume specified in Appendix VI.

The septic tank should have a minimum volume of 1800 gallons with an effluent filter installed at the outlet of the tank. Alternatively, you can use two, 750-gallon tanks in series. It should be water tight and heavy enough not to float when empty. A watertight access riser and lid, set at grade, should provide access to each compartment. The top of the tank should be covered by minimum of 6 inches of fill. The tank should be installed level. The slope of the sewer line to the septic tank should be uniform and not less than 2 percent. Install a cleanout at the junction of the septic tank with the building.

The pumping tank should be 1200 gallons. It should be watertight. A watertight riser and lid, set at grade, should provide access. The top of the tank should be covered by minimum of 6 inches of fill.

The pumping tank should be equipped with a visual and audible high water alarm on a separate electrical circuit as the pump. The alarm should include a float switch, that when tripped will turn on a light and set off a buzzer. The light should be placed inside the residence. The buzzer should be outside.

The location of septic tanks should be greater than 5 feet from property lines and 10 feet from buildings.

Only quality materials should be used, and installed in accordance with the manufacturers recommendations.

All electrical work should be performed in conformance with applicable codes and standards. All switches, relays, and NEMA approved closures shall be water proof, corrosion proof resistant, and explosion proof. All electrical connections should be made outside of the tank. Power cords should be plugged into a NEMA approved outdoor receptacle mounted outside of the tank. Electrical connections can be made inside the tank only if wired inside a sealed, watertight box.

During construction, the contractor should use caution to minimize disruption and compaction of native soils. Removal or compaction of the topsoil may destroy the suitability of the site.

This system must be installed during dry weather. No site preparation or low-pressure pipe construction work should occur if the soil is wet.

CLOSURE

The system will function properly only if is installed using high quality workmanship and materials, and maintained regularly. I do not warrant the operation or proper functioning of the system for any period of time. At their discretion, Humboldt County Department of Environmental Health (HCDEH) will grant final approval of the suitability of the information provided in this report and any required addenda. In addition, through inspections, HCDEH will determine the adequacy of construction at build-out.

Thank you for requesting my services. If you have any questions, please call.

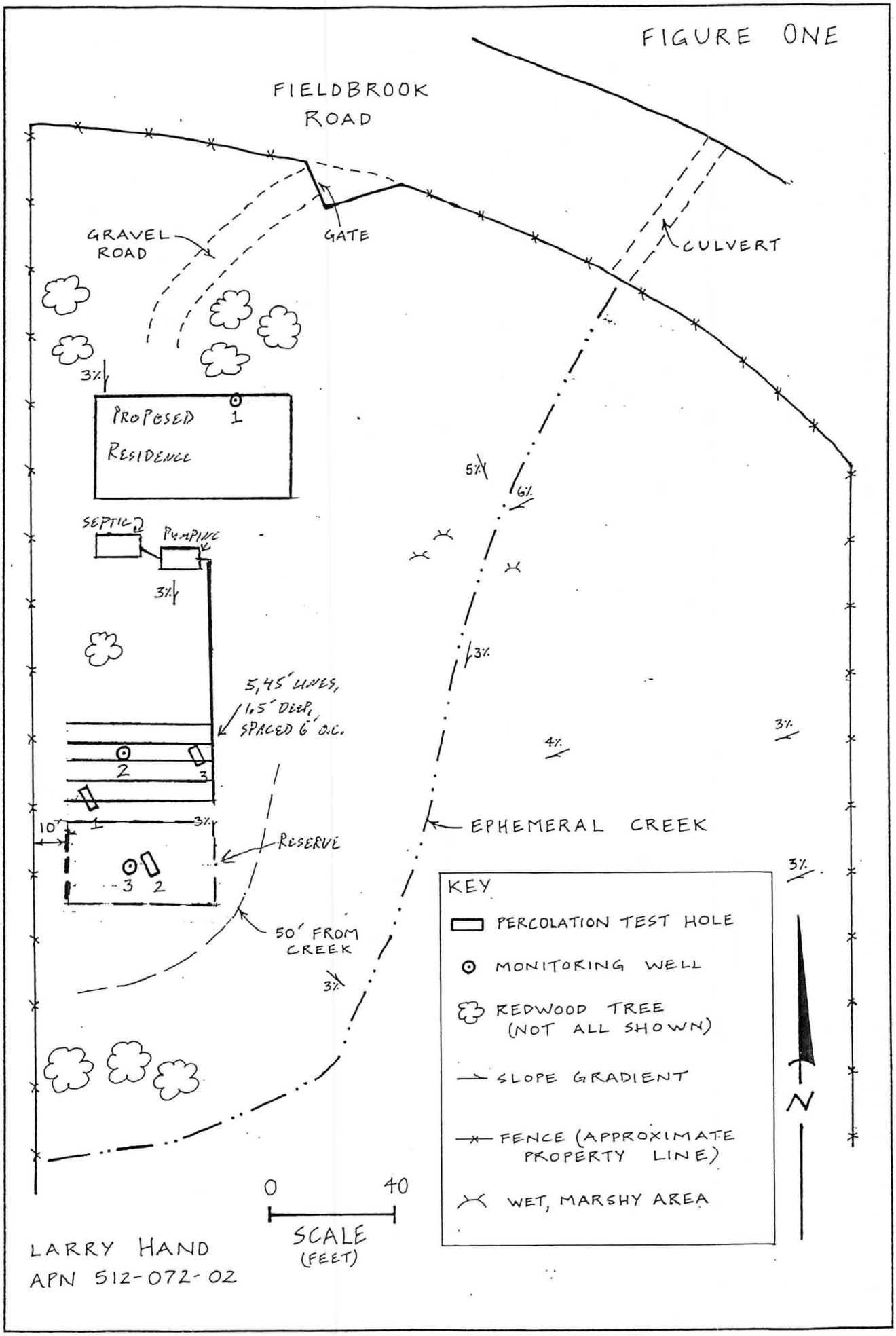
Sincerely,

Mark Verhey, Registered Geologist
R.G. 6,729 Expires ~~1/31/01~~ 1/31/21 MV

References Cited

Cogger , C., Carlile, B., Osborne, D, 1982. Design and installation of low-pressure pipe waste treatment systems, North Carolina State Univ., UNC Sea Grant Publication UNC-SG-82-03, 31 pp.

FIGURE ONE



LARRY HAND
APN 512-072-02

SOIL LOG

APPENDIX I

Job Name Larry Hand
Equipment hand auger

Date 6-Dec-98

Log No. 2
By MV

Laboratory Data					
% coarse frag's	% sand/clay/silt	% water	dry density (gm/cc)	depth (feet)	**USDA Soil Classification** texture, consistency, moisture, color, symbol misc: structure, roots, pores, clay films
				1	Loam, very friable, damp, black, (L). moderate medium granular structure, many fine roots, few medium roots.
2%	24.5/36.6/38.9	22.3	1.55	2	Clay Loam, medium stiff, damp, dark yellowish brown and grey with few distinct mottles, (CL). moderate medium subangular blocky, few medium roots,
				3	
				4	Clay Loam, medium stiff, damp, dark yellowish brown and grey with many distinct mottles, (CL). moderate medium subangular blocky
				5	
				6	
				7	Sandy Clay Loam, medium stiff, damp, dark yellowish brown and grey with many distinct mottles, (SCL).
				8	becomes gravelly
				9	Bottom of hole, refusal on rock (9.0 ft).
				10	

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SOIL LOG

APPENDIX I

Job Name Larry Hand
Equipment hand auger

Date 6-Dec-98

Log No. 3
By MV

Laboratory Data					
% coarse frag's	% sand/clay/silt	% water	dry density (gm/cc)	depth (feet)	**USDA Soil Classification** texture, consistency, moisture, color, symbol misc: structure, roots, pores, clay films
				-	
				-	Loam, very friable, damp, black, (L).
				-	moderate medium granular structure, many fine roots, few
				1	medium roots.
				-	
				-	
				-	
3%	26.4/35.1/38.5	25.4	1.47	2	Clay Loam, medium stiff, damp, dark yellowish brown and grey with
				-	few faint mottles, (CL).
				-	moderate medium subangular blocky, few medium roots,
				-	
				3	
				-	
				-	
				-	Sandy Clay Loam, medium stiff, damp, dark yellowish brown and grey
				4	with few distinct mottles, (SCL).
				-	moderate medium subangular blocky
				-	
				-	becomes many distinct mottles
				5	
				-	
				-	
				-	
				6	
				-	
				-	
				-	
				7	
				-	
				-	
				-	
				8	
				-	
				-	Bottom of hole in same (8.7 ft)
				-	
				9	
				-	
				-	
				-	
				10	

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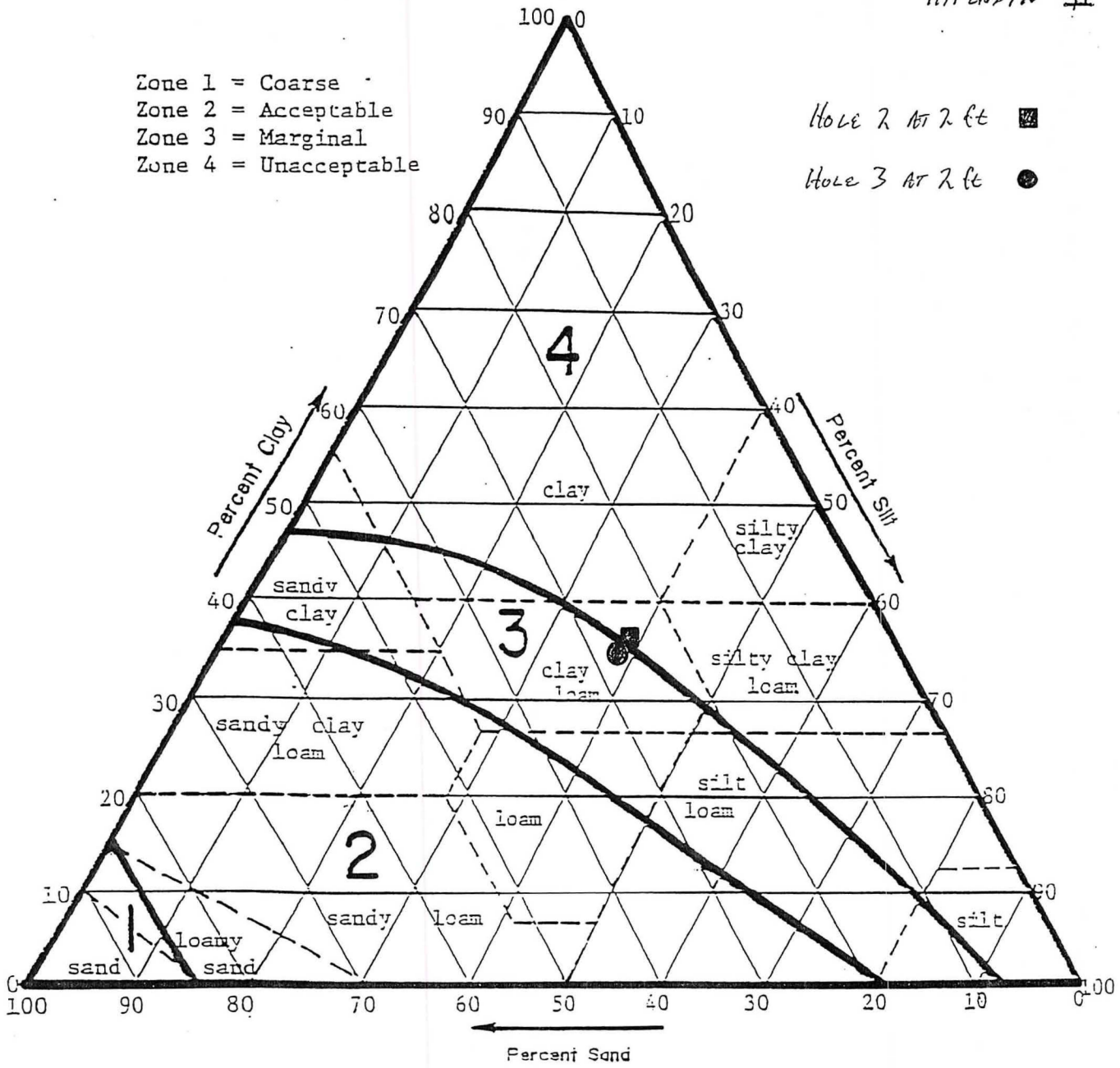
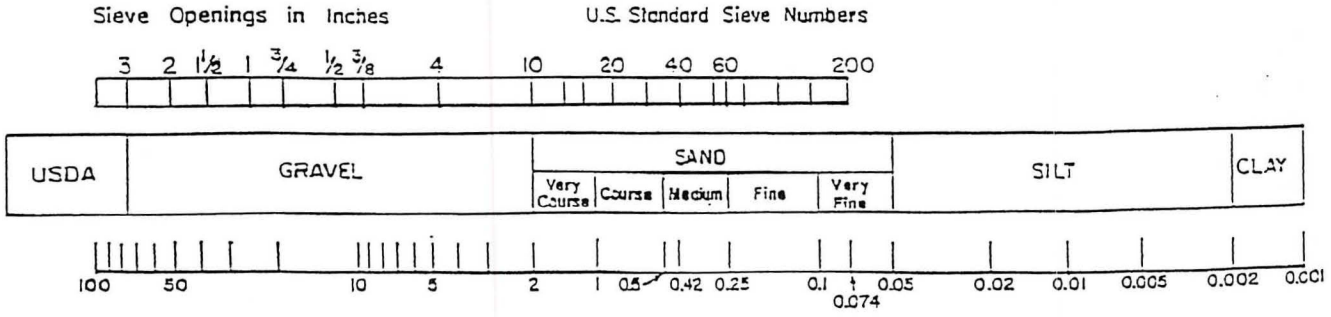
SOIL PERCOLATION SUITABILITY CHART

APPENDIX II





1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk density greater than 1.7 g/cc.

APPENDIX III

Percolation Test Data

Job Name Larry Hand
Location Fieldbrook
APN 502-072-02
Testing Period Wet Weather
Water Supply Community

Test No. 1

Date: 30-Jan-99
By: MV

Hole Data		
depth	method	size
0 -18 in	hand tools	12 in diam

Presoak Data		
Start time and date	9:00	30-Jan-99
End time and date	10:24	30-Jan-99

Test Data	time	elapsed time (min.)	drop (in.)
start	10:24		
read	10:39	15	3/4
	10:40		
	10:55	15	3/4
	10:56		
	11:11	15	3/4
	11:11		
	11:26	15	5/8
	11:26		
	11:41	15	5/8
	11:41		
	11:56	15	5/8
	11:56		
	12:11	15	5/8

STABILIZED PERCOLATION RATE = 24 minutes/inch

Note: See Appendix I for soil log.

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APPENDIX III

Percolation Test Data

Job Name Larry Hand
Location Fieldbrook
APN 502-072-02
Testing Period Wet Weather
Water Supply Community

Test No. 2

Date: 30-Jan-99
By: MV

Hole Data		
depth	method	size
0 -18 in	hand tools	12 in diam

Presoak Data		
Start time and date	9:00	30-Jan-99
End time and date	10:24	30-Jan-99

Test Data	time	elapsed time (min.)	drop (in.)
start	10:22		
read	10:37	15	1 3/4
	10:38		
	10:53	15	1 1/2
	10:54		
	11:09	15	1 1/3
	11:09		
	11:24	15	1 1/2
	11:24		
	11:39	15	1 1/2
	11:39		
	11:54	15	1 1/3
	11:54		
	12:09	15	1
	12:09		
	12:24	15	1

STABILIZED PERCOLATION RATE = 15 minutes/inch

Note: See Appendix I for soil log.

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APPENDIX III

Percolation Test Data

Job Name Larry Hand
Location Fieldbrook
APN 502-072-02
Testing Period Wet Weather
Water Supply Community

Test No. 3

Date: 30-Jan-99
By: MV

Hole Data		
depth	method	size
0 -18 in	hand tools	12 in diam

Presoak Data		
Start time and date	9:00	30-Jan-99
End time and date	10:24	30-Jan-99

Test Data

	time	elapsed time (min.)	drop (in.)
start	10:23		
read	10:38	15	1 3/4
	10:39		
	10:54	15	1 3/4
	10:55		
	11:10	15	1 5/8
	11:10		
	11:25	15	1 1/2
	11:25		
	11:40	15	1 1/2
	11:40		
	11:55	15	1 1/4
	11:55		
	12:10	15	1 1/4
	12:10		
	12:25	15	1 1/4

STABILIZED PERCOLATION RATE = 12 minutes/inch

Note: See Appendix I for soil log.

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Groundwater Monitoring Data

Appendix IV

Hole#
2

Stickup Height
1.0 foot

Date	Reading from top of pipe (ft)	water depth below ground (ft)	24 hour Rainfall	Rainfall To Date
12/12/98	6.08	5.08	0.07	21.02
12/28/98	7.33	6.33	0.04	22.49
1/23/99	4.50	3.50	0.42	26.70
3/25/99	4.83	3.83	2.41	44.50
3/26/99	6.08	5.08	0.03	44.53
3/27/99	7.08	6.08	0.00	44.53
3/28/99	7.75	6.75	0.01	44.54
3/30/99	5.83	4.83	1.05	46.13
3/31/99	5.00	4.00	0.30	46.43
4/1/99	6.00	5.00	0.02	46.45
4/2/99	6.67	5.67	0.09	46.54
4/3/99	7.17	6.17	0.07	46.61
4/4/99	7.83	6.83	0.01	46.62
4/5/99	7.17	6.17	0.34	46.96
4/6/99	7.50	6.50	0.00	46.96
4/7/99	7.75	6.75	0.28	47.24
4/8/99	6.92	5.92	0.47	47.71
4/9/99	6.92	5.92	0.07	47.78
4/11/99	6.92	5.92	0.43	48.21
4/12/99	7.67	6.67	0.00	48.21
4/13/99	9.17	8.17	0.00	48.21

Hole#
3

Stickup Height
1.3 feet

Date	Reading from top of pipe (ft)	water depth below ground (ft)	24 hour Rainfall	Rainfall To Date
12/12/98	7.25	5.95	0.07	21.02
12/28/98	8.00	6.70	0.04	22.49
1/23/99	4.80	3.50	0.42	26.70
3/25/99	5.33	4.03	2.41	44.50
3/26/99	5.33	4.03	0.03	44.53
3/27/99	6.67	5.37	0.00	44.53
3/28/99	7.50	6.20	0.01	44.54
3/30/99	7.75	6.45	1.05	46.13
3/31/99	6.25	4.95	0.30	46.43
4/1/99	5.25	3.95	0.02	46.45
4/2/99	6.67	5.37	0.09	46.54
4/3/99	7.25	5.95	0.07	46.61
4/4/99	7.75	6.45	0.01	46.62
4/5/99	8.00	6.70	0.34	46.96
4/6/99	7.67	6.37	0.00	46.96
4/7/99	7.17	5.87	0.28	47.24
4/8/99	8.00	6.70	0.47	47.71
4/9/99	7.00	5.70	0.07	47.78
4/11/99	7.17	5.87	0.43	48.21
4/12/99	7.17	5.87	0.00	48.21
4/13/99	7.92	6.62	0.00	48.21

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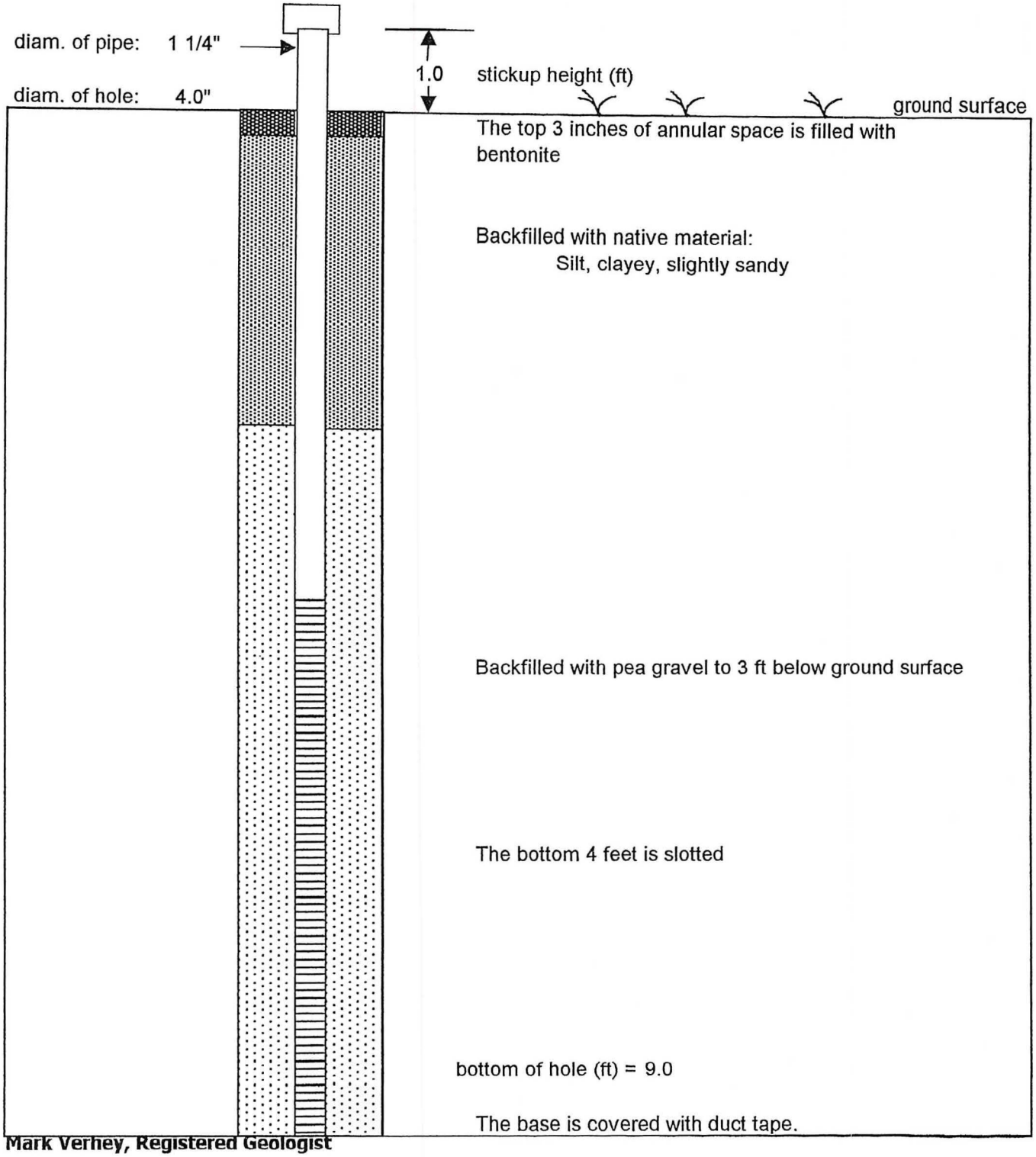
APPENDIX V

Groundwater Monitoring Well Installation Details

Job Name Larry Hand
Location Fieldbrook
APN 502-072-02

Hole # 2
Installed By MAV
Length Scored bottom 4 ft
Total length of Pipe (ft) 10
Stickup Height (ft) 1.0



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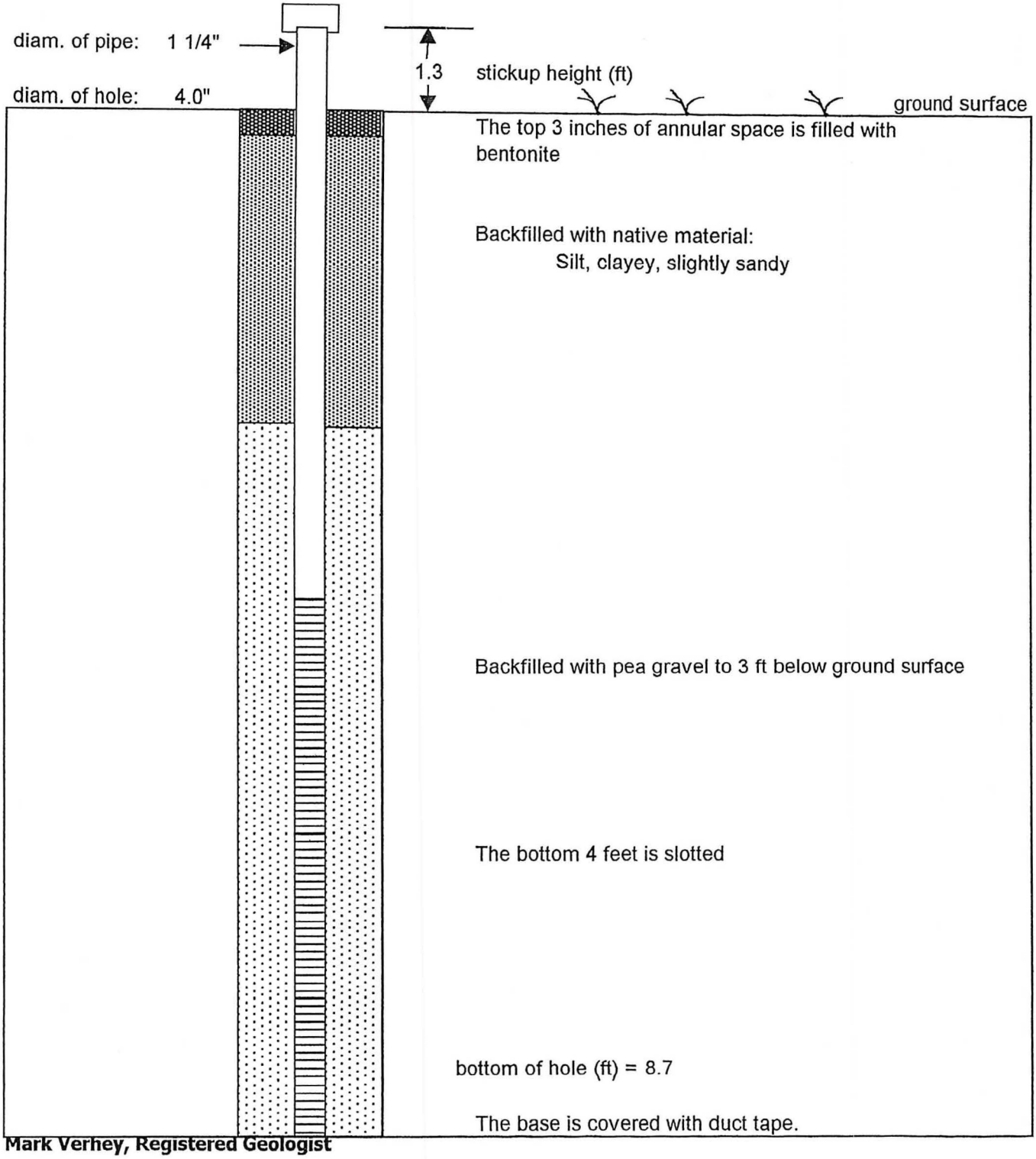
Groundwater Monitoring Well Installation Details

Job Name Larry Hand
Location Fieldbrook
APN 502-072-02

Hole # 3
Installed By MAV
Length Scored bottom 4 ft
Total length of Pipe (ft) 10
Stickup Height (ft) 1.3



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Calculation of Minimum Length of Leachfield Trench

APPENDIX VI

Design Data

Estimated Daily Sewage Flow: 450 gallons per day (3 BR residence)
Texture: Clay Loam (Appendix II)
Results of Percolation Testing: 24 minutes per inch (mpi)
Depth to High Groundwater: 3.5 ft (see Appendix III)

Design Details

A) Loading Rate

Use a loading rate of 0.4 gallons per day per square foot (gpd/sq ft)

B) Total length of distribution line = daily sewage flow / loading rate / 5 Use 5, 45 foot lines spaced 6 foot on center. This uses an area 45' x 24'.

Use a line spacing of 6 foot on center

= 450 / 0.4 / 5 = **225** feet

C) Distribution Network

The pressure head at the terminal end of the line should be 3 feet. Pressure head should be regulated by a dedicated ball or gate valve(s) approved for sewage transmission. Holes should be drilled 5/32" diameter placed at 3 intervals. No holes should be closer than 2' from the terminal end of the line. This spacing and recommended line length allows for 14 holes per line. With 3 feet of head and a 5/32" diameter hole, the flow rate is 0.5 gallons per minute per hole (gpm/hole). With 14 holes per line, 0.5 gpm/hole, and 5 lines, the system flow rate is **35 gpm**

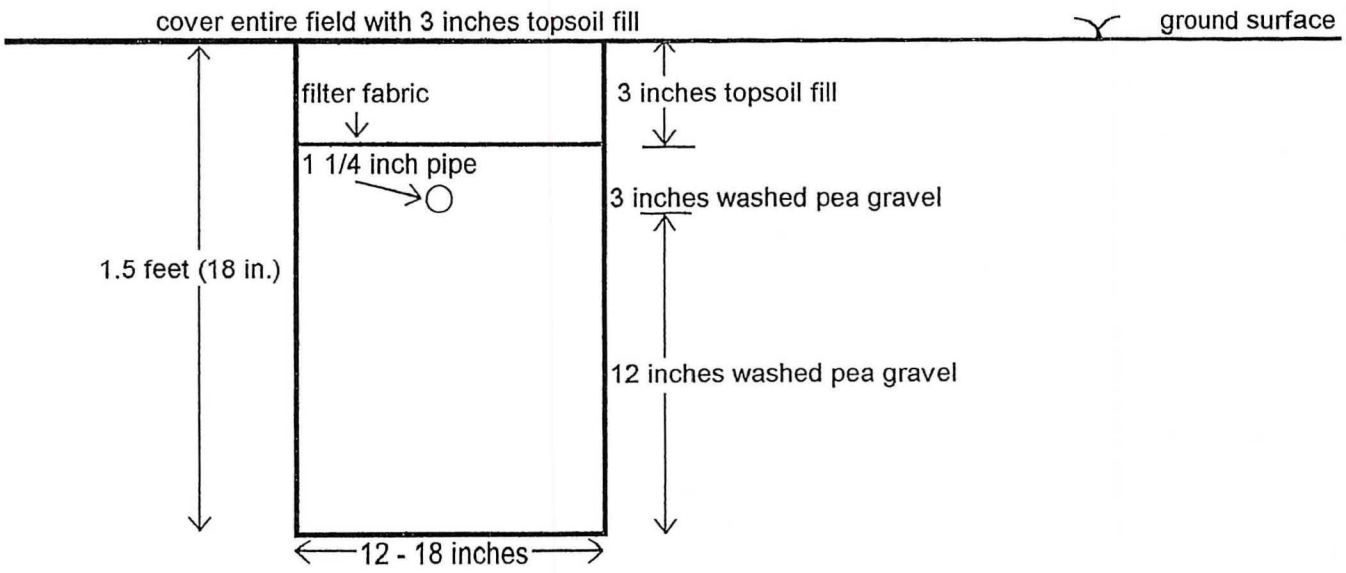
D) Pump Selection and Recommended Dosing Volume

The pump must have enough power to pump effluent at the calculated flow rate against the total head (resistance) encountered in the distribution system. A 1/2 horse power pump will be adequate. The on/off float switches should be set to supply 80 gallons per dose.

TYPICAL TRENCH DETAIL

Width: 12-18 inches
Depth: 1.5 feet
Slope: max. of 1.5 inches per 50 feet

Rock under pipe: 12 inches of washed pea gravel
Rock over pipe: 2 inches of washed pea gravel
Material over rock: filter fabric
Material over fabric: topsoil fill



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Specifications

Orenco Systems®
Incorporated

814 AIRWAY AVENUE

SUTHERLIN, OREGON

97479-9012

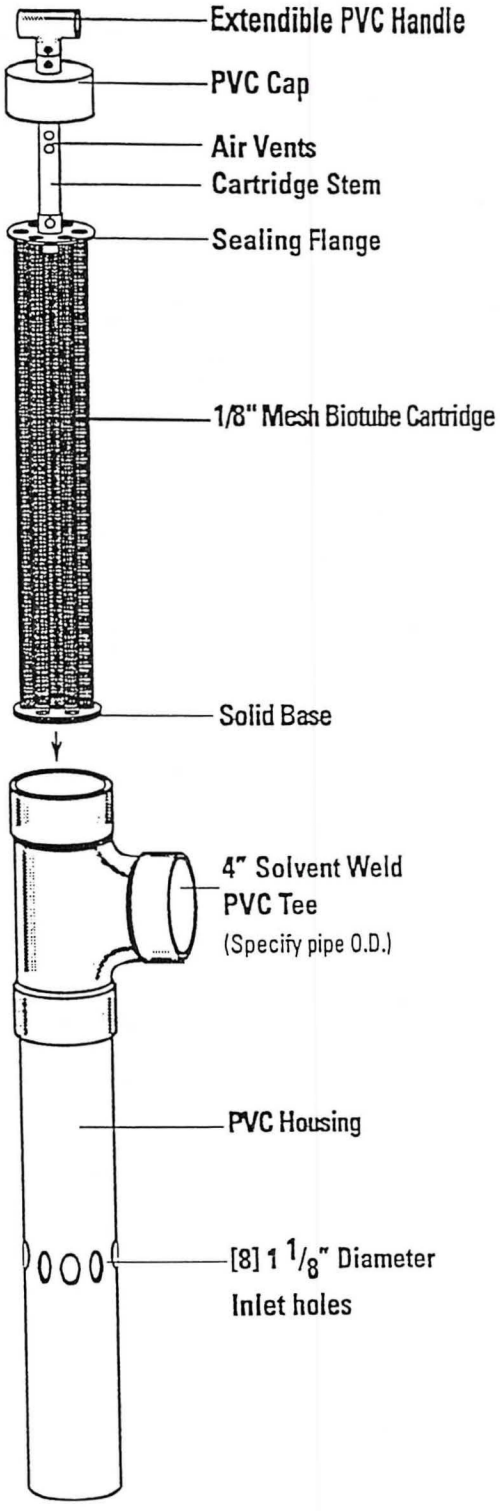
TELEPHONE:

(541) 459-4449

FACSIMILE:

(541) 459-2884

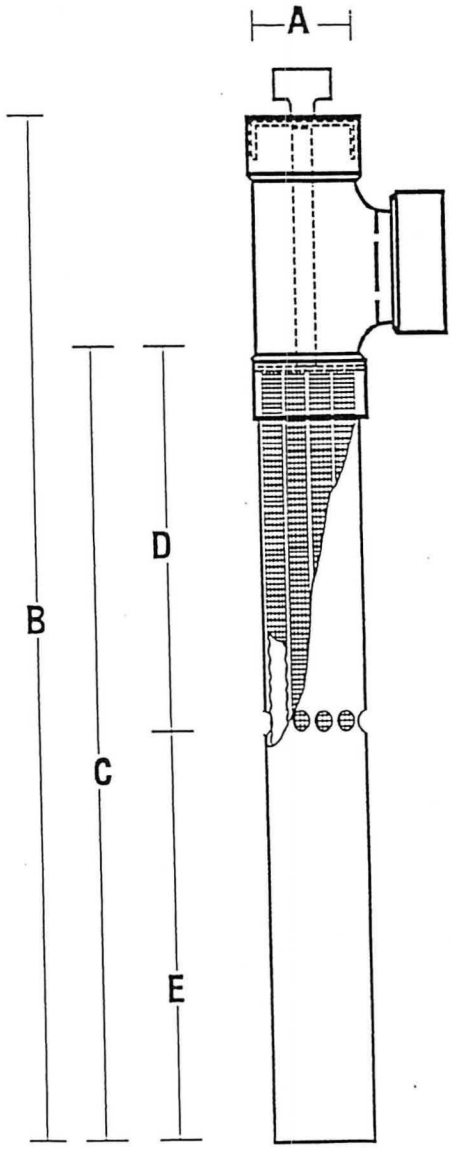
OSI Biotube® Effluent Filter



Dimensions

Model		FTO444-36	FTO436-28
A	Nominal Diameter	4"	4"
B	Vault Height	44"	36"
C	Invert Height	38"	30"
D	Invert to Inlet Height	16"	11"
E	Inlet Hole Height	22"	19"
F	Filter Area (ft^2)	5.3	4.1

Custom sizes available. Call for assistance.



Revision 8/14/96
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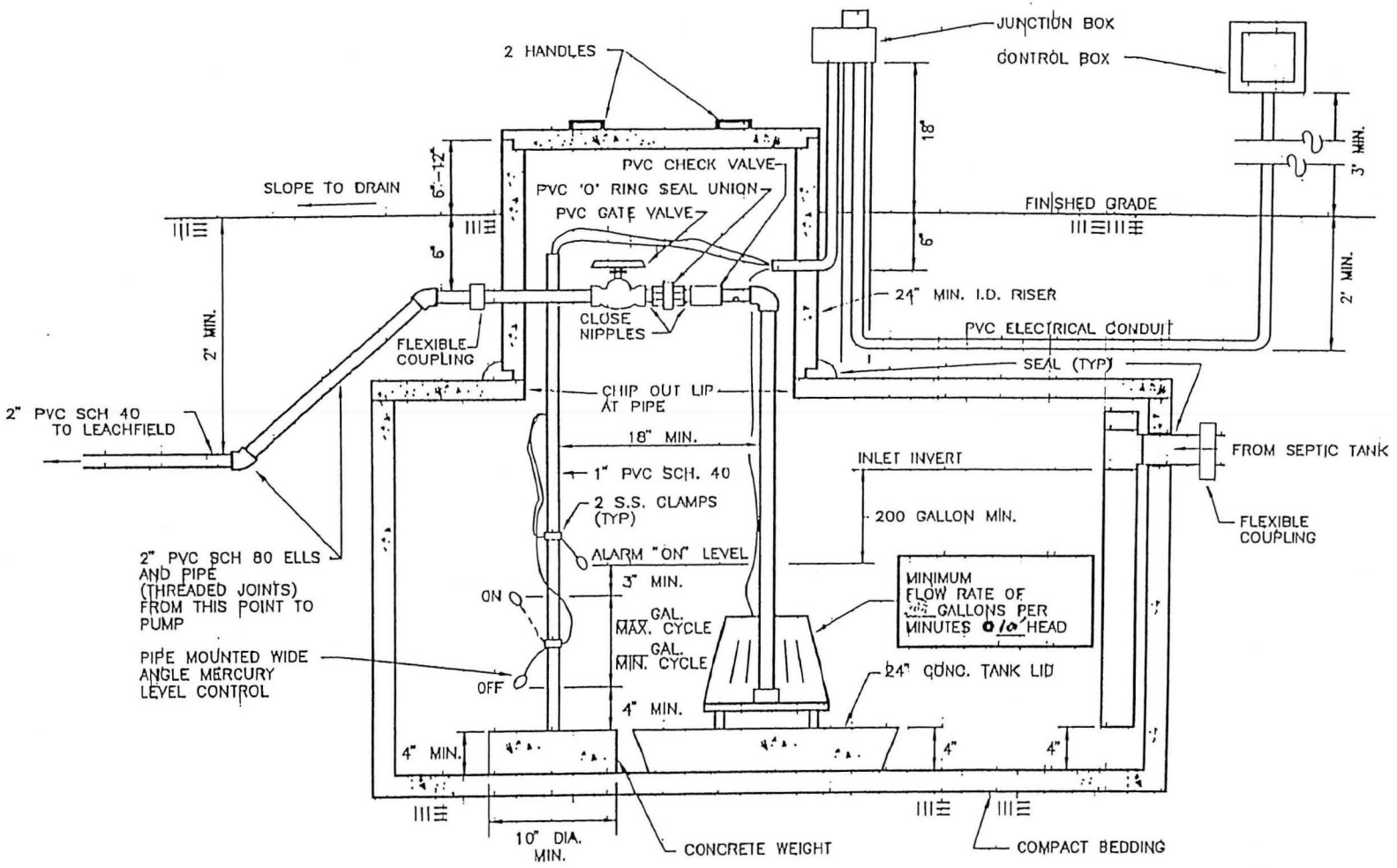
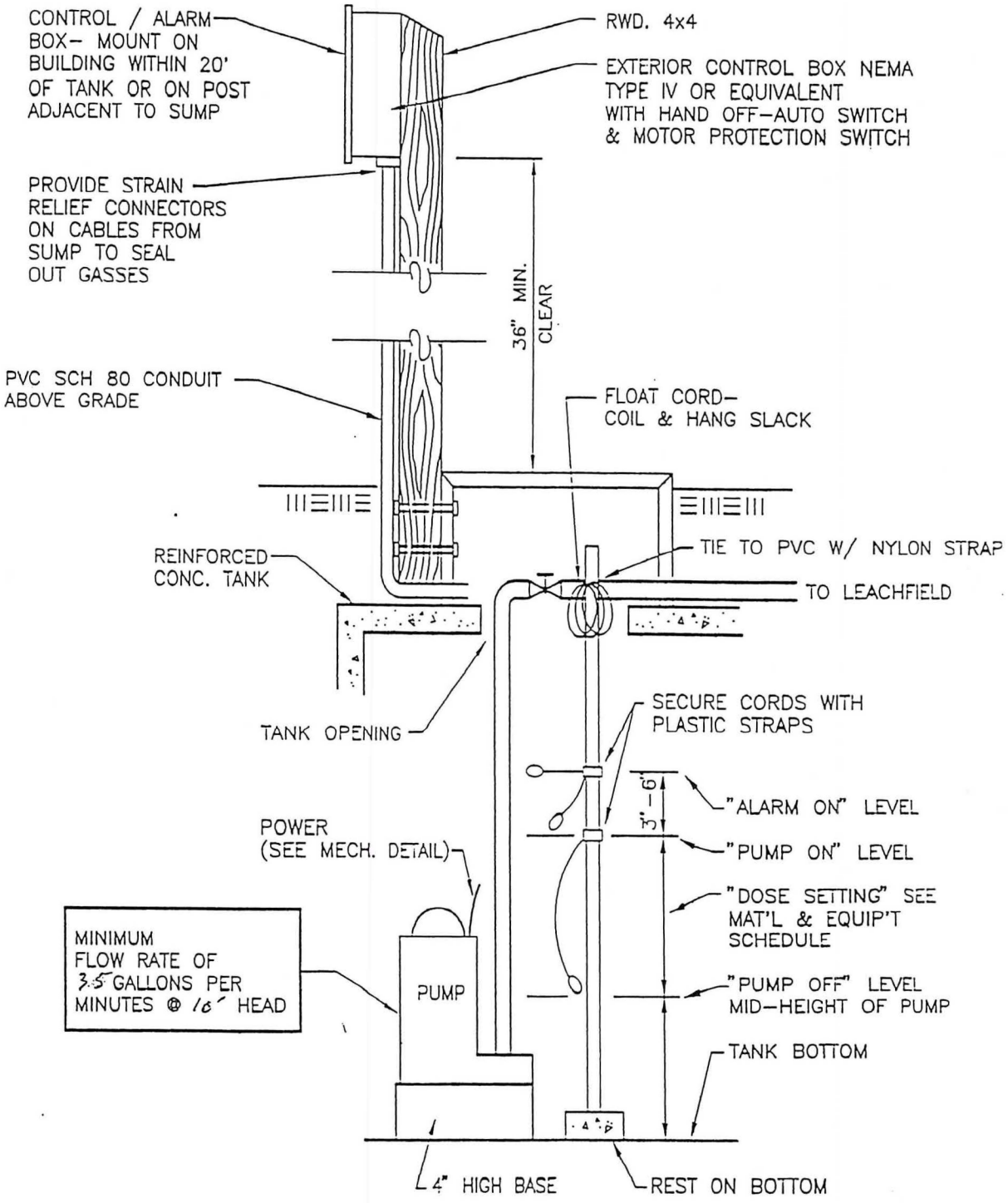
Covered by U.S. Method of Use Patent Nos. 4439323 and 5492635



SUMP / PUMP

N.T.S.

C
2



CONTROL / ALARM

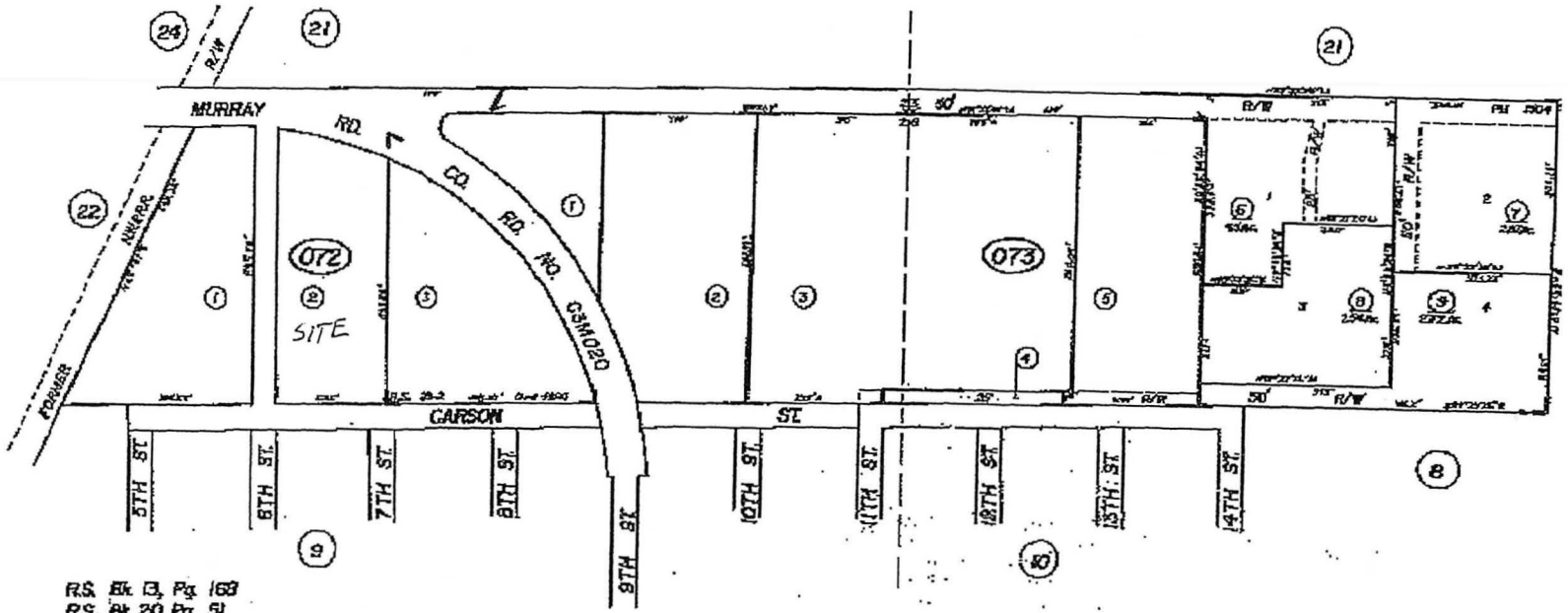
N.T.S.

B
2

POR. SEC. 26, T7N, R1E, H.B.&M.

512-07

NOTES ON TOWN OF FIELDBOOK:
- RECORDED DATA IS CONTAINED IN R.S. BK. 3, PGS. 63 & 64 AN AMENDED MAP (HERRICK'S SURVEY NO. 1231) SHOWS ADDITIONAL TRACTS & STREETS. THIS MAP WAS NOT RECORDED.
- STREETS HAVE BEEN ABANDONED, SUPERVISOR'S MINUTES BK."M", PG. 389 & BK."O", PG. 3, WITH REFERENCE TO BOTH RECORDED & UN-RECORDED SURVEYS.
- 6TH, 8TH, 7TH, 8TH, 10TH, 12TH, 13TH STS. ARE NOT OPEN ON GROUND



R.S. Bk. 13, Pg. 169
R.S. Bk. 20, Pg. 51
R.S. Bk. 28, Pg. 2
R.S. Bk. 30, Pg. 12
R.S. Bk. 29, Pg. 63.
P.M. No. 1304 of P.M. Bk. 11, Pg. 104

Assessor's Maps Bk. 512 – Pg. 07
County of Humboldt, Calif.