Subsurface Sewage Treatment System Management Plan

Property Owner: Kevin Seefeldt, Jennifer Boyes Phone: 763-670-1044 Date: 7-10-2019
Mailing Address: 26224 115th Lane City: Isle Zip: 56342
Site Address: 26224 115th Lane City: Isle Zip: 56342

This management plan will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic service provider or maintenance provider.

System Designer: Recommends SSTS check every 36 months.
Local Government: Recommends SSTS check every 36 months.
State Requirement: Requires SSTS check every 36 months.
(State requirements are based on MN Rules Chapter 7080.2450, Subp. 2 & 3)

My System needs to be checked every 36 months.

Homeowner Management Tasks:

Leaks – Check (look, listen) for leaks in toilets and dripping faucets. Repair leaks promptly.
Surfacing sewage – Regularly check for wet or spongy soil around your soil treatment area.
Effluent filter – Inspect and clean twice a year or more.
Alarms – Alarm signals when there is a problem. Contact a service or maintenance provider any time an alarm signals.
Event counter or water meter – Record your water use.
-recommend meter readings be conducted (*circle one: DAILY WEEKLY MONTHLY N/A)*

Licensed septic service provider or maintenance provider (Check all that apply):

- ☐ Check to make sure tank is not leaking
- ☐ Check and clean the in-tank effluent filter (if exists)
- ☐ Check the sludge/scum layer levels in all septic tanks
- ☐ Recommend if tank should be pumped
- ☐ Check inlet and outlet baffles
- ☐ Check the drainfield effluent levels in the rock layer
- ☐ Check the pump and alarm system functions
- ☐ Check wiring for corrosion and function
- ☐ Check dissolved oxygen and effluent temperature in tank
- ☐ Provide homeowner with list of results and any action to be taken
- ☐ Flush and clean laterals if cleanouts exist

"I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in the Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Property Owner Signature: [signature] Date: 7-10-2019

Designer Signature: [signature] Date: 7/10/2019

See Reverse Side for Management Log

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 6/15/2019, FIELD EVALUATION DATE 7/10/2019
PROPERTY OWNER: Kevin Seefeldt & Jennifer PHONE 763-670-1044
ADDRESS: 26224 115th LN CITY,STATE,ZIP: Isle MN. 56342
LEGAL DESCRIPTION:
PIN# 13-1-069500 / 13-1-070200 SEC 29 T43 R24 TWP NAME IOWA
FIRE# — LAKE/RIVER — LAKE CLASS — OHWL — FT

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES NO X	YES NO
COMPACTED AREAS	YES NO X	YES NO
FLOODING	YES NO X	YES NO
RUN ON POTENTIAL	YES NO X	YES NO
SLOPE %	2	
DIRECTION OF SLOPE	North	
LANDSCAPE POSITION	Side Slope	
VEGETATION TYPES	Lawn Grass	

REFERENCE BM ELEV. 100 F
REFERENCE BM DESCRIPTION
Bottom of Siding

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 12, 1A 15, 2 ____, 2A ____

BOTTOM ELEVATION-FIRST TRENCH OR BOTTOM OF ROCK BED: #1 +2 FT., #2 ____ FT.

SOIL SIZING FACTOR: SITE #1 1.67, SITE #2 ____

CONSTRUCTION RELATED ISSUES: None

LIC# L2006 SITE EVALUATOR SIGNATURE: Dave Engdahl

SITE EVALUATOR NAME: Dave Engdahl TELEPHONE# 592-3606

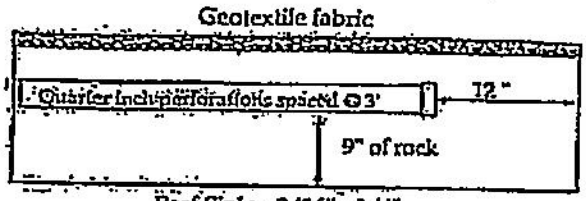
LUG REVIEW ____ DATE ____

Comments:

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

PRESSURE DISTRIBUTION SYSTEM



Perf Sizing 3/16" - 1/4"
Perf Spacing 1.5'-5'

1. Select number of perforated laterals 3

2. Select perforation spacing = 3 ft

3. Since perforations should not be placed closer than 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length.

   50 (rock layer length) - 2 ft = 48 ft

4. Determine the number of spaces between perforations. Divide the length (3) by perforation spacing (2) and round down to nearest whole number.

   Perforation spacing = 48 ft ÷ 3 ft = 16 spaces

5. Number of perforations is equal to one plus the number of perforation spaces(4). *Check figure E-4 to assure the number of perforations per lateral guarantees <10% discharge variation.*

   16 spaces + 1 = 17 perforations/lateral

6. A. Total number of perforations = perforations per lateral (5) times number of laterals (1)

   17 perfs/lat x 3 lat = 51 perforations

   B. Calculate the square footage per perforation.
   Should be 6-10 sqft/perf. *Does not apply to at-grades.*
   Rock bed area = rock width (ft) x rock length (ft)
   10 ft x 50 ft = 500 sqft
   Square foot per perforation = Rock bed area ÷ number of perfs (6)
   500 sqft ÷ 51 perfs = 9.8 sqft/perf

7. Determine required flow rate by multiplying the total number of perforations (6A) by flow per perforation *(see figure E-6)*

   51 perfs x .74 gpm/perfs = 37.74 gpm

8. If laterals are connected to header pipe as shown on upper example, to select minimum required lateral diameter; enter figure E-4 with perforation spacing (2) and number of perforations per lateral (5) Select minimum diameter for perforated lateral = 1½ inches.

9. If perforated lateral system is attached to manifold pipe near the center, lower diagram, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral = _____ inches.

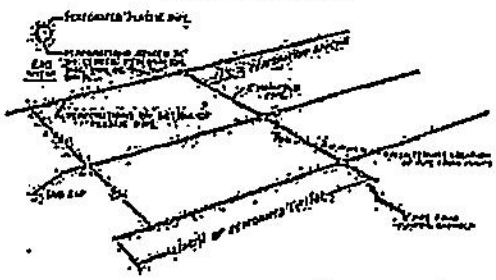
E-4: Maximum allowable number of 1/4-inch perforations per lateral to guarantee <10% discharge variation.

perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	6	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

head (feet)	perforation diameter (inches) 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.42	0.56	0.74
2.0[b]	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

[a] Use 1.0 foot for single-family homes.
[b] Use 2.0 foot for anything else.



I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Bruce Eglehl (Signature) 62006 (license #) 7/12/2019 (date)

MOUND DESIGN WORK SHEET (For Flows up to 1200 gpd)

A. Average Design FLOW

Estimated 600 gpd *(see figure A-1)*
or measured _____ x 1.5 (safety *factor*) = _____ gpd

A-1: Estimated Sewage Flows in Gallons per Day

number of bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60%
3	450	300	218	of the
4	600	375	256	values
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II, or III
8	1200	675	408	columns.

B. SEPTIC TANK Capacity

1000 gallons *(see figure C-1)*

C-1: Septic Tank Capacities (in gallons)

Number of Bedrooms	Minimum Liquid Capacity	Liquid capacity with garbage disposal	Liquid capacity with disposall & filt inside
2 or less	750	1125	1500
3 or 4	1000	1500	2000
5 or 6	1500	2250	3000
7, 8 or 9	2000	3000	4000

C. SOILS *(refer to site evaluation)*

1. Depth to restricting layer = 1 feet
2. Depth of percolation tests = — feet
3. Texture Loam
   Percolation rate 16-30 mpi
4. Soil loading rate .10 gpd/sqft *(see figure D-33)*
5. Percent land slope 2 %

D. ROCK LAYER DIMENSIONS

1. Multiply average design flow (A) by 0.83 to obtain required rock layer area.
   608 gpd x 0.83 sqft/gpd = 459 sqft
2. Determine rock layer width = 0.83 sqft/gpd x linear Loading Rate (LLR)
   0.83 sqft/gpd x 12 gpd/sqft = 10 ft
3. Length of rock layer = area ÷ width =
   500 sqft (D1) ÷ 10 ft (D2) = 50 ft

Mound LLR	
< 120 MPI	≤12
≥ 120 MPI	≤6

E. ROCK VOLUME

1. Multiply rock area (D1) by rock depth of 1 ft to get cubic feet of rock
   500 sqft x 1 ft = 500 cuft
2. Divide cuft by 27 cuft/cuyd to get cubic yards
   500 cuft ÷ 27 cuyd/cuft = 18.5 cuyd
3. Multiply cubic yards by 1.4 to get weight of rock in tons
   18.5 cuyd x 1.4 ton/cuyd = 26 tons

F. SEWAGE ABSORPTION WIDTH

Absorption width equals absorption ratio (See Figure D-33) times rock layer width (D2)

10 x 2 ft = 20 ft

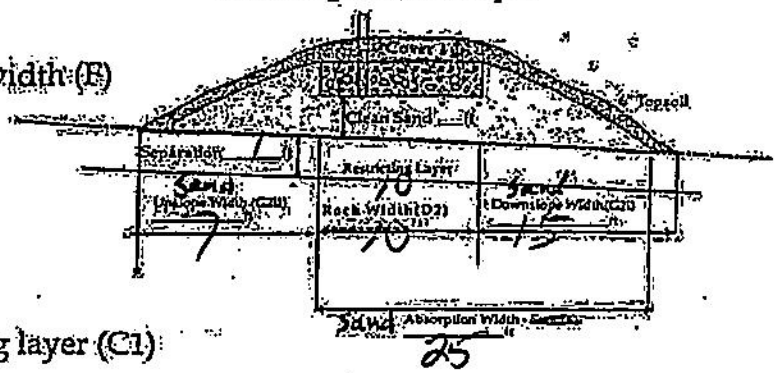
D-33: Absorption Width Sizing Table

Percolation Rate in Minutes per Inch (MPI)	Soil Texture	Loading Rate Gallons per day per square foot	Absorption Ratio
Faster than 5	Coarse Sand, Medium Sand, Loamy Sand, Fine Sand	1.20	1.00
6 to 15	Sandy Loam	0.72	1.67
16 to 30	Loam	0.60	2.00
31 to 45	Silt Loam, Silt	0.50	2.40
46 to 60	Sandy Clay Loam, Silty Clay Loam, Clay Loam	0.45	2.67
61 to 120	Silty Clay, Sandy Clay, Clay	0.24	5.00
Slower than 120*			

*Systems should not be used where percolation rates are slower than 120 MPI

G. MOUND SLOPE WIDTH & LENGTH
(landslope greater than 1%)

Landslope > 1% slope



1. Downslope absorption width = absorption width (E) minus rock layer width (D2)
20 ft - 10 ft = 10 ft

2. Calculate mound size

UPSLOPE

a. Depth of clean sand fill at upslope edge of rock layer = 3 ft minus the distance to restricting layer (C1)
3 ft - 1 ft = 2 ft

b. Mound height at the upslope edge of rock layer = depth of clean sand for separation (G2a) at upslope edge plus depth of rock layer (1 ft) plus depth of cover (1 ft)
2 ft + 1ft + 1ft = 4.0 ft

c. Upslope berm multiplier based on land slope
3.85 (see figure D-34)

d. Upslope width = berm multiplier (G2c) x upslope mound height (G2b):
4 x 3.85 ft = 15.4 ft

D-34: SLOPE MULTIPLIER TABLE

Land Slope in %	UPSLOPE multipliers for various slope ratios						DOWNSLOPE multipliers for various slope ratios				
	3:1	4:1	5:1	6:1	7:1	8:1	3:1	4:1	5:1	6:1	7:1
0	3.0	4.0	5.0	6.0	7.0	8.0	3.0	4.0	5.0	6.0	7.0
1	2.91	3.85	4.76	5.66	6.54	7.41	3.09	4.17	5.26	6.38	7.53
2	2.83	3.70	4.54	5.36	6.14	6.90	3.19	4.35	5.56	6.82	8.16
3	2.75	3.57	4.35	5.08	5.79	6.45	3.30	4.54	5.88	7.32	8.86
4	2.68	3.45	4.17	4.84	5.46	6.06	3.41	4.76	6.25	7.89	9.72
5	2.61	3.33	4.00	4.62	5.19	5.71	3.53	5.00	6.67	8.57	10.77
6	2.54	3.23	3.85	4.41	4.93	5.41	3.65	5.26	7.14	9.38	12.07
7	2.48	3.12	3.70	4.23	4.70	5.13	3.80	5.56	7.69	10.34	13.73
8	2.42	3.03	3.57	4.05	4.49	4.88	3.95	5.88	8.33	11.54	15.91
9	2.36	2.94	3.45	3.90	4.30	4.65	4.11	6.25	9.09	13.04	18.52
10	2.31	2.86	3.33	3.75	4.12	4.44	4.29	6.67	10.00	15.00	23.33
11	2.26	2.78	3.23	3.61	3.95	4.26	4.48	7.14	11.11	17.65	30.43
12	2.21	2.70	3.12	3.49	3.80	4.08	4.69	7.69	12.50	21.43	43.75

e. Drop in elevation = rock layer width (D2) x percent landslope (C5) ÷ 100
4 ft x 2 % ÷ 100 = .2 ft

f. Downslope mound height = depth of clean sand for slope difference (G2e) at downslope rock edge plus the mound height at the upslope edge of rock layer (G2b)
4.0 ft + .2 ft = 4.2 ft

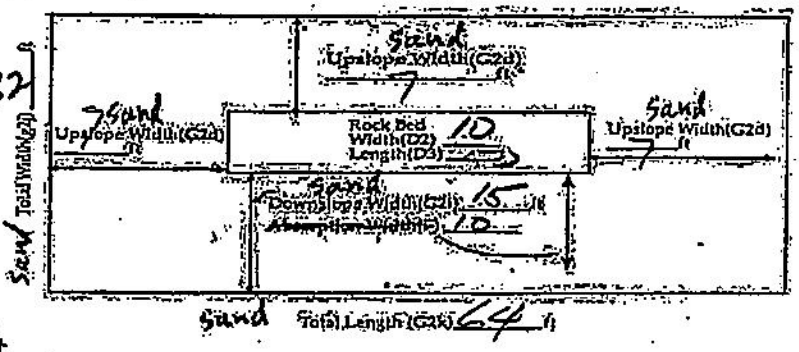
g. Downslope berm multiplier based on percent land slc
4.17 (see figure D-34)

h. Downslope width = downslope multiplier (G2g) times downslope mound height (G2f)
4.17 x 4.2 ft = 17.5 ft

i. Select the greater of G1 and G2h as the downslope width: 17.5 ft

j. Total mound width is the sum of upslope width (G2d) width plus rock layer width (D2) plus downslope width (G2i)
15.4 ft + 10 ft + 17.5 ft = 42.9 ft

k. Total mound length is the sum of upslope width (G2d) plus rock layer length (D3) plus upslope width (G2d)
15.4 ft + 50 ft + 15.4 ft = 81 feet



Final Dimensions:
32 x 64

I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Bruce E Jett (signature) L2006 (license #) 7/12/2019 (date)

PUMP SELECTION PROCEDURE

1. Determine pump capacity:

A. Gravity distribution

1. Minimum required discharge is 10 gpm
2. Maximum suggested discharge is 45 gpm. For other establishments at least 10% greater than the water supply rate, but no faster than the rate at which effluent will flow out of the distribution device.

B. Pressure distribution

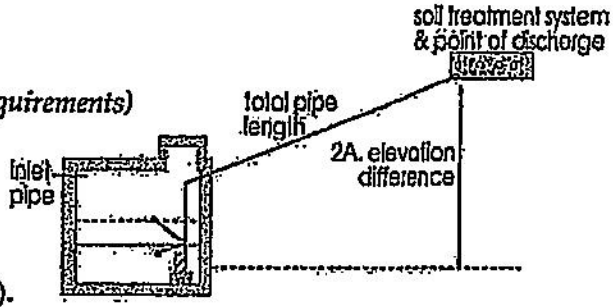
See pressure distribution work sheet

From A or B Selected pump capacity: 28.86 gpm

2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?
2.4 feet

B. Special head requirement? *(See Figure at right - Special Head Requirements)*
5.0 feet



Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

C. Calculate Friction loss

1. Select pipe diameter 2 in
2. Enter *Figure E-9* with gpm (1A or B) and pipe diameter (C1).
   Read friction loss in feet per 100 feet from Figure E-9
   Friction Loss = 1.55 ft/100ft of pipe
3. Determine total pipe length from pump discharge to soil treatment discharge point. Estimate by adding 25 percent to pipe length for fitting loss. Total pipe length times 1.25 = equivalent pipe length
   20 feet x 1.25 = 25 feet
4. Calculate total friction loss by multiplying friction loss (C2) in ft/100 ft by the equivalent pipe length (C3) and divide by 100.
   = 1.55 ft/100ft x 25 ÷100 = .4 ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)
2.4 ft + 5 ft + .4 ft =

Total head: 12.8 feet

E-9: Friction Loss in Plastic Pipe Per 100 feet			
	nominal pipe diameter		
flow rate gpm	1.5"	2"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.58	0.23
35	6.96	2.06	0.30
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.70
60		5.60	0.82
65		6.48	0.95
70		7.44	1.09

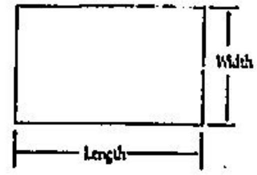
3. Pump selection

A pump must be selected to deliver at least 28.86 gpm (1A or B) with at least 12.8 feet of total head (2D)

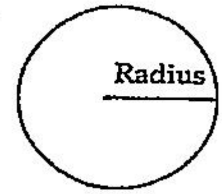
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Bruce Lyon (signature) L2806 (license #) 7/12/2019 (date)

DOSING CHAMBER SIZING



1. Determine area
   A. Rectangle area = L x W
   ______ x ______ = ______ square feet
   B. Circle area = π (3.14) x radius in feet x radius in feet
   3.14 x ______ ft x ______ ft = ______ sqft
   C. Get area from manufacturer ______ sqft



2. Calculate gallons per inch   Jacobs Specifications
   There are 7.5 gallons per cubic foot of volume, therefore multiply the area (1A, B or C) times the conversion factor and divide by 12 inches per foot to calculate gallon per inch.
   Area x 7.5 ÷ 12 = ______ sqft x 7.5 ÷ 12 in/ft = 15.86 gallon per inch

3. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom 42 in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
   = 42 in x 15.86 gal/in = 666 gal

Legal Tank: 500 gallons or 100% the Daily flow or Alternating Pumps

4. Calculate gallons to cover pump (with 2-3 inches of water covering pump)
   (Pump and block height (inch) + 2 inch) x gallon/inch
   (10 in + 2 in) x 15.86 gal/in = 190 gallon

A-1: Estimated Sewage Flows In Gallons per Day				
number of bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60%
3	450	300	218	of the
4	600	375	256	values
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II, or III
8	1200	675	408	columns.

5. Calculate total pumpout volume
   A. Select pump size for 4-5 does per day. Gallon per dose = gpd (see *figure A-1*) / doses per day = 600 gpd ÷ 5 doses/day = 120 gallons
   B. Calculate drainback
      1. Determine total pipe length, 20 feet
      2. Determine liquid volume of pipe, .17 gal per ft (*see figure E-20*)
      3. Drainback quantity = 20 ft (5B1) x .17 gal per ft (5B2) = 4 gal
   C. Total pump out volume = dose volume (5A) + drainback (5B3)
   120 gal + 4 gal = 124 Total gallon

E-20: Volume of Liquid in Pipe	
Pipe Diameter inches	Gallons per foot
1	0.045
1.25	0.078
1.5	0.11
2	0.17
2.5	0.25
3	0.38
4	0.66

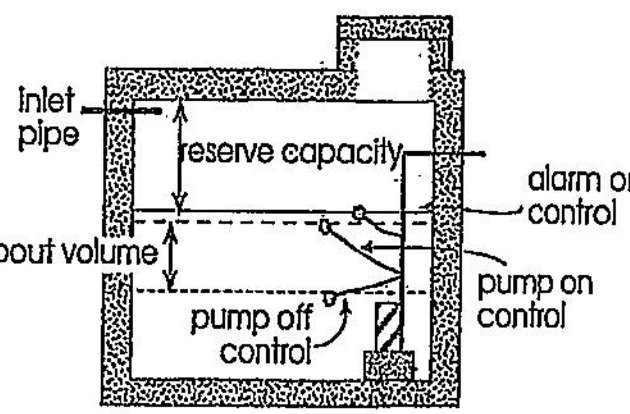
6. Float separation distance (using total pumpout volume)
   Total pumpout volume (5C) ÷ gal/inch (2)
   124 gal ÷ 15.86 gal/in = 7.8 inch

7. Calculate volume for alarm (typically 2 to 3 inches)
   Alarm depth (inch) x gallon/inch (2) = 2 in x 15.86 gal/in) = 32 gal

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   124 gal + 190 gal + 32 gal = 346 gallons

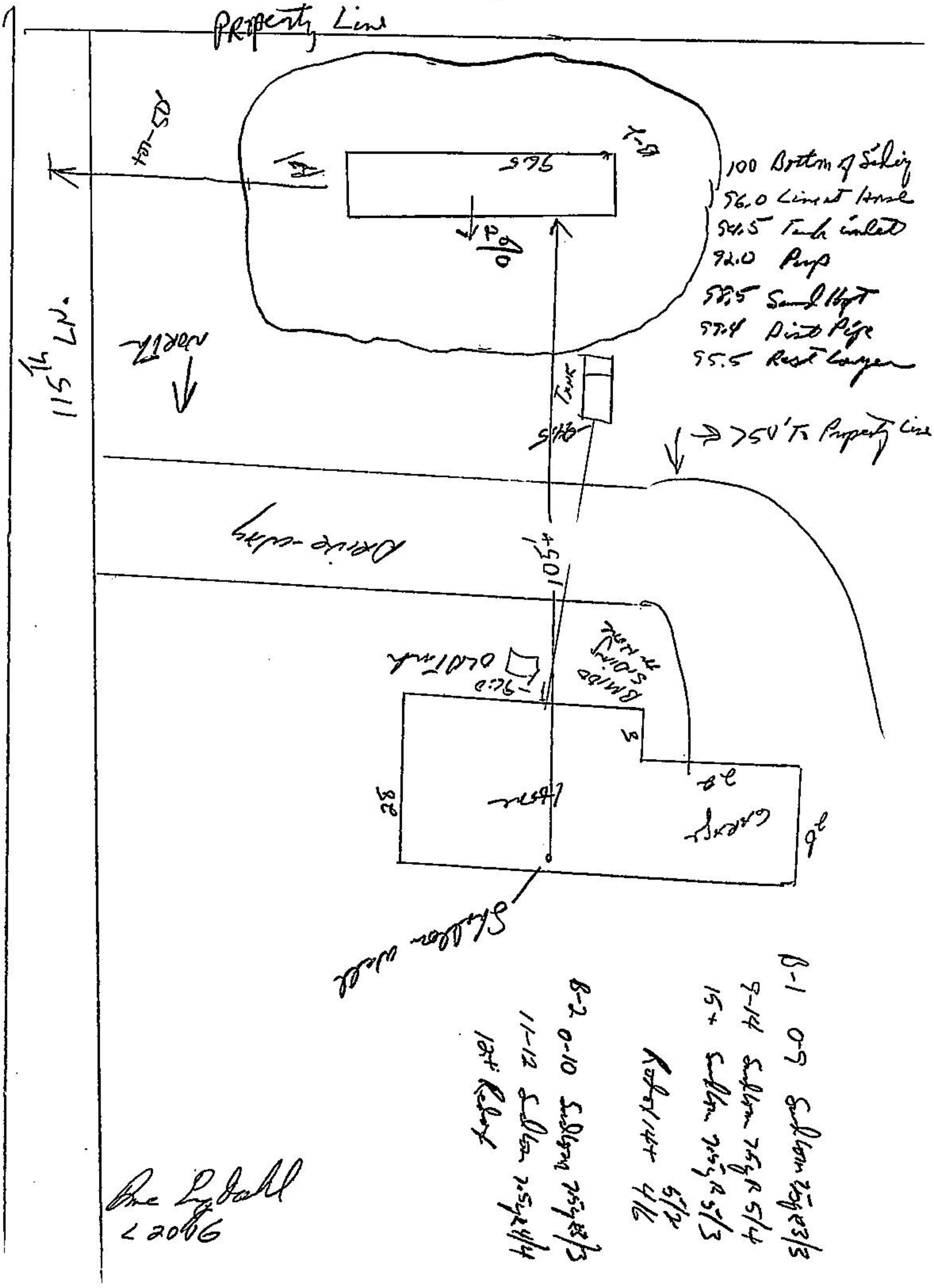
9. Total Tank Depth = total gallon (8) ÷ gallon/inch (2)
   346 gal ÷ 15.86 gal/in = 21.8 in

Recommended:
Calculate reserve capacity (75% the daily flow)
Daily flow x .75 = 600 x .75 = 450 gallons



I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

[signature] (signature) C2006 (license #) 7/12/2019 (date)


Property Line
115th LN.
North
100 Bottom of Siding
96.0 Line at House
94.5 Tank inlet
92.0 Pump
98.5 Sand Hgt
97.4 Dist Pipe
95.5 Rest Layer
Tank
75' To Property Line
Drive-way
House
Garage
old tank
Shallow well