

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 8-29-23, FIELD EVALUATION DATE 8-29-23
PROPERTY OWNER: Charles Fisher PHONE 612-281-5045
ADDRESS: 29537 410th place CITY, STATE, ZIP: Pittkin 56431
LEGAL DESCRIPTION: parts lot 4 and 5 Platt Sargent Hill
PIN# 07-1-102003 SEC 25 T 46 R 27 WWP NAME Farm Island
FIRE# _____ LAKE/RIVER Spirit LAKE CLASS Rd OHWL _____ FT

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2	REFERENCE BM ELEV. _____ FT
DISTURBED AREAS	YES _____ NO <u>X</u>	YES _____ NO _____	REFERENCE BM DESCRIPTION _____
COMPACTED AREAS	YES _____ NO <u>X</u>	YES _____ NO _____	_____
FLOODING	YES _____ NO <u>X</u>	YES _____ NO _____	_____
RUN ON POTENTIAL	YES _____ NO <u>X</u>	YES _____ NO _____	_____
SLOPE %	<u>8%</u>	_____	_____
DIRECTION OF SLOPE	<u>Northerly</u>	_____	_____
LANDSCAPE POSITION	<u>Level on area sewer kite</u>	_____	_____
VEGETATION TYPES	<u>woods</u>	_____	_____

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 26", 1A _____, 2 28", 2A _____

BOTTOM ELEVATION—FIRST TRENCH OR BOTTOM OF ROCK BED: #1 1' sand base FT., #2 _____ FT.

SOIL SIZING FACTOR: SITE # 1 1.27, SITE #2 _____

CONSTRUCTION RELATED ISSUES: 1650 Combo to 10'x50' Rock Bed on 1' Sand Base

LIC# 2088 SITE EVALUATOR SIGNATURE: Bob Bartel

SITE EVALUATOR NAME: Bob Bartel TELEPHONE# 218-831-6430

LUG REVIEW _____ DATE _____

Comments: _____

SOIL BORING LOGS ON REVERSE SIDE

67-1-102003

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10R 3/3
1	sdy	10R 4/4
26"	Loam	
	Lo mottles	10R 4/2

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
5"	Topsoil	10R 3/3
1	sdy	10R 4/4
28"	Loam	
	Lo mottles	10R 4/2

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

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

07-1-102 003

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

B. SEPTIC TANK Capacity

1650 combo 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 disposal & lift 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)

- Depth to restricting layer = 26" feet
- Depth of percolation tests = _____ feet
- Texture Sand Loam
 Percolation rate _____ mpi
- Soil loading rate 1.27 gpd/sqft (see figure D-33)
- Percent land slope 0 % on sewer site

D. ROCK LAYER DIMENSIONS

- Multiply average design flow (A) by 0.83 to obtain required rock layer area.
600 gpd x 0.83 sqft/gpd = 500 sqft
- Determine rock layer width = 0.83 sqft/gpd x linear Loading Rate (LLR)
 0.83 sqft/gpd x _____ gpd/sqft = _____ ft
- 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

- Multiply rock area (D1) by rock depth of 1 ft to get cubic feet of rock
500 sqft x 1 ft = 500 cuft
- Divide cuft by 27 cuft/cuyd to get cubic yards
500 cuft ÷ 27 cuyd/cuft = 19 cuyd
- Multiply cubic yards by 1.4 to get weight of rock in tons
19 cuyd x 1.4 ton/cuyd = 27 tons

F. SEWAGE ABSORPTION WIDTH

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

10 x 1.50 ft = 15 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	0.79	1.50
16 to 30	Loam	0.60	2.00
31 to 45	Silt Loam	0.50	2.40
46 to 60	Silt Sandy Clay Loam Silty Clay Loam	0.45	2.67
61 to 120	Clay Loam Silty Clay Sandy Clay	0.24	5.00
Slower than 120*	Clay		

*System designed for these soils must be other or performance

07-1-102003 $\leq 1\%$ land slope

G. Mound Slope Width and Length
(landslope less than or equal to 1%)

1. Absorption width (F) 15 ft

2. Calculate mound size

a. Determine depth of clean sand fill

at upslope edge of rock layer = 3 ft

minus the distance to restricting layer (C1)

3 ft - 2 ft = 1 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)

1 ft + 1ft + 1ft = 3 ft

c. Berm width = upslope mound height (G2b) times 4 (4 is recommended, but could be 3-12)

3 x 3 = 9 ft

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm width (G2c): 9 ft + 10 ft + 9 ft = 28 ft

e. Additional width necessary for absorption = absorption width (F) minus the landscape width (G2d)

15 ft - 28 ft = -13 ft, if number is negative (<0) skip to g

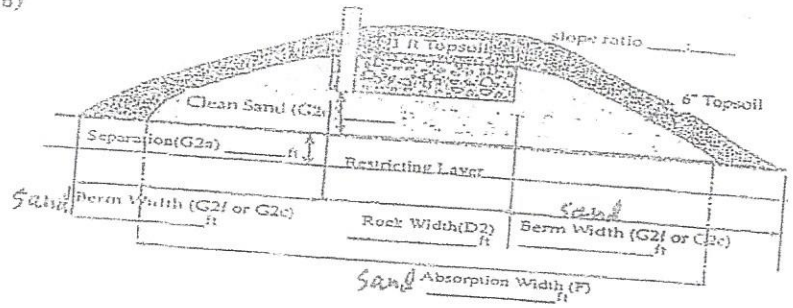
f. Final berm width = additional width (G2e) plus the berm width (G2c)

 ft + ft = ft

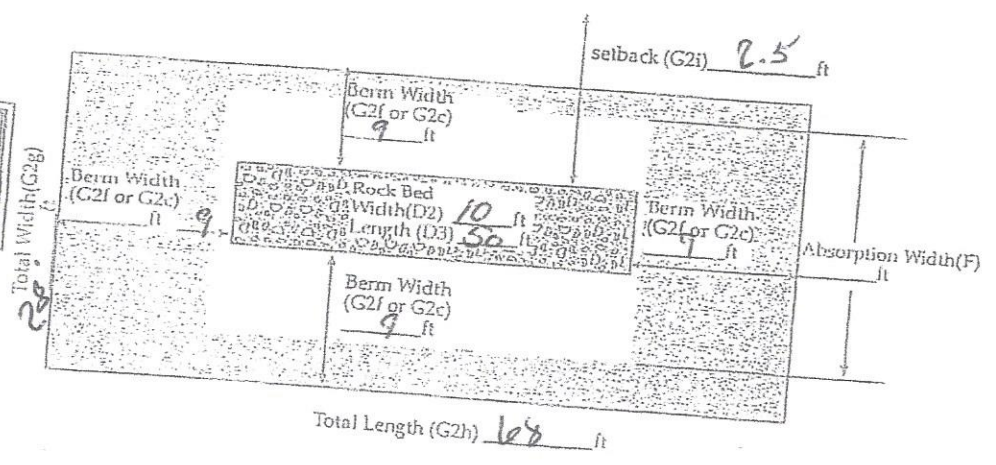
g. Total mound width is the sum of berm width (G2f or G2c) plus rock layer width (D2) plus berm width (G2f or G2c): 9 ft + 10 ft + 9 ft = 28 ft

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or G2c): 9 ft + 50 ft + 9 ft = 68 ft

i. Setbacks from the rockbed are calculated as follows: the absorption width (F) minus the rock bed width (D2) divided by 2: (15 ft - 10 ft) ÷ 2 = 2.5 ft



Final Dimensions:
28 x 68



I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.
Bob Bault (signature) 2088 (license #) 8-29-23 (date)

PRESSURE DISTRIBUTION SYSTEM

07-1402003

- Select number of perforated laterals 3
- Select perforation spacing = 3 ft
- 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.

$$\frac{50}{\text{Rock layer length}} - 2 \text{ ft} = \underline{48} \text{ ft}$$

- 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

- 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

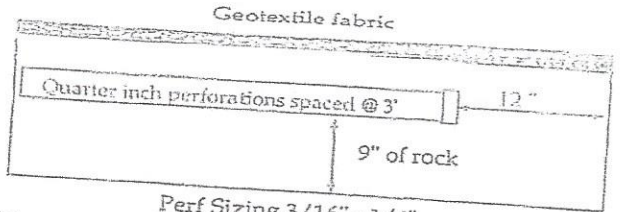
- A. Total number of perforations = perforations per lateral (5) times number of laterals (1)
17 perfs/lat x 3 lat = 51 perforations

- 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

- 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 = 38 gpm

- 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 = 2 inches.

- 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.



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

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

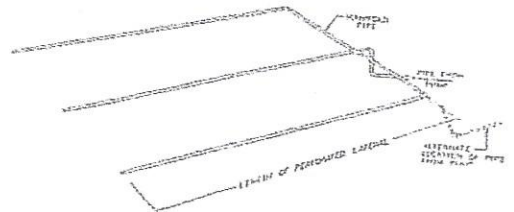
perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

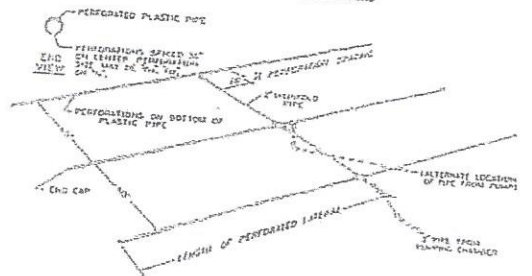
head (feet)	perforation diameter (inches)			
	1/8	3/16	7/32	1/4
1.0 ^a	0.18	0.42	0.56	0.74
2.0 ^b	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

^a Use 1.0 foot for single-family homes.
^b Use 2.0 feet for anything else.

MANIFOLD LOCATED AT END OF PRESSURE DISTRIBUTION SYSTEM



LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION BY MANIFOLD



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PUMP SELECTION PROCEDURE

07-1-102003

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: 38 gpm

2. Determine pump head requirements:

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

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

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

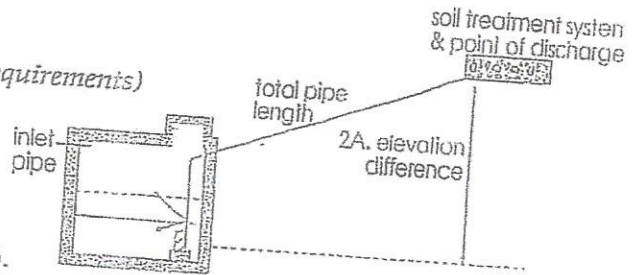
Friction Loss = 2.64 ft/100ft of pipe

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
55 feet x 1.25 = 69 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.
= 2.64 ft/100ft x 69 ÷ 100 = 1.8 ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)
14 ft + 5 ft + 2 ft =

Total head: 21 feet



Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

flow rate gpm	E-9: Friction Loss in Plastic Pipe Per 100 feet		
	nominal pipe diameter		
	1.5"	2"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.55	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 38 gpm (1A or B) with at least 21 feet of total head (2D)

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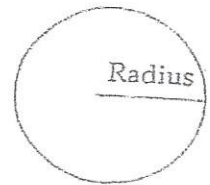
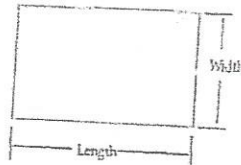
Bob Bault (signature)

2088 (license #)

8.29.23 (date)

DOSING CHAMBER SIZING

07-1-102003



- Determine area
 - Rectangle area = $L \times W$
 $\underline{\quad\quad} \times \underline{\quad\quad} = \underline{\quad\quad}$ square feet
 - Circle area = $\pi (3.14) \times \text{radius in feet} \times \text{radius in feet}$
 $3.14 \times \underline{\quad\quad} \text{ ft} \times \underline{\quad\quad} \text{ ft} = \underline{\quad\quad}$ sqft
 - Get area from manufacturer $\underline{\quad\quad}$ sqft

- Calculate gallons per inch
 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.
 $\text{Area} \times 7.5 \div 12 = \underline{\quad\quad}$ sqft $\times 7.5 \div 12 \text{ in/ft} = \underline{12.69}$ gallon per inch *12.69*

- Calculate total tank volume
 - Depth from bottom of inlet pipe to tank bottom $\underline{45.5}$ in
 - Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) \times gal/in (2)
 $= \underline{45.5} \text{ in} \times \underline{12.69} \text{ gal/in} = \underline{577}$ gal

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

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	volumes
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II, or III
8	1200	675	408	columns.

- Calculate gallons to cover pump (with 2-3 inches of water covering pump)
 (Pump and block height (inch) + 2 inch) \times gallon/inch
 $(\underline{12} \text{ in} + 2 \text{ in}) \times \underline{12.69} \text{ gal/in} = \underline{178}$ gallon

- Calculate total pumpout volume
 - Select pump size for 4-5 does per day. Gallon per dose = gpd (see figure A-1)
 $\text{gpd} \div \text{doses per day} = \underline{600} \text{ gpd} \div \underline{4} \text{ doses/day} = \underline{150}$ gallons
 - Calculate drainback
 - Determine total pipe length, $\underline{55}$ feet
 - Determine liquid volume of pipe, $\underline{.17}$ gal per ft (see figure E-20)
 - Drainback quantity = $\underline{55} \text{ ft (5B1)} \times \underline{.17} \text{ gal per ft (5B2)} = \underline{9}$ gal
 - Total pump out volume = dose volume (5A) + drainback (5B3)
 $\underline{150} \text{ gal} + \underline{9} \text{ gal} = \underline{159}$ 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

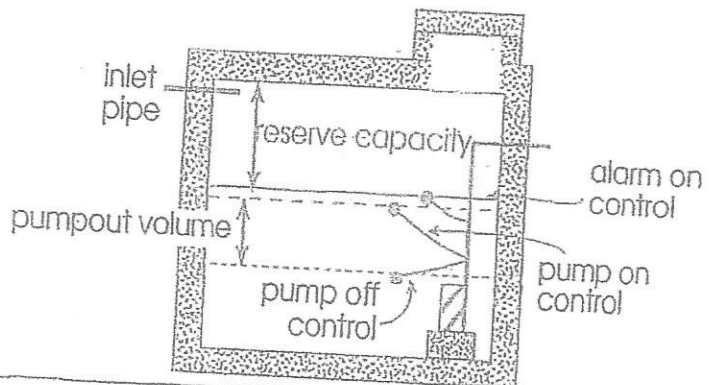
- Float separation distance (using total pumpout volume)
 $\text{Total pumpout volume (5C)} \div \text{gal/inch (2)}$
 $\underline{159} \text{ gal} \div \underline{12.69} \text{ gal/in} = \underline{12}$ inch

- Calculate volume for alarm (typically 2 to 3 inches)
 $\text{Alarm depth (inch)} \times \text{gallon/inch (2)} = \underline{12.69} \text{ in} \times \underline{2} \text{ gal/in} = \underline{25}$ gal

- Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
 $\underline{178} \text{ gal} + \underline{159} \text{ gal} + \underline{25} \text{ gal} = \underline{362}$ gallons

- Total Tank Depth = total gallon (8) \div gallon/inch (2)
 $\underline{362} \text{ gal} \div \underline{12.69} \text{ gal/in} = \underline{28}$ in

Recommended:
 Calculate reserve capacity (75% the daily flow)
 $\text{Daily flow} \times .75 = \underline{600} \times .75 = \underline{450}$ gallons



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Bob Bault (signature) 2088 (license #) 8-29-23 (date)

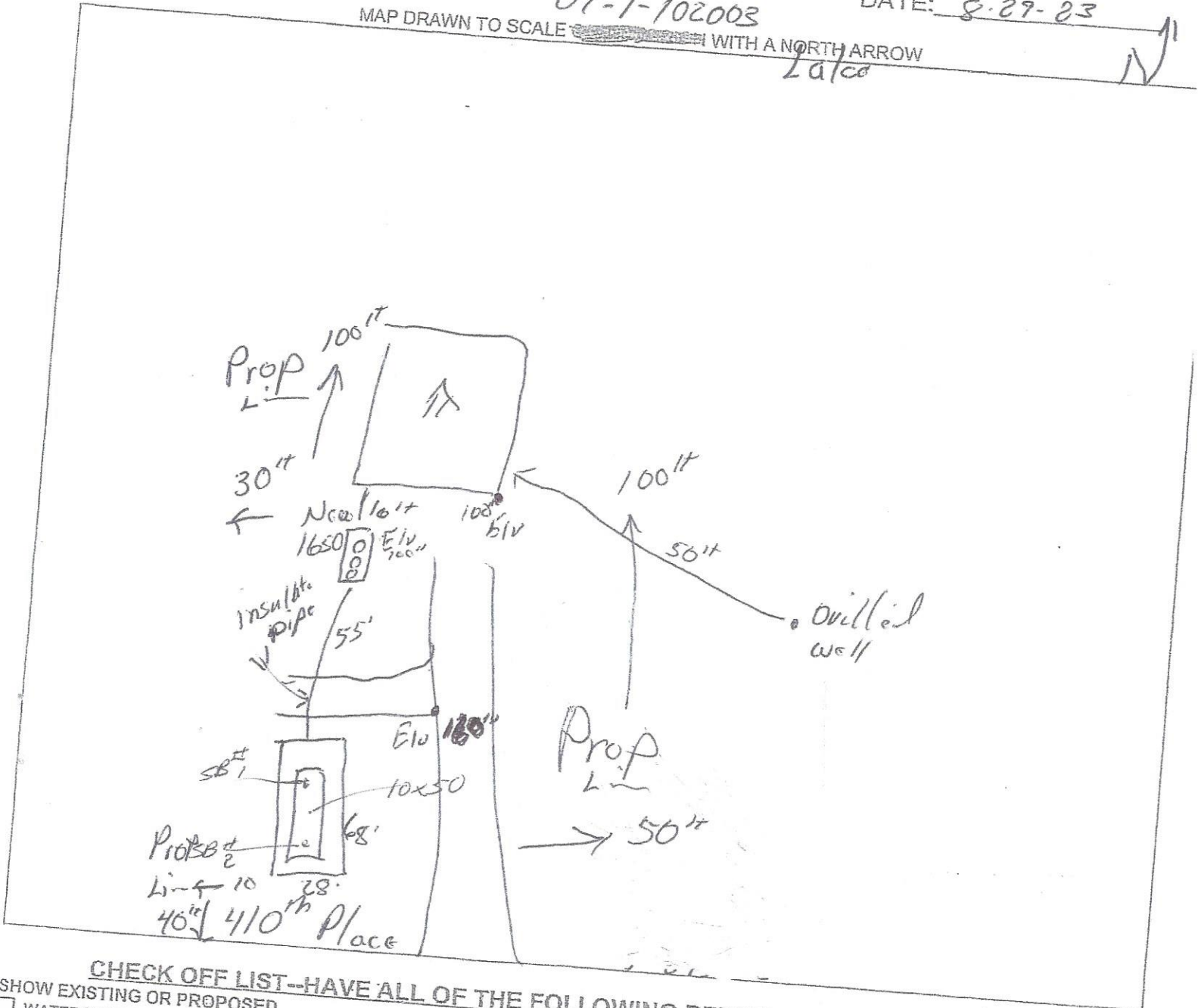
CLIENT: Chuck Fisher

SKETCH SHEET

07-1-102003

DATE: 8-29-23

MAP DRAWN TO SCALE WITH A NORTH ARROW
Latco



CHECK OFF LIST--HAVE ALL OF THE FOLLOWING BEEN DRAWN ON THE MAP??

- SHOW EXISTING OR PROPOSED
- WATER WELLS WITHIN 100 FT OF TREATMENT AREAS
- PRESSURE WATER LINES WITHIN 10 FT OF TREATMENT AREAS
- STRUCTURES
- ALL SOIL TREATMENT AREAS
- HORIZONTAL AND VERTICAL REFERENCE
- POINT OF SOIL BORINGS
- LOT EASEMENTS
- DISTURBED/ COMPACTED AREAS
- SITE PROTECTION--LATHE AND RIBBON EVERY 15 FT
- ACCESS ROUTE FOR TANK MAINTENANCE
- REQUIRED SETBACKS
- STRUCTURES
- OHWL
- PROPERTY LINES
- LOT IMPROVEMENTS
- ALL ISTS COMPONENTS
- DIRECTION OF SLOPE
- ALL LOT DIMENSIONS

- INDICATE ELEVATIONS**
- 160" Sewer Tank 100"
 - BENCHMARK 100
 - ELEVATION OF SEWER LINE @ HOUSE 40"
 - ELEVATION @ TANK INLET 24"
 - ELEVATION @ BOTTOM OF ROCK LAYER 184"
 - ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER 134"
 - ELEVATION OF PUMP -23"
 - ELEVATION OF DISTRIBUTION DEVICE 193"

DESIGNER SIGNATURE Bob Bull
 LICENSE# 2088

DATE 8-29-23

07-1-102003

Subsurface Sewage Treatment System Management Plan

Property Owner: Chuck Fisher Phone: 612-281-5845 Date: 8-29-23
Mailing Address: 2260 Timber wood Dr City: Channahon Zip: 55317
Site Address: 29537 410th Place City: Aitkin Zip: 56431

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.

System Designer: check every _____ months.
Local Government: check every _____ months.
State Requirement: check every 36 months.

My System needs to be checked every 36 months.

(State requirements are based on MN Rules Chapter 7090.2450, Subp. 2 & 3)
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 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

Professional Management Tasks

- Check to make sure tank is not leaking
- Check and clean the in-tank effluent filter
- 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: _____ Date: _____
Designer Signature: Bob Bault Date: 8-29-23

See Reverse Side for Management Log

07-1-102603
Maintenance Log

Activity	Date Accomplished
<i>Check frequently:</i>	
Leaks: check for plumbing leaks	
Soil treatment area check for surfacing	
Lint filter: check, clean if needed	
Effluent screen: if owner-maintained	
Water usage rate (monitor frequency _____)	
<i>Check annually:</i>	
Caps: inspect, replace if needed	
Sludge & Scum/Pump	
Inlet & Outlet baffles	
Drainfield effluent leaks	
Pump, alarm, wiring	
Flush & clean laterals if cleanouts exists	
Other:	
Other:	

Notes:

Mitigation/corrective action plan: