FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 7-29-23, FIELD EVALUATION DATE 7-29-23
PROPERTY OWNER: Todd Bohner
ADDRESS: 37707 St. Hwy. 18 CITY, STATE, ZIP: Aitkin 56431 PHONE 651-747-7457
LEGAL DESCRIPTION: Lot 10 Elys Lake View Lots
PIN# 36-1-078200 SEC 21 T 45 R 26 TWP NAME Wealthwood twp
FIRE# LAKE/RIVER mille lacs LAKE CLASS GD 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 %	0	
DIRECTION OF SLOPE	0	
LANDSCAPE POSITION	Level	
VEGETATION TYPES	grass yard	

REFERENCE BM ELEV. FT.
REFERENCE BM DESCRIPTION

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING #1 20", 1A, 2 21", 2A

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

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

CONSTRUCTION RELATED ISSUES: add 500 Pump tank pluse 10'x38' Rock Bed on 18" Sand Base and Box in 14'x42' Field

LIC# 2088 SITE EVALUATOR SIGNATURE: Bob Bartl
SITE EVALUATOR NAME: Bob Bartl TELEPHONE# 218-831-2431
LUG REVIEW DATE
Comments:

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

36-1-078200

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10yr 3/3
20"	Sd	10yr 4/4
C	mottles	10yr 4/2

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10yr 3/3
21"	Sd	10yr 4/4
C	mottles	10yr 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)

36-1-07 &200

A. Average Design FLOW

Estimated 450 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 60% of the values in the Class I, II, or III columns.
2	300	225	180	
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

1000 Exist.
500 Lift gallons *(see figure C-1)*
New

C. SOILS *(refer to site evaluation)*

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

1. Depth to restricting layer = 18" feet
2. Depth of percolation tests = _____ feet
3. Texture _____
   Percolation rate _____ mpi
4. Soil loading rate 1.27 gpd/sqft *(see figure D-33)*
5. Percent land slope 0 %

D. ROCK LAYER DIMENSIONS

1. Multiply average design flow (A) by 0.83 to obtain required rock layer area.
   450 gpd x 0.83 sqft/gpd = 380 sqft
2. Determine rock layer width = 0.83 sqft/gpd x linear Loading Rate (LLR)
   0.83 sqft/gpd x _____ gpd/sqft = _____ ft
3. Length of rock layer = area ÷ width =
   380 sqft (D1) ÷ 10 ft (D2) = 38 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
   380 sqft x 1 ft = 380 cuft
2. Divide cuft by 27 cuft/cuyd to get cubic yards
   380 cuft ÷ 27 cuyd/cuft = 15 cuyd
3. Multiply cubic yards by 1.4 to get weight of rock in tons
   15 cuyd x 1.4 ton/cuyd = 20 tons

F. SEWAGE ABSORPTION WIDTH

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

1.50 x 10 ft = 15 ft

D-33: Absorption Width Sizing Table

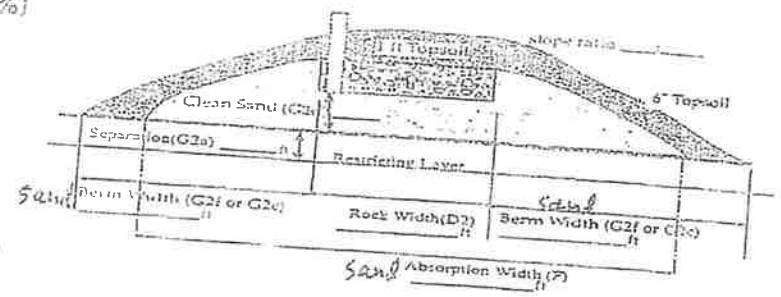
Percolation Rate in Minutes per Inch (MPI)	Soil Texture	Loading Rate Gallons per day per square foot	Absorption Ratio
Faster than 5	Coarse Sand Medium Sand Loamy Sand Fine Sand	1.20	1.00
6 to 15	Sandy Loam	0.72	1.50
16 to 30	Loam	0.60	2.00
31 to 45	Silt Loam	0.50	2.40
46 to 60	Silt Sandy Clay Loam Silty Clay Loam Clay Loam	0.45	2.67
61 to 120	Silty Clay Sandy Clay Clay	0.24	5.00
Slower than 120*			

*System designed for these soils must be either of performance

36-1-078200

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

<=1% land slope



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 - 18" ft = 18" 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)

1.6 ft + 1ft + 1ft = 3.6 ft

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

_____ x 4 = _____ ft Box mound

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm wid (G2c): _____ ft + _____ ft + _____ ft = _____ ft 14 x 42"

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

_____ ft - _____ ft = _____ ft, *if number is negative (<0) skip to g*

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

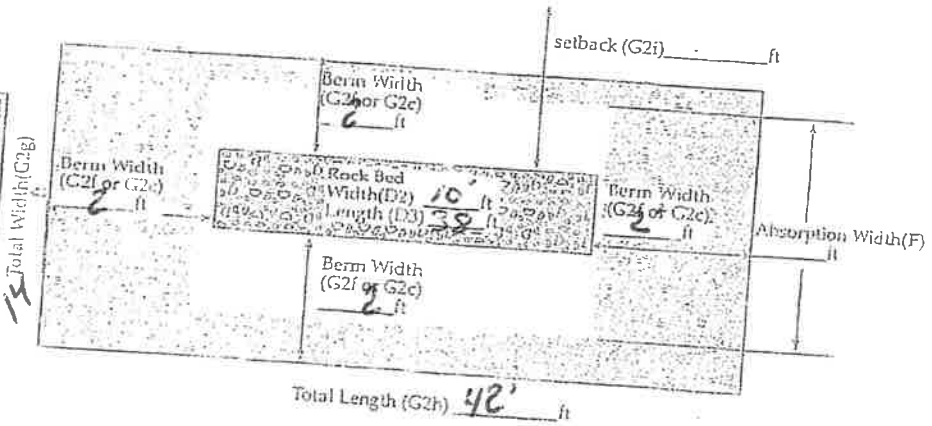
_____ ft + _____ ft = _____ ft

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

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

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

Final Dimensions:
14 x 42



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

Bob Bold (signature) 2088 (license #) 8-11-03 (date)

36-1-078200

PRESSURE DISTRIBUTION SYSTEM

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.

   38 (Rock layer length) - 2 ft = 36 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 = 36 ft ÷ 3 ft = 12 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.*

   12 spaces + 1 = 13 perforations/lateral

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

   13 perfs/lat x 3 lat = 39 perforations

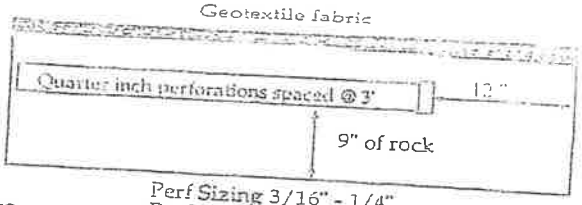
   B. Calculate the square footage per perforation.
   Should be 6-10 sqft/perf. *Does not apply to at-grades.*
   Rock bed area = rock width (ft) x rock length (ft)
   10 ft x 38 ft = 380 sqft
   Square foot per perforation = Rock bed area ÷ number of perfs (6)
   380 sqft ÷ 39 perfs = 9.7 sqft/perf

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

   39 perfs x .74 gpm/perfs = 29 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 = 6 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.



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

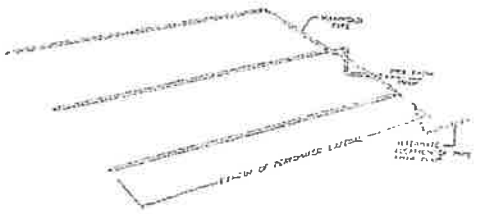
perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

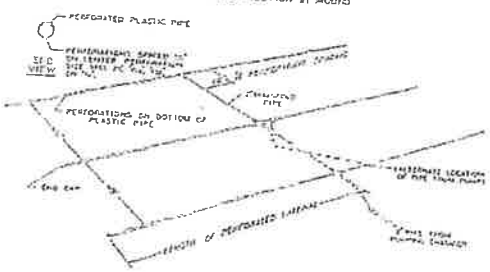
head (feet)	perforation diameter (inches) 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.42	0.56	0.74
2.0[b]	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

[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 IN MOUND



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

Bob Bauld (signature) 2088 (license #) 8-11-23 (date)

PUMP SELECTION PROCEDURE

36-1-078200

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: 29 gpm

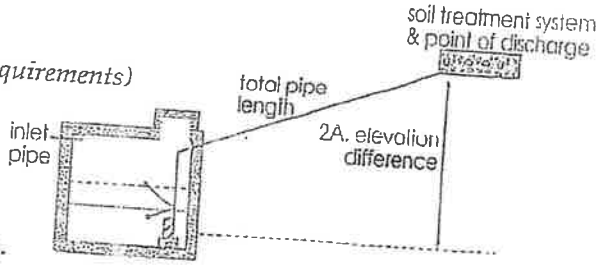
2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?

4 feet

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

5 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
   30 feet x 1.25 = 37.5 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 37.5 ÷100 = .6 ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)

4 ft + 5 ft + .6 ft =

Total head: 10 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	1.55	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 29 gpm (1A or B) with at least 10 feet of total head (2D)

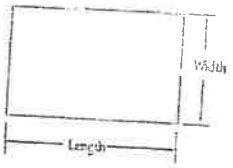
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

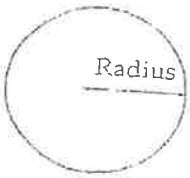
Bob Burtl (signature) 2088 (license #) 2088 (date)

36-1-078200

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
   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 = 16.58 gallon per inch mfg

3. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom 522 mfg: 31 1/8" in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
   = 31.6 in x 16.58 gal/in = 522 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
   (12 in +2 in) x 16.58 gal/in = 224 gallon

A-I: 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 = 450 gpd ÷ 4 doses/day = 112.5 gallons
   B. Calculate drainback
      1. Determine total pipe length, 30 feet
      2. Determine liquid volume of pipe, .17 gal per ft (*see figure E-20*)
      3. Drainback quantity = 30 ft (5B1) x .17 gal per ft (5B2) = 5 gal
   C. Total pump out volume = dose volume (5A) + drainback (5B3)
   112.5 gal + 5 gal = 117 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

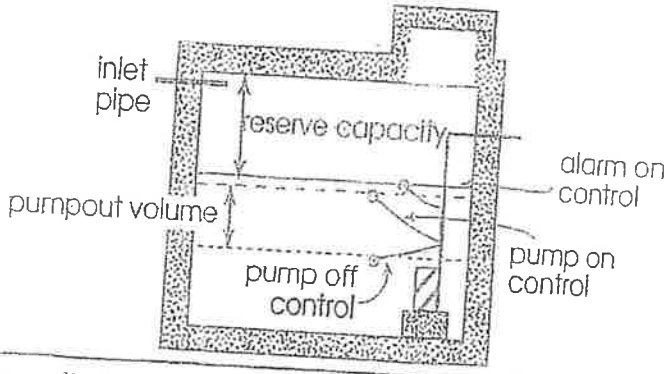
6. Float separation distance (using total pumpout volume)
   Total pumpout volume (5C) ÷ gal/inch (2)
   117 gal ÷ 16.58 gal/in = 7 inch

7. Calculate volume for alarm (typically 2 to 3 inches)
   Alarm depth (inch) x gallon/inch (2) = 16.58 in x 2 gal/in) = 33.16 gal

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   224 gal + 117 gal + 33.16 gal = 374 gallons

9. Total Tank Depth = total gallon (8) ÷ gallon/inch (2)
   374 gal ÷ 16.58 gal/in = 23 in

Recommended:
Calculate reserve capacity (75% the daily flow)
Daily flow x .75 = 450 x .75 = 337.5 gallons



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

Bob Bell (signature) 2688 (license #) 8-10-23 (date)

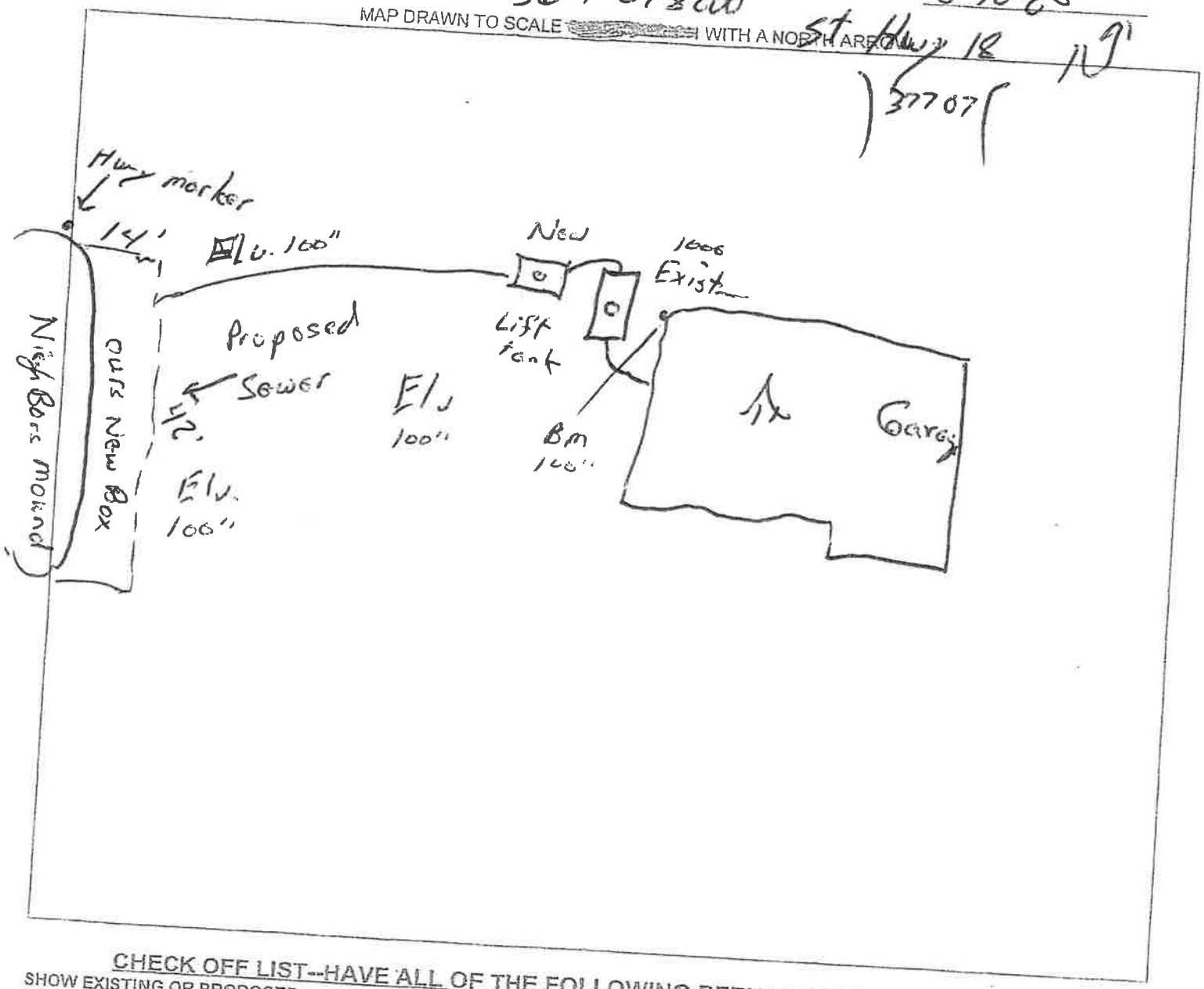
CLIENT: Todd Bohnen

SKETCH SHEET

36-1-678200

DATE: 8·10·23

MAP DRAWN TO SCALE [redacted] WITH A NORTH ARROW



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
- ☐ LOT IMPROVEMENTS
- ☐ ALL SOIL TREATMENT AREAS
- ☐ ALL ISTS COMPONENTS
- ☐ HORIZONTAL AND VERTICALREFERENCE
- ☐ POINT OF SOIL BORINGS
- ☐ DIRECTION OF SLOPE
- ☐ LOT EASEMENTS
- ☐ ALL LOT DIMENSIONS
- ☐ DISTURBED/ COMPACTED AREAS
- ☐ SITE PROTECTION--LATHE AND RIBBON EVERY 15 FT
- ☐ ACCESS ROUTE FOR TANK MAINTENANCE

REQUIRED SETBACKS

- ☐ STRUCTURES
- ☐ PROPERTY LINES
- ☐ OHWL

COMMENTS:

INDICATE ELEVATIONS

BENCHMARK 100

ELEVATION OF SEWER LINE @ HOUSE Exist. 5

ELEVATION @ TANK INLET Exist.

ELEVATION @ BOTTOM OF ROCK LAYER 118"

ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER 79"

ELEVATION OF PUMP 56"

ELEVATION OF DISTRIBUTION DEVICE 118"

DESIGNER SIGNATURE B & G Built

LICENSE# 2088

DATE 8·10·23

31-1-078200

Subsurface Sewage Treatment System Management Plan

Property Owner: Todd Baker Phone: 651-747-1457 Date: 8-10-23

Mailing Address: _____ City: _____ Zip: _____

Site Address: 37707 St. Hwy 18 City: Kettle River 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.
(State requirements are based on MN Rules Chapter 7080.2450, Subp. 2 & 3)

My System needs to be checked every _____ 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 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

- [x] Check to make sure tank is not leaking
- [x] Check and clean the in-tank effluent filter
- [ ] Check the sludge/scum layer levels in all septic tanks
- [ ] Recommend if tank should be pumped
- [x] 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 Bard Date: 8-10-23

See Reverse Side for Management Log

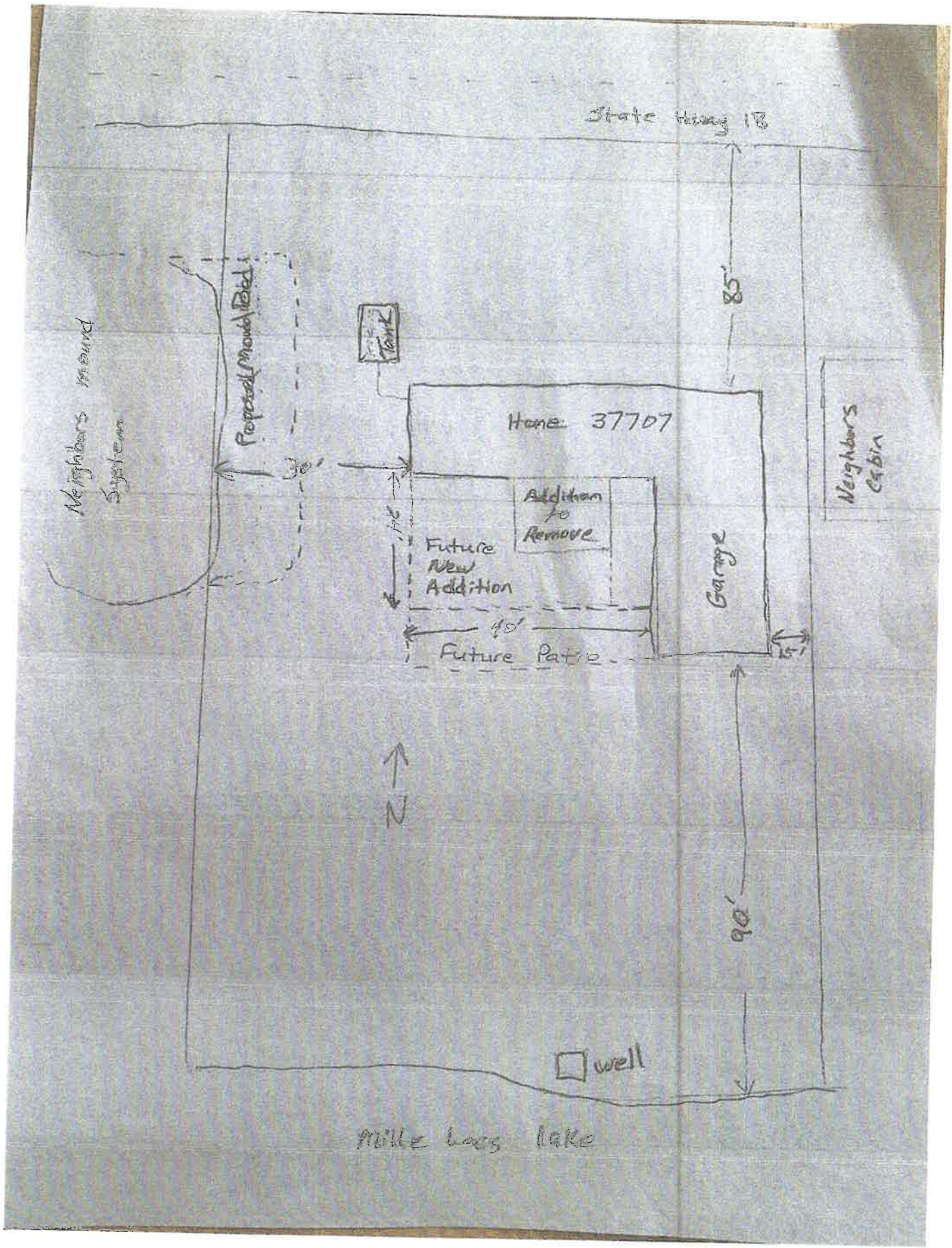
31-1-078200

Maintenance Log

Activity	Date Accomplished											
Check frequently:												
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 _____)												
Check annually:												
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: _____


State Hwy 18
85'
Home 37707
Addition to Remove
Future New Addition
40'
Future Patio
Garage
Neighbors cabin
Neighbors mound System
Proposed Mound Bed
30'
Tank
N
90'
well
Mille Lacs lake