FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE _10-7-21_, FIELD EVALUATION DATE _10-7-21_
PROPERTY OWNER: _Adam Davis   New Owner_ PHONE _____
ADDRESS: _31417 359th Lane_ CITY,STATE,ZIP: _Aitkin 56431_
LEGAL DESCRIPTION: _SW-SE_
PIN# _15-0-036700_ SEC _21_ T _47_ R _25_ TWP NAME _Kimberly Twp_
FIRE#_____ LAKE/RIVER _N/A_ LAKE CLASS _N/A_ 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 yard_	___
VEGETATION TYPES	_grass_	___

REFERENCE BM ELEV. _160"_ FT.
REFERENCE BM DESCRIPTION
cap on tank Existing

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 _18"_, 1A_____, 2_____, 2A_____

BOTTOM ELEVATION--FIRST TRENCH OR BOTTOM OF ROCK BED: #1 _18" Sd Base_ #2_____ FT.

SOIL SIZING FACTOR: SITE # 1 _1.27_, SITE #2_____

CONSTRUCTION RELATED ISSUES: _10' x 38' Rock Bed on 18" Sand Base_

LIC# _2088_ SITE EVALUATOR SIGNATURE: _Bob Bartol_

SITE EVALUATOR NAME: _Bob Bartol_ TELEPHONE# _218-831-6430_

LUG REVIEW_____ DATE_____

Comments:_____
_____
_____
_____

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

15-0-36700

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
4"	Topsoil	10yr 3/3
18"	Lo-Sand	10yr 4/4
	2 mottl/g Lo	7.5yr 4/2

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

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)

A. Average Design FLOW   15-0036700

Estimated **450** gpd *(see figure A-1)*
or measured _____ x 1.5 *(safety factor)* = _____ gpd

B. SEPTIC TANK Capacity

1500 ~~Existing and compliant~~ gallons *(see figure C-1)*

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.

C. SOILS *(refer to site evaluation)*

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

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

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	0.79	1.50
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*			

*System designed for these soils must be either or performance

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

<=1% land slope

15·0·036700
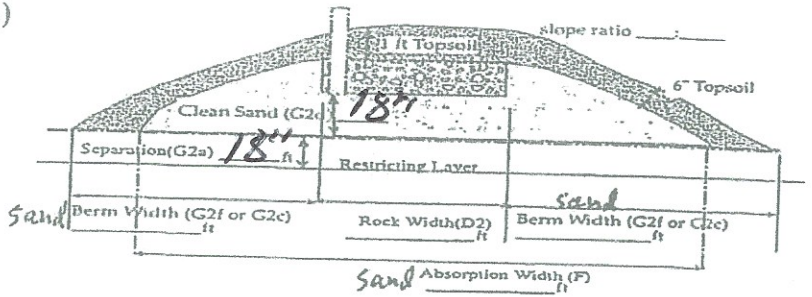
1. Absorption width (F) ___15___ ft

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)
__1.5__ ft + 1ft + 1ft = __3.5__ ft

c. Berm width = upslope mound height (G2b) times 4 *(4 is recommended, but could be 3-12)*
__3.5__ x3 = __10.5__ ft

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm wic
(G2c): __10.5__ ft + __10__ ft + __10.5__ ft = __31__ ft

e. Additional width necessary for absorption = absorption width (F) minus the landscape width (G2d)
__15__ ft - __31__ ft = __-16__ ft, *if number is negative (<0) skip to g*

f. Final berm width = additional width (G2e) plus the berm width (G2c)
__10.5__ 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): __10.5__ ft + __10__ ft + __10.5__ ft = __31__ ft

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or
G2c): __10.5__ ft + __38__ ft + __10.5__ ft = __59__ ft

i. Setbacks from the rockbed are calculated as follows: the absorption width (F) minus the rock bed wid:
(D2) divided by 2: (__15__ ft - __10__ ft) ÷ 2 = __2.5__ ft

Final Dimensions:
__31'__ x __59'__
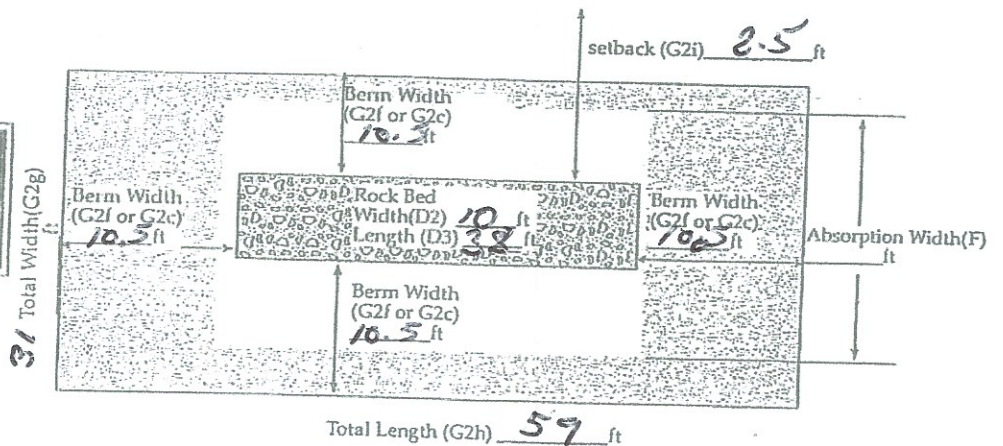
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

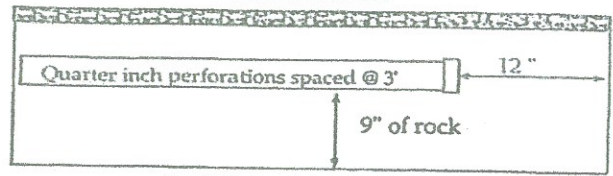__Bob Bartl_____ (signature)   __2088__ (license #)   __10-9-21__ (date)

PRESSURE DISTRIBUTION SYSTEM
15-0-036700

Geotextile fabric

Quarter inch perforations spaced @ 3'   12"

9" of rock

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.

    $$\underset{\text{Rock layer length}}{\underline{380}} - 2\,ft = \underline{36}\,ft$$

4. Determine the number of spaces between perforations. Divide the length (3) by perforation spacing (2) and <u>round down</u> 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)
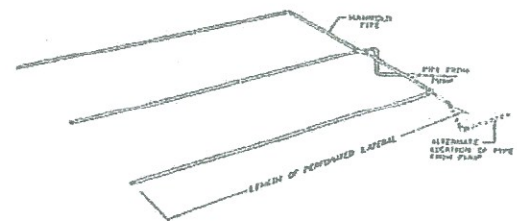   __380__ sqft ÷ __39__ perfs = __9.7__ sqft/perf

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 = __2__ 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	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
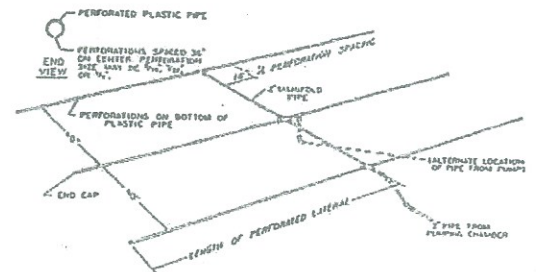
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

__Bob Bartl__ (signature)   __2088__ (license #)   __10-9-21__ (date)

PUMP SELECTION PROCEDURE

15 - 0 - 036700

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?
__5__ 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 = __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
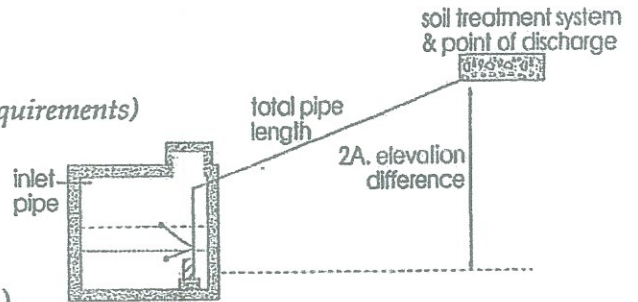__25__ feet x 1.25 = __31.2__ feet

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 __31.2__ ÷100 = __.5__ ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)
__5__ ft + __5__ ft+ __.5__ ft =
Total head: __10.5__ feet

Special Head Requirements

Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

E-9: Friction Loss in Plastic Pipe Per 100 feet

flow rate gpm	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 __29__ gpm
(1A or B) with at least __10.5__ feet of total head (2D)

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

__Bob Bart__ (signature) __2088__ (license #) __10.9.21__ (date)

DOSING CHAMBER SIZING

15. 0-036700

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

   Existing

Width / Length

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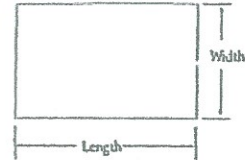
2. Calculate gallons per inch
   There are 7.5 gallons per cubic foot of volume, therefore multiply the area (1A, B or C)
   times the conversion factor and divide by 12 inches per foot to calculate gallon per inch.
   Area x 7.5 ÷ 12 = _____ sqft x 7.5 ÷ 12 in/ft = _____ gallon per inch

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

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

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

   Existing

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

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

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   _____ gal + _____ gal + _____ gal = _____ gallons

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

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	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.

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

Recommended:
Calculate reserve capacity (75% the daily flow)
Daily flow x .75 = _____ x .75 = _____ gallons
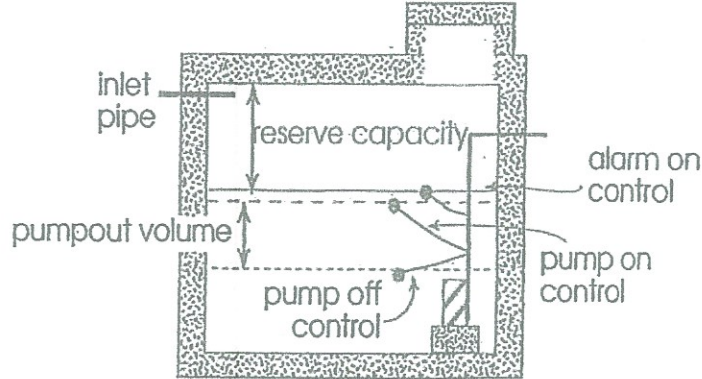
inlet pipe / reserve capacity / alarm on control / pumpout volume / pump on control / pump off control

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

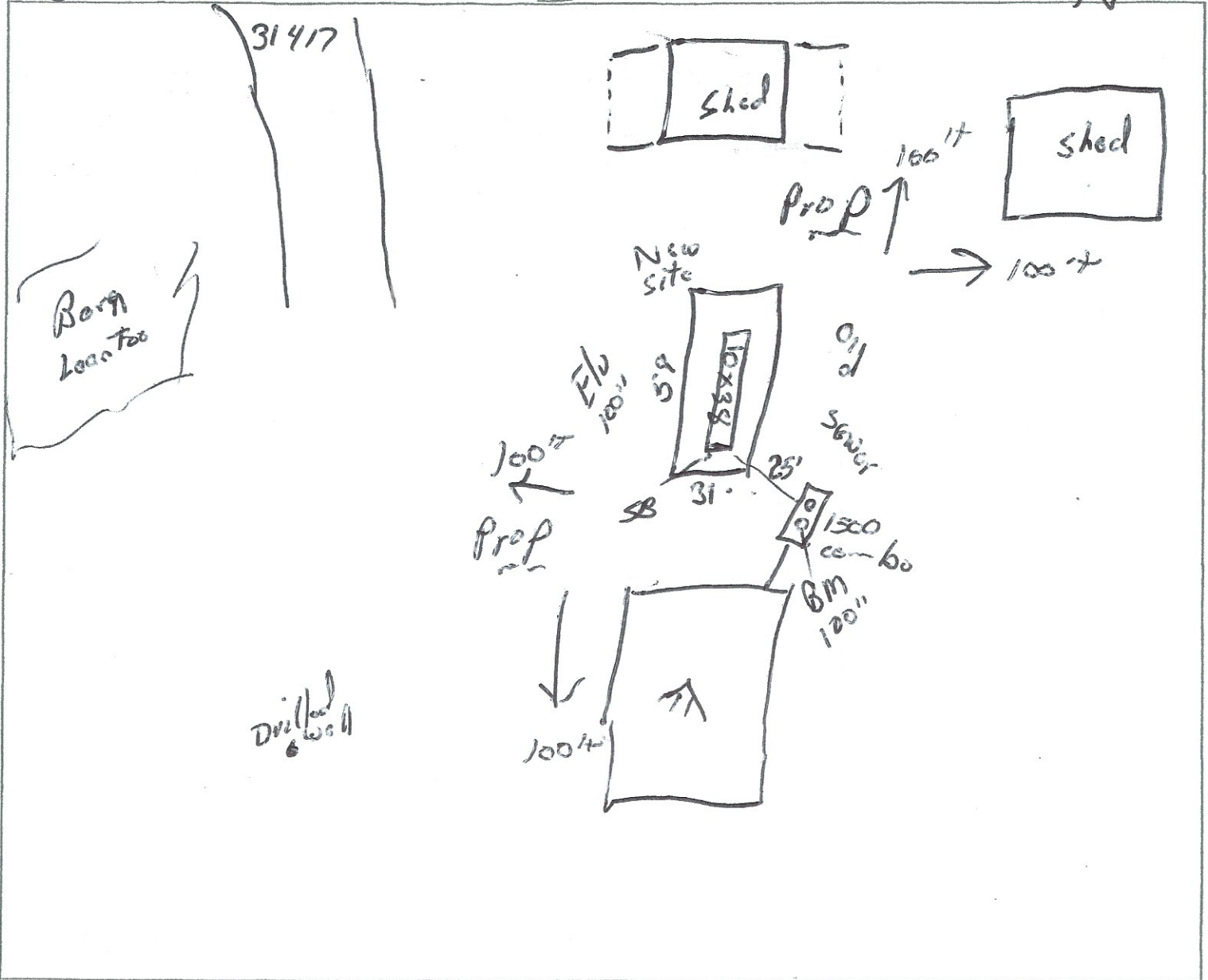_Bob Bortl_ (signature) 2688 (license #) 16-9-21 (date)

CLIENT: *Adam Davis Now* 15-0-0367-00 DATE: 10-9-21

N

359th Lane *owner*
MAP DRAWN TO SCALE ~~WITH~~ WITH A NORTH ARROW

31417

shed

shed

Barn
Lean-too

Prop ↑ 100 ft

→ 100 ft

New site

100 ft E/u 100' 59 10x38 Old Sewer

Prop ← 100 ft

SB 31' 25'

0 1500 combo

Bm 120"

↓ 100 ft ↗

Drilled well

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 VERTICAL REFERENCE
- ☐ 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:

DESIGNER SIGNATURE *Bob Bault*

LICENSE# 2088

INDICATE ELEVATIONS

BENCHMARK	100"
ELEVATION OF SEWER LINE @ HOUSE	Exist
ELEVATION @ TANK INLET	Exist
ELEVATION @ BOTTOM OF ROCK LAYER	18"
ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER	88"
ELEVATION OF PUMP	44"
ELEVATION OF DISTRIBUTION DEVICE	127"

DATE 10-9-21

Subsurface Sewage Treatment System Management Plan

15-0-036700

New Owner
Property Owner: _Adam Davis_   Phone: _507-469-7260_ Date: _10-9-21_

Mailing Address: _____   City: _____   Zip: _____

Site Address: _31417 359th Lane_   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.

(State requirements are based on MN Rules Chapter 7080.2450, Subp. 2 & 3)

> **My System needs to be checked every __24__ 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

- ☒ 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 Ball_   Date: _10-9-21_

See Reverse Side for Management Log

15-0-036700

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:_____

_____

_____

_____

_____