Aitkin County [redacted] **Mound Design**

Property Owner: Gilbertson, David & Janet Date: 12/29/2023
Mailing Address: 9395 SW 66th Loop
City: Ocala State: Fl Zip: 34481
Home Phone Number: Cell:
Site Address: 30636 435th Lane
City: Palisade State: MN Zip: 56469
Driving directions if no address issued:

Legal Description:
Sec: 15 Twp: 48 Range: 25 Twp Name: Fleming
Parcel Number: 08-0-023404
Lake/ River: Wilkins Lake/River Classification: RD

Flow Data

Number of Bedrooms: 3
Dwelling Classification: I
System Type: I
GPD: 450

Estimated Flow in Gallons per Day (GPD)			
Bedrooms	Class I	Class II	Class III
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

Wells

Deep Well: Existing Deep
Shallow Well: Select One
Wells to be sealed (if applicable)? None

Setbacks

Tank(s) to: Well 80'
House 12'
Property Line 50'

Drainfield to: Well 120'
House 126'
Property Line 25'

Sewer Line to well: 21'
Air Test: Yes

Additional System Notes and Information:

Designer Name: Tom Antonsen License Number: 1054
Address: 17633 State Highway 6
City: Deewood State: Mn Zip: 56444
Home Phone Number: 218-534-3355 Cell: 218-851-7757
E-Mail Address: antonsenexc@gmail.com
I hereby certify that I have completed this work in accordance with all applicable requirements.
Designer Signature: Tom Antonsen Date: 12/29/2023

Aitkin [redacted] **County Mound Design**

Property Owner: Gilbertson, David & Janet Date: 12/29/2023 Designer's Initials: tla

Tank Sizing

A. Septic Tank Capacity: 1000 Gallons

Tank Type: 1 Compartment Filter: No

Garbage Disposal/Basement Lift Station: No Disposal or Lift

B. Pump Tank Capacity: 500 Gallons (7080.2100)

a. Alarm Type: Electric

Septic Tank Capacity		
Bedrooms	Minimum	GD/BL
5 or less	1,500	2,250
6 or 7	2,000	3,000
8 or 9	2,500	3,750

Soils

C. Depth to Restricting Layer: 1.3ft.

D. Depth of Clean Sand at Upslope Edge: 2ft.

E. Native SSF: 2.2 (Perc. Rate [Optional] MPI)

F. Land Slope: 4%

Absorption Width Ratio Table		
Texture	SSF	AWR
Sand	0.83	1.00
Fine Sand	1.67	2.00
Sandy Loam	1.27	1.52
Loam	1.67	2.00
Silt Loam	2.00	2.40
Clay Loam	2.20	2.67

Rock Bed Dimensions

G. GPD 450 × .83= 373.5sq. ft.

H. Rock Bed Width: 10ft.

I. Rock Bed Length: 38ft.

J. Cubic Yards of Rock (H) × (I) × Rock Depth 1ft. ÷ 27 = 14 yds^3

Mound Size Calculations

K. AWR (from table): 2.67 × Rock Bed Width (H): 10 = 26.7ft. (Absorption Width)

L. Absorption Width (K): 26.7ft. – Rock Bed Width (H): 10ft. = 16.7ft. (Downslope Minimum)

M. Depth of washed sand (D): 2+ 1 ft. of rock + 1 ft. of cover = 4ft. (Upslope Height)

N. Enter upslope berm value from Berm Multiplier Table: 3.45

O. Upslope berm multiplier (N): 3.45 × upslope height (M): 4 = 13.8ft. (Upslope Width)

P. Rock bed width (H): 10ft. × land slope (F): 4% × 0.01 = 0.4ft. (Drop in Elevation)

Q. Upslope height (M): 4ft. + drop in elevation (P): 0.4ft. = 4.4ft. (Downslope Height)

R. Enter downslope berm value from Berm Multiplier Table: 4.76

S. Downslope height (Q): 4.4 × Downslope berm multiplier (R): 4.76 = 20.94 ft. (Downslope Width)

T. Select the larger number of Step (L) and Step (S): 20.94ft.

U. Upslope width (O): 13.8 + rock bed width (H): 10 + downslope width (T): 20.94 = 44.74ft. (Mound Width)

V. Upslope width (O): 13.8 + rock bed length (I): 38 + Upslope width (O): 13.8 = 65.6ft. (Mound Length)

W. Final Mound Dimensions Are: Width (U): 44ft. by Length (V): 65ft.

Berm Multiplier Table													
Land Slope→	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
Upslope Berm ↓ 3/1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
4/1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70
5/1	5.00	4.76	4.54	4.35	4.17	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12
6/1	6.00	5.66	5.36	5.08	4.84	4.62	4.41	4.23	4.05	3.90	3.75	3.61	3.49
7/1	7.00	6.54	6.14	5.79	5.46	5.19	4.93	4.70	4.49	4.30	4.12	3.95	3.80
Downslope Berm ↓ 3/1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
4/1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69
5/1	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69	8.33	9.09	10.00	11.11	12.50
6/1	6.00	6.38	6.82	7.32	7.89	8.57	9.38	10.34	11.54	13.04	15.00	17.65	21.43
7/1	7.00	7.53	8.14	8.86	9.72	10.77	12.07	13.73	15.91	18.92	23.33	30.43	43.75

Aitkin [redacted] County Mound Design

Property Owner: Gilbertson, David & Janet
Date: 12/29/2023

Designer's Initials: tla

Determine Pump Capacity

1) Gravity Distribution Pump Capacity Range: 10 - 45 GPM

*Skip to Pump Head Requirements if pumping to gravity

2) Pressure Distribution:

a) Number of laterals: 3

b) Lateral Size: 1.5in.

c) Perforation spacing: 3ft.

d) Check Table 4 to see the maximum number of perforations per lateral.

3) Lateral Length (choose):

a) End manifold: rock bed length: 38 - 2 ft. = 36ft.

b) Center manifold: rock bed length /2: 19 - 1 ft. = 18ft.

c) Choose 3a or 3b: 36ft.

4) Total Perforation Determination:

a) (3c): 36ft. ÷ (2c): 3ft. + 1 = 13 Perforations / Lateral

b) (4a): 13 × (2a): 3 = 39 Total Number of Perforations

c) Select perforation discharge from Table 1 = .74 GPM/Perf.

d) (4b): 39 × (4c): 0.74 GPM/Perf. = 28.86 GPM

PUMP HEAD REQUIREMENTS

5) Elevation difference:

a) Elevation difference between pump and point of discharge 10ft.

b) If pumping to a pressure distribution system, (5a) + 5 = 15ft.

c) Choose 5a if pumping to gravity or 5b for pressure: 15 ft.

6) Friction loss:

a) Select a value from Table 2: 1.55ft. / 100 ft. of pipe

b) Pipe length to drainfield: 210ft. × 1.25 = 262.5ft.

c) (6a): 1.55 × (6b): 262.5 ÷ 100 = 4.07 Total Friction Loss

7) Drainback:

a) Actual Pipe length 210ft. × .17 gal/ft. (Table 3) = 35.7 gal

8) (5c): 0ft. + (6c): 4.07ft. = 19.07 Total Head Required

9) Minimum Pump Size 28 GPM (4d) & 19.07 ft. of dynamic head (8)

Table 1
Perforation Discharge (GPM/perf.)

Ft. of Head	7/32" Perf	1/4" Perf
1.0	0.56	0.74
2.0	0.80	1.04

Use 1.0 for single homes, 2.0 for everything else

Table 2
Friction Loss in Plastic Pipe

Flow (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

Table 3
Volume of Liquid in Pipe

Pipe Diameter	Gal/Ft.
1.25 in.	0.078
1.5 in.	0.11
2.0 in.	0.17

Table 4
Max Perforations/Lateral

Perf. Spacing	1.25" Pipe	1.5" Pipe	2" Pipe
2.5 ft.	14	18	28
3 ft.	13	17	26
3.3 ft.	12	16	25
4 ft.	11	15	23
5 ft.	10	14	22

Aitkin County Mound Design

Property Owner: Gilbertson, David & Janet Date: 12/29/2023 Designer's Initials: tla

Please record the depths of all horizons, redoximorphic features, restricting layers, and saturated soils. Include all chroma and hue values.

#1 Proposed Site

Depth (in.)	Texture	Color
22	Clay Loam	10yr 3/4
Mottled		
Past 22"		

#1 Alternate Site

Depth (in.)	Texture	Color

#2 Proposed Site

Depth (in.)	Texture	Color
2	Topsoil	10YR 2/2
16	Clay Loam	10YR 4/3
Mottled		
Past 16"		

#2 Alternate Site

Depth (in.)	Texture	Color

Soil Sizing Factors/Hydraulic Loading Rates

Perc. Rate	Texture	SSF	HLR	Perc. Rate	Texture	SSF	HLR
<0.1	Coarse Sand			16 to 30	Loam	1.67	0.60
0.1 to 5	Sand	0.83	1.20	31 to 45	Silt Loam	2.00	0.50
0.1 to 5	Fine Sand	1.67	0.60	46 to 60	Clay Loam	2.20	0.45
6 to 15	Sandy Loam	1.27	0.79	> 60	Clay Loam	****	0.24

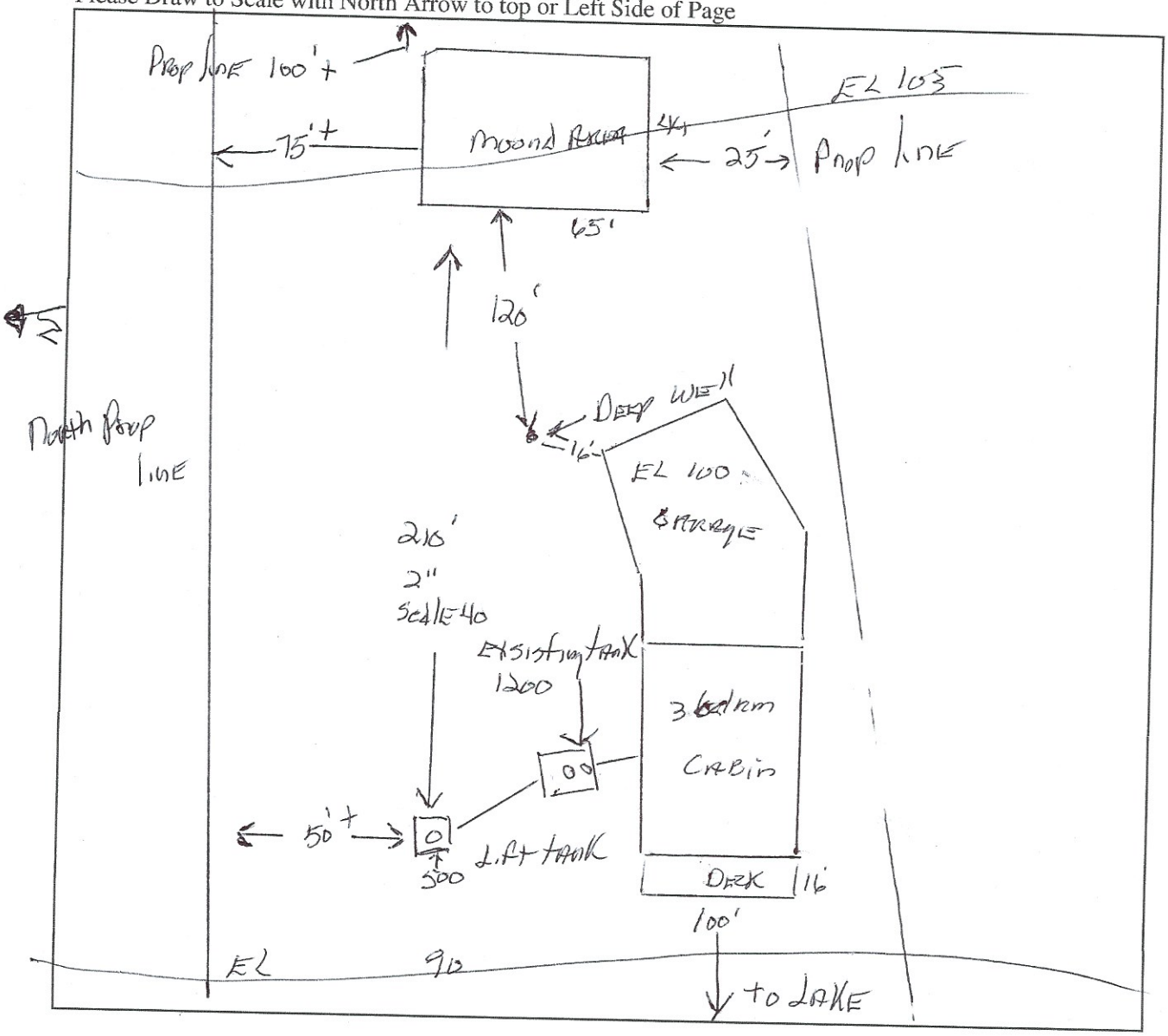
Description of Soil Treatment Areas

	Proposed Site		Alternate Site	
Disturbed Areas?	No			
Compacted Areas?	No			
Flooding Potential?	No			
Run on Potential?	No			
Limiting Layer Depth	Proposed #1 22"	Proposed #2 16"	Alternate #1	Alternate #2
Slope % and Direction	4% E to W			
Landscape Position	Slight Slope			
Vegetation Types	Grass			
Soil Texture	Clay Loam			
Soil Sizing Factor	2.2		Select One	

Aitken
~~Crow Wing~~ **County Mound Design**

Property Owner: David Gilbertson Date: 12-29-23

Please Draw to Scale with North Arrow to top or Left Side of Page



Please show all that apply (Existing or Proposed):

Wells within 100 ft. of a Drainfield	Boring Locations	Access Route for Tank Maintenance
Water lines within 10 ft. of a Drainfield	Component Location	Property Lines
Disturbed/Compacted Areas	OHW	Structures
Drainfield Areas	Lot Easements	Setbacks

Elevations:

Garage Slab = 100 Benchmark Elevation
96 Elevation of Sewer Line at House
95.5 Tank Inlet Elevation
105 Drainfield Elevation
90 Pump Elevation
93.5 Pump Discharge Elevation
~~105~~ 104.5 Restricting Layer Elevation

Designer Signature: Tom Gustavson Date: 12/29/23
License Number: 1654
Page _____ of _____

Subsurface Sewage Treatment System Management Plan

Property Owner: David + Janet Gilbertson Phone: _____ Date: 1/5/2024

Mailing Address: 9395 SW 66th Loop City: Ocala Zip: 34481

Site Address: 30636 435th Lane City: Palisade Zip: 56469

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.

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: Tom Christensen Date: 1-5-24

See Reverse Side for Management Log

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:_____

_____

_____

_____

_____