TRADEWELL SOIL TESTING
18330 Dahlia Street NW
Cedar, MN 55011
(763) 286-9095

Contractor/Owner: **Semler Construction**

Address/Lot/Block: **Lot 6 Block 1 Lake Fannie Acres**

City: **Cambridge** **County:** **Isanti**

This On-Site Sewage Treatment System is designed for a Type 1, 4 bedroom home in accordance with the Minnesota Pollution Control Agency Chapter 7080 and local ordinance.

A seasonally high water table or saturated soil layer was located at 13" to 16" (mottled soil). Due to the seasonally high water table or saturated soil and tighter sub-soils a Pressurized Mound System will need to be installed. The bottom of the rock bed must be located at least 3' above the seasonally high water table or saturated soil.

The soils at a depth of 12" have a percolation rate averaging 6- 15 MPI.

A pumping chamber will need to be installed to lift the effluent to the treatment area.

The manifold and supply line pipe must have back drainage to the pumping chamber. The distribution pipes shall have their ends capped. Be sure the rock and sand fill materials are clean. The sod layer below the entire mounded area must be turned over, just break up the sod, be sure not to over work.

The power supply and switches must be located outside the manhole and pumping chamber in a weather proof enclosure. A warning device must be installed with a light and sound device, this is in case of a pump failure.

All neighboring wells are located greater than 50' away from the proposed treatment area.

Keep all heavy equipment off of the proposed treatment area before and after construction. The treatment area should be marked off before construction. This design is not valid and the system will need to be relocated if failure to protect the areas proposed for On-Site Sewage Treatment occurs.

With proper installation and maintenance, this system should have no problem in treating septic effluent effectively.

Nothing other than gray water, (laundry, showers, etc.) human waste and toilet tissue should be disposed of into the septic tanks. Garbage disposals are not recommended. Smaller amounts of laundry soaps, dish soaps, cleaning agents, etc. are better for the system. Antibacterial soaps and chlorine agents may kill the bacteria needed to treat septic effluent properly. Additives are not recommended, they may cause harmful damage to your system. Recommend to pump and clean your tanks by a certified pumper every other year if you have 1 tank and every 2-3 years if you have a 2-tank system to insure proper maintenance.

Mark Tradewell — September 20, 2022

Mark Tradewell
MPCA #307

Date

****Septic design is subject to test pit soil verification by local unit of government at time of installation.**

Tradewell Soil Testing
18330 Dahlia Street NW
Cedar, MN 55011

Date: September 20th, 2022

Name: Semler Construction

Address: Lot 6 Block 1 Lake Fannie Acres, Cambridge, MN

SOIL BORING TEST REPORT

Boring #1	**Boring #2**	**Boring #3**	**Boring #4**
0"- 8" Topsoil Loamy Fine Sand 10YR 3/2	0"- 8" Topsoil Loamy Fine sand 10YR 3/3	0"- 12" Topsoil Loamy Fine Sand 10YR 3/2	0"- 8" Topsoil Loamy Fine Sand 10YR 3/2
8"- 18" Loamy Fine Sand 10YR 3/4	8"- 13" Loamy Fine Sand 10YR 4/3	12"- 16" Loamy Fine Sand 10YR 4/3 5/3	8"- 16" Loamy Fine Sand 10YR 4/3 5/3
18"- 26" Silt Loam 10YR 5/2	13"- 30" Loam/ Sandy Loam 7.5YR 3/4	16"- 24" Silty Clay Loam 2.5Y 5/2 6/2	16"- 30" Silty Clay Loam 2.5Y 4/3 5/3 5/2
26"- 34" Medium Sand 10YR 4/6 4/3	20"- 26" Silty Clay Loam 2.5Y 4/3 5/2		
Mottles @ 16" Dry Hole	Mottles @ 13" Dry Hole	Mottles @ 14" Dry Hole	Mottles @ 16" Dry Hole

4- Bedroom, Type 1 Home (600 GPD Flow)
Perc Rate = 6- 15 MPI 1.67 SSF .60 Soil Loading Rate
1500 gallon 2- compartment septic tank
1000 gallon pump tank
500 square feet of drainfield with 6" of rock below the pipe
16 cubic yards or 23 ton of clean rock

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MPCA #307

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Date: September 20th, 2022

Name: Semler Construction

Address: Lot 6 Block 1 Lake Fannie Acres, Cambridge, MN

SOIL BORING TEST REPORT

Boring #5			
0"- 8" Topsoil Loamy Fine Sand 10YR 3/3			
8"- 16" Fine Sandy Loam/ Loam 10YR 4/3 5/3			
16"- 26" Silty Clay Loam 10YR 5/3 5/2			
26"- 34" Fine Sandy Loam 2.5Y 4/3			
Mottles @ 16" Dry Hole			

Mark Tradewell
MPCA #307

MOUND SPECIFICATIONS

- Rock to be 3/4" - 2 1/2" (clean).
- A minimum of 24 inches of clean washed sand fill for separation needed.
- Rock bed size 50' X 10'.
- 23 tons or 16 cubic yards of rock needed.
- 17' of downslope dike width at a 4:1 slope.
- 14' of upslope dike width at a 4:1 slope.
- Mound over-all size at basil (grade) is 80' long X 41' wide.
- Total mound height at downslope side of rock bed is 4.53'.
- 12" of loamy cover plus 6" of topsoil over 12" of rock - 18" total cover over top of rock bed.
- 200 yards of clean washed sand for fill soil under rock bed.
- Seed or sod mound immediately to prevent erosion. Small shrubs or flowers are also acceptable around perimeter or base of mound.

PRESSURE DISTRIBUTION SYSTEM

- 3 laterals with 17- 1/4" perforations per lateral at 3' on center.
- Total of 51- 1/4" perforations
- Use 2" pipe for laterals.
- Use 2" pipe for supply line and manifold.

PUMP SYSTEM

- 4 doses per day at 164 gallons per dose (including drainback).
- Pump must be selected to deliver at least 38 GPM with at least 20 feet of total head.
- Minimum of 1/2 horse pump recommended.
- 1500 gallon 2- compartment septic tank(s) needed.
- 1000 gallon pumping tank.

OSTP Mound Design Worksheet ≥1% Slope

Minnesota Pollution Control Agency

University of Minnesota

1. SYSTEM SIZING:

Project ID: 22259

v 04.06.2017

A. Design Flow:	600	GPD
B. Soil Loading Rate:	0.60	GPD/ft^2
C. Depth to Limiting Condition:	1.1	ft
D. Percent Land Slope:	2.0	%
E. Design Media Loading Rate:	1.2	GPD/ft^2
F. Mound Absorption Ratio:	2.00	

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio		Contour Loading Rate:
≤ 60mpi	← OR →	1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi		5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

TABLE IXa

LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B	
	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate Dispersal Bed Area: Design Flow ÷ Design Media Loading Rate = ft^2

600 GPD ÷ 1.2 GPD/ft^2 = 500 ft^2

If a larger dispersal media area is desired, enter size: 500 ft^2

B. Enter Dispersal Bed Width: 10.0 ft *Can not exceed 10 feet*

C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate

10 ft^2 X 1.2 GPD/ft^2 = 12.0 gal/ft *Can not exceed Table 1*

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area ÷ Bed Width = Bed Length

500 ft^2 ÷ 10.0 ft = 50.0 ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio = Absorption Width

10.0 ft X 2.0 = 20.0 ft

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

Calculate Downslope Absorption Width: Absorption Width - Bed Width

20.0 ft - 10.0 ft = 10.0 ft

4. DISTRIBUTION MEDIA: ROCK

A. Rock Media Depth Below Distribution Pipe

6.00 in 0.5 ft

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media: _____

B. Enter the Component: Length: _____ ft Width: _____ ft Depth: _____ ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)

_____ ft ÷ _____ ft = _____ components/row

D. Actual Bed Length = Number of Components/row X Component Length:

_____ components X _____ ft = _____ ft

E. Number of Rows = Bed Width divided by Component Width (Round up)

_____ ft ÷ _____ ft = _____ rows *Adjust width so this is an whole number.*

F. Total Number of Components = Number of Components per Row X Number of Rows

_____ X _____ = _____ components

6. MOUND SIZING

A. Calculate Minimum Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift

3.0 ft - 1.1 ft = 1.9 ft Design Sand Lift (optional): 2 ft

B. Calculate Upslope Height: Clean Sand Lift + media depth + cover (1 ft.) = Upslope Height

2.0 ft + 0.8 ft + 1.0 ft = 3.8 ft

C. Select Upslope Berm Multiplier (based on land slope): 3.70

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio	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

D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height = Upslope Berm Width

3.70 ft X 3.8 ft = 13.9 ft

E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)

10.0 ft X 2.0 % ÷ 100 = 0.20 ft

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation = Downslope Height

3.8 ft + 0.20 ft = 4.0 ft

G. Select Downslope Berm Multiplier (based on land slope): 4.35

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio	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

H. Calculate Downslope Berm Width: Multiplier X Downslope Height = Downslope Berm Width

4.35 x 4.0 ft = 17.2 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet

10.0 ft + 4 ft = 14.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 17.2 ft

K. Select Endslope Berm Multiplier: 3.70 *(usually 3.0 or 4.0)*

L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width

3.70 ft X 4.0 ft = 14.6 ft

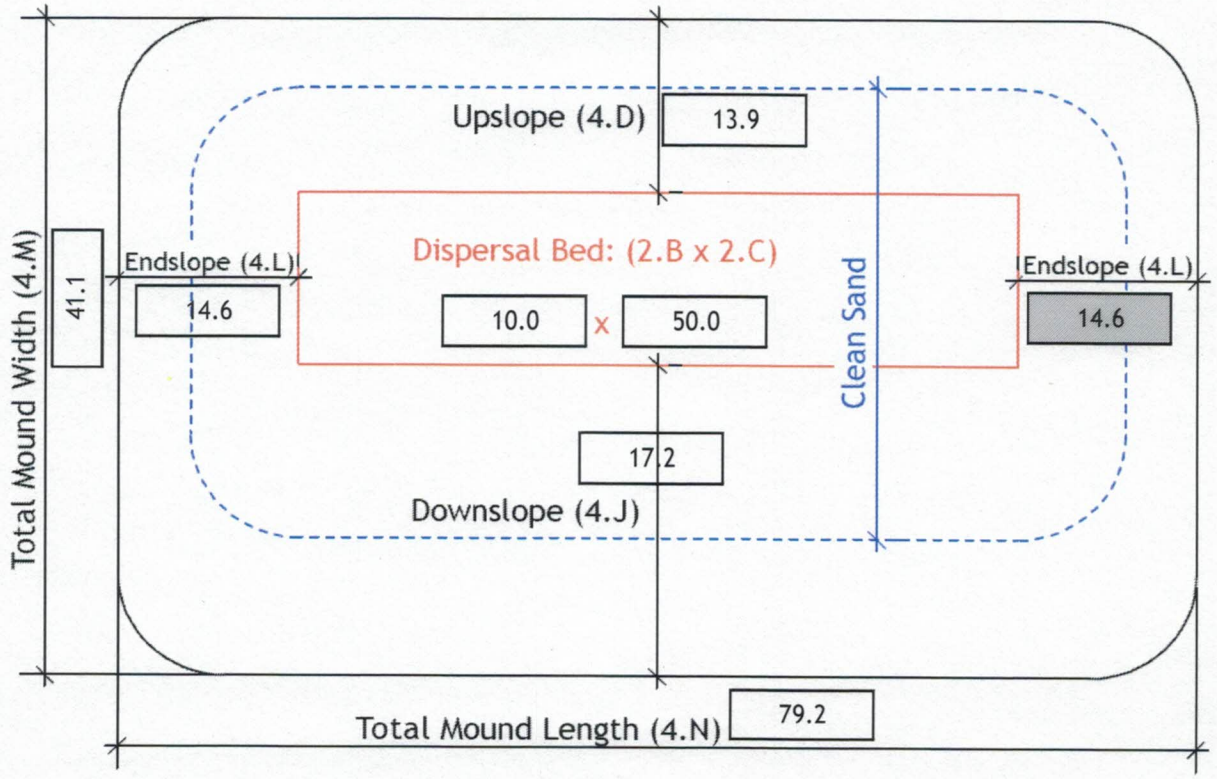
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

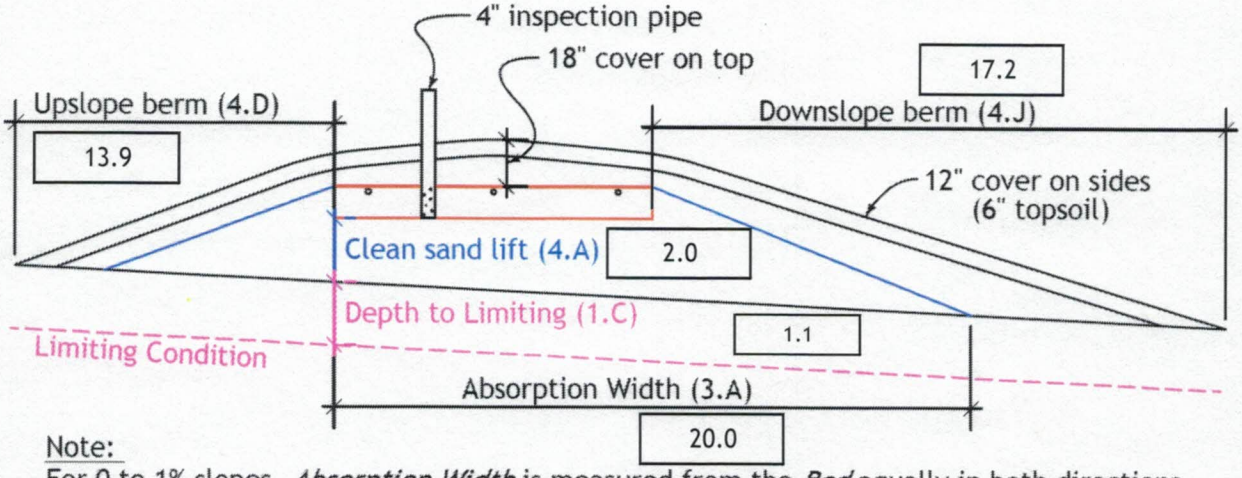
13.9 ft + 10.0 ft + 17.2 ft = 41.1 ft

N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width

14.6 ft + 50.0 ft + 14.6 ft = 79.2 ft

7. MOUND DIMENSIONS





Note:
For 0 to 1% slopes, *Absorption Width* is measured from the *Bed* equally in both directions.
For slopes >1%, *Absorption Width* is measured downhill from the upslope edge of the *Bed*.

Comments:

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

Project ID: 22259 v 04.06.2017

1. Media Bed Width: 10 ft

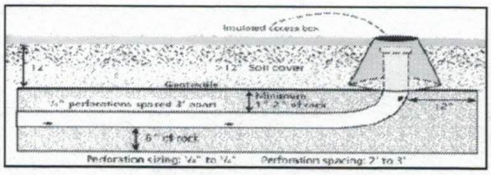
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(10 - 4) ÷ 3] + 1 = 3 laterals *Does not apply to at-grades*

3. Designer Selected *Number of Laterals*: 3 laterals
Cannot be less than line 2 (accept in at-grades)

4. Select *Perforation Spacing*: 3.0 ft

5. Select *Perforation Diameter Size:* 1/4 in



6. *Length of Laterals* = Media Bed Length - 2 Feet.

50 - 2ft = 48 ft *Perforation can not be closer then 1 foot from edge.*

7. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals* by the *Perforation Spacing* and round down to the nearest whole number.

Number of Perforation Spaces = 48 ft ÷ 3 ft = 16 Spaces

8. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces*. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

Perforations Per Lateral = 16 Spaces + 1 = 17 Perfs. Per Lateral

Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

1/4 Inch Perforations						7/32 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3		1	1¼	1½	2	3
2	10	13	18	30	60	2	11	16	21	34	68
2½	8	12	16	28	54	2½	10	14	20	32	64
3	8	12	16	25	52	3	9	14	19	30	60
3/16 Inch Perforations						1/8 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3		1	1¼	1½	2	3
2	12	18	26	46	87	2	21	33	44	74	149
2½	12	17	24	40	80	2½	20	30	41	69	135
3	12	16	22	37	75	3	20	29	38	64	128

9. *Total Number of Perforations* equals the *Number of Perforations per Lateral* multiplied by the *Number of Perforated Laterals.*

17 Perf. Per Lat. X 3 Number of Perf. Lat. = 51 Total Number of Perf.

10. Select *Type of Manifold Connection* (End or Center): end

11. *Select Lateral Diameter (See Table)*: 2.00 in

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

12. Calculate the *Square Feet per Perforation. Recommended value is 4-11 ft² per perforation.*

Does not apply to At-Grades

a. *Bed Area* = Bed Width (ft) X Bed Length (ft)

10	ft	X	50	ft	=	500	ft²

b. *Square Foot per Perforation* = *Bed Area* divided by the *Total Number of Perforations*.

500	ft²	÷	51	perforations	=	9.8	ft²/perforations

13. Select *Minimum Average Head*: 1.0 ft

14. Select *Perforation Discharge* (GPM) based on Table: 0.74 GPM per Perforation

15. Determine required *Flow Rate* by multiplying the *Total Number of Perfs.* by the *Perforation Discharge.*

51	Perfs	X	0.74	GPM per Perforation =	38	GPM

16. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.170 Gallons/ft

17. *Volume of Distribution Piping* =

= [*Number of Perforated Laterals* X *Length of Laterals* X (Volume of Liquid Per Foot of Distribution Piping]

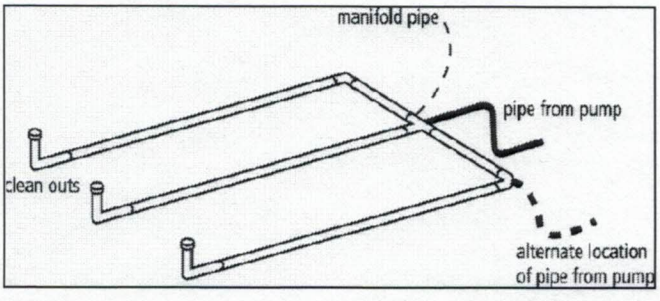
3	X	48	ft	X	0.170	gal/ft	=	24.5	Gallons

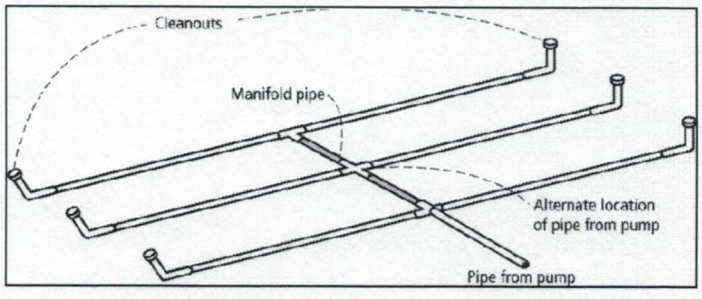
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

24.5	gals	X	4	=	97.9	Gallons

Table II
Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661





Comments/Special Design Considerations:

Minnesota Pollution Control Agency

OSTP Basic Pump Selection Design Worksheet

University of Minnesota

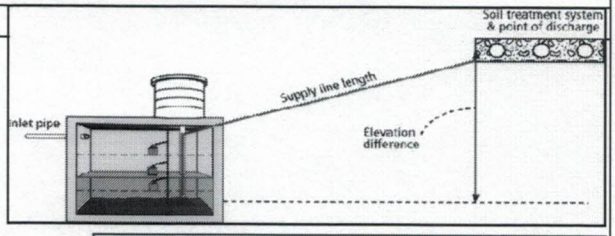
1. PUMP CAPACITY

Project ID: 22259 v 04.06.2017

Pumping to Gravity or Pressure Distribution: Pressure

1. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*
2. If pumping to a pressurized distribution system: 38.0 GPM
3. Enter pump description: Demand Dosing Soil Treatment

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 11 ft

B. Distribution Head Loss: 5 ft

C. Additional Head Loss: _____ ft (due to special equipment, etc.)

Distribution Head Loss	
Gravity Distribution = 0ft	
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:	
Minimum Average Head	**Distribution Head Loss**
1ft	5ft
2ft	6ft
5ft	10ft

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 80 ft

E. **Friction Loss in Plastic Pipe per 100ft** from Table I:

Friction Loss = 3.67 ft per 100ft of pipe

Table I. Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

F. Determine *Equivalent Pipe Length* from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss. *Supply Pipe Length (D.2)* X 1.25 = *Equivalent Pipe Length*

80 ft X 1.25 = 100.0 ft

G. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft* (Line E) by the *Equivalent Pipe Length* (Line F) and divide by 100.

Supply Friction Loss =

3.67 ft per 100ft X 100.0 ft ÷ 100 = 3.7 ft

H. *Total Head* requirement is the sum of the *Elevation Difference* (Line A), the Distribution Head Loss (Line B), Additional Head Loss (Line C), and the Supply Friction Loss (Line G)

11.0 ft + 5.0 ft + _____ ft + 3.7 ft = 19.7 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **38.0** GPM (Line 1 or Line 2) with at least **19.7** feet of total head.

Comments:

Minnesota Pollution Control Agency

OSTP Pump Tank Design Worksheet (Demand Dose)

University of Minnesota

DETERMINE TANK CAPACITY AND DIMENSIONS Project ID: 22259 v 04.06.2017

1. A. *Design Flow (Design Sum.1A)*: 600 GPD

   B. Min. required pump tank capacity: 1000 Gal C. Recommended pump tank capacity: 1000 Gal

2. A. Tank Manufacturer: Brown Wilbert B. Tank Model: 1000

   C. Capacity from manufacturer: 1000 Gallons

   D. Gallons per inch from manufacturer: 23.0 Gallons per inch

   E. Liquid depth of tank from manufacturer: 42.0 inches

   Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.

DETERMINE DOSING VOLUME

3 Calculate *Volume to Cover Pump* (The inlet of the pump must be at least 4-inches from the bottom of the pump tank & 2 inches of water covering the pump is recommended)

(Pump and block height + 2 inches) X *Gallons Per Inch* (2C or 3E)

(12 in + 2 inches) X 23.0 Gallons Per Inch = 322 Gallons

4 *Minimum Delivered Volume* = 4 X Volume of Distribution Piping:

- Line 17 of the Pressure Distribution or Line 11 of Non-level 98 Gallons (minimum dose)

5 Calculate *Maximum Pumpout Volume* (25% of Design Flow)

Design Flow: 600 GPD X 0.25 = 150 Gallons (maximum dose)

6 *Select a pumpout volume that meets both Minimum and Maximum:* 150 Gallons

7 Calculate *Doses Per Day* = Design Flow ÷ *Delivered Volume*

600 gpd ÷ 150 gal = 4 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 80 feet

C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.170 Gallons/ft

D. *Drainback = Length of Supply Pipe* X *Volume of Liquid Per Lineal Foot of Pipe*

80 ft X 0.170 gal/ft = 13.6 Gallons

9. *Total Dosing Volume = Delivered Volume* plus *Drainback*

150 gal + 13.6 gal = 164 Gallons

10. Minimum Alarm Volume = Depth of alarm (2 or 3 inches) X gallons per inch of tank

2 in X 23.0 gal/in = 46.0 Gallons

Volume of Liquid in Pipe	
Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

DEMAND DOSE FLOAT SETTINGS

11. Calculate *Float Separation Distance* using *Dosing Volume*.

Total Dosing Volume /Gallons Per Inch

164 gal ÷ 23.0 gal/in = 7.1 Inches

12. Measuring from bottom of tank:

A. *Distance to set Pump Off Float* = Pump + block height + 2 inches

12 in + 2 in = 14 Inches

B. *Distance to set Pump On Float=Distance to Set Pump-Off Float + Float Separation Distance*

14 in + 7.1 in = 21 Inches

C. *Distance to set Alarm Float = Distance to set Pump-On Float + Alarm Depth* (2-3 inches)

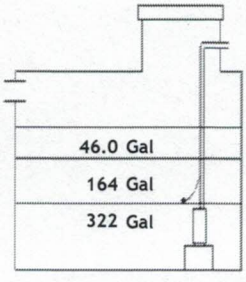
21 in + 2.0 in = 23 Inches

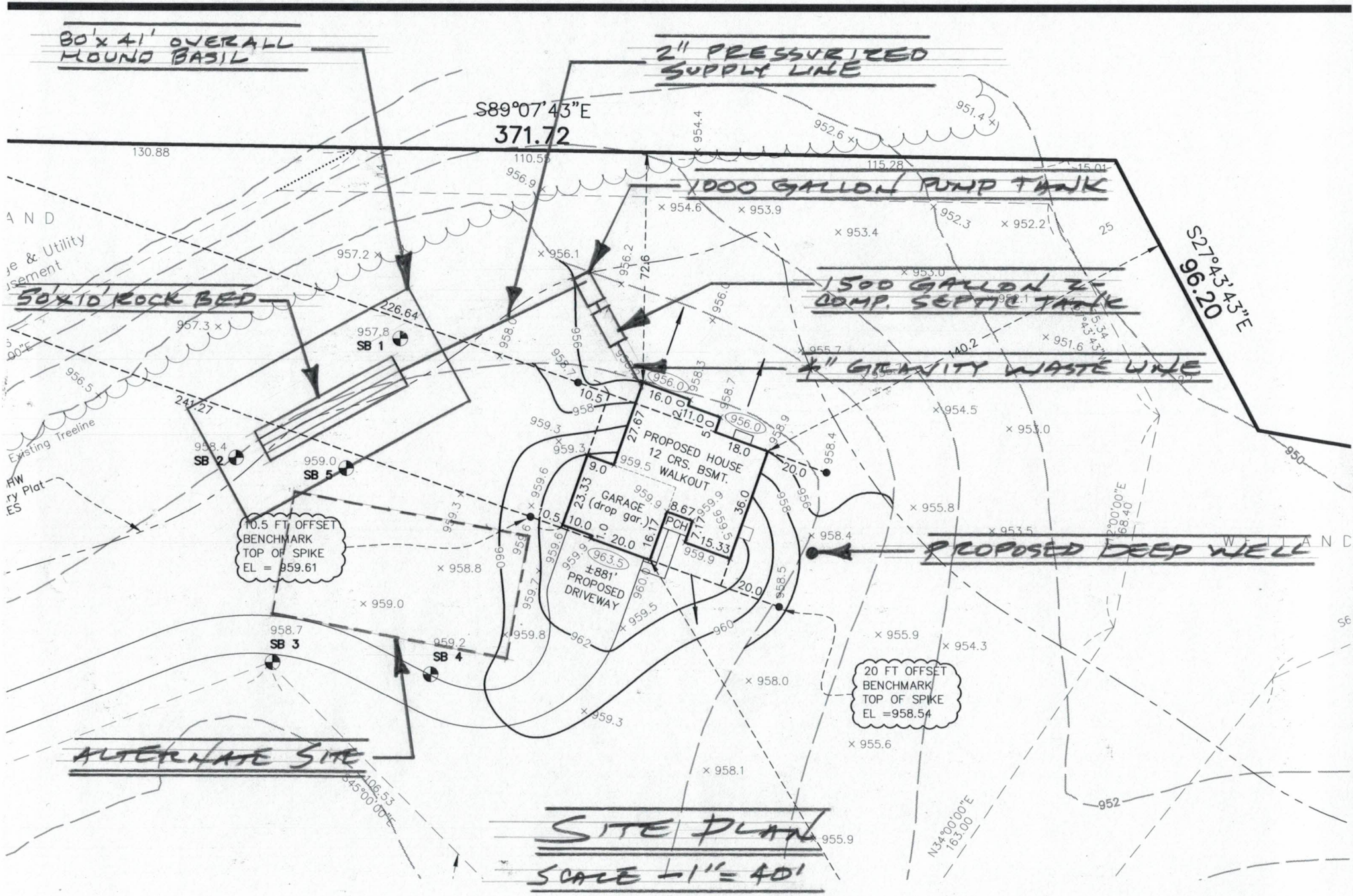
Inches for Dose: 7.1 in

Alarm Depth 23.1 in

Pump On 21.1 in

Pump Off 14.0 in




80'x41' OVERALL MOUND BASIL
2" PRESSURIZED SUPPLY LINE
S89°07'43"E
371.72
1000 GALLON PUMP TANK
1500 GALLON 2 COMP. SEPTIC TANK
4" GRAVITY WASTE LINE
S27°43'43"E
96.20
50'x10' ROCK BED
PROPOSED HOUSE
12 CRS. BSMT.
WALKOUT
GARAGE
(drop gar.)
PCH
PROPOSED DEEP WELL
±881'
PROPOSED
DRIVEWAY
SB 1
SB 2
SB 3
SB 4
SB 5
10.5 FT OFFSET
BENCHMARK
TOP OF SPIKE
EL = 959.61
20 FT OFFSET
BENCHMARK
TOP OF SPIKE
EL =958.54
ALTERNATE SITE
SITE PLAN
SCALE 1"= 40'

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

UNIVERSITY OF MINNESOTA

Property Owner/Client: Semler Construction | **Project ID:** 22259 | v 04.06.2017

Site Address: Lot 6 Block 1 Lake Fannie Acres, Cambridge, MN | **Date:** 9/20/2022

Email Address: | **Phone Number:**

1. DESIGN FLOW, STRENGTH OF WASTE, AND TANKS

A. Design Flow: 600 Gallons Per Day (GPD) Number of Bedrooms (Residential): 4

Type of Wastewater: Residential Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

Other Est. flow (select method and provide data): ☐ Measured Flow: GPD ☑ Estimated Flow: 600 GPD

Other Est. waste strength (attach data or estimate basis): BOD: mg/L TSS: mg/L Oil&Grease: mg/L

B. Septic Tank Sizing

1. Residential dwellings

Min Code Required Septic Tank Capacity: 1500 Gallons, in 1 Tanks or Compartments

Recommended Septic Tank Capacity: 1500 Gallons, in 2 Tanks or Compartments

2. Other Establishments

Waste received by:

Min Code Required Septic Tank Capacity: GPD X = Gallons, in Tanks or Compartments

Designer Recommended Septic Tank Capacity: Gallons, in Tanks or Compartments

3. Effluent Screen & Alarm (Y/N): Manufacturer/Model:

C. Holding Tanks Only: Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Minimum Code Required Capacity: Gallons, in Tanks Type of High Level Alarm:

Designer Recommended Capacity: Gallons, in Tanks

D. Pump Tank 1 Capacity (Code Minimum): 1000 Gallons Pump Tank 2 Capacity (Code Minimum): Gallons

Pump Tank 1 Capacity (Designer Rec): 1000 Gallons Pump Tank 2 Capacity (Designer Rec): Gallons

Pump 1 38.0 GPM Total Head 19.7 ft Pump 2 GPM Total Head ft

Supply Pipe Dia. 2.00 in Dose Volume: 150.0 gal Supply Pipe Dia. in Dose Volume: gal

2. SYSTEM AND DISTRIBUTION TYPE

Soil Treatment Area Type: Mound Distribution Type: Pressure Distribution-Level

Benchmark Reference Elevation: 959.60 ft Benchmark Location: Left Front Offset

MPCA System Type: Type I Type of Distribution Media: ☑ Drainfield Rock ☐ Registered Treatment Media:

Type III/IV Details:

3. SITE EVALUATION SUMMARY:

A. Depth to Limiting Layer: 13 in 1.1 ft

B. Elevation of Limiting Layer: 957.3

C. Loc. of Restrictive Elevation: Boring #2

D. Minimum Required Separation: 36 in 3.0 ft

E. Code Maximum Depth of System: Mound in

F. Measured Land Slope: 2.0 %

G. Soil Texture: Loamy Fine Sand

H. Soil Hyd. Loading Rate: 0.60 GPD/ft^2

I. Perc Rate: 10.0 MPI

J. Soil with >35% Rock Fragments Present? ☐ Yes ☑ No

If yes describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Comments:

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

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4. SOIL TREATMENT AREA DESIGN SUMMARY

Trench Design Summary

Dispersal Area	ft²	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	Number of Trenches		Code Maximum Trench Depth	in
Contour Loading Rate	ft	Min Trench Length	ft	Designer's Max Trench Depth	in

Bed Design Summary

Absorption Area	ft²	Depth of sidewall	in	Code Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designer's Max Bed Depth	in

Mound Design Summary

Absorption Bed Area	500.0 ft²	Bed Length	50.0 ft	Bed Width	10.0 ft
Absorption Width	20.0 ft	Clean Sand Lift	2.0 ft	Berm Width (0-1%)	ft
Upslope Berm Width	13.9 ft	Downslope Berm Width	17.2 ft	Endslope Berm Width	14.6 ft
Total System Length	79.2 ft	Total System Width	41.1 ft	Contour Loading Rate	12.0 gal/ft

At-Grade Design Summary

Absorption Bed Width	ft	Absorption Bed Length	ft	System Finished Height	ft
Contour Loading Rate	gal/ft	Upslope Berm Width	ft	Downslope Berm Width	ft
Endslope Berm Width	ft	System Length	ft	System Width	ft

Level & Equal Pressure Distribution Summary

No. of Perforated Laterals	3	Perforation Spacing	3 ft	Perforation Diameter	1/4 in
Lateral Diameter	2.00 in	Min. Delivered Volume	98 gal	Maximum Delivered Volume	150 gal

Non-Level and Unequal Pressure Distribution Summary

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perforation Size (in)	Spacing (ft)	Spacing (in)
Lateral 1							
Lateral 2							
Lateral 3							
Lateral 4							
Lateral 5							
Lateral 6							

Minimum Delivered Volume _____ gal

Maximum Delivered Volume _____ gal

5. Additional Info for At-Risk, HSW or Type IV Design

A. ***Calculate the organic loading***

1. *Organic Loading to Pretreatment Unit = Design Flow* X *Estimated BOD* in mg/L in the effluent X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs. BOD/day

2. Type of Pretreatment Unit Being Installed: _____

3. Calculate *Soil Treatment System Organic Loading: BOD concentration after pretreatment ÷ Bottom Area* = lbs./day/ft²

_____ mg/L X 8.35 ÷ 1,000,000 ÷ _____ ft² = _____ lbs./day/ft²

Comments/Special Design Considerations:

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

Mark Tradewell		307	09/20/22
(Designer)	(Signature)	(License #)	(Date)

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Septic System Management Plan for Above Grade Systems

The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

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 maintainer or service provider. However, it is **YOUR** responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota's *Septic System Owner's Guide* contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

Property Owner Tony Zerwas	Email
Property Address XXXX 317th Avenue NE	Property ID
System Designer Mark Tradewell	Contact Info (763) 286-9095
System Installer Rick's Plumbing	Contact Info (763) 753-1935
Service Provider/Maintainer	Contact Info
Permitting Authority Isanti County	Contact Info (763) 689-5165
Permit #	Date Inspected

Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-built of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the *Septic System Owner's Guide*, visit www.bookstores.umn.edu and search for the word "septic" or call 800-322-8642.

For more information see http://septic.umn.edu

Version: August 2015

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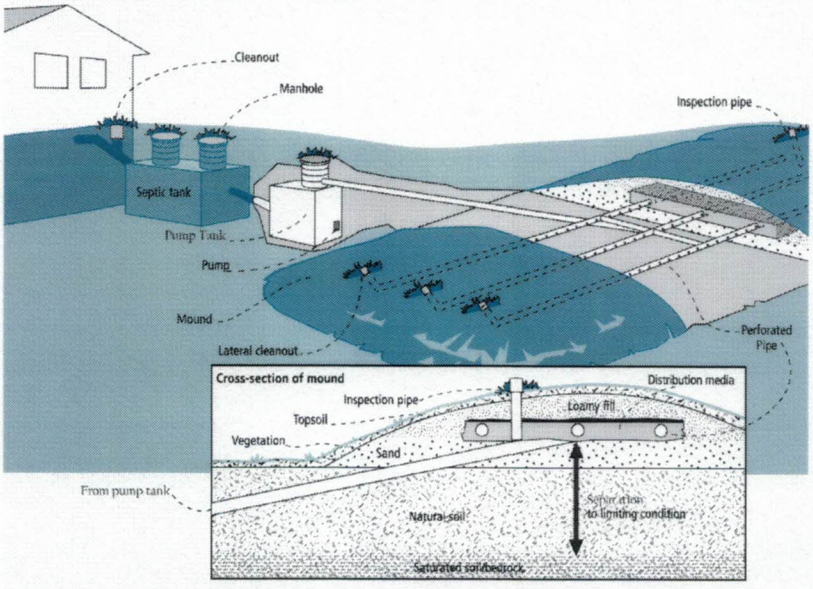
Septic System Management Plan for Above Grade Systems

Your Septic System



Septic System Specifics

System Type: (●) I ( ) II ( ) III ( ) IV* ( ) V*

(Based on MN Rules Chapter 7080.2200 – 2400)

**Additional Management Plan required*

☐ System is subject to operating permit*

☐ System uses UV disinfection unit*

Type of advanced treatment unit _____

Dwelling Type

Number of bedrooms: 4

System capacity/ design flow (gpd): 600

Anticipated average daily flow (gpd): 360

Comments _____

Business? : ( ) Y (●) N What type? _____

Well Construction

Well depth (ft): _____

- ❑ Cased well Casing depth: ??
- ❑ Other (specify): _____

Distance from septic (ft): 100'+

Is the well on the design drawing? (●) Y ( ) N

Septic Tank

- ❑ First tank *Tank volume:* 1500 *gallons*
  Does tank have two compartments? (●) Y ( ) N
- ❑ Second tank *Tank volume:* _____ *gallons*
- ❑ Tank is constructed of Precast Concrete
- ❑ Effluent screen: ( ) Y (●) N Alarm ( ) Y (●) N

- ❑ Pump Tank 1000 *gallons*
- ❑ Effluent Pump *make/model:* Gould PE51
  Pump capacity 38 GPM
  TDH 20 Feet of head
- ❑ Alarm location Post

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 80 ft x 41 ft

Rock bed size (width x length): 50 ft x 10 ft

Location of additional STA: Adjacent

Type of distribution media: Rock

☐ Inspection ports ☐ Cleanouts

☐ Surface water diversions

☐ Additional STA not available