ENVIRONMENTAL SYSTEMS LLC.

2358 HWY# 23
MORA MN. 55051
Ph. 320-241-7036

DESIGN

11/18/2024

LOCATION: 44517 FLEMING RD. HINCKLEY MN
PID 090088001

OWNER: MELANIE BENJAMIN

SYSTEM TYPE: TYPE III MOUND
DESIGN FLOW: 6 BEDROOM DESIGNED @ 900 GPD
TREATMENT AREA: 750 SQ.FT.
SLOPE: 1.5 %
SEPTIC TANK: 2500 GAL. SPLIT/COMBO
PUMP TANK: 1000 GAL.
PUMP: GOULDS WE0511H
FLOW CONTROL AND METER: SJE RHOMBUS
MOD# EZS11W124H1J6A8AC10EP15A17A

KEVIN HERWIG M.P.C.A. 3945

CONSTRUCTION NOTES

PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. BROWN-WILBERT TANKS – SEPTIC 2500 GAL. COMBO WITH POLYLOK PL-122 FILTER AND ALARM, PUMP TANK 1000 GAL. BROWN-WIFLBERT PUMP – GOULDS WE0511H ** PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED.

SJE RHOMBUS EZPIIW6COHIJV8GI0EP17A22C CONTROLIT IS THE DESIGNER'S DISCRETION TO APPROVE OR DISAPPROVE SUBSTITUTIONS.THE INSTALLER WILL BE RESPONSIBLE FOR DESIGN CHANGE FEE.

ALL PRODUCTS AND CONSTRUCTION PRACTICES ARE TO MEET M.P.C.A. 7080 RULE AND MILLE LACS BAND SPECIFICATION FOR SEWAGE TREATMENT SYSTEMS

***Note The old drain field was unable to be located the new system may possibly be over part of the existing system.**

KEVIN HERWIG LIC # 3945 11/18/2024

ONSITE SEWAGE TREATMENT PROGRAM

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Contact Information

v 04.02.2024

Property Owner/Client:	MELANIE BENJAMIN	Date Completed:	11/18/2024
Site Address:	44517 FLEMING RD. HINCKLEY MN. 55037	Project ID:	
Email:	melaniecorn@frontiernet.net	Phone:	320-333-9609
Mailing Address:		Alt Phone:	
Legal Description:			

Parcel ID: 090088001 SEC: 10 TWP: 041 RNG: 018

2. Flow and General System Information

A. Client-Provided Information

Project Type: ☐ New Construction ☑ Replacement ☐ Expansion ☐ Repair

Project Use: ☑ Residential ☐ Other Establishment:

Residential use: # Bedrooms: 6 Dwelling sq.ft.: NA Unfinished sq.ft.:

Adults: NA # Children: 6 # Teenagers:

In-home business (Y/N): No If yes, describe:

Water-using devices: *(check all that apply)*

- ☐ Garbage Disposal/Grinder
- ☐ Dishwasher
- ☐ Hot Tub*
- ☐ Sewage pump in basement
- ☐ Water Softener*
- ☐ Sump Pump*
- ☐ Large Bathtub >40 gallons
- ☐ Iron Filter*
- ☐ Self-Cleaning Humidifier*
- ☐ Clothes Washing Machine
- ☑ High Eff. Furnace*
- ☐ Other:

* Clear water source - should not go into system

Additional current or future uses:

Anticipated non-domestic waste:

The above is complete & accurate: *Client signature & date*

B. Designer-determined Flow and Anticipated Waste Strength Information

Attach additional information as necessary.

Design Flow: 900 GPD Anticipated Waste Type: Residential

Maximum Concentration BOD: 170 mg/L TSS 60 mg/L Oil & Grease 25 mg/L

3. Preliminary Site Information

A. Water Supply Wells

#	Description	Mn. ID#	Well Depth (ft.)	Casing Depth (ft.)	Confining Layer	STA Setback	Source
1	166' away from treatment						
2							
3							
4							

Additional Well Information:

University of Minnesota Onsite Sewage Treatment Program

Field Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Project Information

v 04.02.2024

Property Owner/Client: MELANIE BENJAMIN | **Project ID:**

Site Address: 44517 FLEMING RD. HINCKLEY MN. 55037 | **Date Completed:** 11/18/2024

2. Utility and Structure Information

Utility Locations Identified ☐ Gopher State One Call # | ☐ Any Private Utilities:

Locate and Verify (*see Site Evaluation map*) ☑ Existing Buildings ☐ Improvements ☐ Easements ☑ Setbacks

3. Site Information

Vegetation type(s): Lawn | **Landscape position:** Shoulder

Percent slope: 2.0 % | **Slope shape:** Linear, Linear | **Slope direction:** southeast

Describe the flooding or run-on potential of site:

Describe the need for Type III or Type IV system: REDOX IN THE TOP 12"

Note:

Proposed soil treatment area protected? (Y/N): Yes | **If yes, describe:** STAKED

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): No

If yes, describe:

Soil observations were conducted in the proposed system location (Y/N): Yes

A soil observation in the most limiting area of the proposed system (Y/N): Yes

Number of soil observations: 3 | **Soil observation logs attached (Y/N):** Yes

Percolation tests performed & attached (Y/N): No

5. Phase I. Reporting Information

	Depth		Elevation	
Limiting Condition*:	10	in	99.32	ft
Periodically saturated soil:	10	in	99.32	ft
Standing water:		in		ft
Bedrock:	16	in	98.80	ft

*Most Restrictive Depth Identified from List Below

Soil Texture: Fine Sandy Loam

Percolation Rate: min/inch

Soil Hyd Loading Rate: 0.60 gpd/sq.ft

Benchmark Elevation: 100.0 ft | **Elevations and Benchmark on map? (Y/N):** Yes

Benchmark Elevation Location: CONCRETE SLAB ORANGE DOT

Differences between soil survey and field evaluation: NO SURVEY

Site evaluation issues / comments:

Anticipated construction issues:

University of Minnesota Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.02.2024

Client:	MELANIE BENJAMIN	Location / Address:	44517 FLEMING RD. HINCKLEY MN. 55037

Soil parent material(s): (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	2.0	Slope shape:	Linear, Linear
Flooding/Run-On potential:					
Vegetation:	Lawn	Soil survey map units:	NA	Surface Elevation-Relative to benchmark:	100.07
Date/Time of Day/Weather Conditions:		9am		pc	
Limiting Layer Elevation:	99.24				
Observation #/Location:	1	ne		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)		Mottle Color(s)		Redox Kind(s)	Indicator(s)	Structure Shape	Structure Grade	Structure Consistence
0-6	Fine Sandy Loam	6	5YR	3/3					Granular	Weak	Friable
6-12	Fine Sandy Loam	6	7.5YR	4/4	5YR	5/8	Concentrations	S2	Blocky	Weak	Friable
					10YR	5/4	Depletions	S2			
12-16	Fine Sandy Loam	4	10YR	4/4	5YR	5/6	Concentrations	S2	Platy	Weak	Friable
16-19	Medium Sandy Loam	50	5YR	4/4	5YR	4/6	Concentrations	S2	Blocky	Weak	Extremely Firm
					5YR	5/3	Depletions	S2			
19-40	Medium Loamy Sand	45	5YR	4/3	5YR	4/6	Concentrations	S2	Blocky	Moderate	Firm

Comments: 19"to 40" Extremely hard even when digging with an excavator .Once excavated it looks gravely/sandy it resembles a hard pan type material

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

KEVIN HERWIG		3945	11/18/2024
(Designer/Inspector)	(Signature)	(License #)	(Date)

Optional Verification: I hereby certify that this soil observation was verified according to Minn. R. 7082.0500 subp. 3 A. The signature below represents an infield verification of the periodically saturated soil or bedrock at the proposed soil treatment and dispersal site.

(LGU/Designer/Inspector)	(Signature)	(Cert #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.02.2024

Client:	MELANIE BENJAMIN	Location / Address:	44517 FLEMING RD. HINCKLEY MN. 55037

Soil parent material(s): (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %: 2.0	Slope shape: Linear, Linear
Flooding/Run-On potential:			
Vegetation:	Lawn	Soil survey map units:	NA
Surface Elevation-Relative to benchmark:	99.04		
Date/Time of Day/Weather Conditions:	9am		pc
Limiting Layer Elevation:	98.20		
Observation #/Location:	2	W CENTER	
Observation Type:	Pit		

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Fine Sandy Loam	6	5YR 3/3				Granular	Weak	Friable
6-12	Fine Sandy Loam	6	7.5YR 4/4	5YR 5/8	Concentrations	S2	Blocky	Weak	Friable
				10YR 5/4	Depletions	S2			
12-18	Fine Sandy Loam	4	10YR 4/4	5YR 5/6	Concentrations	S2	Platy	Weak	Friable
				10YR 5/6	Depletions	S2			
18-22	Medium Loamy Sand	50	5YR 4/4	5YR 4/6	Concentrations	S2	Blocky	Weak	Extremely Firm
22-36	Medium Loamy Sand	40	5YR 4/3	5YR 4/6	Concentrations	S2	Blocky	Moderate	Extremely Firm
				5YR 5/3	Depletions	S2			

Comments: 18" to 22" Extremely hard and rocky even when digging with an excavator .

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

KEVIN HERWIG		3945	11/18/2024
(Designer/Inspector)	(Signature)	(License #)	(Date)

Optional Verification: I hereby certify that this soil observation was verified according to Minn. R. 7082.0500 subp. 3 A. The signature below represents an infield verification of the periodically saturated soil or bedrock at the proposed soil treatment and dispersal site.

(LGU/Designer/Inspector)	(Signature)	(Cert #)	(Date)

UNIVERSITY OF MINNESOTA
ONSITE SEWAGE TREATMENT PROGRAM

Soil Observation Log

Project ID:

v 04.02.2024

Client:	MELANIE BENJAMIN	Location / Address:	44517 FLEMING RD. HINCKLEY MN. 55037

Soil parent material(s): (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %: 2.0	Slope shape: Linear, Linear
Flooding/Run-On potential:			
Vegetation:	Lawn	Soil survey map units:	NA
Surface Elevation-Relative to benchmark:	99.50		
Date/Time of Day/Weather Conditions:	9am		pc
Limiting Layer Elevation:	98.65		
Observation #/Location:	3	S.END CENTER	Observation Type: Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Fine Sandy Loam	6	5YR 3/3				Granular	Weak	Friable
6-11	Fine Sandy Loam	6	10YR 4/4	5YR 5/8	Concentrations	S2	Blocky	Weak	Friable
				10YR 5/4	Depletions	S2			
11-18	Fine Sandy Loam	4	10YR 4/4	5YR 5/6	Concentrations	S2	Platy	Weak	Friable
				10YR 5/4	Depletions	S2			

Comments:

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

KEVIN HERWIG		3945	11/18/2024
(Designer/Inspector)	(Signature)	(License #)	(Date)

Optional Verification: I hereby certify that this soil observation was verified according to Minn. R. 7082.0500 subp. 3 A. The signature below represents an infield verification of the periodically saturated soil or bedrock at the proposed soil treatment and dispersal site.

(LGU/Designer/Inspector)	(Signature)	(Cert #)	(Date)

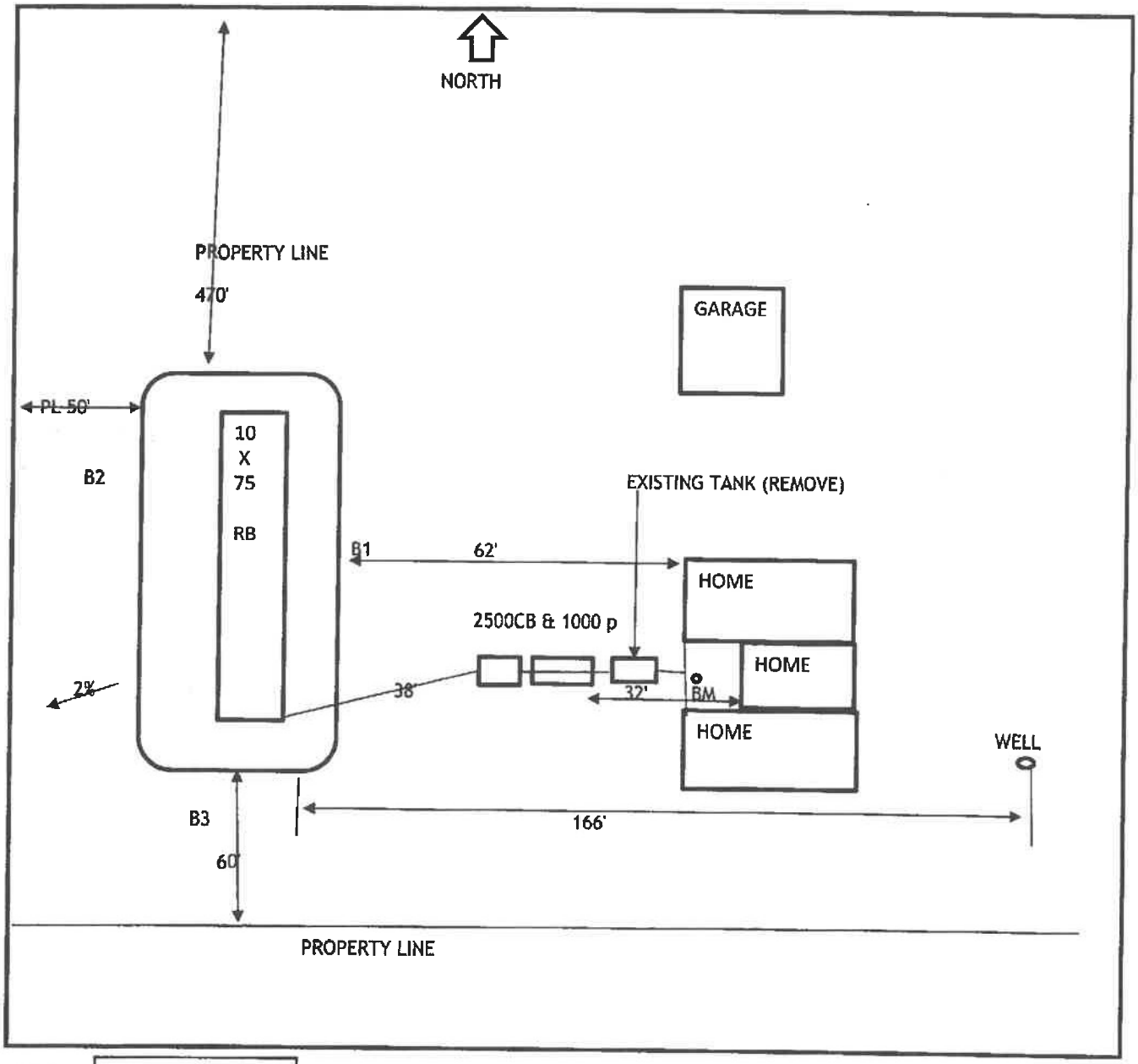
ONSITE SEWAGE TREATMENT PROGRAM

Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.02.2024

Property Owner/Client: MELANIE BENJAMIN



Map scale: NONE ☑ Indicated north ☐ Show slope/contours

Elevations in feet

Benchmark Elev: 100 ft Benchmark Location: CONCRETE SLAB DOT

System Corners: Soil Observation:

Corner 1	100.09 ft	#1:	99.93 ft	TANK INLET	98 ft
Corner 2	100.15 ft	#2:	99.04 ft	Other:	
Corner 3	99.51 ft	#3:	99.5 ft	PUMP TANK INLET	97.4 ft
Corner 4	100.05 ft	#4:	ft		ft

System Corners

1 2

3 4 N

Date Completed: 11/18/2024

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

Minnesota Pollution Control Agency

1. PROJECT INFORMATION

v 04.02.2024

Property Owner/Client:	MELANIE BENJAMIN	Project ID:	
Site Address:	44517 FLEMING RD. HINCKLEY MN. 55037	Date:	11/18/24
Email Address:	melaniecorn@frontiernet.net	Phone:	320-333-9609

2. DESIGN FLOW & WASTE STRENGTH

Design Flow: 900 GPD Anticipated Waste Type: Residential

BOD: 170 mg/L TSS: 60 mg/L Oil & Grease: 25 mg/L

Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

3. HOLDING TANK SIZING

Holding Tank Sizing: see 7080.2290

Code Minimum **Holding Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

Recommended **Holding Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

The holding tank(s) will be: _____ *Existing tank reuse requires a tank integrity assessment*

Type of High Level Alarm: _____

(Alarm Set @ 75% tank capacity measured from inlet to bottom)

Comments: _____

4. SEPTIC TANK SIZING

Sizing: See 7080.1930

A. Residential dwellings:

Number of Bedrooms (Residential): 6

Code Minimum **Septic Tank** Capacity: 2000 Gallons with 1 Tanks or Compartments

Recommended **Septic Tank** Capacity: 2500 Gallons with 2 Tanks or Compartments

The septic tank(s) will be: All New *Existing tank reuse requires a tank integrity assessment*

Comments: _____

Effluent Screen & Alarm (Y/N): Yes Model/Type: PL122 POLYLOK

B. Other Establishments:

Waste received by: _____ _____ GPD x _____ Days Hyd. Retention Time

7080 Minimum **Septic Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

Designed **Septic Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

The septic tank(s) will be: _____ *Existing tank reuse requires a tank integrity assessment*

Comments: _____

Effluent Screen & Alarm (Y/N): _____ Model/Type: _____

*** Other Establishments Require Department of Labor and Industry Approval and Inspection for Building Sewer ***

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

Minnesota Pollution Control Agency

5. PUMP TANK SIZING *Sizing: see 7080.2100*

Soil Treatment Dosing Tank				Other Component Dosing Tank:			
Pump Tank Capacity (7080 Minimum):	900 Gal			Pump Tank Capacity (7080 Minimum):	Gal		
Pump Tank Capacity (Designed):	1000 Gal			Pump Tank Capacity (Designed):	Gal		
Pump Req:	56.0 GPM	Total Head	18.6 ft	Pump Req:	GPM	Total Head	ft
Supply Pipe Dia.	2.00 in	Dose Vol:	225.0 gal	Supply Pipe Dia.	in	Dose Vol:	Gal

* Flow measurement device must be incorporated for any system with a pump *

6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

Soil Treatment Type:	Mound	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	100.00 ft	Benchmark Location:	CONCRETE SLAB ORANGE DOT
MPCA System Type:	Type III	Distribution Media:	Rock
Type III/IV/V Details:	REDOX LESS THAN 12"		

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (yes/no) Yes If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note: 16" aprox 50% using a type III mound

	Depth		Depth		Elevation	
Limiting Condition:	10.0	inches	0.83	ft	99.32	ft
Minimum Req'd Separation:	36	inches	3.00	ft		
Distribution Media Bottom*:	Mound	inches	-2.17	ft	Elevation 103.15	ft

Elevations are critical for system compliance.

Media Bottom Elevation OK

*This is the maximum depth to the bottom of the distribution media for required separation. Negative Depth (ft) requires a mound.

Designed Distribution Bottom Elevation: 103.15 ft Mound Minimum Sand Depth: 36 inches

A. Soil Texture: Fine Sandy Loam

B. Soil Hyd. Loading Rate: 0.60 GPD/ft^2 C: Percolation Rate: MPI

D. Contour Loading Rate: 12.0 Note:

E. Measured Land Slope: 1.5 % Note:

Comments:

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	sq.ft	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Minimum Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	sq.ft	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

Minnesota Pollution Control Agency

Project ID:

Mound:

Dispersal Area	750.0	sq.ft	Bed Length	75.0	ft	Bed Width	10.0	ft
Absorption Width	20.0	ft	Clean Sand Lift	3.0	ft	Berm Width (0-1%)		ft
Upslope Berm Width	14.4	ft	Downslope Berm	16.2	ft	Endslope Berm Width	15.5	ft
Total System Length	105.9	ft	System Width	40.5	ft	Contour Loading Rate	12.0	gal/ft

At-Grade:

Dispersal Area		sq.ft	Bed Length		ft	Bed Width		ft
Upslope Berm		ft	Downslope Berm		ft	Finished Height		ft
System Length		ft	Endslope Berm		ft	System Width		ft

Level & Equal Pressure Distribution Soil Treatment Area

No. of Laterals	3		Lateral Diameter	2.00	in	Lateral Spacing	2.0	ft
Perforation Spacing	3.0	ft	Perforation Diameter	1/4	in	Drainback Volume	6.5	gal
Min Dose Volume	148.9	gal	Max Dose Volume	225.0	gal	Total Dosing Volume	231.5	gal

Non-Level and Unequal Pressure Distribution Soil Treatment Area

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

Minimum Dose Volume ____ gal

Maximum Dose Volume ____ gal

Total Dosing Volume ____ gal

9. Organic Loading and Additional Info for HSW or Type IV/V Design - See Organic Loading tab

Organic Loading to Soil Treatment (Based on Waste Strength Data and Organic Loading Design)

A. Organic Loading Based on: ____ B. Minumum required area ____ sq.ft

Technology Strength Reduction (Tretment Level or HSW)

A. Starting Waste Strength ____ Treatment desinged to meet: ____

Pretreatment Technology: ____ *Must Meet or Exceed Target Level

Model: ____ Units: ____

Disinfection Technology: ____ *Required for Levels A & B

Model: ____ Units: ____

10. Comments/Special Design Considerations:

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

KEVIN HERWIG		3945	11/18/2024

Onsite Sewage Treatment Program

Mound Design Worksheet
≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: v 04.02.2024

A. Design Flow:	900	GPD
B. Soil Loading Rate:	0.60	GPD/sqft
C. Depth to Limiting Condition		ft
D. Percent Land Slope:	1.5	%
E. Media (Sand) Loading Rate:	1.2	GPD/sqft
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 →	1.9, 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/ft²)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft²)	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	0.6	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. Hydraulic Absorption Required Bottom Area: Design Flow (1A) ÷ Design Media Loading Rate(1E)

900 GPD ÷ 1.20 GPD/sqft = 750.0 sq.ft

Optional Upsizing of Dispersal Media Area

B. Larger Bed Area Size or Organic Sizing of Bed Area *[see organic loading sheet(2G)]* sq.ft

C. Designed Dispersal Media Area: 750.0 sq.ft *Larger of 2A or 2B*

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

E. Calculate Contour Loading Rate: Bed Width(2D) X Design Media Loading Rate(1E)

10.0 ft X 1.2 GPD/sqft = 12.0 gal/ft *Can not exceed Table 1*

F. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area(2C) ÷ Bed Width(2D)

750 sqft ÷ 10.0 ft = 75.0 ft

If a larger dispersal media Length is desired, enter Length(ft): ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width(2D) X Mound Absorption Ratio(1F)

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(3A) - Bed Width(2D)

20.0 ft - 10.0 ft = 10.0 ft

4. DISTRIBUTION MEDIA: Project ID:

Select Dispersal Media: Rock — Enter Either 4A or 4B

A. Rock Depth Below Distribution Pipe

6 in

B. Registered Media

Registered Media Depth in

Check registered product information for specific application details and design

Specific Media Comments:

5. MOUND SIZING Project ID:

A. Clean Sand Lift: Required Separation - Depth to Limiting Condition = Clean Sand Lift (1 ft minimum)

3.00 ft - ft = 3.00 ft Design Sand Lift (optional): 3 ft

B. Upslope Height: Clean Sand Lift(5A) + Depth of Media(4AorB) +Depth to Cover Pipe+ Depth of Cover (1 ft)

3.00 ft + 0.50 ft + 0.50 ft + 1.00 ft = 5.00 ft

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

C. Select Upslope Berm Multiplier (based on land slope): 2.87

D. Calculate Upslope Berm Width: Multiplier (5C) X Upslope Mound Height (5B)

2.87 X 5.00 ft = 14.35 ft

E. Calculate Drop in Elevation Under Bed: Bed Width(2D) X Land Slope(1D) ÷ 100 = Drop (ft)

10.00 ft X 1.5 % ÷ 100 = 0.15 ft

F. Calculate Downslope Mound Height: Upslope Height(5B) + Drop in Elevation(5E)

5.00 ft + 0.15 ft = 5.15 ft

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

G. Select Downslope Berm Multiplier (based on land slope): 3.14

H. Calculate Downslope Berm Width: Downslope Multiplier(5G) X Downslope Height (5F)

3.14 x 5.15 ft = 16.17 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width(3B) + 4 feet

10.00 ft + 4.00 ft = 14.00 ft

J. Design Downslope Berm = greater of 5H and 5I: 16.17 ft

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

L. Calculate Endslope Berm Width = Endslope Berm Multiplier(5K) X Downslope Mound Height(5F)

3.00 X 5.2 ft = 15.45 ft

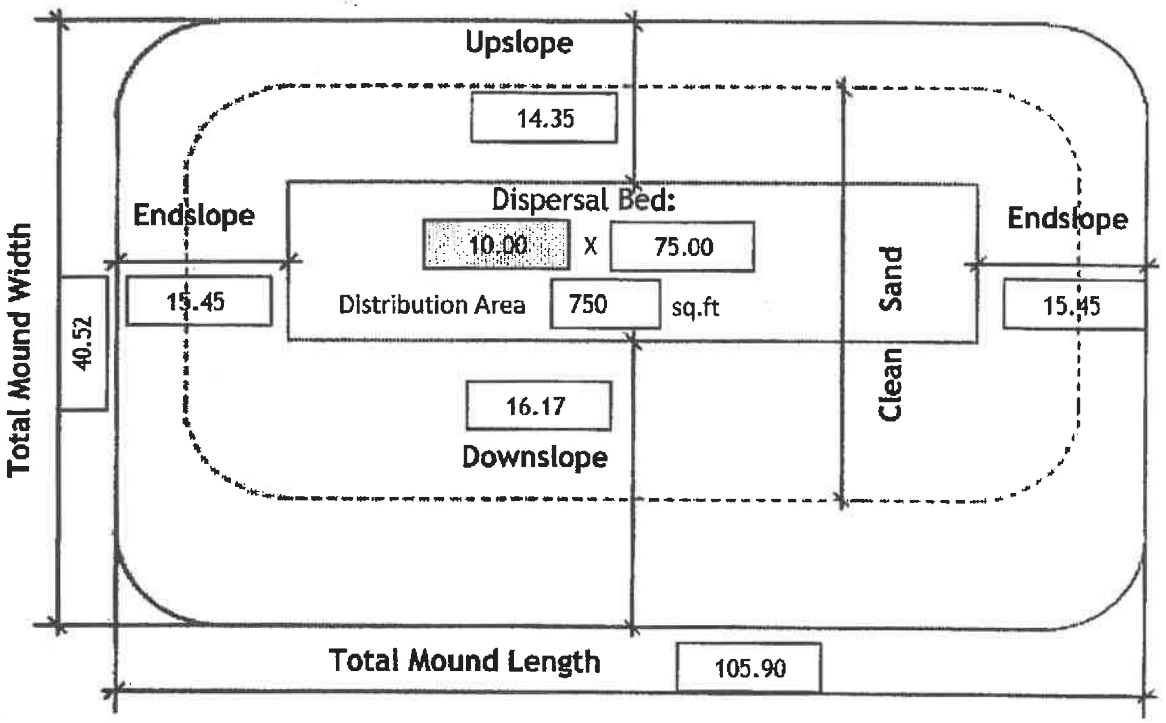
M. Calculate Mound Width: Upslope Berm Width(5D) + Bed Width(2D) + Downslope Berm Width(5J)

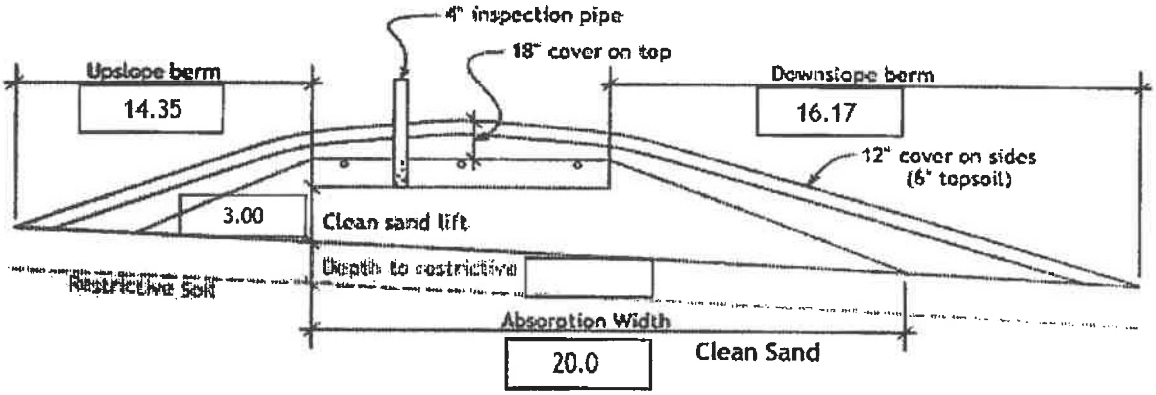
14.35 ft + 10.00 ft + 16.17 ft = 40.52 ft

N. Calculate Mound Length: Endslope Berm Width (5L) + Bed Length(2F) + Endslope Berm Width(5L)

15.45 ft + 75.00 ft + 15.45 ft = 105.90 ft

6. MOUND DIMENSIONS (Feet) Project ID:





Elevation to Benchmark

Required Separation: 36.0 (in)
Elevation Limiting Layer: 99.32 ft

Distribution Media: Rock
Elevation required Separation: 102.32 ft

Media Depth *Below Pipe* 6 (in)
Elevation Distribution Media Bottom: 103.15 ft

Manifold Connection: END
Lateral Pipe Diameter: 2.00 (in)

Perforation Size: 1/4 (in)
Perforation Spacing: 36.0 (in)

If Split and Non-Level Pressure Distribution Used: See Non-Level Pressure Distribution Form

Comments:

University of Minnesota Onsite Sewage Treatment Program

Estimated Mound Materials Worksheet

Minnesota Pollution Control Agency

Mound to be constructed to dimensions in design. This is an estimate of materials needed.
Individual construction practices may vary quantities.

Project ID:

v 04.02.2024

A. Rock *Volume*: (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch*)) X *Bed Length* X *Bed Width* = *Volume*

(6 in + 5.0 in) ÷ 12 X 75.0 ft X 10.0 ft = 687.5 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 687.5 cu.ft ÷ 27 = 25.5 cu.yd

Add 30% for constructability: 25.5 cu.yd X 1.3 = 33.1 cu.yd

B. Calculate *Clean Sand Volume:*

Volume Under Rock bed: *Average Sand Depth* x *Media Width* x *Media Length* = cubic feet

3.1 ft X 10.0 ft X 75 ft = 2325 cu.ft

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

ft - 1) X X ft =

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

ft - 1) X X ft =

Total Clean Sand Volume: *Volume from Length* + *Volume from Width* + *Volume Under Media*

cu.ft + cu.ft + cu.ft = cu.ft

For a Mound on a slope greater than 1%

Upslope Volume: ((*Upslope Mound Height - 1*) x 3 x *Bed Length*) ÷ 2 = cubic feet

((5.0 ft - 1) X 3.0 ft X 75.0) ÷ 2 = 450.0 cu.ft

Downslope Volume: ((*Downslope Height - 1*) x Downslope Absorption Width x *Media Length*) ÷ 2 = cubic feet

((5.2 ft - 1) X 10.0 ft X 75.0) ÷ 2 = 1575.0 cu.ft

Endslope Volume: (*Downslope Mound Height - 1*) x 3 x *Media Width* = cubic feet

(5.2 ft - 1) X 3.0 ft X 10.0 ft = 126.0 cu.ft

Total Clean Sand Volume: *Upslope Volume* + *Downslope Volume* + *Endslope Volume* + *Volume Under Media*

450.0 cu.ft + 1575.0 cu.ft + 126.0 cu.ft + 2325.0 cu.ft = 4476.0 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 4476.0 cu.ft ÷ 27 = 165.8 cu.yd

Add 30% for constructability: 165.8 cu.yd X 1.3 = 215.5 cu.yd

C. Calculate *Sandy Berm Volume:*

Total Berm Volume (approx.): ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2

(5.1 - 0.5)ft X 40.7 ft X 106.2) ÷ 2 = 9950.7 cu.ft

Total Mound Volume - Clean Sand volume -Rock Volume = cubic feet

9950.7 cu.ft - 4476.0 cu.ft - 687.5 cu.ft = 4787.2 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 4787.2 cu.ft ÷ 27 = 177.3 cu.yd

Add 30% for constructability: 177.3 yd^3 x 1.3 = 230.5 cu.yd

D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

40.7 ft X 106.2 ft X 0.5 ft = 2163.2 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 2163.2 cu.ft ÷ 27 = 80.1 cu.yd

Add 30% for constructability: 80.1 cu.yd X 1.3 = 104.2 cu.yd

ONSITE SEWAGE TREATMENT PROGRAM

Pressure Distribution Design Worksheet

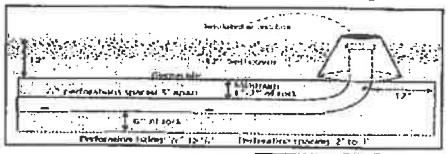
MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.02.2024

1. Media Bed Width: 10.0 ft
2. Media Bed Length: 75.0 ft
3. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width(1.) - 4) ÷ 3] + 1.

   [(10 - 4) ÷ 3] + 1 = 3 laterals *Does not apply to at-grades*
4. Designer Selected *Number of Laterals*: 3 laterals

   Cannot be less than line 2 (Except in at-grades)



5. Lateral spacing in Bed; *Must be greater than 1 foot and no more than 2 feet from Edge*: 2.00 ft
6. *Length of Laterals* = Media Bed Length(2.) - 2 Feet.

   75.0 - 2ft = 73.0 ft *Perforation can not be closer then 1 foot from edge.*
7. Select *Perforation Spacing*: 3.0 ft
8. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals(6.)* by the *Perforation Spacing* (7.) and round down to the nearest whole number.

   Number of Perforation Spaces = 73.0 ft ÷ 3.0 ft = 24 Spaces
9. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces(8.)*. 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 = 24 Spaces + 1 = 25 Perfs. Per Lateral
10. Select *Perforation Diameter Size*: 1/4 in 0.25
11. *Select Lateral Diameter (See Table)*: 2.00 in
12. Select *Manifold Connection* (End or Center): END

If Center Manifold Connection the max number of perfs per lateral in the table can be doubled.

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

1/4 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	10	13	18	30	60
2½	8	12	16	28	54
3	8	12	16	25	52

7/32 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

3/16 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	12	18	26	46	87
2½	12	17	24	40	80
3	12	16	22	37	75

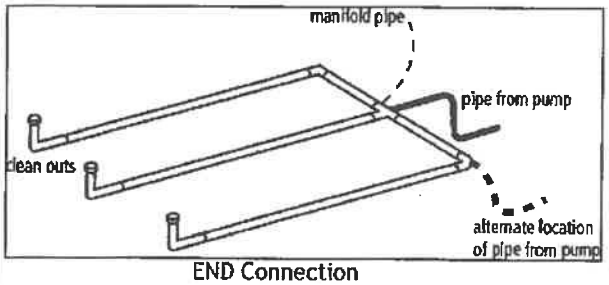
1/8 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	21	33	44	74	149
2½	20	30	41	69	135
3	20	29	38	64	128

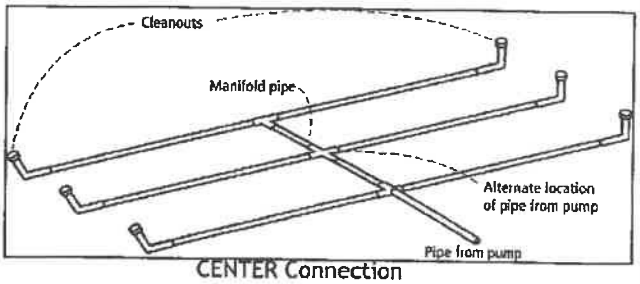
University of Minnesota Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY



END Connection



CENTER Connection

Perf Per Lateral: 25

Perf Per Lateral Equal Split: 13 | 12

OPTIONAL Perf Per Lateral Non-Equal Split*: ____ | ____

* must not exceed maximum number perfs per lateral in table

End Feed Lateral Min Diameter: 2.00

Center Feed Lateral Min Diameter: ____

13. *Total Number of Perforations* equals the *Number of Perforations per Lateral (9.)* multiplied by the *Number of Perforated Laterals.(4.)*

25 Perf. Per Lat. X 3 Number of Perf. Lat. = 75 Total Number of Perf.

14. 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)(1.) X Bed Length (ft)(2.)

10.00 ft X 75.00 ft = 750 sq.ft

b. *Square Foot per Perforation = Bed Area (14a)* ÷ by *Total Number of Perfs (13)*

750 sqft ÷ 75 perf = 10 sq.ft/perf

15. Select *Minimum Average Head*: 1.0 ft

16. Select *Perforation Discharge* based on Table: 0.74 GPM per Perf

17. *Flow Rate = Total Number of Perfs(13.) X Perforation Discharge(16.)*

75 Perfs X 0.74 GPM per Perforation = 56.0 GPM

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

19. *Volume of Distribution Piping = Number of Perforated Laterals(4.) X Length of Laterals(6.) X Volume of Liquid Per Foot of Distribution Piping (18.)*

3 X 73.0 ft X 0.170 gal/ft = 37.2 Gallons

20. Minimum Delivered Volume = Volume of Distribution Piping (19.) X 4

37.2 gal X 4 = 148.9 Gallons

21. Maximum Delivered Volume = Design flow x 25%

900 gpd X 25% = 225.0 Gallons

22. Minimum Delivered vs Maximum Delivered evaluation: Volume ratio correct

Perforation Discharge (GPM)				
Head (ft)	Perforation Diameter			
	1/8	3/16	7/32	1/4
1.0*	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0*	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0*	0.41	0.93	1.26	1.65
1 foot	Dwellings with 3/16 inch to 1/4 inch perforations			
2 feet	Dwellings with 1/8 inch perforations			
	Other establishments and MSTS with 3/16 inch to 1/4 inch perforations			
5 feet	Other establishments and MSTS with 1/8 inch perforations			

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:

Basic STA Pump Selection Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY

Project ID:

v 04.02.2024

Pumping to Gravity or Pressure Distribution: Pressure

A. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*

B. If pumping to a pressurized distribution system: 56.0 GPM

C. Enter pump description: Demand Dosing

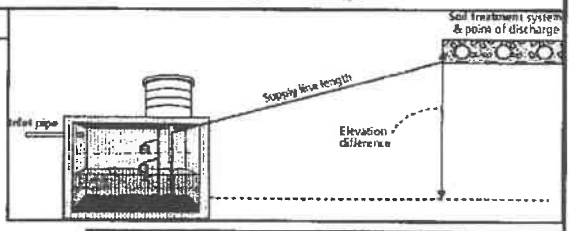
2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 10.0 ft

B. Distribution Head Loss: 5 ft

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

* Common additional head loss: gate valve = 1 ft each, globe valve = 1.5 ft each, splitter valve = see manufacturers details



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: 38 ft

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

Friction Loss = 7.5 ft per 100ft of pipe

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* X 1.25 = *Equivalent Pipe Length*

38 ft X 1.25 = 47.5 ft

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

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

Supply Friction Loss =

7.5 ft per 100ft X 47.5 ft + 100 = 3.6 ft

H. *Total Head* requirement is the sum of the *Elevation Difference(2A)* + Distribution Head Loss(2B) + Additional Head Loss(2C) + Supply Friction Loss(2G)

10 ft + 5.0 ft + _____ ft + 3.6 ft = 18.6 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **56.0** GPM with at least **18.6** feet of total head.

Comments:

STA Dosing Pump Tank Design Worksheet (Demand Dose)

MINNESOTA POLLUTION CONTROL AGENCY

DETERMINE TANK CAPACITY AND DIMENSIONS | Project ID: | v 04.02.2024

1. A. Design Flow: 900 GPD C. Tank Use: Dosing
   B. Code minimum pump tank capacity: 900 Gal D. Designed pump tank capacity: 1000 Gal

2. A. Tank Manufacturer: BROWN PRECAST B. Tank Model: 1000 PUMP
   C. Capacity from manufacturer: 1230 Gallons
   D. Liquid depth of tank from manufacturer: 49.3 inches
   E. Gallons per inch from manufacturer: 40.0 Gallons per inch

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* (2E)

   (12 in + 2 inches) X 40.0 Gallons Per Inch = 560 Gallons

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

   -Item 19 of the Pressure Distribution STA or Item 11 of Non-level STA 148.9 Gallons (Minimum dose) 3.72 inches/dose

5. Calculate *Maximum Pumpout Volume* (25% of Design Flow(1A))

   Design Flow: 900 GPD X 0.25 = 225.0 Gallons (Maximum dose) 5.63 inches/dose

6. *Select a pumpout volume that meets both Minimum and Maximum:* 225.0 Gallons

7. Calculate *Doses Per Day* = Design Flow(1A) ÷ *Delivered Volume(6.)*

   900 gpd ÷ 225.0 gal = 4.0 *Doses**

   * Doses need to be equal to or greater than 4

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

8. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 38 feet

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

   D. *Drainback* = *Length of Supply Pipe(8B)* X *Volume of Liquid Per Lineal Foot of Pipe(8C)*

   38 ft X 0.170 gal/ft = 6.5 Gallons

9. *Total Dosing Volume* = *Delivered Volume(6.)* + *Drainback* (8D)

   225.0 gal + 6.5 gal = 231.5 Gallons

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

    3 in X 40.0 gal/in = 120.0 Gallons

11. Reserve Capacity Volume = [Tank Liquid Depth(2D) - Alarm Float Depth(10.)] x gallons per inch of tank(2E)

    [49.3 in - 22.8 in] X 40.0 gal/in = 1058.5 Gallons

DEMAND DOSE FLOAT SETTINGS — Alarm and Pump are to be wired on separate circuits and inspected by the electrical inspector

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

    Total Dosing Volume(9.) ÷ *Gallons Per Inch(2E)*

    231.5 gal ÷ 40.0 gal/in = 5.79 inches

13. Measuring from bottom of tank:

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

    12.0 in + 2 in = 14.0 inches

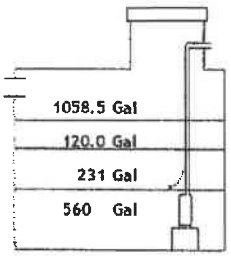
    B. *Distance to set Pump On Float=Distance to Set Pump-Off Float(13A) + Float Separation Distance(12.)*

    14.0 in + 5.8 in = 19.8 inches

    C. *Distance to set Alarm Float* = *Distance to set Pump-On Float(13B)* + *Alarm Depth* (2-3 inches)(10.)

    19.8 in + 3.0 in = 22.8 inches

Inches for Dose:	5.8	in
Alarm Depth	22.8	in
Pump On	19.8	in
Pump Off	14.0	in



MONITORING AND MITIGATION

SEPTIC SYSTEM CLASSIFIED AS TYPE III

Should the system fail a new site for the septic system may be considered or the owner agrees to repair the septic system if it is possible. If the septic system is not repairable the homeowner agrees to disconnect the septic tanks from the septic system and use and maintain the septic tanks as holding tanks.

PINE COUNTY is to be notified as soon as possible about any operational problems. If a failure occurs the septic pump must be disconnected immediately and remain disconnected until all repairs are completed. A pumping contract will need to be set up with a septic maintenance contractor. A copy of all documents must be submitted to the county.

The system must be monitored for a minimum of three years. The mound system is to be inspected by the homeowner for leaks or saturated areas. Inspections are to be done every month for 36 months. Any leaks or failures in the system must be reported to the county within 24 hours.

All expenses for repair or replacement are the homeowner's responsibility.

Type III systems are not warranted by the Inspector, Designer, or Installer

I Melanie Benjamin property owner of 44517 Fleming Rd. Hinckley Mn.

I hereby agree that as long as I am the owner of the property, to accept all legal and financial responsibility for future system repair and/or replacement expense in the event that failure of the system on the above referenced property occurs.

_____

Owner

_____

Date

Owners Septic System Management Plan

Date: 11/18/2024

Property Address: 44517 Fleming Rd Hinckley Mn

Septic Systems can be an expensive investment, good maintenance will ensure they last a lifetime. The purpose of a septic system is to properly "decompose" the pollutants before the water is recycled back into the groundwater. If you're not taking this seriously, ask yourself where your well water comes from.

Your septic design lists all the components of your system and their location. Keep the design, this management plan and the UofM "Septic System Owners Guide" in a safe place for future reference. For a copy of the Owners guide call the University of MN at 1-800-876-8636.

Some of the following tasks you can do yourself, some require a professional, but is it YOUR responsibility to see that it gets done.

Homeowner Tasks

- Do your best to conserve water. Don't overload your septic with multiple large water uses at the same time or on the same day.
- Fix household leaks promptly (leaky toilet, dripping faucets).
- Limit bleach and anti-bacterial products. Use Biodegradable dishwasher detergent.
- Consider a lint filter on your clothes washer.
- Regularly check for wet or spongy soil around your drainfield.
- Have a septic professional check your tanks every 3 years to determine if they need pumping.
- If you have a septic tank filter (effluent filter) clean it on a regular basis (or have a professional do it).
- If a septic alarm goes off, call your septic professional to diagnose the problem.
- Notify the County/City/Township when this management plan is not being met.
- Be aware of and protect your secondary drainfield site.

Professional Tasks

- Disclose the location of the secondary drainfield (if applicable).
- Respond to alarms and diagnose problems as needed.
- Review water use with the owner, check for a "soggy" drainfield.
- Pump the septic tanks as needed and ensure they are in proper working order.
- Verify the pump, dose amount, HI Level Alarm & drainback are all working properly.

"As the owner, I understand it is my responsibility to properly operate and maintain this septic system".

Property Owner Signature: _____ **Date** _____