Lashinski Services, Incorporated **M.P.C.A. Certificate # 4266**

1244 Crosstown Blvd NE Ham Lake MN 55304
Office: (763) 434-3915
service@lashinskiseptic.com

Permit Number: 2024-00109

APPROVED PLAN

By Chris Uebe (CK)
On 5/29/24

February 5, 2024

LCI Landscapes
Tim O'Connor
13960 Lake Drive
Columbus MN 55025

The onsite sewage treatment system at 13960 Lake Drive in Columbus is designed for a type I 2300 sq. ft. office building with 2 proposed bathrooms in accordance to the Minnesota Pollution Control Agency (M.P.C.A.) chapter 7080 and local ordinances. The maximum daily flow for this system was determined by 2300 sq. ft. at .18 GPD/sq. ft., or a maximum daily flow of 415 gallons per day (GPD). For a safety factor, along with possibly future expansion, the system is design for 600 GPD.

The existing tank must be pumped and abandoned. A new 1600-gallon septic tank must be installed as well as a 600-gallon septic tank and 1000-gallon pumping chamber to lift the effluent to the proposed mound location. The tanks must be supplied by an MPCA certified supplier and must be registered tanks. The manhole covers on each tank must be brought to the surface for future maintenance and must be insulated. All plumbing in and out of the tanks must be 4" Schedule #40 PVC. If the tanks are to be installed with less than 24" of cover, they must be insulated to an R-value of 10. The tanks cannot be installed with greater than 4' of cover. An outlet filter is recommended in the outlet of the second tank.

A pressurized mound system should be installed in the area of soil tests #1 through #5. The soils in this area are classified as Zimmerman fine sand with redoximorphic mottling observed a depth of 42" at the upslope edge of the rockbed. A pressurized mound system will be required with a minimum of 12-inches of sand installed beneath the upslope edge of the rockbed, with 6-inches of ¾"-1 ½" rock beneath three 1 1/2" laterals with 7/32" perforations drilled every 36". The system should be installed as drawn on the attached site plan, must be at least 10-feet from the property lines and 50-feet from the well. The entire rockbed must be installed level and the materials clean as per MPCA chapter 7080. It is the homeowner's responsibility to establish ground covering over the proposed system to prevent freezing and/or soil erosion. The installer is to verify that the mound is installed on the contour. Some trees will need to be removed prior to construction.

A deep well is located to the front of the house greater than 50-feet from the proposed SSTS location. No neighboring wells could be located within 100-feet of the proposed SSTS locations, however it is the homeowners responsibility to locate and disclose any wells within 100 feet of the proposed mound and tank locations prior to installation.

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The power supply and switches for the lift pump must be located outside the manhole and pumping chamber in a weatherproof enclosure. A warning device must be installed with both audible and visual alert in case of pump failure. The pressurized force main from the pump to the treatment area must be sloped to allow for drain back.

Keep all heavy equipment off the proposed treatment area before and after construction. The treatment area should be marked off before construction. Failure to protect the site of the proposed treatment area can result in this design being invalid and the system will need to be relocated.

Nothing other than human waste, toilet tissue, laundry, showers, water softeners, etc. should be disposed into the septic tanks. **Iron filters must be diverted out of the system**. Garbage disposals are not recommended due to adding more solids and fine solids passing through the tanks and into the treatment area. Excessive amounts of soaps, cleaning agents, and chlorine may kill the bacteria needed to treat septic effluent. Limit the use of anti-bacterial soaps. We recommend using liquid laundry and dish soap instead of powder. **Additives should not be used.**

Each tank must be inspected by a state licensed professional one year after construction, then at least once every three years thereafter. With proper installation and maintenance, this system should have no problem treating effluent effectively.

Sincerely,

Ryan Lashinski

APPROVED
PLAN

Anoka County Parcel Viewer

Parcel Information:
33-32-22-21-0004
13960 LAKE DR NE
COLUMBUS
MN 55025
Plat:

Approx. Acres: 6.13095753
Commissioner: JEFF REINERT

Owner Information:
ESCAPE PROPERTIES LLC
125 COUNTY ROAD F E
VADNAIS HTS
MN
55127

North

Site slope - 5%, South to North

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Anoka County GIS | 1:600 | Date: 2/4/2024

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

Project ID: #REF! v 04.06.2017

Client/ Address:	**13960 Lake Drive Columbus**		Legal Description/ GPS:		
Soil parent material(s): (Check all that apply)	☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter				
Landscape Position: (check one)	☐ Summit ☑ Shoulder ☑ Back/Side Slope ☐ Foot Slope ☐ Toe Slope ☐ Flat			Slope shape	Linear, Linear
Vegetation:	Grass	Soil survey map units:	ZmB	Slope %: 5.0	Elevation: 102'4"
Weather Conditions/Time of Day:	Sunny			Date	
Observation #/Location:	SB#1			Observation Type:	Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	I-------- Structure----------I		
							Shape	Grade	Consistence
0-8	Loamy Fine Sand	<35%	10YR 3/4				Granular	Weak	Loose
-16	Loamy Fine Sand	<35%	10YR 4/4				Granular	Weak	Loose
-43	Loamy Sand	<35%	10YR 5/4				Granular	Weak	Loose
-50	Loamy Sand	<35%	10YR 5/4	10YR 6/1	Depletions	S1	Granular	Weak	Loose
				10YR 5/8	Concentrations	S2			
									APPROVED PLAN

Comments: Redoximorphic mottling after 43".

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

Ryan Lashinski		**L4266**	**#REF!**
(Designer/Inspector)	(Signature)	(License #)	(Date)

Additional Soil Observation Logs

Project ID: #REF!

University of Minnesota Onsite Sewage Treatment Program

Client/ Address:	13960 Lake Drive Columbus	Legal Description/ GPS:	#REF!

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

Landscape Position: (check one) ☐ Summit ☐ Shoulder ☑ Back/Side Slope ☑ Foot Slope ☐ Toe Slope ☐ Flat Slope shape

Vegetation:	Grass	Soil survey map units:	ZmB	Slope %:	5.0	Elevation:	102'4"
Weather Conditions/Time of Day:	Sunny				Date:		
Observation #/Location:	SB#2				Observation Type:	Auger	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure Shape	Structure Grade	Structure Consistence
0-6	Loamy Fine Sand	<35%	10YR 3/4				Granular	Weak	Loose
-22	Loamy Fine Sand	<35%	10YR 4/4				Granular	Weak	Loose
-45	Loamy Sand	<35%	10YR 5/4				Granular	Weak	Loose
-50	Loamy Sand	<35%	10YR 5/4	10YR 6/1	Depletions	S1	Granular	Weak	Loose
				10YR 5/8	Concentrations	S2			

Comments: Redoximorphic mottling after 44"

#/Location/Elevation:	SB#3 Elev. 101'10"	Observation Type:	Auger

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 Sand	<35%	10YR 4/4				Granular	Weak	Loose
-18	Loamy Fine Sand	<35%	10YR 5/4				Granular	Weak	Loose
-35	Loamy Sand	<35%	10YR 5/3				Granular	Weak	Loose
-40	Loamy Sand	<35%	10YR 4/3	10YR 6/1	Depletions	S1	Granular	Weak	Loose

Comments: Redoximorphic mottling after 35".

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Additional Soil Observation Logs

Project ID: #REF!

University of Minnesota Onsite Sewage Treatment Program

Client/ Address:	13960 Lake Drive Columbus	Legal Description/ GPS:	#REF!

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

Landscape Position: (check one) ☐ Summit ☐ Shoulder ☑ Back/Side Slope ☑ Foot Slope ☐ Toe Slope ☐ Flat Slope shape

Vegetation:	Grass	Soil survey map units:	ZmB	Slope %:	5.0	Elevation:	102'4"
Weather Conditions/Time of Day:	Sunny				Date:		
Observation #/Location:	SB#3				Observation Type:	Auger	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure Shape	Structure Grade	Structure Consistence
0-6	Loamy Fine Sand	<35%	10YR 3/4				Granular	Weak	Loose
-22	Loamy Fine Sand	<35%	10YR 4/4				Granular	Weak	Loose
-40	Loamy Sand	<35%	10YR 5/4				Granular	Weak	Loose
-50	Loamy Sand	<35%	10YR 5/4	10YR 6/1	Depletions	S1	Granular	Weak	Loose
				10YR 5/8	Concentrations	S2			

Comments: Redoximorphic mottling after 40"

#/Location/Elevation:	SB#5 Elev. 101'10"	Observation Type:	Auger

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 Sand	<35%	10YR 4/4				Granular	Weak	Loose
-18	Loamy Fine Sand	<35%	10YR 5/4				Granular	Weak	Loose
-35	Loamy Sand	<35%	10YR 5/3				Granular	Weak	Loose
-40	Loamy Sand	<35%	10YR 4/3	10YR 6/1	Depletions	S1	Granular	Weak	Loose

Comments: Redoximorphic mottling after 35".

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Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

Property Owner/Client: LCI Landscapes | **Project ID:** | v 04.06.2017

Site Address: 13960 Lake Drive | **Date:** 2/5/2024

Email Address: | **Phone Number:**

1. DESIGN FLOW, STRENGTH OF WASTE, AND TANKS

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

Type of Wastewater: Other Est. - At-Risk 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: 450 GPD

Waste strength (attach data/estimate basis for Other Est.): BOD: 125 mg/L TSS: 35 mg/L Oil&Grease: 10 mg/L

B. Septic Tank Sizing

1. Residential dwellings

Min Code Required Septic Tank Capacity: 2250 Gallons, in 2 Tanks or Compartments

Recommended Septic Tank Capacity: 2250 Gallons, in 2 Tanks or Compartments

2. Other Establishments

Waste received by: **Gravity**

Min Code Required Septic Tank Capacity: 600 GPD X 3 = 1800 Gallons, in 2 Tanks or Compartments

Designer Recommended Septic Tank Capacity: 2250 Gallons, in Tanks or Compartments

3. Effluent Screen & Alarm (Y/N): Yes Manufacturer/Model: POlyLoc P125 or larger

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): 0 Gallons Pump Tank 2 Capacity (Code Minimum): Gallons

Pump Tank 1 Capacity (Designer Rec): 0 Gallons Pump Tank 2 Capacity (Designer Rec): Gallons

Pump 1 29.0 GPM Total Head 15.4 ft Pump 2 GPM Total Head ft

Supply Pipe Dia. 3.00 in Dose Volume: 100.0 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: 100 ft Benchmark Location: Top of manhole cover on existing tank

MPCA System Type: **Type I** Type of Distribution Media: Rock

Type III/IV Details:

3. SITE EVALUATION SUMMARY:

A. Depth to Limiting Layer: **35** in **2.9** ft

B. Elevation of Limiting Layer: **98'11"**

C. Loc. of Restrictive Elevation: **SB#1**

D. Minimum Required Separation: **36** in **3.0** ft

E. Code Maximum Depth of System: **Mound** in

F. Measured Land Slope: **5.0** %

G. Soil Texture: **Fine Sand**

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

I. Perc Rate: **>5MPI** MPI

J. Soil with >35% Rock Fragments Present (yes/no)? 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:

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Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

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	1.0 ft	Berm Width (0-1%)	8.6 ft
Upslope Berm Width	7.4 ft	Downslope Berm Width	14.0 ft	Endslope Berm Width	13.4 ft
Total System Length	76.8 ft	Total System Width	31.4 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	7/32 in
Lateral Diameter	1.50 in	Min. Delivered Volume	63 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.

Ryan Lashinski		L4266	02/05/24
(Designer)	(Signature)	(License #)	(Date)

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OSTP Mound Design Worksheet ≥1% Slope

University of Minnesota

1. SYSTEM SIZING: Project ID: v 04.06.2017

A. Design Flow:	600	GPD
B. Soil Loading Rate:	0.60	GPD/ft^2
C. Depth to Limiting Condition:	2.9	ft
D. Percent Land Slope:	5.0	%
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		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	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: _____ 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 in 0.5 ft

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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 - 2.9 ft = 1.0 ft Design Sand Lift (optional): _____ ft

B. Upslope Height: Clean Sand Lift + Depth of Media + Depth of Cover cover (1 ft.)

1.0 ft + 0.9 ft + 1.0 ft = 2.9 ft

C. Select Upslope Berm Multiplier (based on land slope): 2.61

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

2.61 ft X 2.9 ft = 7.4 ft

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

10.0 ft X 5.0 % ÷ 100 = 0.50 ft

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

2.9 ft + 0.50 ft = 3.4 ft

G. Select Downslope Berm Multiplier (based on land slope): 3.53

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

3.53 x 3.4 ft = 11.8 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: 14.0 ft

K. Select Endslope Berm Multiplier: 4.00 *(usually 3.0 or 4.0)*

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

4.00 ft X 3.4 ft = 13.4 ft

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

7.4 ft + 10.0 ft + 14.0 ft = 31.4 ft

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

13.4 ft + 50.0 ft + 13.4 ft = 76.8 ft

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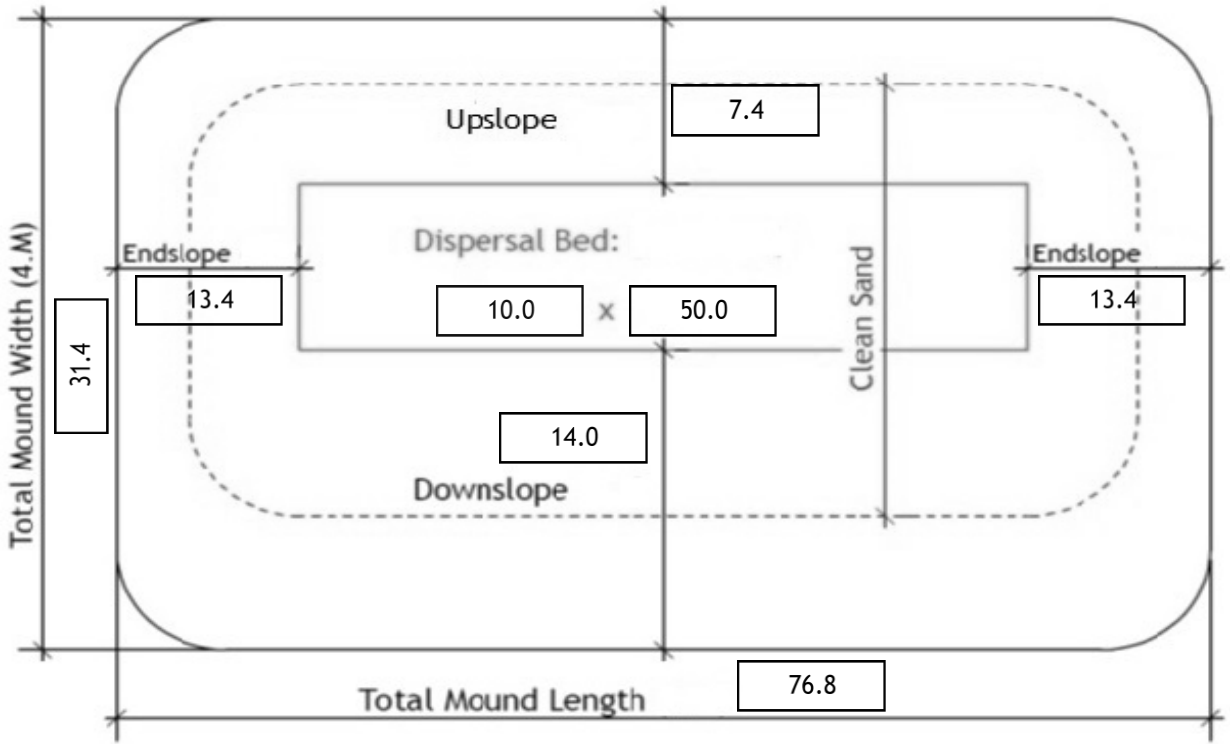
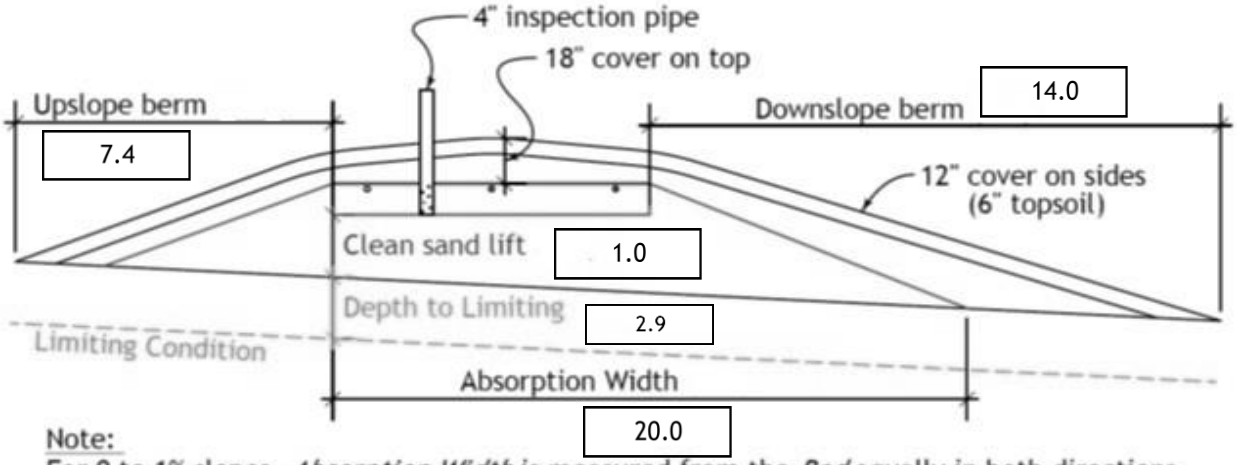
7. MOUND DIMENSIONS





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:

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Minnesota Pollution Control Agency

OSTP Mound Materials Worksheet

University of Minnesota

Project ID: v 04.06.2017

A. Calculate Rock *Volume* : (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch)*) X *Bed Length* (2.D) X *Bed Width* (2.B) = *Volume* (ft^3)

(6 in + 2 in) ÷ 12 X 50.0 ft X 10.0 ft = 333.3 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards:

333.3 ft^3 ÷ 27 = 12.3 yd^3

Add 20% for constructability: 12.3 yd^3 X 1.2 = 14.8 yd^3

For systems using other distribution media - see product registration for material required

B. Calculate *Clean Sand Volume:*

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

1.1 ft X 10.0 ft X 50.0 ft = 550.0 ft^3

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)

2.85 ft - 1) X 5.00 X 50 ft = 462.50

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

2.85 ft - 1) X 5.00 X 10 ft = 92.50

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

462.5 ft^3 + 92.5 ft^3 + 550 ft^3 = 1105.0 ft^3

For a Mound on a slope greater than 1%

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

((2.9 ft - 1) X 3.0 ft X 50.0) ÷ 2 = 138.8 ft^3

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

((3.4 ft - 1) X 10.0 ft X 50.0) ÷ 2 = 587.5 ft^3

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

(3.4 ft - 1) X 3.0 ft X 10.0 ft = 70.5 ft^3

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

138.8 ft^3 + 587.5 ft^3 + 70.5 ft^3 + 550.0 ft^3 = 1346.8 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1346.8 ft^3 ÷ 27 = 49.9 yd^3

Add 20% for constructability: 49.9 yd^3 X 1.2 = 59.9 yd^3

C. Calculate *Sandy Berm Volume:*

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

(3.1 - 0.5)ft X 31.4 ft X 76.8) ÷ 2 = 3138.8 ft^3

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

3138.8 ft^3 - 1346.8 ft^3 - 333.3 ft^3 = 1458.7 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1458.7 ft^3 ÷ 27 = 54.0 yd^3

Add 20% for constructability: 54.0 yd^3 x 1.2 = 64.8 yd^3

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

31.4 ft X 76.8 ft X 0.5 ft = 1207.2 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1207.2 ft^3 ÷ 27 = 44.7 yd^3

Add 20% for constructability: 44.7 yd^3 x 1.2 = 53.7 yd^3

APPROVED PLAN

OSTP Pressure Distribution Design Worksheet

Minnesota Pollution Control Agency

University of Minnesota

Project ID: v 04.06.2017

1. Media Bed Width: 10 ft

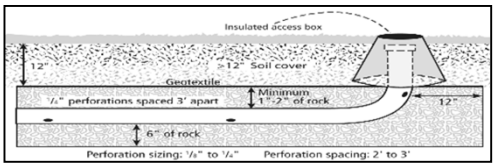
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(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:* 7/32 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

¼ 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)*: 1.50 in

APPROVED PLAN

OSTP Pressure Distribution Design Worksheet

Minnesota Pollution Control Agency

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	ft^2

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

500	ft^2	÷	51	perforations	=	9.8	ft^2/perforations

13. Select *Minimum Average Head*: 2.0 ft

14. Select *Perforation Discharge* (GPM) based on Table: 0.80 GPM per Perforation

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

51	Perfs	X	0.80	GPM per Perforation	=	41	GPM

16. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.110 Gallons/ft

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

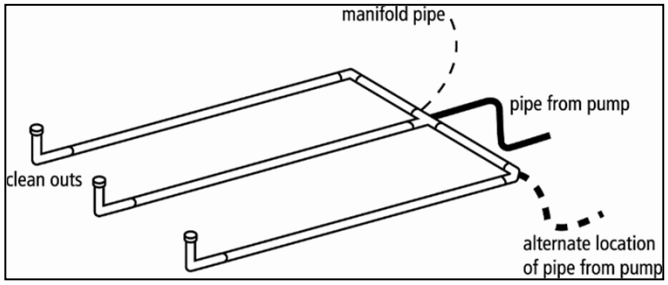
3	X	48	ft	X	0.110	gal/ft	=	15.8	Gallons

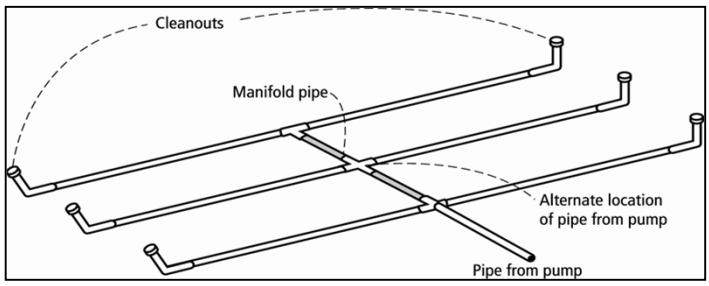
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

15.8	gals	X	4	=	63.4	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:

APPROVED PLAN

Minnesota Pollution Control Agency

OSTP Basic Pump Selection Design Worksheet

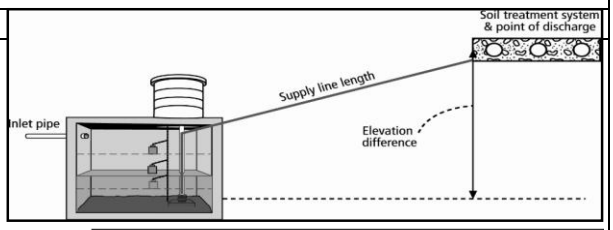
University of Minnesota

1. PUMP CAPACITY Project ID: 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: 29.0 GPM
3. Enter pump description: Demand Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 10 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

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

D. 1. Supply Pipe Diameter: 3.0 in

2. Supply Pipe Length: 100 ft

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

Friction Loss = 0.31 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 (D.2)* X 1.25 = *Equivalent Pipe Length*

100 ft X 1.25 = 125.0 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 =

0.31 ft per 100ft X 125.0 ft ÷ 100 = 0.4 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)

10.0 ft + 5.0 ft + ____ ft + 0.4 ft = 15.4 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **29.0** GPM (Line 1 or Line 2) with at least **15.4** feet of total head.

Comments:

APPROVED PLAN

Minnesota Pollution Control Agency

OSTP Pump Tank Design Worksheet (Demand Dose)

University of Minnesota

DETERMINE TANK CAPACITY AND DIMENSIONS Project ID: v 04.06.2017

1. A. Design Flow: 600 GPD
   B. Min. required pump tank capacity: ____ Gal C. Recommended pump tank capacity: ____ Gal

2. A. Tank Manufacturer: Brown Precast B. Tank Model: ____
   C. Capacity from manufacturer: 1000 Gallons
   D. Gallons per inch from manufacturer: 21.0 Gallons per inch
   E. Liquid depth of tank from manufacturer: 46.0 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)

(10 in + 2 inches) X 21.0 Gallons Per Inch = 252 Gallons

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

- Line 17 of the Pressure Distribution or Line 11 of Non-level 63 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:* 100 Gallons

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

600 gpd ÷ 100 gal = 6.00 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 3 inches

B. Length of Supply Pipe = 100 feet

C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.380 Gallons/ft

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

100 ft X 0.380 gal/ft = 38.0 Gallons

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

100 gal + 38.0 gal = 138 Gallons

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

2 in X 21.0 gal/in = 42.0 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

138 gal ÷ 21.0 gal/in = 6.6 Inches

12. Measuring from bottom of tank:

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

10 in + 2 in = 12 Inches

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

12 in + 6.6 in = 19 Inches

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

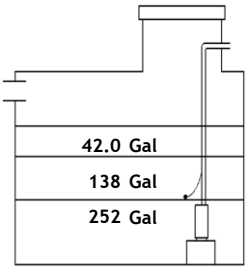
19 in + 2.0 in = 21 Inches

Inches for Dose: 6.6 in

Alarm Depth 20.6 in

Pump On 18.6 in

Pump Off 12.0 in



APPROVED PLAN

Flow Estimation: Other Establishments

v 03.15.2023

Establishment	*7081* Specified Type of Establishment	Unit	# of Units	Design Flow per Unit (See Table I)	Total Avg Daily Flow
1	Office	square foot	2300	0.18	414
2					
3					
4					
5					
				Total Flow 7081 Establishments (gpd)	414

Establishment	*NON 7081* Specified Type of Establishment	Unit	# of Units	Design Flow per Unit	Total Avg Daily Flow
6					
7					
8					
9					
10					
				Total Flow Non-7081 Establishments (gpd)	
				Safety Factor (gpd)	186.00
				Total Flow 7081 and Non 7081 Establishments (gpd)	600.00

APPROVED PLAN

Tank Buoyancy Worksheet

University of Minnesota Onsite Sewage Treatment Program

MINNESOTA POLLUTION CONTROL AGENCY

1. Tank Specifications

Project ID:

v 03.15.2023

A. Tank Manufacturer: Brown

Tank Model: 1600ST

B. Outside Tank Dimensions and Specifications:

Tank Use: Septic

Length:	147	in	Width:	68	in	Height:	61	in	Diameter:		in
Length:	12.3	ft	Width:	5.7	ft	Height:	5.1	ft	Radius of Tank:		in

2. Outside Volume of Tank

Rectangular Tank

A. Area of Tank = Length (ft) X Width (ft)

12.3 ft X 5.7 ft = 69.4 sq.ft

B. Volume of Tank = Area of Tank (2.A) X Height (ft)

69.4 sq.ft X 5.1 ft = 352.9 cu.ft

Circular Tank

A. Area of Tank = πr^2 = (3.14 X (Radius of Tank)^2)

3.14 X ( ) ft)^2 = sq.ft

B. Volume of Tank = Area of Tank X Height (ft)

sq.ft X ft = cu.ft

3. Force of Tank Weight (F_{TW})

Weight of Tank (provided by manufacturer) 13,600 lbs

4. Force of Soil Weight Over Tank (F_{SW})

A. Depth of Cover Over Tank: 20 in 1.7 ft

B. Weight of Soil Per Cubic Foot: 120 lbs/cu.ft

C. Volume of Soil Over Tank = Depth of Cover(4A) (ft) X Area of Tank(2A) (ft^2)

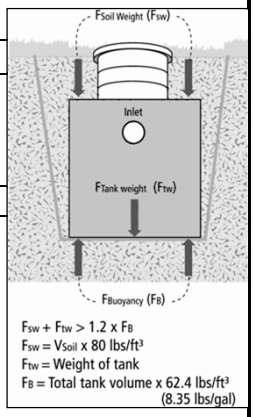
1.7 ft X 69.4 sq.ft = 115.7 cu.ft

D. Weight of Soil Over Tank = Volume of Soil Over Tank(4C) X Weight of Soil Per Cubic Foot

115.7 cu.ft X 120 lbs/cu.ft = 13,883.3 lbs

Note: Assumes saturation does not get over the lid of the tank

Soil Type	Weight of Soil (lbs/ft^3)
Sandy	120
Loamy	100
Clay	90



5. Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank(2B) X Weight of Water Per Cubic Foot (62.4 lbs/ft^3) X 1.2 (Safety Factor)

353 X 62.4 lbs/cu.ft X 1.2 = 26,422.8 lbs

6. Evaluation of Net Forces

A. Downward Force = Force of Tank Weight (F_{TW})(3.) + Force of Soil Weight of Soil (F_{SW})(4.)

13600 lbs + 13883 lbs = 27,483.3 lbs

B. Net Difference = Downward Force(6A) - Buoyant Force Including Safety Factor (5.)

27483 lbs - 26423 lbs = 1,060.6 lbs

If the Net Difference is negative, counter measures will need to be taken to prevent the tank from floating out of the ground.

Comments/Solution:

APPROVED PLAN

Tank Buoyancy Worksheet

University of Minnesota Onsite Sewage Treatment Program

MINNESOTA POLLUTION CONTROL AGENCY

1. Tank Specifications

Project ID:

v 03.15.2023

A. Tank Manufacturer: Brown

Tank Model: B1000L

B. Outside Tank Dimensions and Specifications:

Tank Use: Dosing

Length: 98 in Width: 68 in Height: 61 in Diameter: in

Length: 8.2 ft Width: 5.7 ft Height: 5.1 ft Radius of Tank: in

2. Outside Volume of Tank

Rectangular Tank

A. Area of Tank = Length (ft) X Width (ft)

8.2 ft X 5.7 ft = 46.3 sq.ft

B. Volume of Tank = Area of Tank (2.A) X Height (ft)

46.3 sq.ft X 5.1 ft = 235.2 cu.ft

Circular Tank

A. Area of Tank = πr^2 = (3.14 X (Radius of Tank)^2)

3.14 X (ft) ^{2} = sq.ft

B. Volume of Tank = Area of Tank X Height (ft)

sq.ft X ft = cu.ft

3. Force of Tank Weight (F_{TW})

Weight of Tank (provided by manufacturer) 8,650 lbs

4. Force of Soil Weight Over Tank (F_{SW})

A. Depth of Cover Over Tank: 20 in 1.7 ft

B. Weight of Soil Per Cubic Foot: 120 lbs/cu.ft

C. Volume of Soil Over Tank = Depth of Cover(4A) (ft) X Area of Tank(2A) (ft^2)

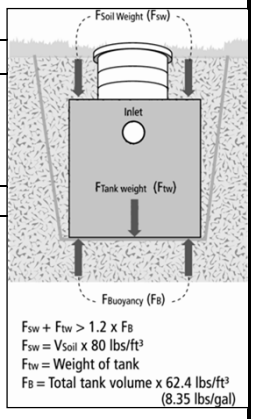
1.7 ft X 46.3 sq.ft = 77.1 cu.ft

D. Weight of Soil Over Tank = Volume of Soil Over Tank(4C) X Weight of Soil Per Cubic Foot

77.1 cu.ft X 120 lbs/cu.ft = 9,255.6 lbs

Note: Assumes saturation does not get over the lid of the tank

Soil Type	Weight of Soil (lbs/ft^3)
Sandy	120
Loamy	100
Clay	90



5.Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank(2B) X Weight of Water Per Cubic Foot (62.4 lbs/ft^3) X 1.2 (Safety Factor)

235 X 62.4 lbs/cu.ft X 1.2 = 17,615.2 lbs

6. Evaluation of Net Forces

A. Downward Force = Force of Tank Weight (F_{TW})(3.) + Force of Soil Weight of Soil (F_{SW})(4.)

8650 lbs + 9256 lbs = 17,905.6 lbs

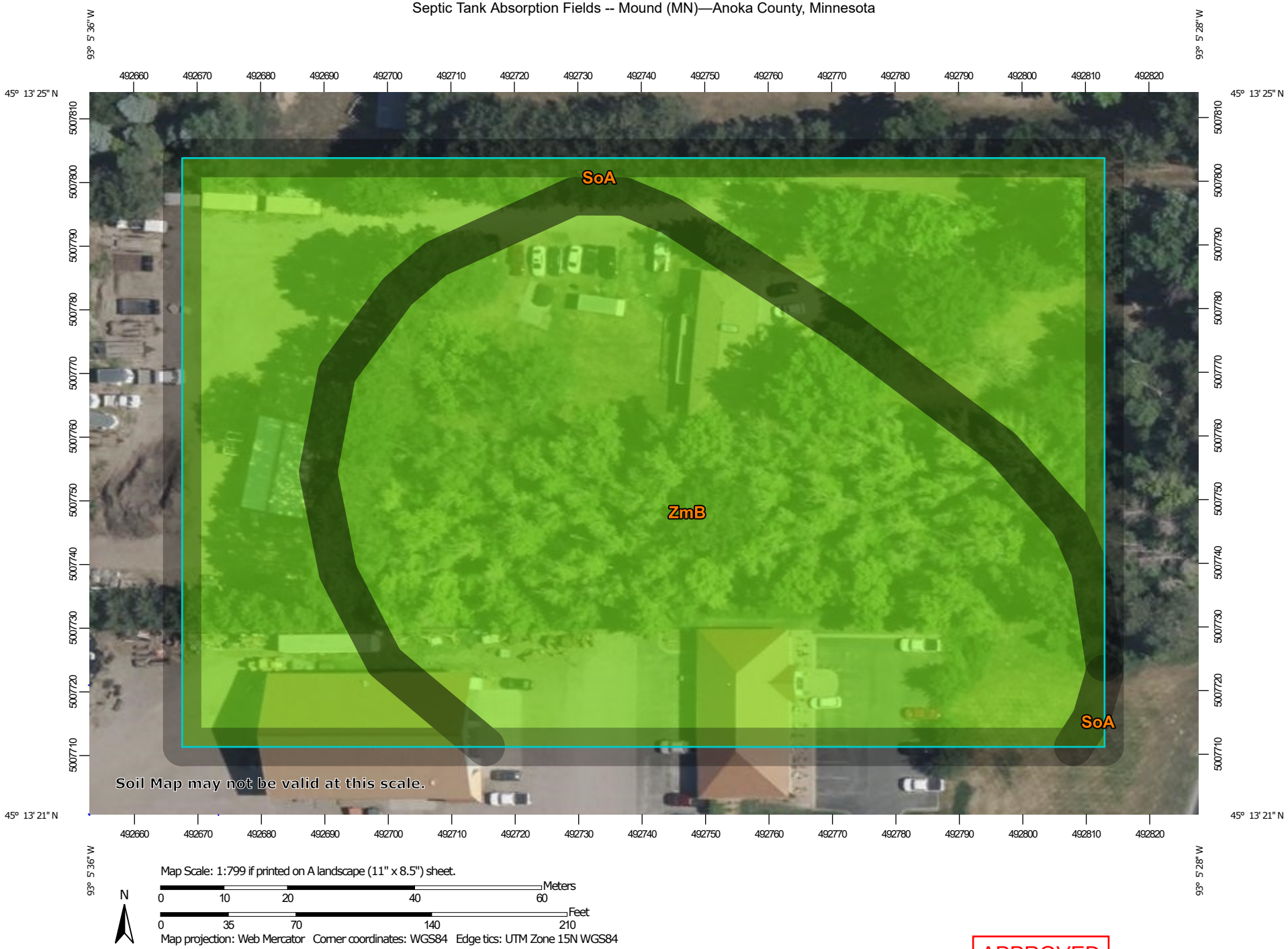
B. Net Difference = Downward Force(6A) - Buoyant Force Including Safety Factor (5.)

17906 lbs - 17615 lbs = 290.4 lbs

If the Net Difference is negative, counter measures will need to be taken to prevent the tank from floating out of the ground.

Comments/Solution:

APPROVED PLAN



Map Scale: 1:799 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Extremely limited
- Very limited
- Moderately limited
- Slightly limited
- Not limited
- Not rated or not available

Soil Rating Lines
- Extremely limited
- Very limited
- Moderately limited
- Slightly limited
- Not limited
- Not rated or not available

Soil Rating Points
- Extremely limited
- Very limited
- Moderately limited
- Slightly limited
- Not limited
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Anoka County, Minnesota
Survey Area Data: Version 21, Sep 9, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

APPROVED PLAN

Septic Tank Absorption Fields — Mound (MN)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
SoA	Soderville fine sand, 0 to 3 percent slopes	Slightly limited	Soderville (85%)	Soil saturation (0.12)	1.4	40.9%
				Slope (0.02)		
ZmB	Zimmerman fine sand, 1 to 6 percent slopes	Slightly limited	Zimmerman (90%)	Slope (0.15)	2.0	59.1%
			Cantlin (5%)	Slope (0.02)		
			Lino (2%)	Soil saturation (0.12)		
Totals for Area of Interest					**3.3**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Slightly limited	3.3	100.0%
Totals for Area of Interest	**3.3**	**100.0%**

APPROVED PLAN

Description

"Mound septic tank absorption fields" are areas in which effluent from a septic tank is distributed into the soil surface through perforated pipe. In this system the drain field is placed above the soil surface in a mound. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat) is evaluated from the surface to a depth of 30 centimeters. Depth to saturation and depth to bedrock are evaluated from the surface to a depth of 203 centimeters. The frequency of ponding and flooding also is evaluated. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Slightly limited" indicates that the soil has features that are favorable for the specified use. "Moderately limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Good performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without special design or expensive installation procedures. "Extremely limited" indicates that the soil has one or more features that are very unfavorable for the specified use. The limitations generally cannot be overcome.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Map Scale: 1:799 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

APPROVED PLAN

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Anoka County, Minnesota
Survey Area Data: Version 21, Sep 9, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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PLAN

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SoA	Soderville fine sand, 0 to 3 percent slopes	1.4	40.9%
ZmB	Zimmerman fine sand, 1 to 6 percent slopes	2.0	59.1%
Totals for Area of Interest		**3.3**	**100.0%**

UNIVERSITY OF MINNESOTA

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 LCI Landscapes

Property Address 13960 Lake Drive | Property ID

System Designer Ryan Lashinski | Phone 612-919-3704

System Installer | Phone 763-434-3915

Service Provider/Maintainer Lashinski Septic | Phone

Permitting Authority City of Columbus | Phone

Permit # | Date Inspected

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

- Attach permit information, designer drawings and as-builts 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*, call 1-800-876-8636 or go to http://shop.extension.umn.edu/

http://septic.umn.edu

Version 11/03/2010

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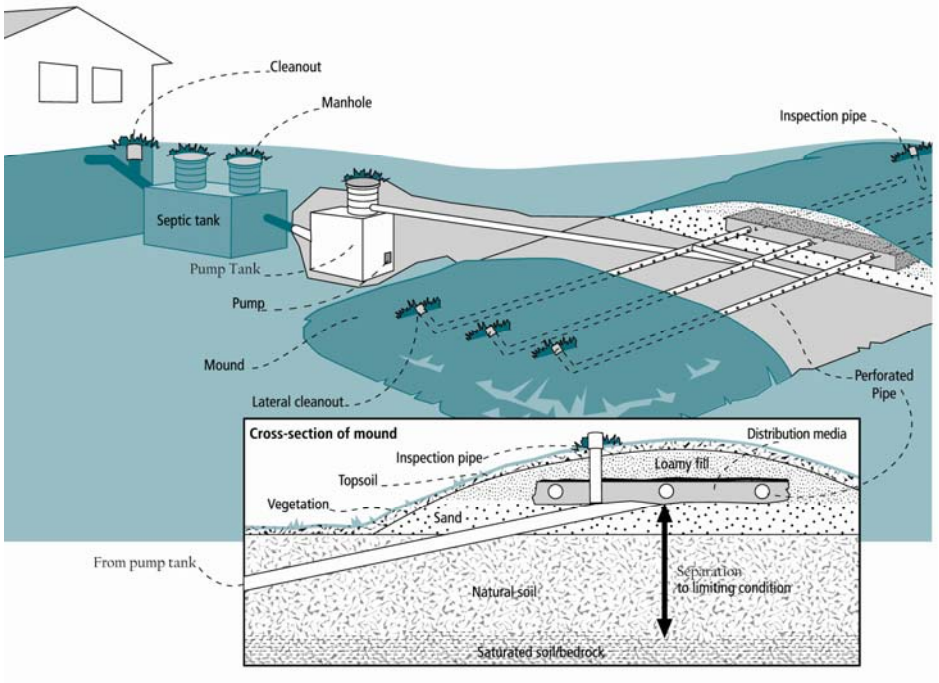
Septic System Management Plan for Above Grade Systems

Your Septic System



Septic System Specifics

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

(*Based on MN Rules Chapter 7080.2200 – 2400)*

☐ System is subject to operating permit*

☐ System uses UV disinfection unit*

Type of advanced treatment unit _____

**Additional Management Plan required*

Dwelling Type

Number of bedrooms: office building

System capacity/ design flow (gpd): 600

Anticipated average daily flow (gpd): 250

Comments_____

Business? yes What type? office

Well Construction

Well depth (ft): >50'

☑ Cased well Casing depth: _____

☐ Other (specify): _____

Distance from septic (ft): >50'

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

Septic Tank

☐ One tank *Tank volume:* _____ *gallons*

Does tank have two compartments? (•) Y ( ) N

☑ Two tanks *Tank volume:* 2200 *gallons*

❑ Tank is constructed of concrete

☑ Effluent Screen *type*: PolyLoc

☑ Pump Tank 1000 gallons

❑ Effluent Pump *make/model*: Zoeller BN51

Pump capacity 29 GPM

TDH 18 Feet of head

❑ Alarm location At lift station

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 39 ft x 77 ft

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

Location of additional STA: East of proposed

☑ Cleanouts or inspection ports

☑ Surface water diversions

☐ Additional STA not available

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Homeowner Management Tasks

These operation and maintenance activities are your responsibility. Use the chart on page 6 to track your activities.

Identify the service intervals recommended by your system designer and your local government. The tank assessment for your system will be the shortest interval of these three intervals. Your pumper/maintainer will determine if your tank needs to be pumped.

System Designer: check every 12 months

Local Government: check every 36 months

State Requirement: check every 36 months

My tank needs to be checked every 12 months

Seasonally or several times per year

- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Surfacing sewage.* Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps, call your service professional. *Untreated sewage may make humans and animals sick.*
- *Alarms.* Alarms signal when there is a problem; contact your maintainer any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. Consider adding one after washing machine.
- *Effluent screen.* If you do not have one, consider having one added the next time the tank is cleaned.

Annually

- *Water usage rate.* A water meter can be used to monitor your average daily water use. Compare your water usage rate to the design flow of your system (listed on the next page). Contact your septic professional if your average daily flow over the course of a month exceeds 70% of the design flow for your system.
- *Caps.* Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- *Water conditioning devices.* See Page 5 for a list of devices. When possible, program the recharge frequency based on *water demand (gallons)* rather than *time (days)*. Recharging too frequently may negatively impact your septic system.
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your pumper/maintainer.

During each visit by a pumper/maintainer

- Ask if your pumper/maintainer is licensed in Minnesota.
- Make sure that your pumper/maintainer services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.

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Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. Professionals should refer to the O/M Manual for detailed checklists for tanks, pumps, alarms and other components. Call 800-322-8642 for more details.

- Written record provided to homeowner after each visit.

Plumbing/Source of Wastewater

- Review the Water Use Appliance Chart on Page 5 with homeowner. Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

Septic Tank/Pump Tanks

- *Manhole lid*. A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- *Liquid level*. Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the drainfield.)
- *Inspection pipes*. Replace damaged caps.
- *Baffles*. Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- *Effluent screen*. Check to make sure it is in place; clean per manufacturer recommendation. Recommend retrofitted installation if one is not present.
- *Alarm*. Verify that the alarm works.
- *Scum and sludge*. Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

Pump

- *Pump and controls.* Check to make sure the pump and controls are operating correctly.
- *Pump vault.* Check to make sure it is in place; clean per manufacturer recommendations.
- *Alarm*. Verify that the alarm works.
- *Drainback.* Check to make sure it is operating properly.
- *Event counter or run time.* Check to see if there is an event counter or run time log for the pump. If there is one, calculate the water usage rate and compare to the anticipated average daily flow listed on Page 2.

Soil Treatment Area

- *Inspection pipes*. Check to make sure they are properly capped. Replace caps that are damaged.
- *Surfacing of effluent*. Check for surfaced effluent or other signs of problems.
- *Lateral flushing.* Check lateral distribution; if cleanouts exist, flush and clean as needed.
- *Ponding.* Check for ponding. Excessive ponding in at-grade and mound beds indicates problems.

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All other components – inspect as listed here:

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Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	• Uses additional water. • Adds solids to the tank. • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Use of a garbage disposal is not recommended. • Minimize garbage disposal use. Compost instead. • To prevent solids from exiting the tank, have your tank pumped more frequently. • Add an effluent screen to your tank.
Washing machine	• Washing several loads on one day uses a lot of water and may overload your system. • Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.	• Choose a front-loader or water-saving top-loader, these units use less water than older models. • Limit the addition of extra solids to your tank by using a liquid or easily biodegradable detergents. • Install a ling filter after the washer and an effluent screen on your tank. • Wash only full loads. • Limit use of bleach-based detergents. • Think even – spread your laundry loads throughout the week.
2nd floor laundry	• The rapid speed of water entering the tank may reduce performance.	• Install an effluent screen in the septic tank to prevent the release of excessive solids to the soil treatment area. • Be sure that you have adequate tank capacity.
Dishwasher	• Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area. • New models promote “no scraping”. They have a garbage disposal inside.	• Use gel detergents. Powdered detergents may add solids to the tank. • Use detergents that are low or no-phosphorus. • Wash only full loads. • Scrape your dishes anyways to keep undigested solids out of your septic system.
Grinder pump (in home)	• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Expand septic tank capacity by a factor of 1.5. • Include pump monitoring in your maintenance schedule to ensure that it is working properly. • Add an effluent screen.
Large bathtub (whirlpool)	• Large volume of water may overload your system. • Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.	• Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time. • Use oils, soaps, and cleaners in the bath or shower sparingly.
Clean Water Uses	**Impacts on System**	**Management Tips**
High-efficiency furnace	• Drip may result in frozen pipes during cold weather.	• Re-route water into a sump pump or directly out of the house. Do not route furnace recharge to your septic system.
Water softener Iron filter Reverse osmosis	• Salt in recharge water may affect system performance. • Recharge water may hydraulically overload the system.	• These sources produce water that is not sewage and should not go into your septic system. • Reroute water from these sources to another outlet, such as a dry well, draintile or old drainfield. • When replacing consider using a demand-based recharge vs. a time-based recharge. • Check valves to ensure proper operation; have unit serviced per manufacturer directions
Surface drainage Footing drains	• Water from these sources will likely overload the system.	

Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

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										
Check annually:										
Water usage rate (monitor frequency 1 yr)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

Notes: _____

_____

Mitigation/corrective action plan: _____

_____

_____

_____

_____

"As the owner of this SSTS, 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 this 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 _____

Management Plan Prepared By: Ryan Lashinski Certification # 3053

Permitting Authority: City of Columbus

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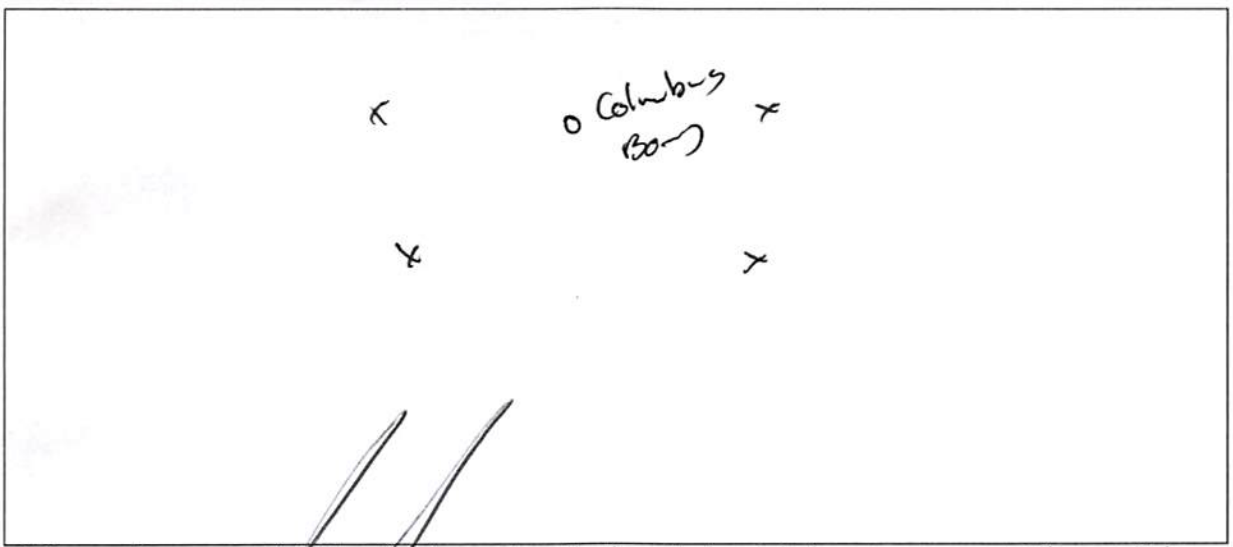
Infield Soil Verification Report

Date of Verification: 5/9/24	Time: 11:00 AM
Site Address: 13960 Lake Drive NE	Permit # 2024-0010
Limiting Condition & Distance: Redox 36"	
Boring Or Test Pit Location: Approximate center of proposed upslope of mound rockbed	

Depth In Inches	Soils Encountered
0-6	10YR 2/2 fsl (Single Grain)
6-22	10YR 3/4 fsl (SG)
22-36	10YR 4/4 fsl (SG)
36-39	10YR 4/4 fsl (SG) w/ 7.5YR 5/8 Redox

End Of Boring At: 39	Redox Present At: 36	Standing Water Present At: N



This report documents an infield verification conducted by the undersigned city inspector pursuant to Minnesota Rules, 7082.0500, Subpart 3(A).

By: _____ MPCA License No: L2896

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