E-Z EXCAVATING LLC.

2358 HWY# 23
MORA MN. 55051
Ph. 320-679-4031
Cell 320-241-7036

MOUND EXISTING SITE DESIGN

LOCATION: 45439 HWY 169 ONAMIA MN.

OWNER: MILLE LACS BAND OF OJIBWE

SYSTEM TYPE: TYPE MOUND TYPE III

DESIGN FLOW: 2 BEDROOM DESIGNED @ 450 GPD

TREATMENT AREA: 380 SQ.FT.
MOUND SIZE: 49.3' X 75.3'
SLOPE: 10 %

SEPTIC TANK: EXISTING
FILTER: YES

PUMP TANK: EXISTING

PUMP: GOULDS WE0511H

FLOW METER: SJE-RHOMBUS W/EVENT COUNTER

KEVIN HERWIG M.P.C.A. 1472

INSTALLATION NOTES

This mound system is an upgrade from TWO bedrooms to THREE bedrooms. The existing mound absorption area shall be increased due to soil type. The existing mound is to be stripped down to the washed sand in all areas, upslope, downslope, and end slope, the south end slopes is to be stripped to virgin soil. Sand is to be jar tested to ensure cleanliness. Any contaminated sand is to be removed and replaced with new washed sand. The new down slope and end extension absorption area is to be roughed up in cover with washed sand. All significant time is to be allowed for the stripped mound area to dry. The remainder of the construction of the mound is normal Type III mound construction and practices. The existing septic tanks are to be pumped, certified, and reused. Any septic tank that fails is to be replaced, use the optional tank information on the design.

Topsoil may be reused.

Contaminated sand, rock and piping are to be disposed of offsite.

KEVIN HERWIG M.P.C.A. 1472

PRODUCT NOTES

PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. (TANKS EXISTING) OPTIONAL SEPTIC TANK- CEMSTONE 9551601 PUMP TANK- CEMSTONE 9550501 PUMP – GOULDS WE0511H) PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED.**

CONTROL-SJE RHOMBUS WITH EVENT COUNTER # 1121W914H8C17A FILTER- POLYLOC FILTER PL-122

IT IS THE DESIGNERS 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

Soil Observation Log

www.SepticResource.com vers 12.4

Owner Information

Property Owner / project: _____ Date 8/2/2019

Property Address / PID: 45439 HWY 169 ONAMIA MN.

Soil Survey Information

☐ refer to attached soil survey

Parent matl's: ☑ Till ☐ Outwash ☐ Lacustrine ☐ Alluvium ☐ Organic ☐ Bedrock

landscape position: ☐ Summit ☑ Shoulder ☐ Side slope ☐ Toe slope

soil survey map units: _____ slope 10 % direction- downhill

Soil Log #1

☐ Boring ☑ Pit Elevation 97.7 Depth to SHWT _____

Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0-4	Silt Loam	<35	10YR3/2	5YR4/6	Friable	Weak	Granular
4-10	Fill	<35	10YR4/3		Friable	Weak	Platy
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

Comments:

45439 HWY 169 ONAMIA MN. **Soil Log #2**

☐ Boring ☑ Pit Elevation 97.5 Depth to SHWT _____

Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0-4	Silt Loam	<35	7.5YR3/2		Friable	Weak	Granular
4-7	Silt Loam	<35	7.5YR3/2	5YR5/6	Friable	Weak	Blocky
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

45439 HWY 169 ONAMIA MN. **Soil Log #3**

☐ Boring ☑ Pit Elevation 96.76 Depth to SHWT _____

Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0-6	Silt Loam	<35	7.5YR3/2		Friable	Weak	Blocky
6-10	Silt Loam	<35	7.5YR3/2	5YR5/6	Friable	Weak	Blocky
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

I hereby certify this work was completed in accordance with MN 7080 and any local req's.

Designer Signature

E-Z EXCAVATING
Company

1472
License #

UNIVERSITY OF MINNESOTA
ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

v 04.02.2019

1. PROJECT INFORMATION

Property Owner/Client: MILLE LACS BAND OF OJIBWE
Project ID:
Site Address: 45439 HWY 169 ONAMIA MN
Date: 08/02/19
Email Address:
Phone:

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other Establishments

Design Flow: 450 GPD
Anticipated Waste Type: Residential
BOD: mg/L TSS: mg/L Oil & Grease: mg/L
Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

3. HOLDING TANK SIZING

Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Code Minimum **Holding Tank** Capacity: Gallons in Tanks or Compartments
Recommended **Holding Tank** Capacity: Gallons in Tanks or Compartments
Type of High Level Alarm: (Set @ 75% tank capacity)
Comments:

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 3
Code Minimum **Septic Tank** Capacity: 1000 Gallons in 1 Tanks or Compartments
Recommended **Septic Tank** Capacity: 1600 Gallons in 2 Tanks or Compartments
Effluent Screen & Alarm (Y/N): Yes Model/Type: CEMSTONE 9551601 OPTIONAL

B. Other Establishments:

Waste received by: GPD x Days Hyd. Retention Time
Code Minimum **Septic Tank** Capacity: Gallons In Tanks or Compartments
Recommended **Septic Tank** Capacity: Gallons In Tanks or Compartments
Effluent Screen & Alarm (Y/N): Model/Type:

5. PUMP TANK SIZING

Pump Tank 1 Capacity (Minimum): 500 Gal
Pump Tank 1 Capacity (Recommended): 0 Gal
Pump 1 29.0 GPM Total Head 15.7 ft
Supply Pipe Dia. 2.00 in Dose Vol: 112.0 gal

Pump Tank 2 Capacity (Minimum): Gal
Pump Tank 2 Capacity (Recommended): Gal
Pump 2 GPM Total Head ft
Supply Pipe Dia. Dose Vol: Gal

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

Soil Treatment Type:	Mound	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	100 ft	Benchmark Location:	FOOTING TOP
MPCA System Type:	Type III	Distribution Media:	Rock
Type III/IV Details:			

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (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.

Note:

		Depth		Depth		Elevation	
Limiting Condition:	0	inches	0.0	ft	97.7	ft	
Minimum Req'd Separation:	36	inches	3.0	ft	Elevation		***Critical for system compliance***
Code Max System Depth:	Mound	inches	-3.0	ft	100.7	ft	

This is the maximimum depth to the bottom of the distribution media. Negative Depth (ft) means it must be a mound.

Soil Texture:	Silt Loam		
Soil Hyd. Loading Rate:	0.50 GPD/ft^2	Percolation Rate:	MPI
Contour Loading Rate:	12	Note:	
Measured Land Slope:	10.0 %	Note:	
Comments:			

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	ft^2	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Min. Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	ft^2	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Mound:

Dispersal Area	375.0	ft^2	Bed Length	37.5	ft	Bed Width	10.0 ft
Absorption Width	25.0	ft	Clean Sand Lift	3.0	ft	Berm Width (0-1%)	ft
Upslope Berm Width	12.2	ft	Downslope Berm	27.0	ft	Endslope Berm Width	18.9 ft
Total System Length	75.3	ft	System Width	49.3	ft	Contour Loading Rate	12.0 gal/ft

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: #REF!

At-Grade:

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

Level & Equal Pressure Distribution

No. of Laterals	3		Perforation Spacing	3	ft	Perforation Diameter	1/4	in
Lateral Diameter	2.00	in	Min Dose Volume	73	gal	Max Dose Volume	113	gal

Non-Level and Unequal Pressure Distribution

	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

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

A. Starting BOD Concentration = Design Flow X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,00 = _____ lbs. BOD/day

B. Target BOD Concentration = Design Flow X Target BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,00 = _____ lbs. BOD/day

Lbs. BOD To Be Removed: _____

PreTreatment Technology: _____ *Must Meet or Exceed Target

Disinfection Technology: _____ *Required for Levels A & B

C. Organic Loading to Soil Treatment Area:

_____ mg/L X _____ gpd x 8.35 ÷ 1,000,000 ÷ _____ ft^2 = _____ $lbs./day/ft^2$

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		1472	8/2/2019
(Designer)	(Signature)	(License #)	(Date)

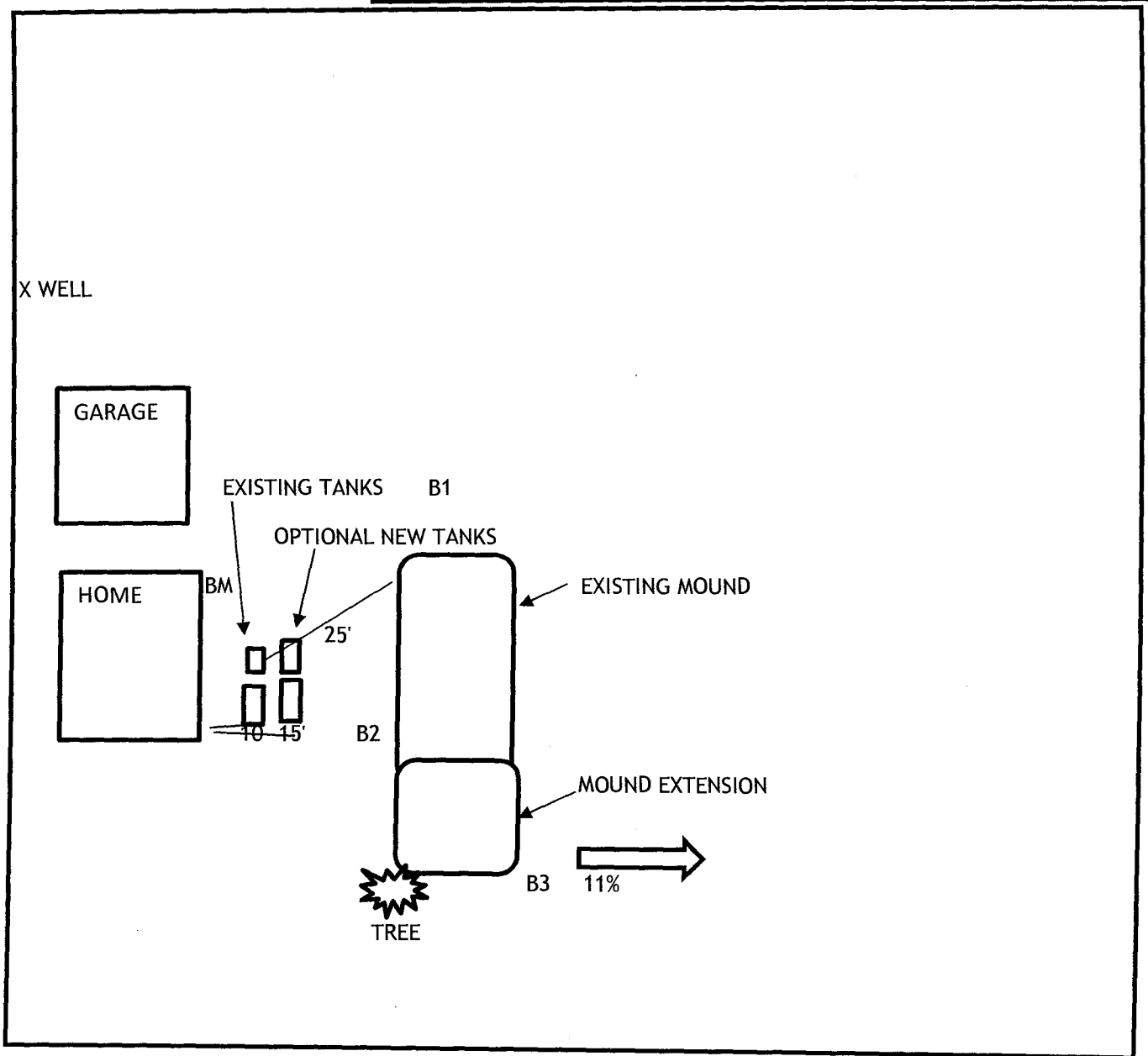
ONSITE SEWAGE TREATMENT PROGRAM

Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

Contact Information | Project ID: | v 04.02.2019

Property Owner/Client: MILLE LACS BAND OF OJIBWE



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

Elevations in feet

System Corners:

NW:	BUILD	ft
NE:	TO	ft
SW:	3 FOOT	ft
SE:	MINIMUM	ft

Soil Borings:

#1:	97.7	ft
#2:	97.5	ft
#3:	96.76	ft

Tank Outlet: EXISTING 97.48 ft

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Mound Design Worksheet
≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: v 04.02.2019

A. Design Flow:	450	GPD
B. Soil Loading Rate:	0.50	GPD/ft^2
C. Depth to Limiting Condition	0.0	ft
D. Percent Land Slope:	10.0	%
E. Design Media Loading Rate:	1.2	GPD/ft^2
F. Mound Absorption Ratio:	2.50	

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: Absorption Area Loading Rate (gpd/ft^2)	Treatment Level C: Mound Absorption Ratio	Treatment Level A, A-2, B: Absorption Area Loading Rate (gpd/ft^2)	Treatment Level A, A-2, B: 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

450 GPD ÷ 1.2 GPD/ft^2 = 375 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

375 ft^2 ÷ 10.0 ft = 37.5 ft

3. ABSORPTION AREA SIZING

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

10.0 ft X 2.5 = 25.0 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

25.0 ft - 10.0 ft = 15.0 ft

4. DISTRIBUTION MEDIA: ROCK Project ID: #REF!

A. Rock Depth Below Distribution Pipe

6 in 0.50 ft

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

A. Enter Dispersal Media: _____

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

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

_____ ft ÷ _____ ft = _____ components/row

Check registered product information for specific application details and design

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

_____ components X _____ ft = _____

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

_____ ft ÷ _____ ft = _____ rows *Adjust width so this is a 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 - _____ ft = 3.0 ft Design Sand Lift (optional): 3 ft

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

3.0 ft + 0.8 ft + 1.5 ft = 5.3 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): 2.31

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

2.31 ft X 5.3 ft = 12.2 ft

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

10.0 ft X 10.0 % ÷ 100 = 1.00 ft

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

5.3 ft + 1.00 ft = 6.3 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): 4.29

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

4.29 x 6.3 ft = 27.0 ft

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

15.0 ft + 4 ft = 19.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 27.0 ft

K. Select Endslope Berm Multiplier: 3.00 *(usually 3.0 or 4.0)*

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

3.00 ft X 6.3 ft = 18.9 ft

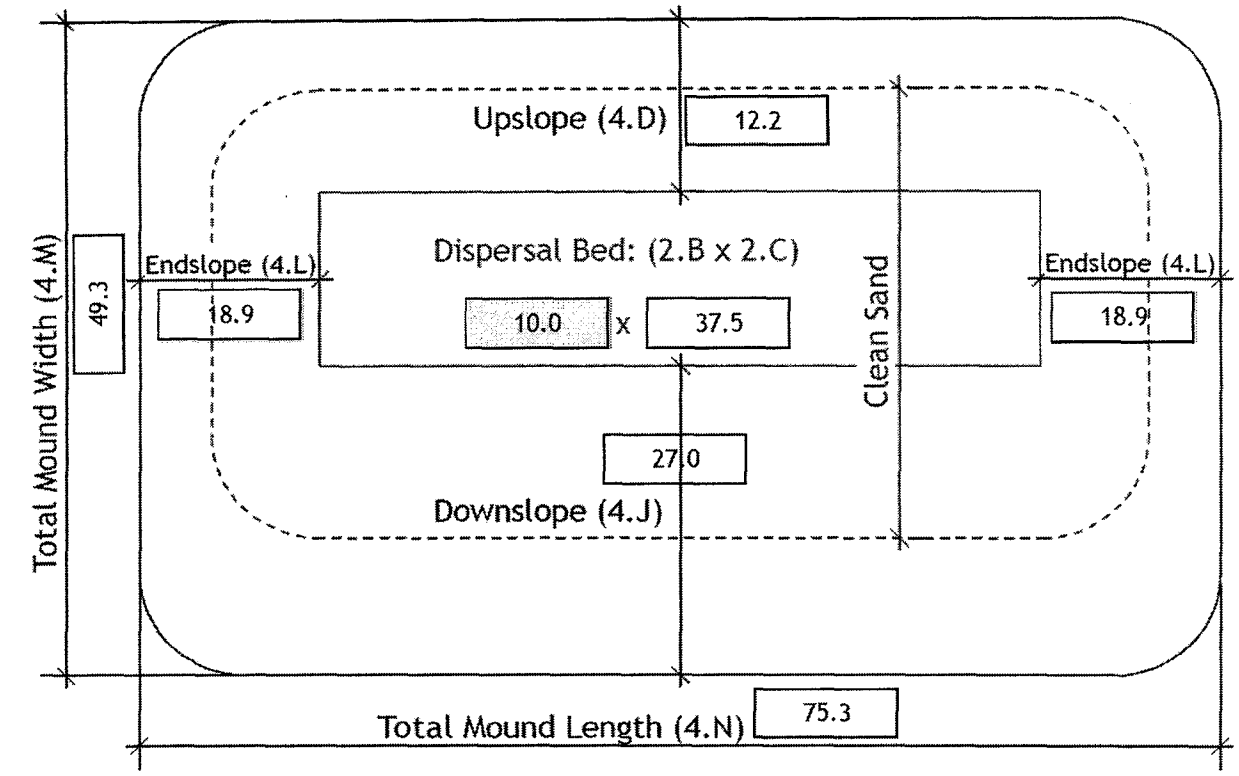
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

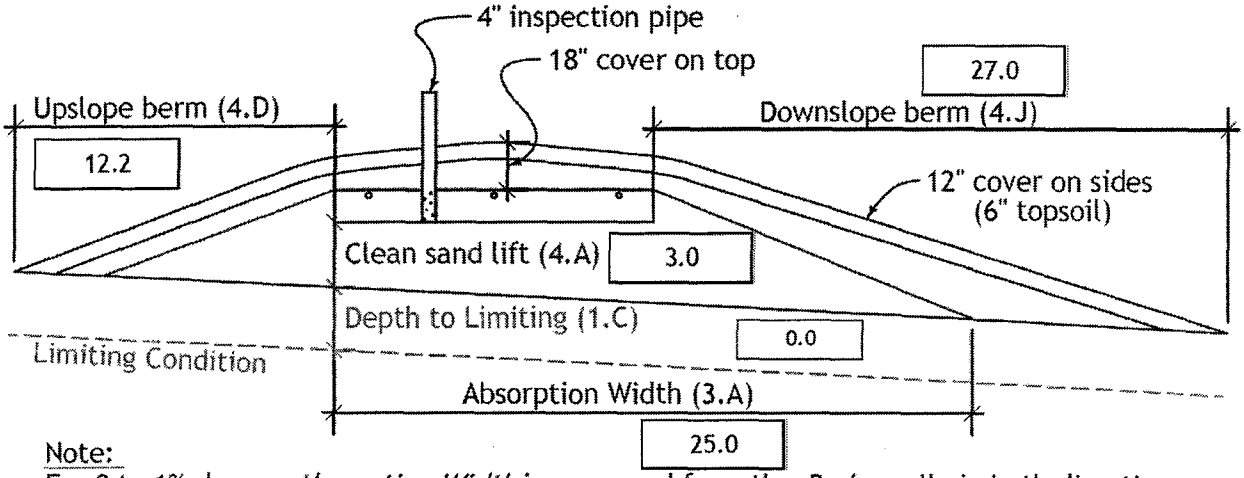
12.2 ft + 10.0 ft + 27.0 ft = 49.3 ft

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

18.9 ft + 37.5 ft + 18.9 ft = 75.3 ft

7. **MOUND DIMENSIONS** Project ID: #REF!





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:

University of Minnesota Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.02.2019

1. Media Bed Width: 10 ft

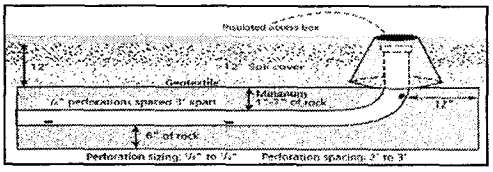
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(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 (Except in at-grades)

4. Select *Perforation Spacing*: 3.00 ft

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



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

38.0 - 2ft = 36.0 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 = 36.0 ft ÷ 3.0 ft = 12 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 = 12 Spaces + 1 = 13 Perfs. Per Lateral

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

¼ 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

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

13 Perf. Per Lat. X 3 Number of Perf. Lat. = 39 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 3.0 ft

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

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

University of Minnesota Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

Minnesota Pollution Control Agency

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	38	ft	=	380	ft²

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

380	ft²	÷	39	perforations	=	9.7	ft²/perforations

13. Select *Minimum Average Head*: 1.0 ft

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

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

39	Perfs	X	0.74	GPM per Perforation	=	29	GPM

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

17. *Volume of Distribution Piping* =

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

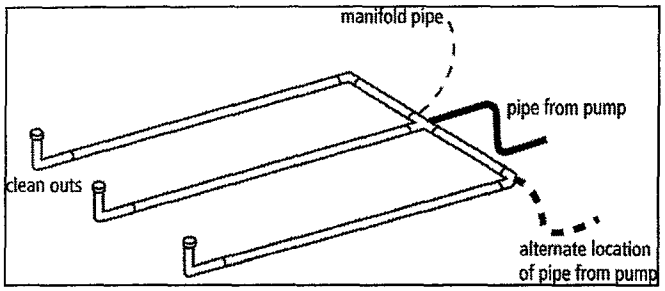
3	X	36	ft	X	0.170	gal/ft	=	18.4	Gallons

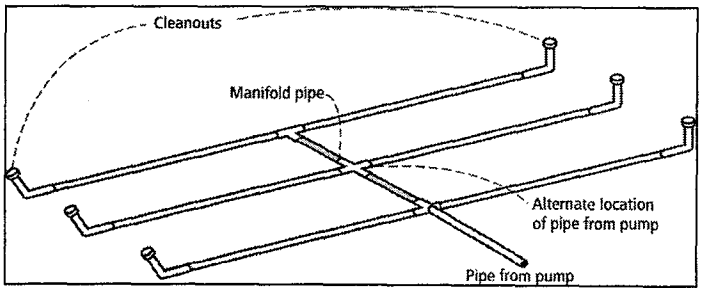
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

18.4	gals	X	4	=	73.4	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:

ONSITE SEWAGE TREATMENT PROGRAM

Basic Pump Selection Design Worksheet

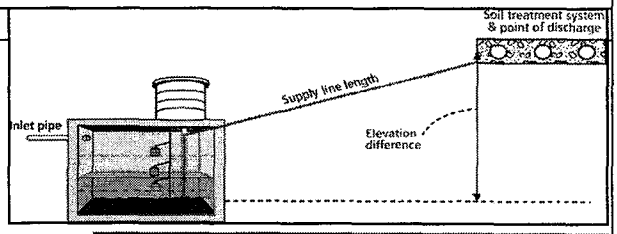
MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY Project ID: v 04.02.2019

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

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 25 ft

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

Friction Loss = 2.23 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*

25 ft X 1.25 = 31.3 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* (Line E) by the *Equivalent Pipe Length* (Line F) and divide by 100.

Supply Friction Loss =

2.23 ft per 100ft X 31.3 ft ÷ 100 = 0.7 ft

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

10.0 ft + 5.0 ft + _____ ft + 0.7 ft = 15.7 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **29.0** GPM (Line 1 or Line 2) with at least **15.7** feet of total head.

Comments:

Pump Tank Design Worksheet (Demand Dose)

MINNESOTA POLLUTION CONTROL AGENCY

DETERMINE TANK CAPACITY AND DIMENSIONS | Project ID: | v 04.02.2019

1. A. *Design Flow (Design Sum.1A)*: 450 GPD — C. Tank Use: Dosing
   B. Min. required pump tank capacity: 500 Gal — D. Recommended pump tank capacity: 500 Gal

2. A. Tank Manufacturer: NA — B. Tank Model: CEMSTONE 9550501 OPTIONAL
   C. Capacity from manufacturer: NA Gallons
   D. Gallons per inch from manufacturer: 16.0 Gallons per inch
   E. Liquid depth of tank from manufacturer: 43.0 inches

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

DETERMINE DOSING VOLUME

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

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

(12 in + 2 inches) X 16.0 Gallons Per Inch = 224 Gallons

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

-Item 18 of the Pressure Distribution or Item 11 of Non-level 73 **Gallons (Minimum dose)** 4.6 inches/dose

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

Design Flow: 450 GPD X 0.25 = 113 **Gallons (Maximum dose)** 7.0 inches/dose

6 *Select a pumpout volume that meets both Minimum and Maximum:* 112 Gallons

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

450 gpd ÷ 112 gal = 4.02 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 25 feet

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

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

25 ft X 0.170 gal/ft = 4.3 Gallons

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

112 gal + 4.3 gal = 116 Gallons

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

2 in X 16.0 gal/in = 32.0 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

116 gal ÷ 16.0 gal/in = 7.3 Inches

12. Measuring from bottom of tank:

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

12 in + 2 in = 14 Inches

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

14 in + 7.3 in = 21 Inches

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

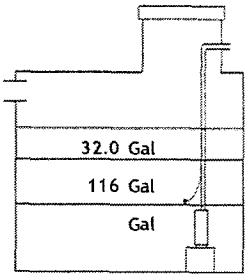
21 in + 2.0 in = 23 Inches

Inches for Dose: 7.3 in

Alarm Depth 23.3 in

Pump On 21.3 in

Pump Off 14.0 in



MITIGATION ACTION PLAN

SEPTIC SYSTEM CLASSIFIED AS TYPE III

Should the system failed 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.

MILLE LACS BAND OF OJIBWE DNR and Kevin Herwig are 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 any and 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 system must be reported to the county within 24 hours.

Type III systems are not warrantied by the Designer, Installer, or the Local Unit of Government

Any and all expenses for inspections, maintenance, repair, or replacement are the homeowner's responsibility.

I , property owner of 45439 HWY 169 ONAMIA Mn.

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

TYPE III MOUND ON EXISTING SITE

INSTALLATION NOTES

This mound system is an upgrade from two bedrooms to three bedrooms. The existing mound absorption area shall be increased due to soil type. The existing mound is to be stripped down to the washed sand in all areas, upslope, downslope and end slopes are too stripped to virgin soil. Sand is to be jar tested to ensure cleanliness. Any contaminated sand is to be removed and replaced with new washed sand. The new down slope and end extension absorption area is to be roughed up in cover with washed sand. The remainder of the construction of the mound is normal Type III mound construction and practices.

Topsoil may be reused.

Contaminated sand, rock and piping are to be disposed of offsite.

KEVIN HERWIG M.P.C.A. 1472

Owners Septic System Management Plan

Date: _____

Property Address: 45439 HWY 169 ONAMIA 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** _____