E-Z EXCAVATING LLC.

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

PRESSURE BED DESIGN

OWNER: MILLE LACS BAND OF OJIBWE
LOCATION :
Parcel ID 030430001
Property Address 30910 EAGLE FEATHER DR
HINCKLEY MN.
Sec/Twp/Rng 35-041-020
Brief Tax Description Sect-35 Twp-041 Range-020 6.09 AC
THAT PART OF NORTHEAST 1/4 OF NORTHEAST 1/4 DESC
AS COM AT NE CORNER; THENCE SOUTH 915 FT TO PT
OF BEG; THENCE WEST 660 FT; THENCE SOUTH 402.4 FT;
THENCE EAST 660 FT; THENCE NORTH 402.4 FT TO POINT
OF BEGINNING & THERE TERM
SYSTEM TYPE: TYPE 1 PRESSURE BED
DESIGN FLOW: 5 BEDROOM DESIGNED @ 750 GPD
TREATMENT AREA: **962** SQ.FT.
BED SIZE: 20' X 48.1 '
SLOPE: 5 %
SEPTIC TANK: 2500 CEMSTONE SPLIT
FILTER: POLYLOK PL-122 WITH ALARM
PUMP TANK: 1000 CEMSTONE
PUMP: GOULDS WE0511H
FLOW METER: SJE-RHOMBUS AB DUO W/EVENT
COUNTER

KEVIN HERWIG M.P.C.A. 1472

CONSTRUCTION NOTES

PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. (CEMSTONE TANKS –1 SEPTIC 2500 GAL. COMBO(#9552501) W/ POLYLOK PL-122 FILTER WITH ALARM, 1-PUMP TANK 1000 GAL.(# 9551001) PUMP – GOULDS WE0511H) PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED.**

SJE RHOMBUS AB DUO CONTROL WITH EVENT COUNTER(POLYLOC FILTER PL-122 WITH ALARM)

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

University of Minnesota Onsite Sewage Treatment Program

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Contact Information

v 04.01.2020

Property Owner/Client:	MILLE LACS BAND OF OJIBWE	Date Completed:	9/25/2020
Site Address:	30910 EAGLE FEATHER DR HINCKLEY MN.	Project ID:	
Email:		Phone:	
Mailing Address:	43408 OoDENA DR. ONAIMA MN		
Legal Description:			
Parcel ID:	030430001	SEC: 35 TWP: 041 RNG: 020	

2. Flow and General System Information

A. Client-Provided Information

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

Project Use: ☑ Residential ☐ Other Establishment: HOME REPLACEMENT

Residential use: # Bedrooms: 5 Dwelling Sq.ft.: Unfinished Sq. Ft.:

Adults: # Children: # Teenagers:

In-home business (Y/N): 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 Information

Attach additional information as necessary.

Design Flow: 750 GPD Anticipated Waste Type: Residential

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	WELL		>50'				OWNER
2							
3							
4							

Additional Well Information: NO WELLS WITHIN 50

ONSITE SEWAGE TREATMENT PROGRAM

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Site within 200' of noncommunity transient well (Y/N)	No	Yes, source:	
Site within a drinking water supply management area (Y/N)	No	Yes, source:	
Site in Well Head Protection inner wellhead management zone (Y/N)	No	Yes, source:	
Buried water supply pipes within 50 ft of proposed system (Y/N)	No		
B. Site located in a shoreland district/area?	No	Yes, name:	
Elevation of ordinary high water level:	ft	Source:	
Classification:	Tank Setback: ft.	STA Setbk: ft.	
C. Site located in a floodplain?	No	Yes, Type(s):	N/A
Floodplain designation/elevation (10 Year):	N/A ft	Source:	N/A
Floodplain designation/elevation (100 Year):	N/A ft	Source:	N/A

D. Property Line Id / Source: ☑ Owner ☐ Survey ☐ County GIS ☐ Plat Map ☐ Other:

E. ID distance of relevant setbacks on map: ☐ Water ☐ Easements ☑ Well(s) ☐ Building(s) ☐ Property Lines ☐ OHWL ☐ Other:

4. Preliminary Soil Profile Information From Web Soil Survey (attach map & description)

Map Units: NONE Slope Range: %

List landforms:

Landform position(s):

Parent materials:

Depth to Bedrock/Restrictive Feature: in Depth to Watertable: in

Map Unit Ratings

Septic Tank Absorption Field- At-grade:

Septic Tank Absorption Field- Mound:

Septic Tank Absorption Field- Trench:

5. Local Government Unit Information

Name of LGU: PINE COUNTY

LGU Contact:

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:

ONSITE SEWAGE TREATMENT PROGRAM

Field Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Project Information

v 04.01.2020

Property Owner/Client: MILLE LACS BAND OF OJIBWE | Project ID:

Site Address: 30910 EAGLE FEATHER DR HINCKLEY MN. | Date Completed: 9/25/2020

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: 5 % | Slope shape: Linear, Linear | Slope direction: southwest

Describe the flooding or run-on potential of site: NONE

Describe the need for Type III or Type IV system:

Note:

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

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*:	60	in	**92.1**	ft	**Most Restrictive Depth Identified from List Below*
Periodically saturated soil:	NA	in		ft	Soil Texture: medium sandy loam
Standing water:	NA	in		ft	Percolation Rate: min/inch
Bedrock:	NA	in		ft	Soil Hyd Loading Rate: 0.78 gpd/ft^2
Benchmark Elevation:	100.0	ft			Elevations and Benchmark on map? (Y/N): Yes

Benchmark Elevation Location: TOP OF WELL CAP NW OF BED

Differences between soil survey and field evaluation:

Site evaluation issues / comments:

Anticipated construction issues:

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	MILLE LACS BAND OF OJIBWE	Location / Address:	30910 EAGLE FEATHER DR HINCKLEY MN.

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

Landscape Position: (select one)	Shoulder	Slope %:	5.0	Slope shape	Linear, Linear
Elevation-relative to benchmark:	98.2				
Vegetation:	Lawn	Soil survey map units:			
Limiting Layer Elevation:	93.2				
Weather Conditions/Time of Day:	OVERCAST			Date	09/24/20
Observation #/Location:	1	N. CENTER		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-9	Sandy Loam	<35%	10YR 3/3				Granular	Weak	Friable
9-24	Sandy Loam	<35%	7.5YR 4/4				Blocky	Weak	Friable
24-66	Sand	<35%	2.5Y 3/4				Single grain	Structureless	Loose

Comments

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

KEVIN HERWIG		1472	9/24/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	MILLE LACS BAND OF OJIBWE	Location / Address:	30910 EAGLE FEATHER DR HINCKLEY MN.

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

Landscape Position: (select one)	Shoulder	Slope %:	5.0	Slope shape	Linear, Linear
Elevation-relative to benchmark:	97.9				
Vegetation:	Lawn	Soil survey map units:	NONE	Limiting Layer Elevation:	92.85
Weather Conditions/Time of Day:	OVERCAST	9:30 AM	Date	09/24/20	
Observation #/Location:	2	N.E.	Observation Type:	Pit	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-10	Sandy Loam	<35%	10YR 3/3				Granular	Weak	Friable
10-24	Sandy Loam	<35%	7.5YR 4/4				Blocky	Weak	Friable
24-66	Sand	<35%	2.5Y 3/4				Single grain	Structureless	Loose

Comments

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KEVIN HERWIG		1472	9/24/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	MILLE LACS BAND OF OJIBWE	Location / Address:	30910 EAGLE FEATHER DR HINCKLEY MN.

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

Landscape Position: (select one)	Shoulder	Slope %: 5.0	Slope shape	Linear, Linear	Elevation-relative to benchmark: 97.1
Vegetation:	Lawn	Soil survey map units:	NONE		Limiting Layer Elevation: 92.1
Weather Conditions/Time of Day:	OVERCAST	9:30 AM		Date	09/24/20
Observation #/Location:	3	N.E.		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-9	Sandy Loam	<35%	10YR 3/3				Granular	Weak	Friable
9-20	Sandy Loam	<35%	7.5YR 4/4				Blocky	Weak	Friable
20-60	Sand	<35%	2.5Y 3/4				Single grain	Structureless	Loose

Comments

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KEVIN HERWIG		1472	9/24/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

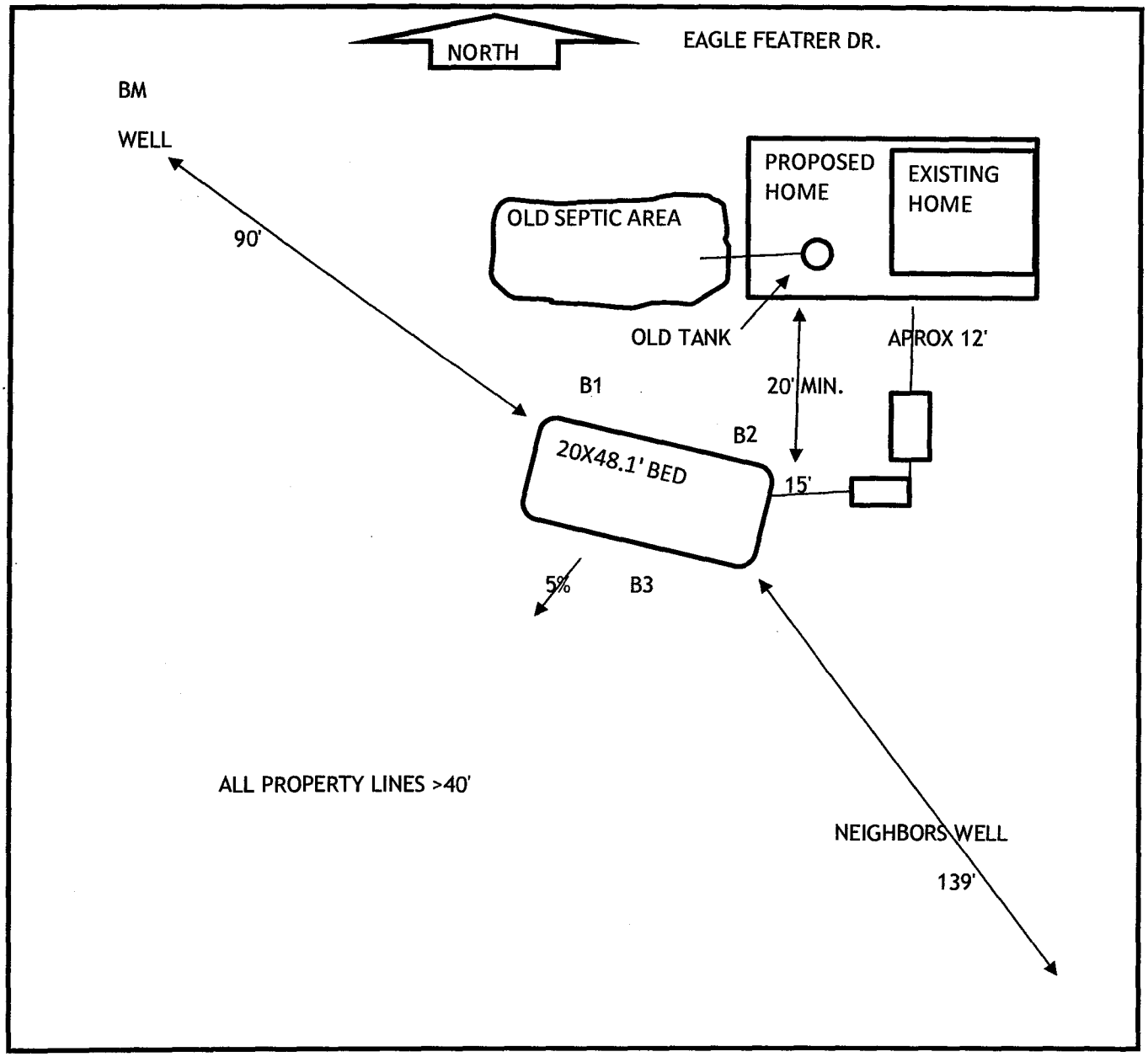
University of Minnesota Onsite Sewage Treatment Program

Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.01.2020

Property Owner/Client: MILLE LACS BAND OF OJIBWE



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

Elevations in feet

System Corners:

NW:	97.45	ft
NE:	97.64	ft
SW:	96.98	ft
SE:	97.45	ft

Soil Borings:

#1:	98.2	ft
#2:	97.85	ft
#3:	97.1	ft

Tank Outlet: 96.1 ft

University of Minnesota Onsite Sewage Treatment Program

Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

	Project ID:	v 04.01.2020
Property Owner/Client:	MILLE LACS BAND OF OJIBWE	

Mapping Checklist

Locate

- ☐ Lot Dimensions/Property Lines
- ☑ Dwellings and Other Improvements
- ☑ Existing or Proposed System(s)
- ☐ Replacement Area
- ☐ Unsuitable Area(s)
- ☐ Public Water Supply Wells
- ☐ Pumping Access
- ☐ Inner Wellhead Zone

Easements

- ☐ Phone
- ☐ Electric
- ☐ Gas

Elevations

- ☑ Benchmark
- ☑ Borings
- ☐ Perc Tests
- ☐ Horizontal and Vertical Reference Points

Setbacks

- ☑ Building
- ☑ All water wells within 100 feet
- ☐ Pressure Pipe
- ☐ Water Suction
- ☐ Streams, Lakes
- ☐ Floodway and Fringe

Comments:

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

1. PROJECT INFORMATION

v 04.01.2020

Property Owner/Client:	MILLE LACS BAND OF OJIBWE	Project ID:	
Site Address:	30910 EAGLE FEATHER DR HINCKLEY MN.	Date:	09/25/20
Email Address:		Phone:	

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other Establishments

Design Flow: 750 GPD — Anticipated Waste Type: Residential

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

Treatment Level: *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): 5

Code Minimum **Septic Tank** Capacity: 1500 Gallons in 1 Tanks or Compartments

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

Effluent Screen & Alarm (Y/N): Yes — Model/Type: POLYLOK PL-122

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):	750 Gal	Pump Tank 2 Capacity (Minimum):	Gal
Pump Tank 1 Capacity (Recommended):	1000 Gal	Pump Tank 2 Capacity (Recommended):	Gal
Pump 1	47.0 GPM	Pump 2	GPM
Total Head	13.0 ft	Total Head	ft
Supply Pipe Dia.	2.00 in	Supply Pipe Dia.	
Dose Vol:	187.0 gal	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:	Bed	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	100 ft	Benchmark Location:	TOP OF WELL CAP NW OF BED
MPCA System Type:	Type I	Distribution Media:	Rock
Type III/IV Details:			

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Depth of Observation

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 of Limiting Condition	
Limiting Condition:	60	inches	5.0	ft	92.10	ft
Minimum Req'd Separation:	36	inches	3.0	ft	Elevation	*Critical for system compliance*
Code Max System Depth:	24	inches	2.0	ft	95.10	ft

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

Soil Texture:	Sandy Loam		
Soil Hyd. Loading Rate:	0.78 GPD/ft^2	Percolation Rate:	MPI
Contour Loading Rate:		Note:	
Measured Land Slope:	5.0 %	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	Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	962 ft^2	Sidewall Depth	6.0 in	Maximum Bed Depth	24.0 in
Bed Width	20 ft	Bed Length	48.1 ft	Designed Bed Depth	20.0 in

Mound:

Dispersal Area	ft^2	Bed Length	ft	Bed Width	ft
Absorption Width	ft	Clean Sand Lift	ft	Berm Width (0-1%)	ft
Upslope Berm Width	ft	Downslope Berm	ft	Endslope Berm Width	ft
Total System Length	ft	System Width	ft	Contour Loading Rate	gal/ft

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

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	7	Perforation Spacing	3 ft	Perforation Diameter	3/16 in
Lateral Diameter	2.00 in	Min Dose Volume	186 gal	Max Dose Volume	188 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	9/25/2020
(Designer)	(Signature)	(License #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Bed Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: v 04.01.2020

A. Design Flow: 750 GPD

B. Code Maximum Depth: 24 inches Designers Maximum Depth: 20 inches

C. Soil Loading Rate: 0.78 GPD/ft²

D. Required Bottom Area: Design Flow ÷ Soil Loading Rate

750 GPD ÷ 0.78 GPD/ft² = 962 ft²

E. Select Distribution Method: Pressure Notes:

F. Select Dispersal Media: Rock Product:

G. If distribution media is installed in contact with sand or loamy sand or with a percolation rate of 0.1 to 5 mpi indicate distribution or treatment method:

2. BED CONFIGURATION: (for sites with less than 6% slope)

A. Select size Multiplier: 1.0 1.0 = pressurized or 1.5 = gravity

B. Req'd Bottom Area = Bottom Area X Size Multiplier =

961.5 ft² X 1.0 = 962 ft²

C. Designed Bottom Area: ft² *Optional upsizing of bed area*

D. Select Bed Width: 20 ft

E. Calculate Bed Length: Designed Bottom Area ÷ Bed Width = Bed Length

962 ft² ÷ 20.0 ft = 48.1 ft

3. MATERIAL CALCULATION: ROCK

A. If drainfield rock is being used, select sidewall height

6 in 0.50 ft

B. Media Volume: (Media Depth + depth to cover pipe) X Designed Bottom Area = ft³

(0.50 ft + 0.33 ft) X 961.5 ft² = 798 ft³

C. Calculate Volume in cubic yards: Media volume in cubic feet ÷ 27 = cubic yards

798 ft³ ÷ 27 = 30 yd³

4. MATERIAL CALCULATION: REGISTERED PRODUCTS - CHAMBERS AND EZFLOW

A. Registered Product:

B. Component Length: ft

C. Component Width: ft

D. Component depth (louver or depth of sidewall loading) in

Check registered product information for specific application details and design

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

ft ÷ ft = components

F. Actual Bed Length = Number of Components X Component Length:

components X ft = ft

G. Number of Rows = Bed Width divided by Component Width

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

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

X = components

ONSITE SEWAGE TREATMENT PROGRAM

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.01.2020

1. Media Bed Width: 20 ft

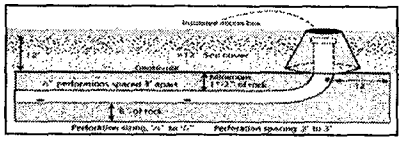
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(20 - 4) ÷ 3] + 1 = 7 laterals *Does not apply to at-grades*

3. Designer Selected *Number of Laterals*: 7 laterals
Cannot be less than line 2 (Except in at-grades)

4. Select *Perforation Spacing*: 3.00 ft

5. Select *Perforation Diameter Size:* 3/16 in



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

48.1 - 2ft = 46.1 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 = 46.1 ft ÷ 3.0 ft = 15 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 = 15 Spaces + 1 = 16 Perfs. Per Lateral

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

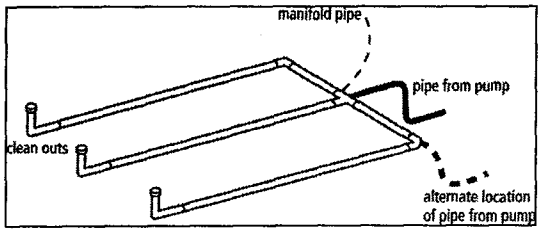
Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

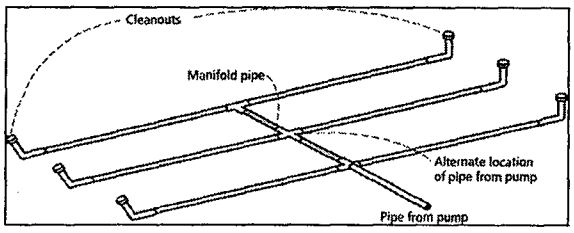
3/16 Inch Perforations

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





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

16 Perf. Per Lat. X 7 Number of Perf. Lat. = 112 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 2.8 ft

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

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

University of Minnesota Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

13. 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)

20 ft X 48 ft = 962 ft^2

b. *Square Foot per Perforation = Bed Area* ÷ by the *Total Number of Perfs*

962 ft^2 ÷ 112 perf = 8.6 ft^2/perf

14. Select *Minimum Average Head*: 1.0 ft

15. Select *Perforation Discharge* based on Table: 0.41 GPM per Perf

16. *Flow Rate = Total Number of Perfs X Perforation Discharge.*

112 Perfs X 0.41 GPM per Perforation = 47 GPM

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

18. *Volume of Distribution Piping* =

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

7 X 46 ft X 0.170 gal/ft = 54.9 Gallons

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

54.9 gals X 4 = 219.4 Gallons

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:

ONSITE SEWAGE TREATMENT PROGRAM

Basic Pump Selection Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY

Project ID:

v 04.01.2020

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: 47.0 GPM

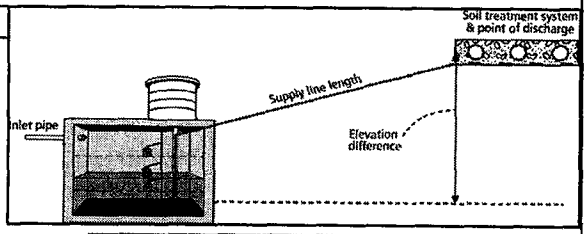
C. Enter pump description: _____

2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 7 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: 2.0 in

2. Supply Pipe Length: 15 ft

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

Friction Loss = 5.44 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*

15 ft X 1.25 = 18.8 ft

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

Supply Friction Loss =

5.44 ft per 100ft X 18.8 ft ÷ 100 = 1.0 ft

H. *Total Head* requirement is the sum of the *Elevation Difference* + Distribution Head Loss, + Additional Head Loss + Supply Friction Loss

7.0 ft + 5.0 ft + _____ ft + 1.0 ft = 13.0 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **47.0** GPM with at least **13.0** feet of total head.

Comments:

ONSITE SEWAGE TREATMENT PROGRAM

Pump Tank Design Worksheet (Demand Dose)

MINNESOTA POLLUTION CONTROL AGENCY

DETERMINE TANK CAPACITY AND DIMENSIONS Project ID: v 04.01.2020

1. A. *Design Flow (Design Sum.1A)*: 750 GPD C. Tank Use: Dosing
   B. Min. required pump tank capacity: 750 Gal D. Recommended pump tank capacity: 1000 Gal

2. A. Tank Manufacturer: CEMSTONE B. Tank Model: 9551001
   C. Capacity from manufacturer: 1070 Gallons
   D. Gallons per inch from manufacturer: 32.0 Gallons per inch
   E. Liquid depth of tank from manufacturer: 32.0 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*

(12 in + 2 inches) X 32.0 Gallons Per Inch = 448 Gallons

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

-Item 18 of the Pressure Distribution or Item 11 of Non-level 186 **Gallons (Minimum dose)** 5.8 inches/dose

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

Design Flow: 750 GPD X 0.25 = 188 **Gallons (Maximum dose)** 5.9 inches/dose

6 ***Select a pumpout volume that meets both Minimum and Maximum:*** 187 Gallons

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

750 gpd ÷ 187 gal = 4.01 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 15 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*

15 ft X 0.170 gal/ft = 2.6 Gallons

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

187 gal + 2.6 gal = 190 Gallons

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

2 in X 32.0 gal/in = 64.0 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

190 gal ÷ 32.0 gal/in = 5.9 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

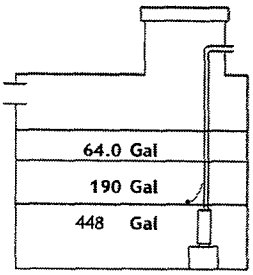
B. *Distance to set Pump On Float=Distance to Set Pump-Off Float + Float Separation Distance*

14 in + 5.9 in = 20 Inches

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

20 in + 2.0 in = 22 Inches

Inches for Dose: 5.9 in
Alarm Depth 21.9 in
Pump On 19.9 in
Pump Off 14.0 in



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Septic System Management Plan for Above Grade Systems

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

This **management plan** will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is **YOUR** responsibility to make sure all tasks get accomplished in a timely manner.

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

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

Property Owner MILLE LACS BAND OF OJIBWE	Email
Property Address 30910 EAGLE FEATHER DR. HINCKLEY	Property ID 030430001
System Designer KEVIN HERWIG	Contact Info 320-241-7036
System Installer	Contact Info
Service Provider/Maintainer	Contact Info
Permitting Authority PINE COUNTY	Contact Info
Permit #	Date Inspected

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

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

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

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

Version: August 2015

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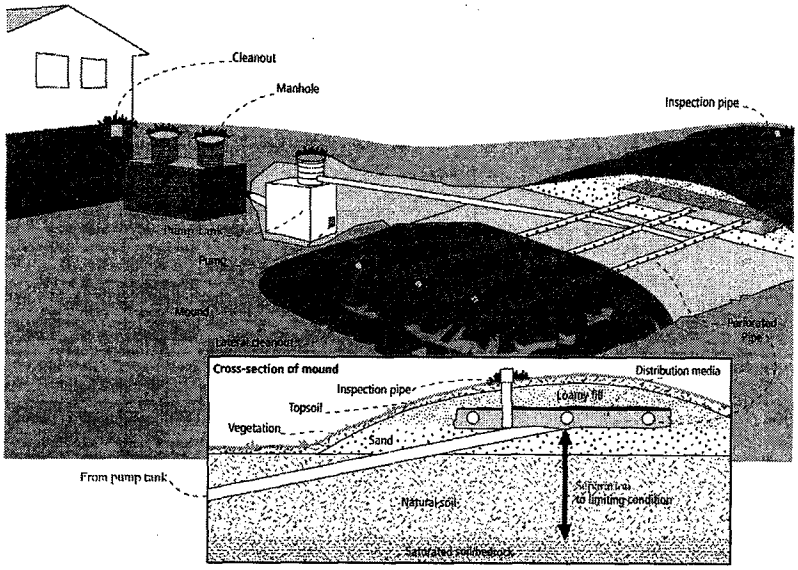
Septic System Management Plan for Above Grade Systems

Your Septic System



Septic System Specifics

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

(Based on MN Rules Chapter 7080.2200 – 2400)

**Additional Management Plan required*

☐ System is subject to operating permit*

☐ System uses UV disinfection unit*

Type of advanced treatment unit _____

Dwelling Type

Number of bedrooms: 4/ DESIGNED @5

System capacity/ design flow (gpd): 750

Anticipated average daily flow (gpd): 600

Comments _____

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

Well Construction

Well depth (ft): >50'

☐ Cased well Casing depth: _____

☐ Other (specify): _____

Distance from septic (ft): 90

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

Septic Tank

☐ First tank *Tank volume:* 2500 *gallons*

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

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

☐ Tank is constructed of CONCRETE

☐ Effluent screen: (●) Y ( ) N Alarm (●) Y ( ) N

☐ Pump Tank 1000 *gallons*

☐ Effluent Pump *make/model:* GOULDS WE511H

Pump capacity 50 GPM

TDH 13 Feet of head

☐ Alarm location HOME

Soil Treatment Area (STA)

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

Rock bed size (width x length): 20 ft x 48.1 ft

Location of additional STA: _____

Type of distribution media: ROCK

☑ Inspection ports ☑ Cleanouts

☑ Surface water diversions

☐ Additional STA not available

Homeowner Management Tasks

These op*eration and maintenance ac*tivities are your responsibility. *Chart on page 6 can help track your activities.*

Your toilet is not a garbage can. Do not flush anything besides human waste and toilet paper. No wet wipes, cigarette butts, disposal diapers, used medicine, feminine products or other trash!

The system and septic tanks needs to be checked every 36 months

Your service provider or pumper/maintainer should evaluate if your tank needs to be pumped more or less often.

Seasonally or several times per year

- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Soil treatment area.* 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 and leaks, call your service professional. *Untreated sewage may make humans and animals sick.* Keep bikes, snowmobiles and other traffic off and control borrowing animals.
- *Alarms.* Alarms signal when there is a problem; contact your service professional any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. If you do not have one, consider adding one after washing machine.
- *Effluent screen.* If you do not have one, consider having one installed the next time the tank is cleaned along with an alarm.

Annually

- *Water usage rate.* A water meter or another device 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. Consider updating to demand operation if your system currently uses time,
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your service provider or pumper/maintainer.

During each visit by a service provider or pumper/maintainer

- Make sure that your service professional services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- Ask how full your tank was with sludge and scum to determine if your service interval is appropriate.
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.

Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. At each visit a written report/record must be provided to homeowner.

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 soil treatment area.)
- *Inspection pipes.* Replace damaged or missing pipes and 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 draining properly.
- *Event counter or elapsed time meter.* Check to see if there is an event counter or elapsed time meter for the pump. If there is one or both, calculate the water usage rate and compare to the anticipated use listed on Design and Page 2. Dose Volume: _____ gallons: Pump run time: _____ Minutes

Soil Treatment Area

- *Inspection pipes.* Check to make sure they are properly capped. Replace caps and pipes that are damaged.
- *Surfacing of effluent.* Check for surfacing effluent or other signs of problems.
- *Lateral flushing.* Check lateral distribution; if cleanouts exist, flush and clean at recommended frequency.
- *Vegetation* - Check to see that a good growth of vegetation is covering the system.

All other components – evaluate as listed here:

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 liquid or easily biodegradable detergents. Limit use of bleach-based detergents and fabric softeners. • Install a lint filter after the washer and an effluent screen to your tank • Wash only full loads and think even – spread your laundry loads throughout the week.
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 directly out of the house. Do not route furnace discharge 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 overload the system and is prohibited from entering septic system.	

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Septic System Management Plan for Above Grade Systems

Homeowner 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)***										
Alarm**										
Check annually:										
Water usage rate (maximum gpd _____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

*Monthly

**Quarterly

***Bi-Annually

Notes:

"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: KEVIN HERWIG Certification # 3659

Permitting Authority: _____

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