Jensen Backhoe, LLC

510 2nd St. NW
Hinckley, MN 55037

Office: (320) 384-7678
Cell: 612-390-9014

8/26/19

Andrew Aarestad
3016 Rankin Road
St. Anthony, Mn. 55418

Mr. Aarestad,

I have designed a mound type septic system for your 3 bedroom cabin located in Wagner Township, Aitkin County. SE ¼ Section 26 Township 430N Range 22W. I have sized the system for a 450 gallons per day usage. The septic tank will be a 1,000 gallon tank. The pump tank will be a 650 gallon capacity tank. The pump will be a .5 HP pump. The soil treatment mound area will be designed for 450 gallons/day.

Care will have to be exercised to keep traffic off the treatment area so that no soil compaction occurs. Also care will have to be exercised by you to keep heavy traffic off of the treatment area once the system is finished.

The System is designed to receive septic waste from the home. Footing drains or sump pit water must not enter the system. Please review the staking that I placed on your site to verify suitability to your needs. I will be sending you a Home Owners Manual after the system is installed.

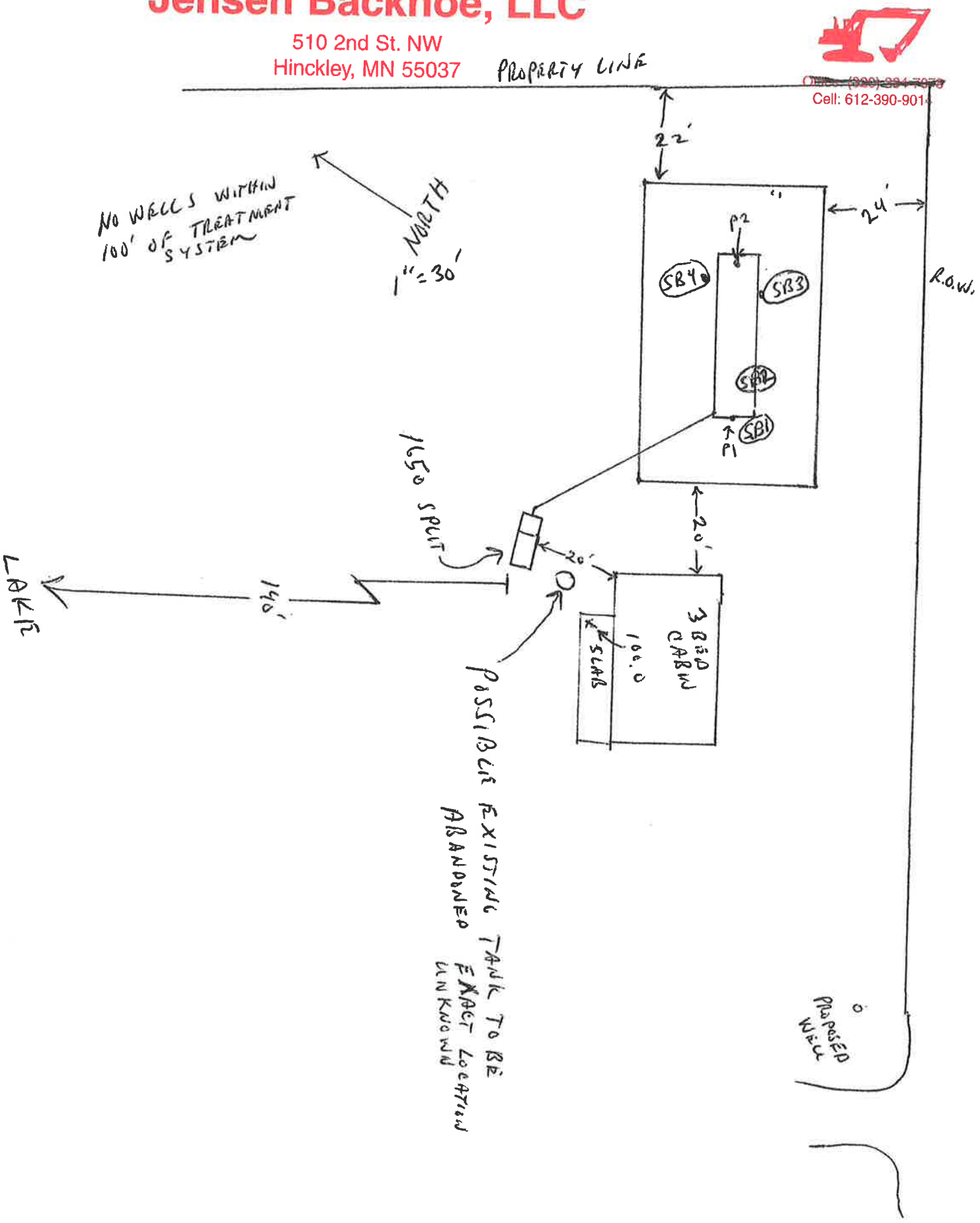
Sincerely,

Scott Jensen, President
License #346

Jensen Backhoe, LLC

510 2nd St. NW
Hinckley, MN 55037

Office: (320) 384-7073
Cell: 612-390-9014



UNIVERSITY OF MINNESOTA

OSTP Preliminary Evaluation Form

v 11.3.28

1. Contact Information

Property Owner/Client: Andrew Aarestad | Client Phone Number: 319-743-5129

Mailing Address: 3016 Rankin Road St. Anthony, Mn. 55418

Site Address: 11438 116th Lane, Finlayson, Mn. 55735

Parcel I.D.: 34-1-065200 & 65300 | Township #: 43 | Range #: 22 W | Section: 26

Date: 8/21/19 | Township name: Wagner | Legal Desc or Lat/Long:

Evaluation for system type: ☐ New Construction ☑ Replacement | Parcel dimensions: 50 x 160 each

2. Flow Information

Client-Provided Information

Type(s) of use (*all that apply*): ☑ Residential ☐ Commercial ☐ Other Use (Specify)

No. of bedrooms* (*If applicable*): 3 | Unfinished space (ft^2):

No. of residents in home: ☐ Adults ☐ Children ☐ Teenagers ☐ Daycare

Existing flow measurements: ☐ Yes (If Yes, attach readings) ☑ No

Water-using devices (*check all that apply*): ☐ Garbage Disposal ☐ Dishwasher ☐ Large Bathtub/Jacuzzi ☐ Laundry/Large Tub on 2nd Floor ☐ Water Softener* ☐ Sump Pump* ☐ High Efficiency Furnace* ☐ Hot Tub* ☐ Iron Filter* Other (*specify*): * Clear water source

Water use concerns (*check all that apply*): ☐ Faucet/Toilet ☐ In-Home Business ☐ Multiple Loads of Laundry/Day ☐ No Lint Screen ☐ Use of Anti-Bacterial Soap ☐ Long-Term Prescription Meds ☐ Frequent Entertaining of Out-of-Town Guests

Any additional current or future uses on this parcel (*specify*):

Any non-sewage discharges to system (*specify*):

Sewage ejector or grinder pump in home: ☐ Yes ☑ No

I acknowledge the above is complete and accurate (*Client(s) signature and date*):

Designer-determined Flow Information

A. Estimated Design Flow (gallons per day): 450

Anticipated waste strength values: ☑ Domestic ☐ High Strength | BOD: mg/L | CBOD: mg/L | (TSS): mg/L | O&G: mg/L

3. Preliminary Site Information

B(1). Water supply well(s) within 100 ft of absorption area: ☐ Yes ☑ No

Well(s) were located: ☐ Direct Observation ☐ County Well Index Maps ☑ Personal Communication | MN Unique Well Id #:

Depth of well(s): ft | Well casing depth(s): ft | Source:

B(2). Site within 200 ft of noncommunity transient supply well: ☐ Yes ☑ No | Source:

B(3). Site within a drinking water supply management area: ☐ Yes ☑ No | Source:

B(4). Location of all existing and proposed buildings and improvements on lot (*see Site Evaluation map*)

B(5). Buried water supply pipes within 50 ft of proposed system: ☐ Yes ☑ No

C. Location of all easements on lot (*see Site Evaluation map*) | Source:

D. Elevation of ordinary high water level (OWHL) - MN DNR (*if adjacent to parcel*):

E. Floodplain designation and flood elevation | Source:

F. Determine property lines (*see Site Evaluation map*): ☐ Survey ☐ Plat Map ☑ Other: Property Pins

Site located in a shoreland district/area: ☐ Yes ☐ No

G. Distance of setbacks: ☐ Property Lines ☐ OHWL ☐ Easements ☐ Water Supply Pipes ☐ Well(s) ☐ Other Buildings

H. Soil Survey Information (*from web soil survey*): ☐ Map | Map Units on Parcel:

List landforms: hill | Slope Range: 2%

Parent materials -*check all that apply*: ☐ Till ☐ Outwash ☐ Loess ☐ Bedrock ☐ Alluvium ☐ Colluvium ☑ Lacustrine ☑ Organic ☐ Cut/Fill

Landscape Position (*check all that apply*): ☐ Summit ☑ Shoulder ☐ Backslope ☐ Footslope ☐ Toeslope ☐ Depression ☐ Stream ☐ Terrace ☐ Manmade ☐ Plain

Minimum bedrock depth: inches | Maximum bedrock depth: inches

Minimum bedrock depth: inches | Maximum bedrock depth: inches

Map Unit Ratings:

Septic Tank Absorption Field - Trench (MN):

Septic Tank Absorption Field - At-grade (MN):

Septic Tank Absorption Field - Mound (MN):

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OSTP Preliminary Evaluation Form

v 11.3.28

4. Preliminary Soil Profile Information *(from web soil survey - map unit description & official series descriptions)*

Enter information here or attach map and description.

Map Unit ____________

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

Map Unit ____________

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

Map Unit ____________

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

Map Unit ____________

	Depth	Texture(s)	Structure(s)	Consistence	Other (flooding, ponding, etc.)
Horizon 1					
Horizon 2					
Horizon 3					
Horizon 4					
Horizon 5					

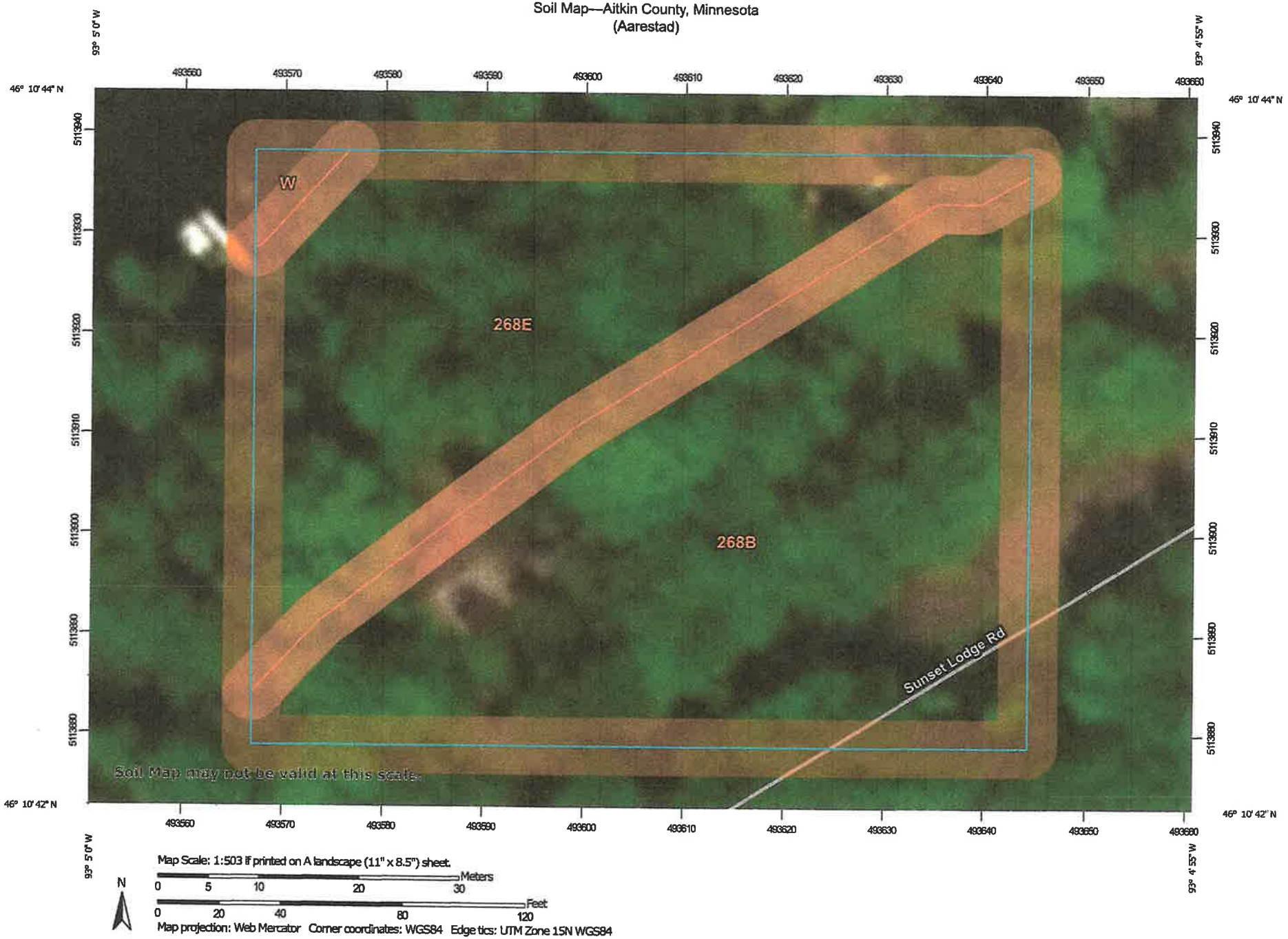
5. Local Government Unit Information

Name of LGU	Aitkin County	LGU Contact	
LGU-specific setbacks			
LGU-specific design requirements			
LGU-specific installation requirements			

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

Scott Jensen	[signature]	346	08/21/19
(Designer)	(Signature)	(License #)	(Date)

Soil Map—Aitkin County, Minnesota
(Aarestad)



Map Scale: 1:503 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

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 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 1:20,000.

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: Aitkin County, Minnesota
Survey Area Data: Version 19, Sep 12, 2018

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

Date(s) aerial images were photographed: May 27, 2014—Jul 13, 2017

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
268B	Cromwell fine sandy loam, 1 to 6 percent slopes	0.7	58.6%
268E	Cromwell fine sandy loam, 12 to 25 percent slopes	0.5	40.4%
W	Water	0.0	1.0%
Totals for Area of Interest		1.1	100.0%

UNIVERSITY OF MINNESOTA

OSTP Field Evaluation Form

v 11.3.28

1. Contact Information

Property Owner/Client: Andrew Aarestad — Client Phone Number: 319-743-5129

Address: 11438 116th Lane, Finlayson, Mn. 55735

Date: 8/21/2019 — Weather Conditions: Sunny- Warm

2. Utility and Structure Information

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

Property Lines: ☐ Determined and Approved By Client ☑ Determined But Not Approved ☐ Approximate ☐ Property Lines Surveyed — *Client's Approval (initial)*

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

3. Site Information

Percent Slope	2	Slope Direction	NW
Landscape Position	Shoulder	Slope Shape	VV
Vegetation type(s)	Wooded		

Evidence of cut, fill, compacted or disturbed areas: ☐ Yes ☑ No ☐ Locate Areas on Site Evaluation Map

Discuss the flooding or run-on potential of site: Small drainage swale will have to be rerouted along road side to NE. Erosion control devices will have to be in

Identify benchmarks and elevations (*Site Evaluation Map*): Patio slab on lake side of cabin = 100.0

Proposed soil treatment area adequately protected: ☑ Yes ☐ No

4. General Soils Information

Original soils: ☑ Yes ☐ No

Type of observation: ☐ Soil Probe ☑ Soil Boring ☑ Soil Pit*

**Soil pit required if determining loading rate without perc test*

Number of soil observations: 4

Soil observations were conducted in the proposed system location: ☑ Yes ☐ No

A soil observation was made within the most limiting area of the proposed system: ☑ Yes ☐ No

Soil boring log forms completed and attached: ☑ Yes ☐ No

Percolation tests performed, forms completed and attached: ☑ Yes ☐ No

5. Phase I. Reporting Information

Depth to standing water		inches
Flood elevation		feet
Depth to bedrock		inches
Depth to periodically saturated soil	12	inches
Maximum depth of system		inches
Elevation at system bottom	108.7	feet
Percolation rate	8	min/inch
Loading rate	0.78	gpd/ft^2
Contour loading rate	5	gpd/ft

Anticipated construction issues

Differences between soil survey and field evaluation

Site evaluation issues / comments

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

Scott Jensen		346	08/21/19
(Designer)	(Signature)	(License #)	(Date)

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date: 8/23/2019

Time: 9:30

Client/ Address: Andrew Aarestad

Legal Description/ GPS: 11438 116th Lane, Finlayson, Mn. 55735

Landscape position: Shoulder

Vegetation: wooded

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

Observation #/Location: #1

Slope%: 2.0

Soil survey map units:

Slope shape: VV

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-11	loam	<35%	7.5YR 4/2				Massive	Weak	Friable
11-27	fine loamy sand	<35%	7.5YR4/4				Platey	Moderate	Firm
24				7.5YR6/8	Concentrations	S1			

Comments: Surface elevation is 107.0

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

Scott Jensen		346	8/21/2019
(Designer)	(Signature)	(License #)	(Date)

Additional Soil Observation Logs

University of Minnesota Onsite Sewage Treatment Program

Date: 8/23/2019

Time: 9:30

Client/ Address: **Andrew Aarestad**

Legal Description/ GPS: 11438 116th Lane, Finlayson, Mn. 55735

Landscape position: Shoulder

Vegetation: wooded

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

Observation #/Location: #2

Slope%: 2

Soil survey map units:

Slope shape: Convex, Convex

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	loam	<35%	7.5YR4/2				Massive	Weak	Friable
6-24	Sandy Loam	<35%	7.5YR4/4				Platey	Moderate	Firm
15				7.5YR 6/8	CONCENTRATIONS	S1			

Comments: Surface elevation is 106.6

Observation #/Location:

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence

Comments:

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

v 11.3.28

Date: 8/23/2019

Time: 9:45 PM

Client/ Address: Andrew Aarestad

Legal Description/ GPS: 11438 116th Lane, Finlayson, Mn. 55735

Landscape position: Shoulder

Vegetation: wooded

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

Observation #/Location: #3

Slope%: 2.0

Soil survey map units: 268B

Slope shape: Convex, Convex

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	loam	<35%	7.5YR4/2				Massive	Weak	Friable
6-15	fine sandy loam	<35%	7.5YR4/4				Massive	Weak	Friable
12				7.5YR6/8	Concentrations	S1			

Comments: Surface elevation is 106.7

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

Scott Jensen		346	8/21/2019
(Designer)	(Signature)	(License #)	(Date)

Additional Soil Observation Logs

University of Minnesota Onsite Sewage Treatment Program

Date: 8/23/2019

Time: 9:45 PM

Client/ Address: Andrew Aarestad

Legal Description/ GPS: 11438 116th Lane, Finlayson, Mn. 55735

Landscape position: Shoulder

Vegetation: Wooded

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

Observation #/Location: #4

Slope%: 2.0

Soil survey map units:

Slope shape: Convex,Convex

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-6	Sandy Loam	<35%	7.5YR4.2				Massive	Weak	Friable
6-12	Fine Loamy Sand	<35%	7.5YR4.4				Granular	Weak	Friable
12-18	Fine Sand	<35%	7.5YR4/4				Granular	Structureless	Loose

Comments: Surface elevation is 105.9

Observation #/Location:

Depth (in)	Texture	Coarse Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence

Comments:

OSTP Percolation Data Sheet v.11.3.28

UNIVERSITY OF MINNESOTA

1. Contact Information

Property Owner/Client: Andrew Aarestad

Address: 11438 116th Lane, Finlayson, Mn. 55735

2. General Percolation Information

Diameter: 6 in

Date prepared and/or soaked: 8/23/19

Method of scratching sidewall: knife

Is pre-soak required*? no * *Not required in sandy soils*

Soak* start time:

Soak* end time:

hrs of soak

Method to maintain 12 in of water during soak

3. Percolation Test Data

Test hole: #1

Location: South end of rock bed

Date reading taken: 8/23/19

Elevation: 106.9

Starting time: 10:14 AM

Depth**: 12 inches

Soil texture description:

Depth (in)	Soil Texture
0-8	Loam
8-12	Sandy Loam

** *12 inches for mounds & at-grades, depth of absorption area for trenches & beds*

Reading	Start Time	End Time	Start Reading (in)	End Reading (in)	Perc rate (mpi)	% Difference Last 3 Rates	Pass
1	10:14 AM	10:16 AM	17.63	17.88	-8.0	NA	NA
2	10:17 AM	10:19 AM	17.50	17.75	-8.0	NA	NA
3	10:20 AM	10:22 AM	17.25	17.50	-8.0	0.0	Yes
4	10:22 AM	10:24 AM	17.50	17.75	-8.0		Yes
5							

Chosen Percolation Rate for Test Hole #1: 8.0 mpi

Additional percolation test data may be included on attached pages

Design Percolation Rate (maximum of all tests) = 8.00 mpi

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

Scott Jensen		346	08/21/19
(Designer)	(Signature)	(License #)	(Date)

Additional Percolation Data

UNIVERSITY OF MINNESOTA

Test hole: #2 Location: north end of rock bed

Starting time: 10:29 AM Depth**: 12 inches

** 12 in. for mounds & at-grades, depth of absorption area for trenches and beds

Soil texture description:

Depth (in)	Soil Texture
0-5	Sandy Loam
5 - 12	sand

Reading	Start Time	End Time	Start Reading (in)	End Reading (in)	Perc rate (mpi)	% Difference Last 3 Rates	Pass
1	10:29 AM	10:31 AM	18.88	20.00	-1.8	NA	NA
2	10:32 AM	10:33 AM	18.50	19.50	-1.0	NA	NA
3	10:34 AM	10:35 AM	18.25	19.25	-1.0	-77.8	Yes
4	10:36 AM	10:37 AM	18.50	19.50	-1.0		Yes
5	10:38 AM	10:39 AM	18.63	19.63	-1.0		Yes
6							

Chosen Percolation Rate for Test Hole #2 1.0 mpi

Test hole: #3 Location:

Date reading taken: Elevation:

Starting time: Depth**: inches

** 12 in. for mounds & at-grades, depth of absorption area for trenches and beds

Soil texture description:

Depth (in)	Soil Texture

Reading	Start Time	End Time	Start Reading (in)	End Reading (in)	Perc rate (mpi)	% Difference Last 3 Rates	Pass
1						NA	NA
2						NA	NA
3							

Chosen Percolation Rate for Test Hole #3 mpi

Jensen Backhoe, LLC

510 2nd St. NW
Hinckley, MN 55037

~~Office: (320) 384-7878~~
Cell: 612-390-9014

Andrew Aarestad
Patio slab on lake side of cabin as noted on plan 100.0

	SURFACE	PIPE INVERT	BOTTOM	ROCK/SAND ELEV.
Pipe ty-in	0	0		
Pump tank	102.3	98.5	95.0	
S corner of mound	107.1			
N corner of mound	104.0			
W corner of mound	105.7			
E corner of mound	105.6			
S corner of rock bed	107.0	109.5		108.7
N corner of rock bed	105.8	109.5		108.7
W corner of rock bed	106.8	109.5		108.7
E corner of rock bed	105.4	109.5		108.7

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

UNIVERSITY OF MINNESOTA

Property Owner/Client: Andrew Aarestad | Project ID: | v 04.06.2017

Site Address: 11438 116th Lane, Finlayson, Mn. 55735 | Date: 8/26/19

Email Address: andrew.aarestad@gmail.com | Phone Number: 319-743-5129

1. DESIGN FLOW, STRENGTH OF WASTE, AND TANKS

A. Residential Design Flow: 450 Gallons Per Day (GPD) Number of Bedrooms (Residential): 3

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

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

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

B. Septic Tank Sizing

1. Residential dwellings

Min Code Required Septic Tank Capacity: 1000 Gallons, in 1 Tanks or Compartments

Recommended Septic Tank Capacity: 1000 Gallons, in 1 Tanks or Compartments

2. Other Establishments

Waste received by:

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

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

3. Effluent Screen & Alarm (Y/N): Yes Manufacturer/Model: Poly-Loc 122

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

Pump Tank 1 Capacity (Designer Rec): #REF! Gallons Pump Tank 2 Capacity (Designer Rec): Gallons

Pump 1 23.0 GPM Total Head 23.1 ft Pump 2 GPM Total Head ft

Supply Pipe Dia. 2.00 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: Patio Slab on lake side of cabin lower level

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

Type III/IV Details:

3. SITE EVALUATION SUMMARY:

A. Depth to Limiting Layer: 12 in 1.0 ft

B. Elevation of Limiting Layer: 105.7

C. Loc. of Restrictive Elevation: Rock bed

D. Minimum Required Separation: 36 in 3.0 ft

E. Code Maximum Depth of System: Mound in

F. Measured Land Slope: 2.0 %

G. Soil Texture: Loam

H. Soil Hyd. Loading Rate: 0.78 GPD/ft²

I. Perc Rate: MPI

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

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

Comments:

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

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	375.0 ft²	Bed Length	37.5 ft	Bed Width	10.0 ft
Absorption Width	15.0 ft	Clean Sand Lift	2.0 ft	Berm Width (0-1%)	ft
Upslope Berm Width	14.8 ft	Downslope Berm Width	18.3 ft	Endslope Berm Width	16.8 ft
Total System Length	71.1 ft	Total System Width	43.1 ft	Contour Loading Rate	12.0 gal/ft

At-Grade Design Summary

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

Level & Equal Pressure Distribution Summary

No. of Perforated Laterals	3	Perforation Spacing	3 ft	Perforation Diameter	7/32 in
Lateral Diameter	2.00 in	Min. Delivered Volume	73 gal	Maximum Delivered Volume	113 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:

Need to move drainage swale from mound area closer to road.

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

Scott Jensen		346	
(Designer)	(Signature)	(License #)	(Date)

Minnesota Pollution Control Agency

OSTP Mound Design Worksheet ≥1% Slope

University of Minnesota

1. SYSTEM SIZING: Project ID: v 04.06.2017

A. Design Flow:	450	GPD
B. Soil Loading Rate:	0.78	GPD/ft²
C. Depth to Limiting Condition:	1.0	ft
D. Percent Land Slope:	2.0	%
E. Design Media Loading Rate:	1.2	GPD/ft²
F. Mound Absorption Ratio:	1.50	

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		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft²)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft²)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	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 = ft²

450 GPD ÷ 1.2 GPD/ft² = 375 ft²

If a larger dispersal media area is desired, enter size: _____ ft²

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 ft² X 1.2 GPD/ft² = 12.0 gal/ft *Can not exceed Table 1*

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

375 ft² ÷ 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 1.5 = 15.0 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

15.0 ft - 10.0 ft = 5.0 ft

4. DISTRIBUTION MEDIA: ROCK

A. Rock Media Depth Below Distribution Pipe

9 in 0.8 ft

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

A. Enter Dispersal Media:

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

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

ft ÷ ft = components/row

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

components X ft = ft

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

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

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

X = components

6. MOUND SIZING

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

3.0 ft - 1.0 ft = 2.0 ft Design Sand Lift (optional): ft

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

2.0 ft + 1.0 ft + 1.0 ft = 4.0 ft

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

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio	3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
	4:1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70

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

3.70 ft X 4.0 ft = 14.8 ft

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

10.0 ft X 2.0 % ÷ 100 = 0.20 ft

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

4.0 ft + 0.20 ft = 4.2 ft

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

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio	3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
	4:1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69

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

4.35 x 4.2 ft = 18.3 ft

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

5.0 ft + 4 ft = 9.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 18.3 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 4.2 ft = 16.8 ft

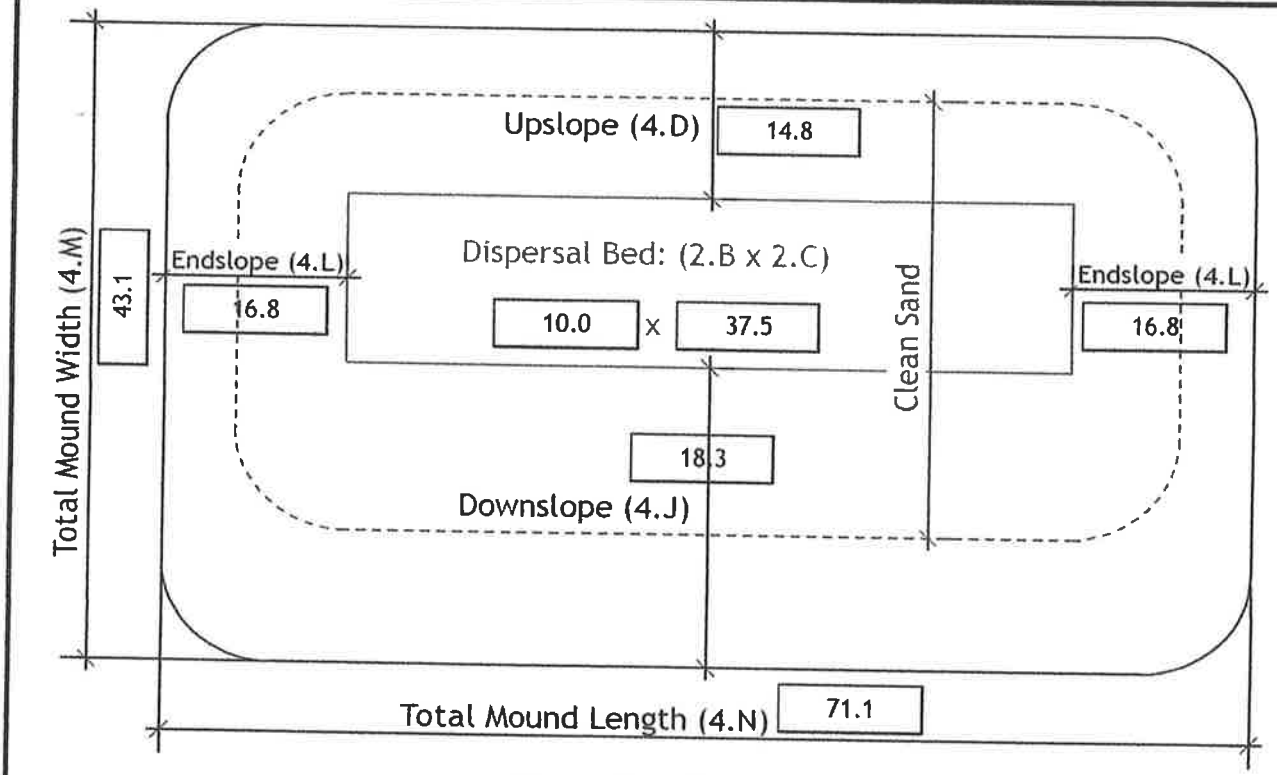
M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

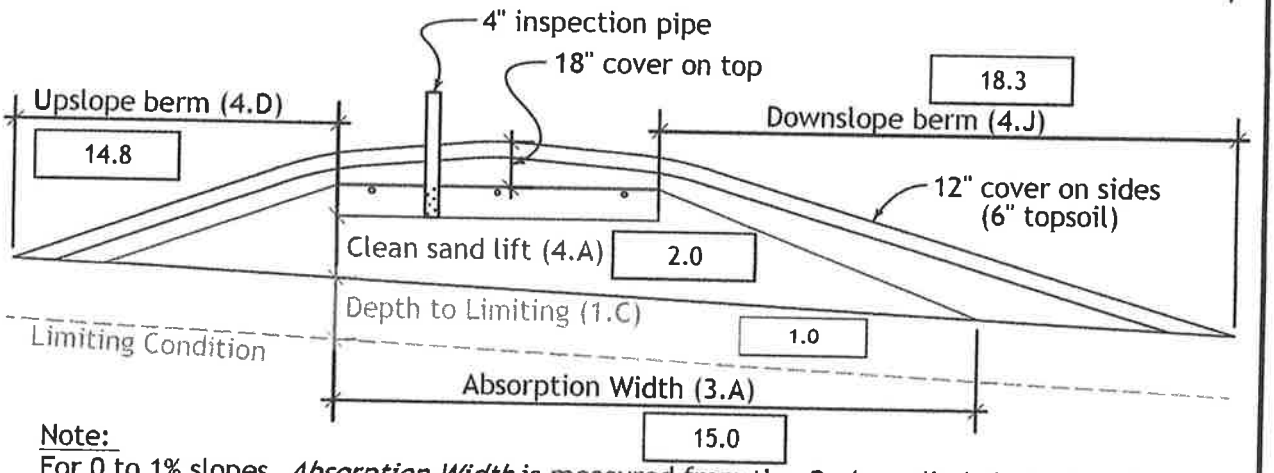
14.8 ft + 10.0 ft + 18.3 ft = 43.1 ft

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

16.8 ft + 37.5 ft + 16.8 ft = 71.1 ft

7. MOUND DIMENSIONS





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

Comments:

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

Project ID: v 04.06.2017

1. Media Bed Width: 10 ft

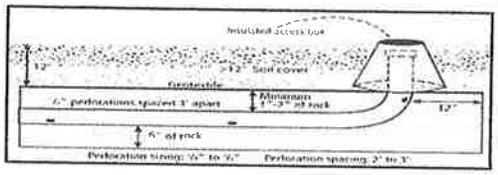
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(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.

38 - 2ft = 36 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 ft ÷ 3 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. Select *Type of Manifold Connection* (End or Center): End

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

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

12. Calculate the *Square Feet per Perforation. Recommended value is 4-11 ft² per perforation.*
Does not apply to At-Grades

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

10	ft	X	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: 0.56 GPM per Perforation

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

39	Perfs	X	0.56	GPM per Perforation	=	23	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]

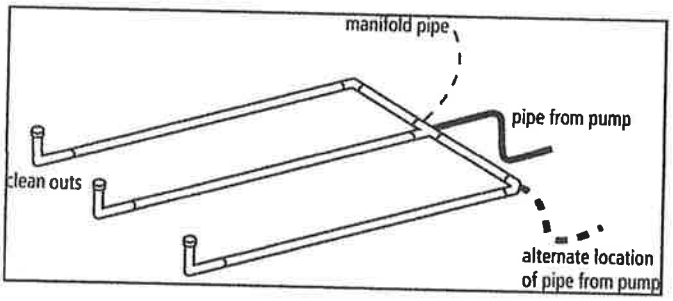
3	X	36	ft	X	0.170	gal/ft	=	18.4	Gallons

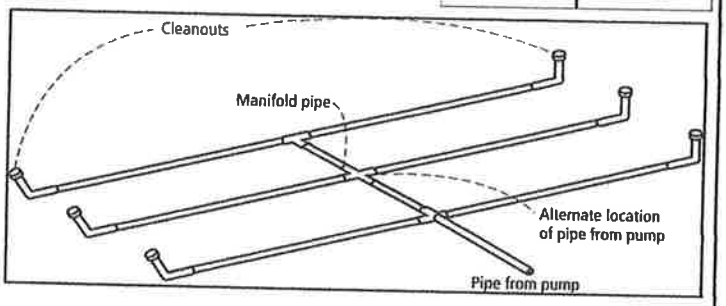
18. Minimum Delivered Volume = Volume of Distribution Piping X 4

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:

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

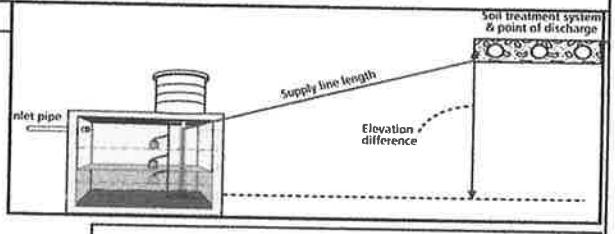
1. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*
2. If pumping to a pressurized distribution system: 23.0 GPM
3. Enter pump description: Demand Dosing

2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 17 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: 60 ft

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

Friction Loss = 1.45 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*

60 ft X 1.25 = 75.0 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 =

1.45 ft per 100ft X 75.0 ft + 100 = 1.1 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)

17.0 ft + 5.0 ft + _____ ft + 1.1 ft = 23.1 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **23.0** GPM (Line 1 or Line 2) with at least **23.1** feet of total head.

Comments:

Minnesota Pollution Control Agency

OSTP Pump Tank Design Worksheet (Demand Dose)

University of Minnesota

DETERMINE TANK CAPACITY AND DIMENSIONS

Project ID:

v 04.06.2017

1. A. *Design Flow (Design Sum. 1A)*: 450 GPD

   B. Min. required pump tank capacity: 500 Gal C. Recommended pump tank capacity: 650 Gal

2. A. Tank Manufacturer: Knife River B. Tank Model: KR1650C

   C. Capacity from manufacturer: 650 Gallons

   D. Gallons per inch from manufacturer: 15.9 Gallons per inch

   E. Liquid depth of tank from manufacturer: 41.0 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)

(16 in + 2 inches) X 15.9 Gallons Per Inch = 286 Gallons

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

- Line 17 of the Pressure Distribution or Line 11 of Non-level 73 Gallons (minimum dose)

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

Design Flow: 450 GPD X 0.25 = 113 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*

450 gpd ÷ 100 gal = 4.5 Doses

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 60 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*

60 ft X 0.170 gal/ft = 10.2 Gallons

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

100 gal + 10.2 gal = 110 Gallons

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

2 in X 15.9 gal/in = 31.8 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

110 gal ÷ 15.9 gal/in = 6.9 Inches

12. Measuring from bottom of tank:

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

16 in + 2 in = 18 Inches

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

18 in + 6.9 in = 25 Inches

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

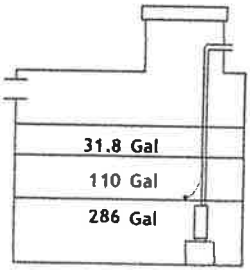
25 in + 2.0 in = 27 Inches

Inches for Dose: 6.9 in

Alarm Depth 26.9 in

Pump On 24.9 in

Pump Off 18.0 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 Andrew Aarestad	Email Andrew.Aarestad@g
Property Address 11438 116th Lane, Finlayson, Mn.	Property ID 34-1-065200
System Designer Scott Jensen	Contact Info 612-390-9014
System Installer Jensen Backhoe, LLC	Contact Info 612-390-9014
Service Provider/Maintainer Purple Pumper	Contact Info 320-630-3821
Permitting Authority Aitkin 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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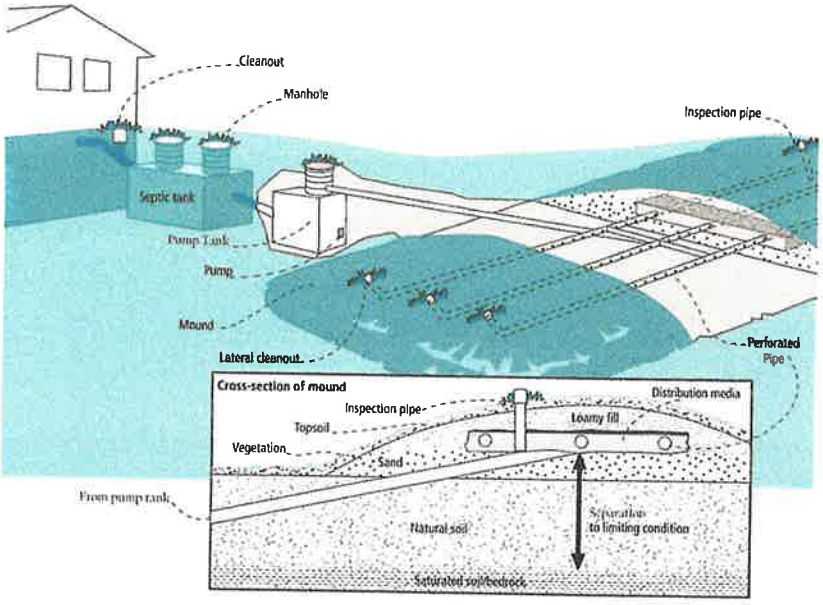
Septic System Management Plan for Above Grade Systems

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: 3

System capacity/ design flow (gpd): 450

Anticipated average daily flow (gpd): 450

Comments _____

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

Well Construction

Well depth (ft): _____

☐ Cased well Casing depth: _____

☐ Other (specify): _____

Distance from septic (ft): _____

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

Septic Tank

☐ First tank *Tank volume:* 1000 *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 650 *gallons*

☐ Effluent Pump *make/model:* Liberty 283

Pump capacity 23 GPM

TDH 23 Feet of head

☐ Alarm location at lift station

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 43 ft x 71 ft

Rock bed size (width x length): 10 ft x 38 ft

Location of additional STA: west of mound

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: 100 gallons: Pump run time: 4 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:

Effluent filter in septic tank outlet. Flushing clean outs in east end of mound.

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: Check and clean effluent filter bi-annually

"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: Scott Jensen Certification # 346

Permitting Authority: _____