Onsite Septic System

Becker County Planning & Zoning
915 Lake Ave, Detroit Lakes, MN 56501
Phone (218)-846-7314; Fax (218)-846-7266

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ZONING

YEAR	
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1. **PROPERTY DATA (as it appears on the tax statement, purchase agreement or deed)**
Parcel Number(s) of property where the system will be installed: 10 072951 3 & 10 072950 8

Is this a split of an existing property? Yes (No)
(If yes and a parcel number has not yet been assigned, indicate the main parcel number from which the new parcel was split.)

Section 3 Township 139 Range 40 Township Name Erie

Lake Name Cotton Lake Classification _____

Legal Description: Strobel Shores Blk 1 Lot 8

Project Address: 21967 County 32

2. **PROPERTY OWNER INFORMATION (as it appears on the tax statement, purchase agreement or deed)**

Owner's First Name Keith Owner's Last Name Arneson

Mailing Address 113 2nd Ave #8 City, State, Zip Nortwood, ND 58267

Phone Number _____

3. **DESIGNER/INSTALLER INFORMATION**

Designer Name Randy Anderson Company Name Anderson on-site License # 634

Address P.O 1421 Detroit Lakes Phone Number 218 845 3072

Installer Name Tim Stenger Company Name _____ License # _____

Address _____ Phone Number _____

4. **SYSTEM DESIGN INFORMATION**

System Status

_____ Vacant Lot-No existing system-new structure
X Replacement – structure removed and being rebuilt
_____ Failing –Replacement- cesspool/seepage pit or other
_____ Enlargement of system-Undersized
_____ Repairs Needed to existing
_____ Additional system on property

What will new system serve? Check one

X Dwelling
_____ Resort/Commercial
_____ Commercial (Non-resort)
_____ Other – explain below

8/13/13 Date of site evaluation

Design Flow 450 Gallons Per Day
Number of Bedrooms 3
Garbage Disposal X Yes ____ No
Dishwasher ____ Yes ____ No
Lift station in House ____ Yes ____ No
Grinder pump in House ____ Yes ____ No

Well Depth to be drilled
Depth of other wells within 100 ft of system N/A

Original Soil X Compacted Soil ____
Type of Soil Observation
____ Pit ____ Probe X Boring
Depth to Restricting Layer 34
Maximum Depth of System mound

Size of All Tanks to be installed
_____ gal Single Compartment Septic Tank ~~1000~~ 600 gal Separate Lift Station
1500 gal Compartmented Tank
_____ Pit Privy
_____ gal Holding Tank
_____ Existing Tank to be used
_____ Existing tank w/new Additional Tank
_____ Existing tank w/new Lift Station
_____ Holding Tank with Privy

Total Number of tanks to be installed in this system 2 (This # will be reported to MPCA at end of year.)

PARCEL	
APP	SEPTIC
YEAR	

Total Number of tanks to be installed in this system _____
(This # will be reported to MPCA at end of year.)

Type of Drainfield	Full Size of Drainfield	Reduced/Warrantied size
_____ Chamber Trench	_____ sq ft	_____ sq ft
_____ Rock Trench	_____ sq ft	_____ sq ft
_____ Gravelless	_____ sq ft	_____ sq ft
X Mound	_____ sq ft ***	
_____ Pressure Bed	_____ sq ft ***	
_____ Seepage Bed	_____ sq ft ***	
_____ At-grade	_____ sq ft ***	
_____ Alternative / Performance	_____ sq ft ***	

***Attach Worksheets

Type of chamber _____
Depth of Rock _____

Alarm? Yes X No _____
Type of Alarm Elec
Size of Lift Pump _____
Size of Lift Line _____

SETBACKS

	TANK	DRAINFIELD
Distance to Well	_____	_____
Distance to Building	_____	_____
Distance to Property Line	_____	_____
Distance to OHW of Lake	_____	_____
Distance to Pressure Line	_____	_____
Distance to Wetland/Protected Water	_____	_____

Perc Rate 23 Soil Sizing Factor 1.67 *If SSF other than .83, attach Perc Test Data

Soil Borings (three are required)

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0-6	10AM	10YR 2/2	Blocky		0-6	10AM	10YR 2/2	Blocky
6-25	10AM	10YR 4/4	"		6-29	10AM	10YR 4/4	"
25-40	10AM	2.5Y 5/4	"		29-36	10AM	2.5Y 5/4	"
	mottles	35"				mottles	36"	

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0-6	10AM	10YR 2/2	Blocky					
6-26	10AM	10YR 4/4	"					
26-34	10AM	2.5Y 5/4	"					
	mottles	32"						

5. REQUIRED DOCUMENTS

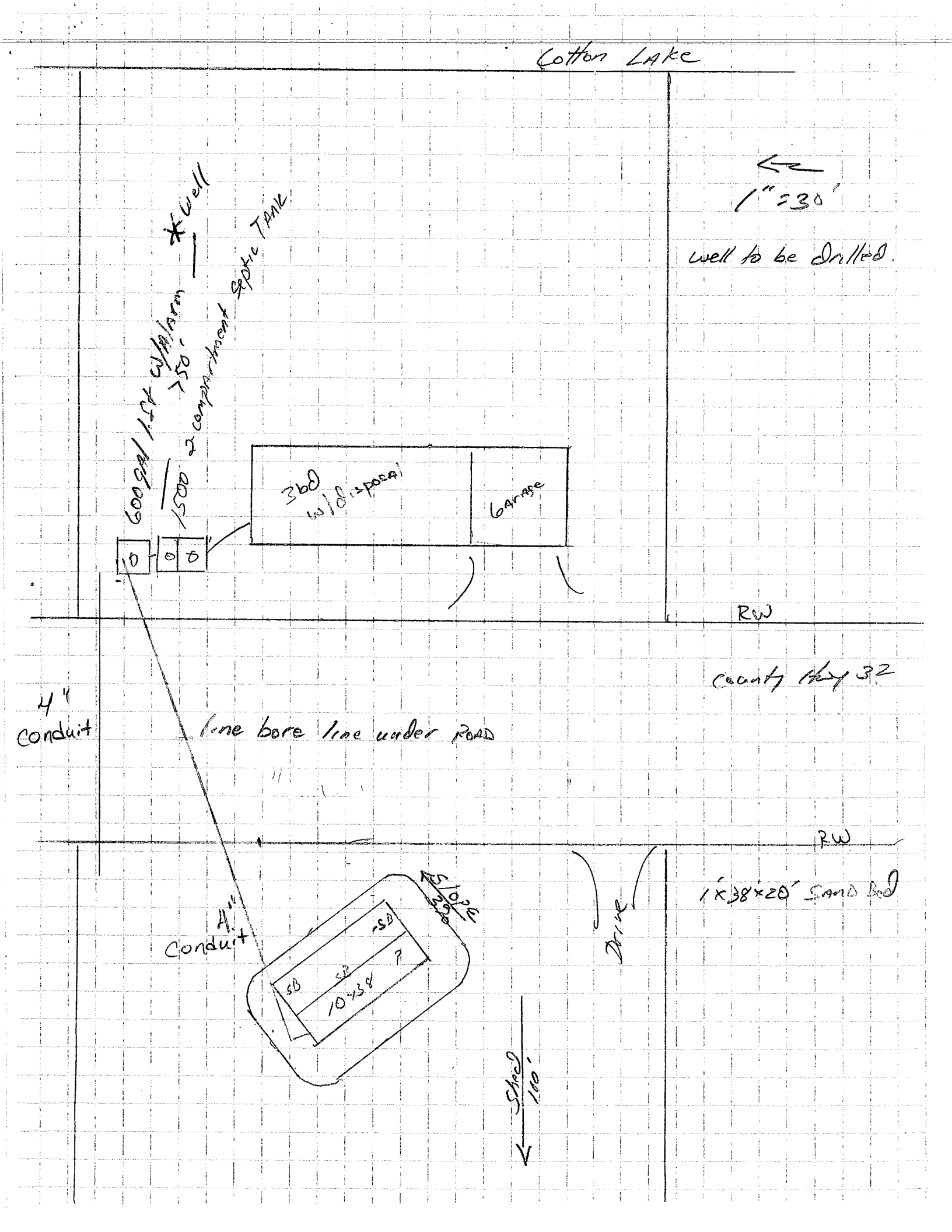
U of MN worksheets are required for mounds, pressure beds, seepage beds, at-grades or Type IV or Type V systems. Are the required worksheets attached? X Yes _____ No

6. DESIGNER'S CERTIFIED STATEMENT

I, Randy Anderson (Print Name of Designer) certify that I have completed the preceding design work in accordance with all applicable requirements (including, but not limited to Minnesota Chapter 7080 and the Becker County Individual Sewage Treatment System Ordinance).

Signature of Designer

8/13/13
Date


Cotton Lake
1" = 30'
well to be drilled.
* well
150'
600 gal / 1500 gal 2 compartment septic TANK
360 w/ 8:12 pitch
6 Garage
RW
County Hwy 32
4" Conduit
Fine bore line under ROAD
RW
1 x 38 x 20' Sand Bed
4" Conduit
45/0/24 3.30
SB
SB
SB
10 x 38
Drive
Shed 100'

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

UNIVERSITY OF MINNESOTA

Property Owner/Client: Keith Arneson | **Project ID:** | v 12.08.06

Site Address: 21967 County 32 Rochert, MN | **Date:** 8/13/13

1. DESIGN FLOW AND TANKS

A. *Design Flow:* 450 Gallons Per Day (GPD)

Note: The estimated design flow is considered a peak flow rate including a safety factor. For long term performance, the average daily flow is recommended to be < 60% of this value.

B. *Septic Tanks:*

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

Recommended Septic Tank Capacity: 1500 Gallons, in 2 Tanks or Compartments

Effluent Screen & Alarm? no

C. *Holding Tanks Only:*

Number of Holding Tanks: | Total Volume of Holding Tanks: Gallons

Type of High Level Alarm:

D. *Pump Tank 1* Capacity: 600 Gallons | *Pump Tank 2* Capacity: Gallons

2. SYSTEM TYPE

Type of Soil Treatment and Dispersal Area*

○ Trench ○ Bed ◉ Mound ○ At-Grade

○ Drip ○ Holding Tanl ○ Other

Type of Distribution*

○ Gravity Distribution ◉ Pressure Distribution-Level ○ Pressure Distribution-Unlevel

* Selection Required | Benchmark Elev = 100 ft

System Type

☑ Type I ☐ Type II ☐ Type III ☐ Type IV ☐ Type V

Benchmark Location:

Type of Distribution Media: rock

3. SITE EVALUATION:

A. *Depth to Limiting Layer:* 34 in | 2.8 ft | Elevation & Location of Limiting Layer: ft

B. Minimum required separation: 36 in | 3.0 ft | Location:

B. *Measured Percent Land Slope:* 2.0 % | 0.0 | Code Maximum Depth of System: -2 in*

C. Soil Texture: loam | Perc Rate: 23 MPI *if value is negative a mound is required

D. Soil Hydraulic Loading Rate: 0.60 GPD/ft² | E. Contour Loading Rate 12.0 Gal/ft

4. DESIGN SUMMARY

Trench Design Summary

Dispersal Area	ft²	Sidewall Depth	in	Trench Width	in
Total Lineal Feet	ft	Number of Trenches		Code Maximum Trench Depth	in
				Designer's Max Trench Depth	in

Bed Design Summary

Absorption Area	ft²	Media Below Pipe	in	Code Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designer's Max Bed Depth	in

Mound Design Summary

Absorption Area	760 ft²	Bed Length	38 ft	Bed Width	10.0 ft
Absorption Width	20.0 ft	Clean Sand Lift	1.0 ft	Berm Width (slope 0-1%)	ft
Upslope Berm Width	10.7 ft	Downslope Berm Width	14.5 ft	Endslope Berm Width	12.8 ft
Total System Length	63.6 ft	Total System Width	35.2 ft		

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OSTP Design Summary Worksheet

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At-Grade Design Summary

Absorption Bed Width	ft	Absorption Bed Length	ft	System Height	ft
Absorption Bed Area	ft^2	Upslope Berm Width	ft	Downslope Berm Width	ft
Endslope Berm Width	ft	System Length	ft	System Width	ft

Level Pressure Distribution Summary

No. of Perforated Laterals	3	Perforation Spacing	3 ft	Perforation Diameter	1/4 in
Lateral Diameter	2.00 in	Supply Pipe Diameter	2.00 in	Minimum Dose Volume	0 gal
Flow Rate	29.0 GPM	Total Head	20 ft	Maximum Dose Volume	112.5 gal

5. Additional Info for Type IV/Pretreatment Design

A. ***Calculate the organic loading using option 1 or 2***

1. *Organic Loading = Pounds of BOD X Units*

_____ lbs/day X _____ = _____ lbs BOD/day

2. *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

B. Type of Pretreatment Unit Being Installed: _____

C. Calculate *Soil Treatment System Organic Loading: lbs. BOD/day ÷ Bottom Area* = lbs/day/ft^2

_____ lbs/day ÷ _____ ft^2 = _____ lbs/day/ft^2

Comments/Special Design Considerations:

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

Randy Anderson		634	8/13/13
(Designer)	(Signature)	(License #)	(Date)

OSTP Mound Design Worksheet
>1% Slope

Minnesota Pollution Control Agency

University of Minnesota

1. SYSTEM SIZING: Project ID: v 12.08.06

A. *Design Flow:*	450	GPD
B. *Soil Loading Rate:*	0.60	GPD/ft^2
C. *Depth to Limiting Condition:*	2.8	ft
D. *Percent Land Slope:*	2.0	%
E. *Design Media Loading Rate:*	1.2	GPD/ft^2
F. *Mound Absorption Ratio* (Table IXa):	2.00	
G. *Design Contour Loading Rate:*	12.0	GPD/ft

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio		Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

TABLE IXa

LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C: Absorption Area Loading Rate (gpd/ft^2)	Treatment Level C: Mound Absorption Ratio	Treatment Level A, A-2, B,: Absorption Area Loading Rate (gpd/ft^2)	Treatment Level A, A-2, B,: Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate *Required Dispersal Bed Area: Design Flow* (1.A) ÷ *Design Media Loading Rate* (1.E) = ft^2

	450	GPD ÷	1.20	GPD/ft^2 =	375	ft^2
If a larger dispersal media area is desired, enter size:	380	ft^2				

B. Calculate *Dispersal Bed Width: Contour Loading Rate* (1.G) ÷ *Design Media Loading Rate* (1.E) = *Bed Width*

12.0	ft ÷	1.2	gpd/ft^2 =	10	ft	

C. Calculate *Dispersal Bed Length: Dispersal Bed Area* (2.A) ÷ *Bed Width* (2.B) = *Bed Length*

380	ft^2 ÷	10	ft =	38	ft

D. Enter *Dispersal Media*: rock

E. If using a registered product, enter the *Component Length*: _____ in ÷ 12 = _____ ft

F. If using a registered product, enter the *Component Width*: _____ in ÷ 12 = _____ ft

G. *Number of Components per Row = Bed Length* (2.C) divided by *Component Length* (4.J) (Round up)

_____ ft ÷ _____ ft = _____ components/row

H. *Number of Rows = Bed Width* (2.B) divided by *Component Width* (4.K) (Round up)

Adjust Contour Loading Rate on Design Summary page until this number is a whole number. Note: CLR of 10.8 gal/ft results in 9 foot wide bed.

_____ ft ÷ _____ ft = _____ rows

I. *Total Number of Components = Number of Components per Row X Number of Rows*

_____ X _____ = _____ components

3. ABSORPTION AREA SIZING

Note: Mound setbacks are measured from the Absorption Area.

A. Calculate *Absorption Width: Bed Width* (2.B) X *Mound Absorption Ratio* (1.F) = *Absorption Width*

10.0 ft X 2.0 = 20.0 ft

B. For slopes >1%, the *Absorption Width* is measured downhill from the upslope edge of the *Bed*.

Calculate *Downslope Absorption Width*: *Absorption Width* (3.A) - *Bed Width* (2.B) = ft

20.0 ft - 10.0 ft = 10.0 ft

4. MOUND SIZING

A. Calculate *Clean Sand Lift:* 3 feet minus *Depth to Limiting Condition* (1.C) = *Clean Sand Lift* (1 ft minimum)

3.0 ft - 2.8 ft = 1.0 ft Design Sand Lift (optional): 1 1.0

B. Calculate *Upslope Height: Clean Sand Lift* (4.A) + *media depth* + *cover* (1 ft.) = *Upslope Height*

1.0 ft + 1.0 ft + 1.0 ft = 3.0 ft

D-34: Slope Multiplier Table

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Upslope	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	2.17	2.13	2.09	2.06	2.03	2.00	1.97	1.95	1.93	1.91	1.89	1.87	1.85
Berm Ratio	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	2.62	2.55	2.48	2.41	2.35	2.29	2.23	2.18	2.13	2.08	2.03	1.98	1.93

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Downslope	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	4.95	5.24	5.55	5.88	6.24	6.63	7.04	7.47	7.93	8.42	8.93	9.46	10.02
Berm Ratio	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	8.29	8.92	9.57	10.24	10.94	11.67	12.42	13.19	13.99	14.82	15.67	16.54	17.44

C. Select *Upslope Berm Multiplier* (based on land slope): 3.57 (figure D-34)

D. Calculate *Upslope Berm Width*: *Multiplier* (4.C) X *Upslope Mound Height* (4.B) = *Upslope Berm Width*

3.57 ft X 3.0 ft = 10.7 ft

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

10.0 ft X 2.0 % ÷ 100 = 0.20 ft

F. Calculate *Downslope Mound Height: Upslope Height* (4.B) + *Drop in Elevation* (4.E) = *Downslope Height*

3.0 ft + 0.20 ft = 3.2 ft

G. Select *Downslope Berm Multiplier* (based on land slope): 4.54 (figure D-34)

H. Calculate *Downslope Berm Width: Multiplier* (4.G) X *Downslope Height* (4.F) = *Downslope Berm Width*

4.54 x 3.2 ft = 14.5 ft

I. Calculate *Minimum Berm to Cover Absorption Area: Downslope Absorption Width* (3.B or 3.C) + 4 ft. = ft

10.0 ft + 4 ft = 14.0 ft

J. *Design Downslope Berm* = greater of 4H and 4I: 14.5 ft

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

L. Calculate *Endslope Berm* (4.K) X *Downslope Mound Height* (4.F) = *Endslope Berm Width*

4.00 ft X 3.2 ft = 12.8 ft

M. Calculate Mound Width: *Upslope Berm Width* (4.D) + *Bed Width* (2.B) + *Downslope Berm Width* (4.J) = ft

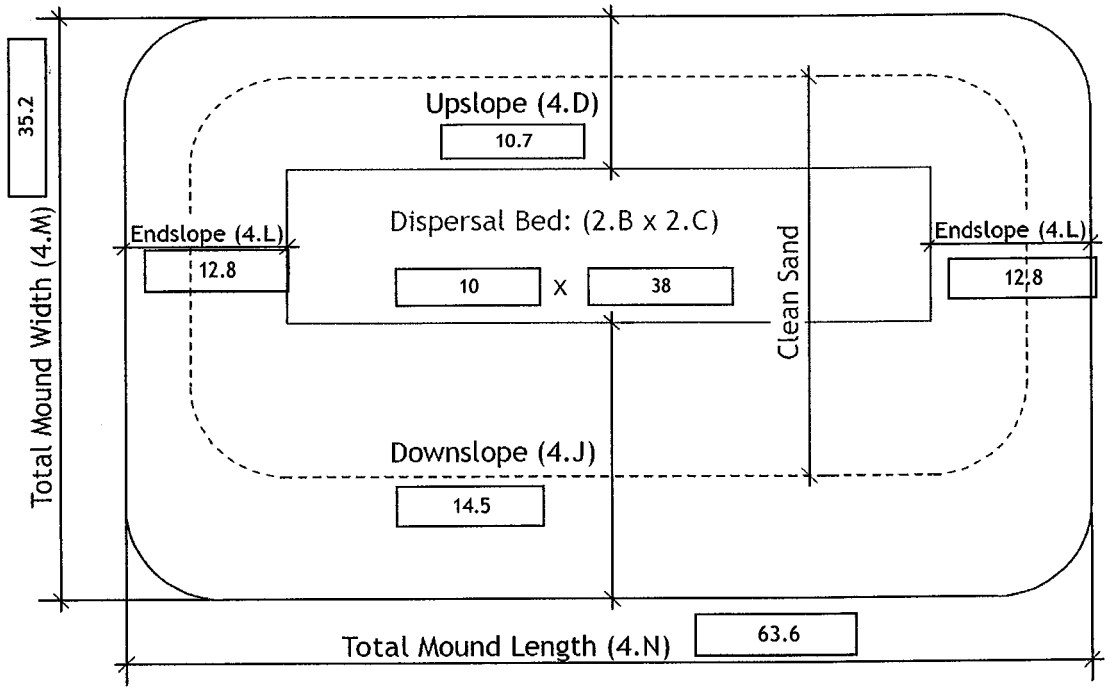
10.7 ft + 10.0 ft + 14.5 ft = 35.2 ft

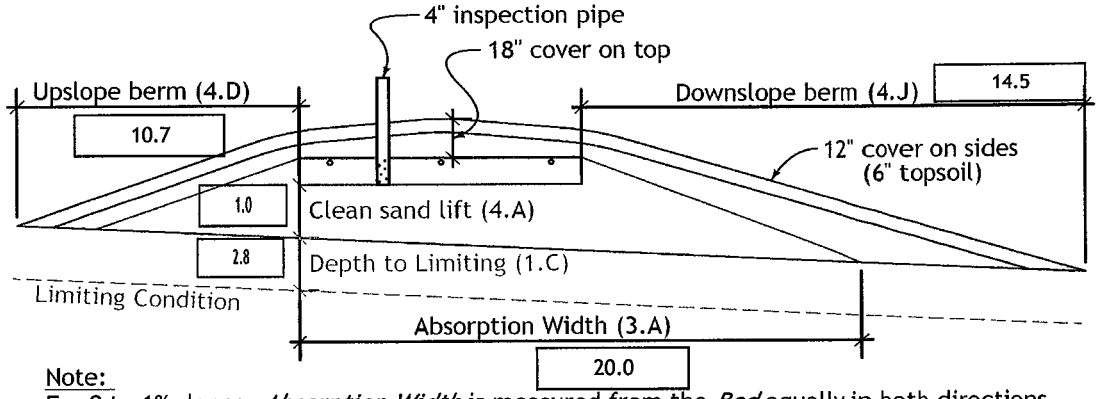
N. Calculate Mound Length: *Endslope Berm Width* (4.L) + *Bed Length* (2.C) + *Endslope Berm Width* (4.L) = ft

12.8 ft + 38.0 ft + 12.8 ft = 63.6 ft

Comments:

5. 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*.

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OSTP Mound Materials Worksheet

University of Minnesota

Project ID: v 12.08.06

A. Calculate *Bed* (rock) *Volume*: *Bed Length* (2.C) X *Bed Width* (2.B) X *Depth* = *Volume* (ft^3)

38.0 ft X 10.0 ft X 1.0 = 380.0 ft^3

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

380.0 ft^3 ÷ 27 = 14.1 yd^3

Add 20% for constructability: 14.1 yd^3 X 1.2 = 16.9 yd^3

B. Calculate *Clean Sand Volume:*

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

1.1 ft X 10.0 ft X 38.0 ft = 418.0 ft^3

For a Mound on a slope from 0-1%

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

(ft - 1) X X ft =

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

(ft - 1) X X ft =

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

ft^3 + ft^3 + ft^3 = ft^3

For a Mound on a slope greater than 1%

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

((3.0 ft - 1) X 3.0 ft X 38.0) ÷ 2 = 114.0 ft^3

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

((3.2 ft - 1) X 10.0 ft X 38.0) ÷ 2 = 418.0 ft^3

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

(3.2 ft - 1) X 3.0 ft X 10.0 ft = 66.0 ft^3

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

114.0 ft^3 + 418.0 ft^3 + 66.0 ft^3 + 418.0 ft^3 = 1016.0 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1016.0 ft^3 ÷ 27 = 37.6 yd^3

Add 20% for constructability: 37.6 yd^3 X 1.2 = 45.2 yd^3

C. Calculate *Sandy Berm Volume:*

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

(3.1 - 0.5)ft X 35.2 ft X 63.6) ÷ 2 = 2913.5 ft^3

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

2913.5 ft^3 - 1016.0 ft^3 - 380.0 ft^3 = 1517.5 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1517.5 ft^3 ÷ 27 = 56.2 yd^3

Add 20% for constructability: 56.2 yd^3 x 1.2 = 67.4 yd^3

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

35.2 ft X 63.6 ft X 0.5 ft = 1120.6 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1120.6 ft^3 ÷ 27 = 41.5 yd^3

Add 20% for constructability: 41.5 yd^3 x 1.2 = 49.8 yd^3

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OSTP Pressure Distribution Design Worksheet

University of Minnesota

Project ID: v 12.08.06

1. Media Bed Width: 10 ft

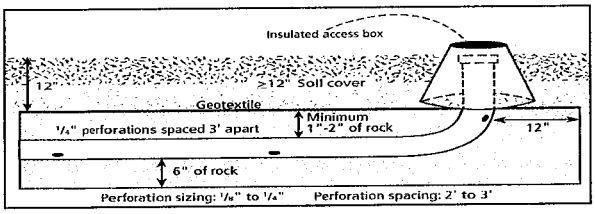
2. Minimum Number of Laterals in system/zone = [(Media Bed Width (Line1) - 4) ÷ 3] + 1 round up to the neareast whole number + 1.

(10 - 4) + 1 = 3 laterals

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:* 1/4 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* (Line 6) by the *Perforation Spacing* (Line 4) 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* (Line 7). 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

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* (Line 8) multiplied by the *Number of Perforated Laterals* (Line 3).

13 Perf. Per Lateral X 3 Number of Perf. Laterals = 39 Total Number of Perf.

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

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

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OSTP Pressure Distribution Design Worksheet

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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* (Line 9).

380	ft²	÷	39	perforations	=	9.7	ft²/perforations

13. Select *Minimum Average Head*: 1.0 ft

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

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

39	Perfs	X	0.74	GPM per Perforation =	29	GPM

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

17. *Volume of Distribution Piping* =

= [*Number of Perforated Laterals* (Line 3) X *Length of Laterals* (Line 6) X (Volume of Liquid Per Foot of Distribution Piping (Line 16)]

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

18. Minimum Dose = Volume of Distribution Piping (Line 17) X 4

18.4	gals	X	4	=	73.4	Gallons

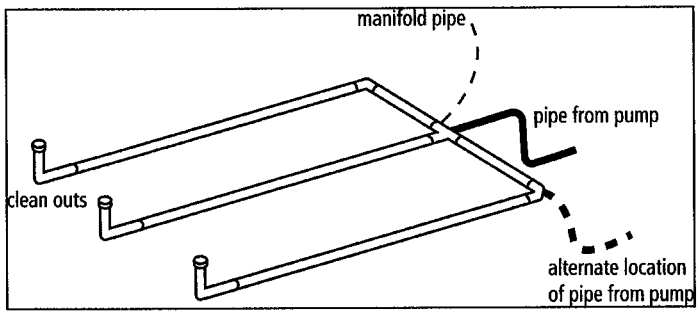
Perforation Discharge (GPM)

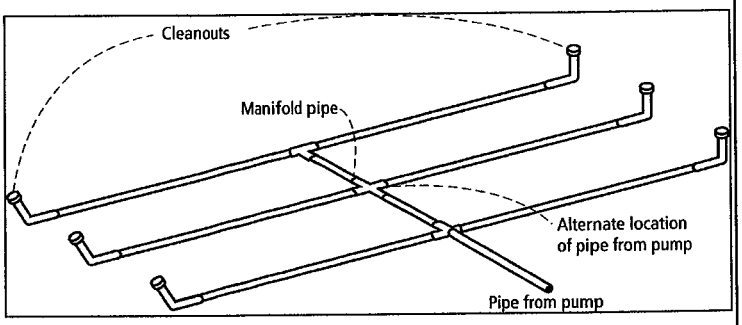
Head (ft)	Perforation Diameter			
	1/8	3/16	7/32	1/4
1.0[a]	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0[b]	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0[c]	0.41	0.93	1.26	1.65

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:

Minnesota Pollution Control Agency

OSTP Basic Pump Selection Design Worksheet

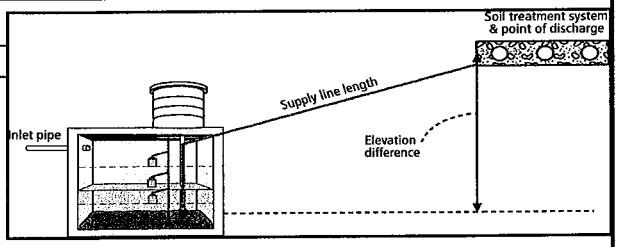
University of Minnesota

1. PUMP CAPACITY Project ID: v 12.08.06

Pumping to Gravity or Pressure Distribution: ○ Gravity ◉ Pressure **Selection required**

1. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*
2. If pumping to a pressurized distribution system: 29.0 GPM

(Line 11 of Pressure Distribution)



2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 11 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: 150 ft

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

Friction Loss = 2.23 ft per 100ft of pipe

F. Determine *Equivalent Pipe Length* from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss. *Supply Pipe Length (D.2)* X 1.25 = *Equivalent Pipe Length*

150 ft X 1.25 = 187.5 ft

Table I. Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

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

Supply Friction Loss =

2.23 ft per 100ft X 187.5 ft ÷ 100 = 4.2 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)

11.0 ft + 5.0 ft + _____ ft + 4.2 ft = 20.2 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **29.0** GPM (Line 1 or Line 2) with at least **20.2** feet of total head.

Comments:

APP YEAR	SEPTIC

********** FOR OFFICE USE ONLY **********

Application Approved by: Heidi Mottet Date: 8-20-13

Amount Paid 150.00 Receipt Number 129545 Permit Number

NOTES: 542037

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INSPECTION REPORT

Home Information

Does the structure contain any of the following elements?

Garbage disposer ✓ Yes ____ No Dishwasher ____ Yes ____ No

Grinder pump ____ Yes ____ No Lift pump in basement ____ Yes ____ No

Effluent screen installed? ____ Yes ____ No Effluent screen manufacturer ____

Alarm required? ✓ Yes ____ No Alarm Type ____ Alarm manufacturer ____

Lift pump in system? ✓ Yes ____ No Pump manufacturer ____

Number of bedrooms ____

Component Information

Tank size 1500 + 600 lift Tank manufacturer Brown

Drainfield size 380 sq. ft.

Drainfield medium ____ Medium manufacturer 10'x38' mound

Drainfield medium size/depth ____

Soil Verification

Vertical separation verified for Boring #1 on ____ Depth +36"

Vertical separation verified for Boring #2 on ____ Depth ____

Vertical separation verified for Boring #3 on ____ Depth ____

Setback Verification

	TANK	DRAINFIELD
Distance to Well	+50	+50
Distance to Building	+10	+20
Distance to Property Line	+10	+10
Distance to OHW of Lake	+75	+75
Distance to Pressure Line	-	-
Distance to Wetland/Protected Water	-	-

Date System Installed 9/3/13 Installer Tim Stenger Exc. Inspector Paul Stoll

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CERTIFICATE OF COMPLIANCE

) Certificate Is Hereby Denied

✓ Certificate is Hereby Granted Based upon the Application, addendum from, plans, specifications and all other supporting data. h property maintenance, this system can be expected to function satisfactory, however, this is not a guarantee.

Paul Stoll — Title: Is ts inspector — Date: 9/3/13

ure

Title

Date

icate of Compliance is not valid unless signed by a Registered Qualified Employee)

COUNTY OF BECKER

Planning and Zoning

915 Lake Ave, Detroit Lakes, MN 56501

Phone: 218-846-7314 ~ Fax: 218-846-7266

SSTS STATEMENT - # OF BEDROOMS AND WATER-USE APPLIANCES

Note: Form must be legible and completed in ink

Property Owner Name(s): Keith Arneson

Address: 113 2nd Ave #8 City, State, Zip: North wood ND

Phone: _____ Alt. Phone: _____

Legal Description: Strobel Shores Blk 1 Lot 8

Lake/River: Cotton Lake Tax Parcel No. 100729513 & 10092 9508

Property Address: 21967 Co. 32

Definitions:

Bedroom – any room or unfinished area within a dwelling that might reasonably be used as a sleeping room. Lofts and unfinished basements (with at least one egress window and/or door) are counted as bedrooms.

Water-use Appliances – installed or anticipated: e.g. automatic washer, dishwasher, water conditioning unit, whirlpool bath, garbage disposal, or self-cleaning humidifier in furnace. **Note:** A dishwasher with a built-in garbage disposal counts as two (2) water-use appliances.

Existing # of bedrooms: 3 + # of bedrooms yet to be constructed: _____ = Total # of bedrooms to be serviced by the SSTS: _____ (min. # bedrooms allowed by State is two)

Existing # of water-use appliances: _____ List each: _____
+ # of water-use appliances yet to be installed: _____ List each: _____
_____ = Total # of water-use appliances to be serviced by the SSTS: _____

I (we) do hereby swear and affirm that the above-stated number of bedrooms and water-use appliances exist and/or will be installed in the residence located on the property listed on this document such that they will be serviced by the subsurface sewage treatment system (SSTS) that will be designed for and connected to said residence and installed on said property.

Keith Arneson
Property Owner(s) Signature(s)

8/24/13
Date