100232001

ptic System Application

PARCEL	
APP	SEPTIC
YEAR	
SCANNED	
LAKE	

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

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: 100232001

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 13 Township 139 Range 40 Township Name ERIE

Lake Name Non-Shoreland Lake Classification

Legal Description: Pt SW1/4 SE1/4 Beg S QN Cor Sec 13 E 570' N 260' W 260' N 350' W 250' S 610' to POB

Project Address: 34450 190th St

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

Owner's First Name Grant & Brenda Owner's Last Name Corcoran

Mailing Address 34450 190th St City, State, Zip Detroit Lakes, MN 56501

Phone Number

3. DESIGNER/INSTALLER INFORMATION

Designer Name Randy Anderson Company Name Anderson On-Site License # 634

Address PO 1421 Detroit Lakes Phone Number 218 849 3072

Installer Name Jason Niemi Company Name Magnuson Construction License # 3225

Address 43493 150th St Frazee, MN 56544 Phone Number (218) 234-8076

RECEIVED
AUG 22 2014
ZONING

2/21/14 Date of site evaluation

4. SYSTEM DESIGN INFORMATION

System Status

_____ Vacant Lot-No existing system-new structure
_____ Replacement – structure removed and being rebuilt
X 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

Design Flow 450 Gallons Per Day
Number of Bedrooms 2 Sizing for 3
Garbage Disposal ____ Yes X No
Dishwasher X Yes ___ No
Lift station in House ____ Yes X No
Grinder pump in House ____ Yes X No

Well Depth 50 +
Depth of other wells within 100 ft of system N/A

Original Soil X Compacted Soil ____
Type of Soil Observation
X Pit ____ Probe ____ Boring
Depth to Restricting Layer 23"
Maximum Depth of System Mound

Size of All Tanks to be installed

_____ gal Single Compartment Septic Tank
_____ gal Compartmented Tank
_____ Pit Privy
500 gal Separate Lift Station
_____ 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 1 (This # will be reported to MPCA at end of year.)

PARCEL	
APP	SEPTIC

PARCEL	
APP	SEPTIC
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	760 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 29gpm @ 24' head
Size of Lift Line 2"

PROPOSED SETBACKS

	TANK	DRAINFIELD
Distance to Well	100+	100+
Distance to Building	28	45
Distance to Property Line	100	100
Distance to OHW of Lake	—	—
Distance to Pressure Line	100+	100+
Distance to Wetland/Protected Water	75	140

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
0-12	loAm	10yr 2/2	pms		0-10	loAm	10yr 2/2	pms
12-24	Sandy loAm	10yr 4/4	Blocky		10-22	loAm	10yr 4/4	Blocky
24	loAm	2.5y 4/4	mottled		22+	loAm	mottled	Platy

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0-8	loAm	10yr 2/2	pms					
8-23	loAm	Blocky	10yr 4/4					
23+	mottled							

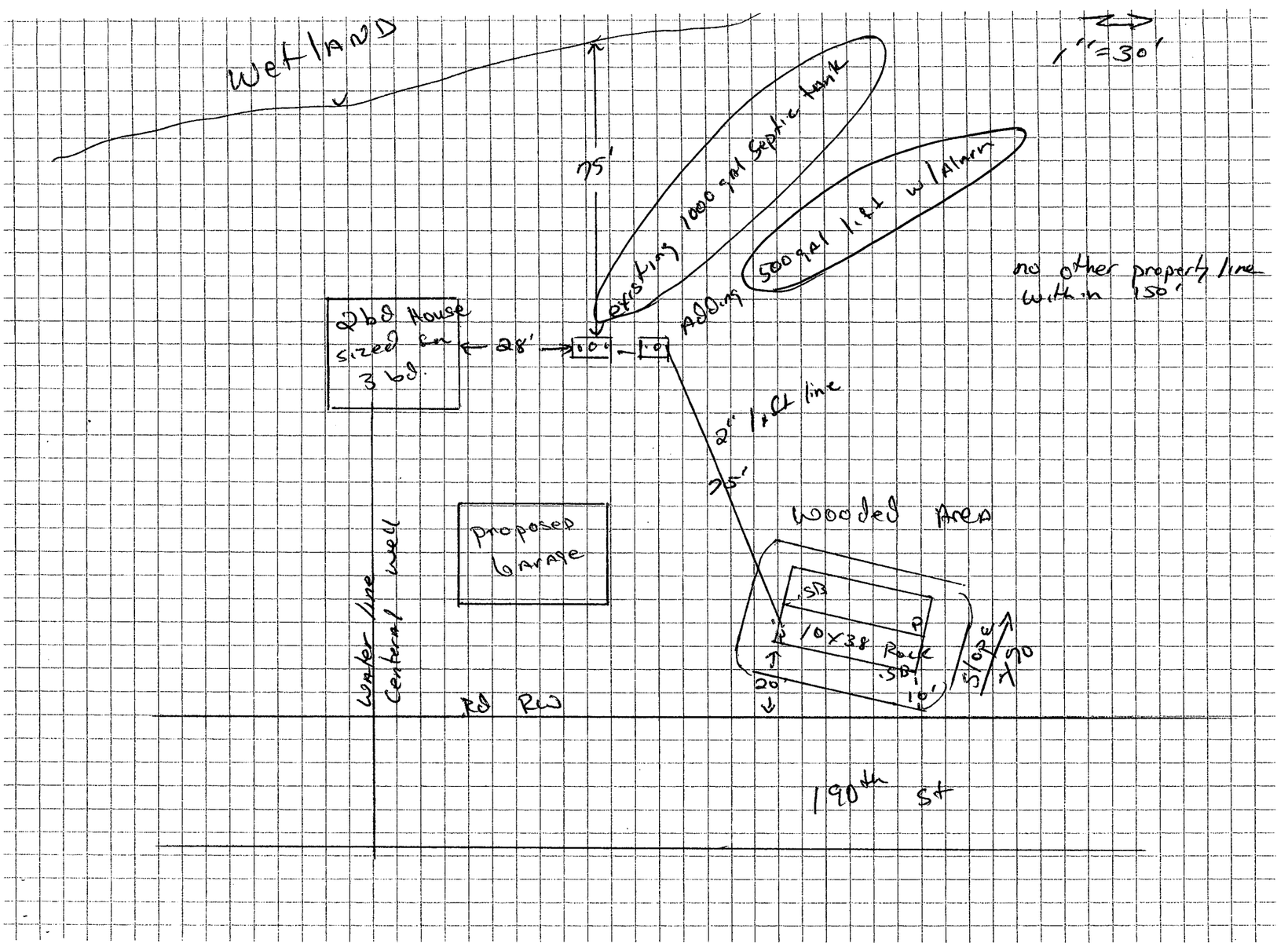
5. REQUIRED DOCUMENTS

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

Signature of Designer _____ Date 7/21/14


Wetland
1" = 30'
75'
existing 1000 gal Septic tank
500 gal lift w/ Alarm
no other property line within 150'
2bd House sized for 3 bd.
28'
10'
10'
Addition
20' inlet line
75'
Wooded Area
Proposed Garage
Water line Centered in well
RD ROW
10 x 38 Rock
.5%
10'
20'
Slope
190th St

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

Property Owner/Client: Grant Graham | **Project ID:** | v 12.08.06

Site Address: 34450 190th St. Detroit Lakes, MN 56501 | **Date:** 7/21/14

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: 1000 Gallons, in 1 Tanks or Compartments

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

Effluent Screen & Alarm? optional

C. *Holding Tanks Only:*

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

Type of High Level Alarm:

D. *Pump Tank 1* Capacity: 500 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

Benchmark Location:

System Type

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

Type of Distribution Media: rock

3. SITE EVALUATION:

A. *Depth to Limiting Layer:* 23 in 1.9 ft | Elevation & Location of Limiting Layer: ft

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

B. *Measured Percent Land Slope:* 4.0 % 0.0 | Code Maximum Depth of System: -13 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	1.1 ft	Berm Width (slope 0-1%)	ft
Upslope Berm Width	10.6 ft	Downslope Berm Width	16.6 ft	Endslope Berm Width	13.9 ft
Total System Length	65.9 ft	Total System Width	37.2 ft		

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

UNIVERSITY OF MINNESOTA

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	24 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	07/21/14
(Designer)	(Signature)	(License #)	(Date)

Becker County, Minnesota

776B—Snellman-Sugarbush complex, 2 to 8 percent slopes

Map Unit Setting

Elevation: 800 to 2,000 feet
Mean annual precipitation: 20 to 28 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 150 days

Map Unit Composition

Snellman and similar soils: 60 percent
Sugarbush and similar soils: 30 percent
Minor components: 10 percent

Description of Snellman

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy glacial till

Typical profile

A - 0 to 3 inches: sandy loam
E - 3 to 12 inches: sandy loam
Bt - 12 to 32 inches: sandy clay loam
Bk,C - 32 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Description of Sugarbush

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit, shoulder, backslope

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy mantle over sandy and gravelly outwash deposits

Typical profile
A - 0 to 3 inches: sandy loam
E - 3 to 17 inches: loamy sand
Bt - 17 to 28 inches: sandy loam
2C - 28 to 60 inches: gravelly coarse sand

Properties and qualities
Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Minor Components

Balmlake
Percent of map unit: 2 percent

Wykeham
Percent of map unit: 2 percent

Eagleview
Percent of map unit: 2 percent

Two inlets
Percent of map unit: 2 percent

Egglake
Percent of map unit: 1 percent
Landform: Swales

Karlstad
Percent of map unit: 1 percent

Data Source Information

Soil Survey Area: Becker County, Minnesota
Survey Area Data: Version 9, Dec 26, 2013

Minnesota Pollution Control Agency

OSTP Mound Design Worksheet
>1% Slope

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:*	1.9	ft
D. *Percent Land Slope:*	4.0	%
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	← OR →	1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi		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

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

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 - 1.9 ft = 1.1 ft Design Sand Lift (optional): 1.1

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

1.1 ft + 1.0 ft + 1.0 ft = 3.1 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): 3.45 (figure D-34)

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

3.45 ft X 3.1 ft = 10.6 ft

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

10.0 ft X 4.0 % ÷ 100 = 0.40 ft

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

3.1 ft + 0.40 ft = 3.5 ft

G. Select *Downslope Berm Multiplier* (based on land slope): 4.76 (figure D-34)

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

4.76 x 3.5 ft = 16.6 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: 16.6 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 3.5 ft = 13.9 ft

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

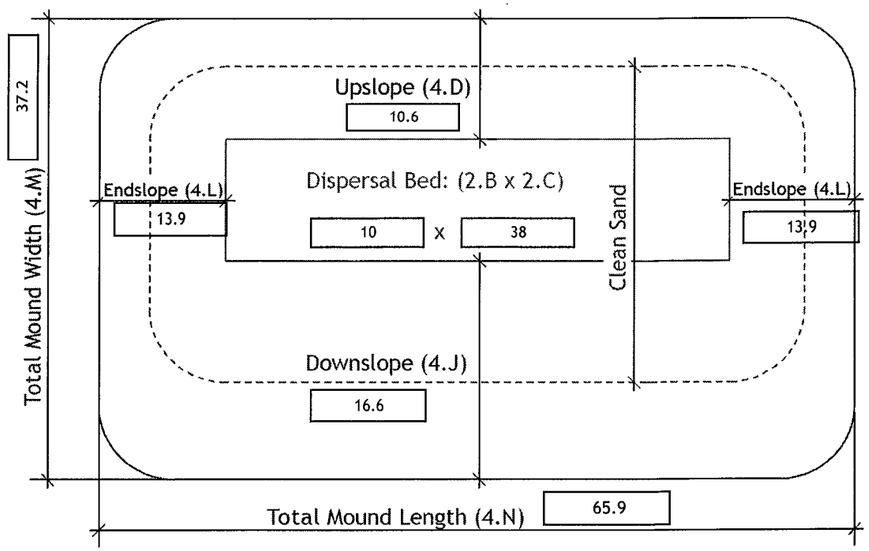
10.6 ft + 10.0 ft + 16.6 ft = 37.2 ft

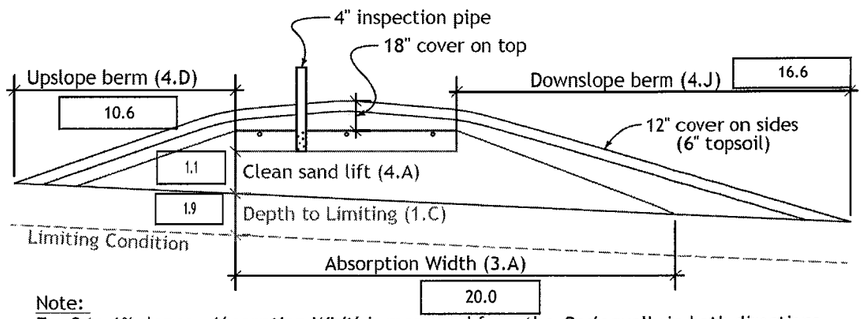
N. Calculate Mound Length: *Endslope Berm Width* (4.L) + *Bed Length* (2.C) + *Endslope Berm Width* (4.L) = ft

13.9 ft + 38.0 ft + 13.9 ft = 65.9 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*.

Minnesota Pollution Control Agency

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

1.3 ft X 10.0 ft X 38.0 ft = 487.7 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

((3.1 ft - 1) X 3.0 ft X 38.0) ÷ 2 = 118.8 ft^3

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

((3.5 ft - 1) X 10.0 ft X 38.0) ÷ 2 = 471.8 ft^3

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

(3.5 ft - 1) X 3.0 ft X 10.0 ft = 74.5 ft^3

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

118.8 ft^3 + 471.8 ft^3 + 74.5 ft^3 + 487.7 ft^3 = 1152.8 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1152.8 ft^3 ÷ 27 = 42.7 yd^3

Add 20% for constructability: 42.7 yd^3 X 1.2 = 51.2 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

(3.3 - 0.5)ft X 37.2 ft X 65.9) ÷ 2 = 3411.6 ft^3

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

3411.6 ft^3 - 1152.8 ft^3 - 380.0 ft^3 = 1878.8 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1878.8 ft^3 ÷ 27 = 69.6 yd^3

Add 20% for constructability: 69.6 yd^3 x 1.2 = 83.5 yd^3

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

37.2 ft X 65.9 ft X 0.5 ft = 1225.7 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1225.7 ft^3 ÷ 27 = 45.4 yd^3

Add 20% for constructability: 45.4 yd^3 x 1.2 = 54.5 yd^3

Minnesota Pollution Control Agency

OSTP Pressure Distribution Design Worksheet

University of Minnesota

Project ID: v 12.08.06

1. Media Bed Width: 10 ft

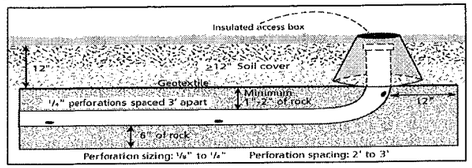
2. Minimum Number of Laterals in system/zone = [(Media Bed Width (Line1) - 4) ÷ 3] + 1 round up to the neareast whole number + 1.

(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

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* (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

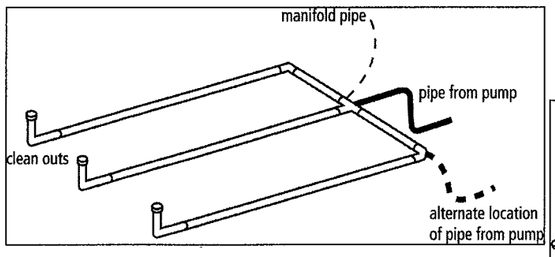
Perforation Discharge (GPM)

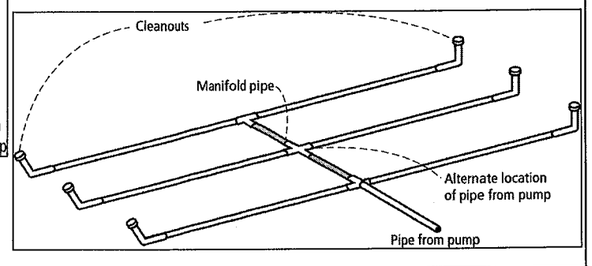
Head (ft)	Perforation Diameter 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0[b]	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0[c]	0.41	0.93	1.26	1.65

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:

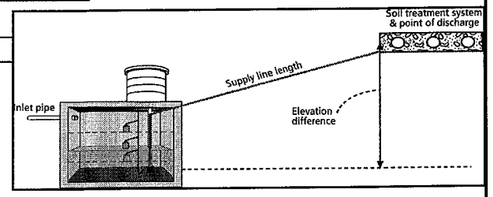
v 12.08.06

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: 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: 80 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*

80 ft X 1.25 = 100.0 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 =

2.23 ft per 100ft X 100.0 ft ÷ 100 = 2.2 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)

17.0 ft + 5.0 ft + _____ ft + 2.2 ft = 24.2 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **29.0** GPM (Line 1 or Line 2) with at least **24.2** feet of total head.

Comments:

PERCOLATION TEST SHEET

Test hole location Proposed Site Hole # 1 Date test hole was prepared: 7/21/14

Depth of hole bottom: 12 inches Diameter of hole: 6 inches

Soil Data from test hole:

depth, inches	soil texture:	soil color
0-12	loAm	10yr2/2

Method of scratching sidewall: wire Depth of pea size gravel in bottom of hole: _____ inches

Date and hour of initial water filling: 7-23-14 Depth of initial water filling: 12 above hole bottom

Method used to maintain 12" of water depth in hole for 4 hours: manual

Percolation test conducted by: Randy Anderson Percolation test started at 4 (am) (pm)

Maximum water depth above hole bottom during test: 8 inches

TIME	INTERVAL (MINUTES)	WATER DEPTH	WATER DROP (fraction)	WATER DROP (decimal)	PERC RATE CALCULATION
	START	8			
	20	7 7/8	7/8	.88	20 ÷ .88 = 22.7 A (TIME ÷ DROP (Decimal) = PERC)
	REFILL	8			
	20	7 7/8	7/8	.88	20 ÷ .88 = 22.7 B
	REFILL	8			
	25	6 7/8	1 1/8	1.13	25 ÷ 1.13 = 22.1 C
	REFILL				D
					E
	REFILL				F
					G
	REFILL				H

conversions: 1/16 = .06; 1/8 = .13; 3/16 = .19; 1/4 = .25; 5/16 = .31; 3/8 = .38; 7/16 = .44; 1/2 = .5; 9/16 = .56; 5/8 = .63; 11/16 = .69; 3/4 = .75; 13/16 = .81; 7/8 = .88; 15/16 = .94

Ten Percent Calculation *

A,B,C
Largest # of ABC − Smallest # of ABC = _____
Smallest # of ABC × 0.10 = _____

B,C,D
Largest # of BCD − Smallest # of BCD = _____
Smallest # of BCD × 0.10 = _____

C,D,E
Largest # of CDE − Smallest # of CDE = _____
Smallest # of CDE × 0.10 = _____

D,E,F
Largest # of DEF − Smallest # of DEF = _____
Smallest # of DEF × 0.10 = _____

E,F,G
Largest # of EFG − Smallest # of EFG = _____
Smallest # of EFG × 0.10 = _____

F,G,H
Largest # of FGH − Smallest # of FGH = _____
Smallest # of FGH × 0.10 = _____

* If the top number in each set of boxes is larger than the bottom number, take another reading. If the top number is equal to or smaller than bottom number, average the 3 numbers for the perc rate.

mailed COC 10-6-15

PARCEL	
APP	SEPTIC
YEAR	

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

Application Approved by: Heba Malla Date: 8/22/14

Amount Paid 10/2/14 Receipt Number 160007-572494 Permit Number _____

NOTES: call Jason Niemi when approved 234-8076.

Left VM 8/25/14

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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 Electric Alarm manufacturer _____

Lift pump in system? ✓ Yes ____ No Pump manufacturer 29 gpm

Number of bedrooms 2 sized for 3

Component Information

Tank size existing 1000 + 500 l.ft Tank manufacturer Infiltrator

Drainfield size 380 sq ft.

Drainfield medium _____ Medium manufacturer 10' x 38' 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	+100	+100
Distance to Building	+10	+20
Distance to Property Line	+10	+10
Distance to OHWof Lake	-	-
Distance to Pressure Line	+100	+100
Distance to Wetland/Protected Water	75	100'

Date System Installed 10/5/15 **Installer** Magnum Contract **Inspector** Laurie Stahl

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CERTIFICATE OF COMPLIANCE

( ) Certificate Is Hereby Denied

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

Laurie Stahl — Signature

ISTS Inspector — Title

10/5/15 — Date

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

Becker County Planning & Zoning
835 Lake Ave, P O Box 787
Detroit Lakes, MN 56502-0787
Phone (218)-846-7314; Fax (218)-846-7266

OCT 19 2006

Onsite Septic System Site Evaluation/Design

1. **PROPERTY DATA** (as it appears on the tax statement)
Parcel Number(s) of property system will be installed R10023200X1
(if parcel is a new split and a parcel number has not yet been issued, indicate the main parcel number from which the new parcel has been split from)
Section 13 Township 139 Range 40 Township Name Erie

Lake Name _____ Lake Classification _____

Legal Description: S1/2 of SE 1/4

Project Address: 34454 190th St Detroit Lakes, MN 56501

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

Owner's First Name Grant E & Brenda L. Owner's Last Name Graham

Mailing Address 34454 190th St. City, State, Zip Detroit Lakes, MN 56501

Phone Number 847-1254

3. **DESIGNER/INSTALLER INFORMATION**

Designer Name Dale J. Renner Company Name D+B Septic + Landscape License # 2591

Address 31664 St. Hwy 34 D.L. Phone Number 218-841-3781 218-847-6122

Installer Name Owner Company Name _____ License # _____

Address _____ Phone Number _____

4. **SYSTEM DESIGN INFORMATION**

Date of Site Evaluation 10/13/06

EXISTING SYSTEM STATUS – Check One

X No existing system-new structure
_____ Cesspool/Seepage
_____ Failing (other than cesspool)
_____ Undersized
_____ Replacement or repair to existing

What will new system serve? Check one

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

Design Flow 300 Gallons Per Day
Number of Bedrooms 2
Garbage Disposal _____ Yes X No
Grinder Pump in House ____ Yes X No
Lift station in House ____ Yes X No

Well Depth 200
Depth of other wells within 100 ft of system _____

Original Soil X Compacted Soil _____
Type of Soil Observation
X Pit _____ Probe _____ Boring
Depth to Restricting Layer 7'
Maximum Depth of System 4'

mail to Grant Braham when approved.
✓ mailed 10/20/06

✓ in intake Tea
✓ in access Tea

Size of All Tanks to Be installed
1000 gal Septic Tank
_____ gal Lift Station
_____ gal Holding Tank
_____ gal Other Tanks

Type of Drainfield Medium to be used
_____ Chamber
____ H10 ____EQ36
X Drainfield Rock
18" Rock Depth
_____ Gravelless
_____ Experimental
_____ No Drainfield

Type of Alarm _____
Size of Lift Pump _____
Size of Lift Line _____

Type of Drainfield to be installed
X Trench
_____ At-grade
_____ Pressure Bed
_____ Seepage Bed
_____ Mound

Size of Drainfield sq ft to be installed
300 sq ft
_____ sq ft
_____ sq ft
_____ sq ft
_____ sq ft

SETBACKS	TANK	DRAINFIELD
Distance to Well	138'	146'
Distance to Building	18'	30'
Distance to Property Line	200'+	200'+
Distance to OHW	[redacted]	[redacted]
Distance to Pressure Line	81	58

Perc Rate 3.63 Soil Sizing Factor .83 *If SSF other than .83, attach Perc Test Data

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0-8"	top soil	10yr 2/1			50"-71"	sand loam	10yr 4/5	
8"-24"	sand loam	10yr 4/2			78"-84"	" "	5/3 10yr	
24"-38"	" "	10yr 3/6						
38"-50"	" "	10yr 4/6						

5. DESIGNER'S CERTIFIED STATEMENT

I, Dale J. Renner 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).
(Print Name of Designer)

Dale J. Renner — Signature of Designer
10/15/06 — Date

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

Application Approved by: Debi Molitor Date: 10-20-06
Amount Paid 100.00 Receipt Number 118957-343083 Permit Number _____

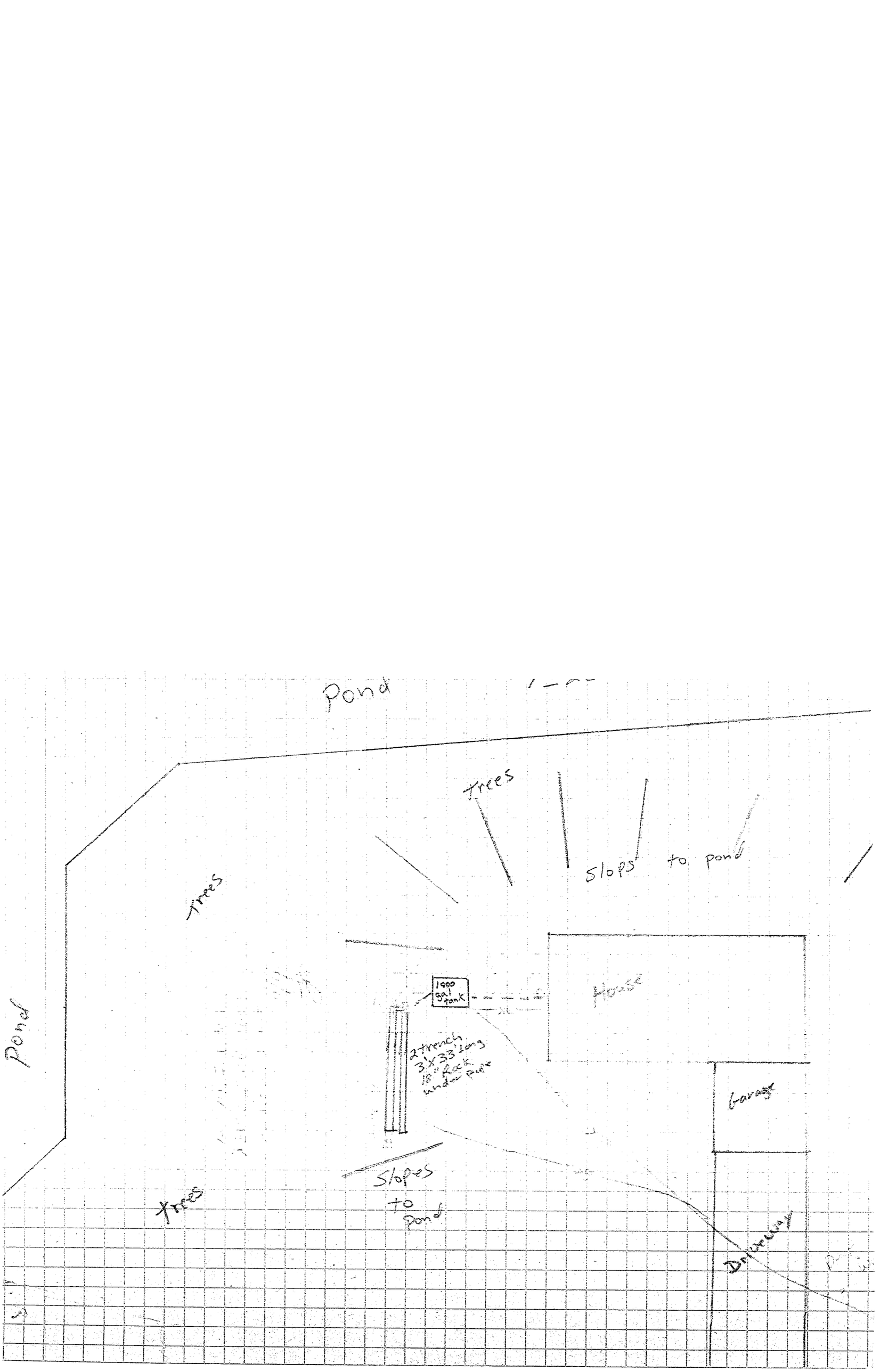
****

CERTIFICATE OF COMPLIANCE

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

David A Stoll — Signature
ISTS Inspector — Title
11/1/06 — Date

(Certificate of Compliance is not valid unless signed by a Registered Qualified Employee)
Date System Installed 11/1/06 Inspected by David A Stoll


Pond
Trees
Slops to Pond
Trees
Pond
1000 gal tank
House
2 trench 3'x33'long 18" Rock under Pipe
Garage
Slopes to Pond
Trees
Driveway