PARCEL	
APP	SEPTIC
YEAR	

Onsite Septic System Application

RECEIVED
SEP 04 2012
ZONING

Becker County Plan
915 Lake Ave, Detroit Lakes, MN 565
Phone (218)-846-7314; Fax (218)-846-7

061115000

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: 06111 5000

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 09 Township 138 Range 043 Township Name Cormorant

Lake Name Upper Cormorant Lake Classification Recreational Dev.

Legal Description: Tucker SUB Div All of SUB DIV

Project Address: 13471 N Beach Point Lake Park MN

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

Owner's First Name Steve & Cheryl Owner's Last Name Hedlund

Mailing Address 13471 North Beach Point City, State, Zip Lake Park MN 56554

Phone Number 218-841-9568

3. DESIGNER/INSTALLER INFORMATION

Designer Name Eric Larson Company Name Septic Check License # 2624

Address 6074 Keystone Rd Mike MN Phone Number 320-983-2447

Installer Name Septic Check Company Name " same License # 2624

Address " same " Phone Number " same "

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

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

7/26/12 Date of site evaluation

Design Flow 1800 Gallons Per Day
Number of Bedrooms N/A
Garbage Disposal ____ Yes X No
Dishwasher ____ Yes X No
Lift station in House ____ Yes X No
Grinder pump in House ____ Yes X No

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

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

Size of All Tanks to be installed

1600X3 _____ gal Single Compartment Septic Tank
2500 _____ gal Compartmented Tank
_____ Pit Privy
_____ 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 4 (This # will be reported to MPCA at end of year.)

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	1503 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 12"

Alarm? Yes X No _____
Type of Alarm Liberal & Audio
Size of Lift Pump 506PM 35TDH
Size of Lift Line 2"

PROPOSED SETBACKS

	TANK	DRAINFIELD
Distance to Well	>100'	>
Distance to Building	>20'	>100'
Distance to Property Line	>100'	30'
Distance to OHW of Lake	124'	>200'
Distance to Pressure Line		
Distance to Wetland/Protected Water	N/A	N/A

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

~~Soil Borings (three are required)~~ See Attached Soil Logs

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure

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, Eric Larson (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).

_____ 9/4/2012
Signature of Designer Date

Septic Check

Septic System Management Services

INDIVIDUAL SEWAGE SYSTEM DESIGN SUMMARY

Property Owner: Steve & Cheryl Hedlund
Phone: 1-877-767-2752
Address: 13471 North Beach Point
Township:
City: Lake Park Zip: 56554
County: Becker

DESIGN USAGE

Single Family Home ____ Other X
Number of Potential Bedrooms 18
Garbage Disposal None
Sewage Lift Pump none

SITE CHARACTERISTICS

Soil type Loam
Soil Sizing Factor .60 Gallons per day per ft2
Depth to restrictive layer 17"

PUMP INFORMATION

Pump GPM & TDH 50GPM 35TDH
Cycles per day 10
Gallons per cycle 180
Perforation size & spacing 3/16" every 3'
Number, spacing, & diameter of laterals 3 – 2" laterals every 3'
Forcemain Size 2"

CAPACITIES

Daily Water Use 1800 Est X Calc ____
Septic Tank Capacity 5630 Gallons
Pump Tank Capacity 1660 Gallons (Duplex Pumps)

MOUND SYSTEM

Dimension of Dispersal bed 9' by 167'
Depth of Media Below Pipe 6"
Dimensions of Mound 34.8' by 192.9'
% Slope of Soil Under Mound 8%
Upslope Dike Width 8.7'
Downslope Dike Width 17.1'
Sideslope Dike Width 13.0'

TRENCH SYSTEM

Type of trench
Maximum Depth of trench
Square Feet of bed Required
Square Feet of bed Proposed
Lineal Feet of bed Proposed

APPROVAL

By _____ Date 8/6/2012
Eric Larson License #2624
See additional information sheet if checked ☒

Protecting Your Investment and Everyone's Environment
6074 Keystone Rd. • Milaca, MN 56353
(320) 983-2447 • (320) 983-2151 • (888) 983-2447 • www.septic-check.com • Info@septic-check.com

Septic Check
Septic System Management Services

Septic Design Additional Information
End of the Road Resort

Design Overview: This design is for a septic system update at End of the Road Resort. The drain field that accommodates cabins 1 through 6 is hydraulically failing and needs to be replaced.

The four existing tanks that serve cabins 1 through 6 will be pumped and properly abandoned. Effluent will gravity flow through the septic tanks to the mound dose tank. Effluent will then be evenly distributed through dual alternating time dose controlled pumps to both sections of the mound.

Water Use: Water use has not been monitored to date. This design estimates 50 gallons a person per day using the facilities per MN rule 7081.0130.

Based on maximum cabin capacity the design flow would be totaled at 1800 gallons a day. Six cabins, six people per cabin. This system will have a total septic tank capacity of 5630 gallons in four separate tanks to meet the minimum standard of three times the daily flow. Pump monitoring will record actual flows.

Additional Notes: Installer to verify all elevations, dimensions and ensure proper fall to pipes. Pitch pump chamber outlets to ensure complete drain back to pump chamber or bury, insulate, and heat trace to prevent freezing. Insulate tanks and any other system components as deemed appropriate. Establish turf to prevent erosion and freezing in the mounds.

Elevations are referenced to Bench Mark at the NE corner of the concrete slab on cabin 9.

Property owner to verify all property lines.

East end of mound will be in part over the existing drainfield site. Accordingly, this will be a Type III system and flow monitoring is required.

Each tank is to be pumped through the maintenance cover when serviced. Do not pump through inspection pipes.

Case and seal sewer lines at water line crossings

Tanks to be abandoned will be pumped out, crushed and filled or removed.

All construction to be performed in accordance with MN Rule 7080.

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OSTP Soil Observation Log

Project ID: v 12.04.25

Client/ Address:	End of the Road Resort	Legal Description/ GPS:	61115000

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

Landscape Position: (check one) ☐ Summit ☐ Shoulder ☑ Back/Side Slope ☐ Foot Slope ☐ Toe Slope Slope shape

Vegetation	Heavily Wooded	Soil survey map units	Waukon Loam	Slope%	0.1	Elevation:	
Weather Conditions/Time of Day:	Sunny 10 AM				Date	07/26/12	
Observation #/Location:	SB1				Observation Type:	☑ Auger ☐ Probe ☐ Pit	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-8	Loam	<35%	10 YR 3/1				Blocky	Strong	Friable
8-10	Loam	<35%	10 YR 3/2				Blocky	Strong	Friable
10-17	Clay Loam	<35%	10 YR 3/4				Blocky	Moderate	Friable
17-21	Clay Loam	<35%	10 YR 3/4		Concentrations	S1	Blocky	Moderate	Friable

Comments

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

Eric Larson		2624	8/6/2012
(Designer)	(Signature)	(License #)	(Date)

Additional Soil Observation Logs

Project ID:

University of Minnesota Onsite Sewage Treatment Program

Client/ Address:	End of the Road Resort	Legal Description/ GPS:	61115000

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

Landscape Position: (check one) ☐ Summi ☐ Shoulder ☑ Back/Side Slope ☐ Foot Slope ☐ Toe Slope shape

Vegetation	Heavily Wooded	Soil survey map units	Waukon Loam	Slope%	8.0	Elevation:	

Weather Conditions/Time of Day:	Sunny 10:05 AM	Date	07/26/12

Observation #/Location:	SB2	Observation Type:	☑ Auger ☐ Probe ☐ Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Grade	Consistence
0-11	Loam	<35%	10 YR 2/1				Blocky	Strong	Friable
11-18	Loam	<35%	10 YR 3/3				Blocky	Strong	Friable
18-24	Clay Loam	<35%	10 YR 3/3		Concentrations	S1	Blocky	Moderate	Friable

Comments

Observation #/Location:	SB3	Observation Type:	Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Grade	Consistence
0-10	Loam	<35%	10 YR 2/1				Blocky	Strong	Friable
10-17	Silt Loam	<35%	10 YR 3/3				Blocky	Strong	Friable
17-24	Clay Loam	<35%	10 YR 3/3		Concentrations	S1	Blocky	Moderate	Friable

Comments

Additional Soil Observation Logs

Project ID:

University of Minnesota Onsite Sewage Treatment Program

Client/ Address:	End of the Road Resort	Legal Description/ GPS:	PID # 061115000

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

Landscape Position: (check one) ☐ Summi ☐ Shoulder ☑ Back/Side Slope ☐ Foot Slope ☐ Toe Slope shape

Vegetation	Heavily Wooded	Soil survey map units	Waukon Loam	Slope%	8.0	Elevation:	

Weather Conditions/Time of Day:	10:15 AM	Date	07/26/12

Observation #/Location:	SB4	Observation Type:	☑ Auger ☐ Probe ☐ Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Grade	Consistence
0-10	Sandy Loam	<35%	10 YR 2/1				Granular	Strong	Friable
10-20	Loam	<35%	10 YR 3/3				Blocky	Strong	Friable
20-24	Clay Loam	<35%	10 YR 3/3		Concentrations	S1	Blocky	Moderate	Friable

Comments	

Observation #/Location:	SB5	Observation Type:	Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Grade	Consistence
0-13	Loam	<35%	10 YR 2/2				Blocky	Strong	Friable
13-14	Loam	<35%	10 YR 3/2				Blocky	Strong	Friable
14-18	Clay Loam	<35%	10 YR 3/3				Blocky	Moderate	Friable
18-24			10 YR 3/3		Concentrations	S1	Blocky	Moderate	Friable

Comments	

Minnesota Pollution Control Agency

OSTP Design Summary Worksheet

University of Minnesota

Property Owner/Client: End of the Road Resort | Project ID: | v 12.04.25

Site Address: 13471 North Beach Point Lake Park MN 56554 | Date: 5/16/12

1. DESIGN FLOW AND TANKS

A. *Design Flow:* 1800 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: 5400 Gallons, in 3 Tanks or Compartments

Recommended Septic Tank Capacity: 5630 Gallons, in 4 Tanks or Compartments

Effluent Screen & Alarm? yes

C. *Holding Tanks Only:*

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

Type of High Level Alarm:

D. *Pump Tank 1* Capacity: 1660 Gallons | *Pump Tank 2* Capacity: Gallons

2. SYSTEM TYPE

Type of Soil Treatment and Dispersal Area*: ○ Trench ○ Bed ◉ Mound ○ At-Grade ○ Drip ○ Holding Tank ○ Other:

Type of Distribution*: ○ Gravity Distribution ◉ Pressure Distribution-Level ○ Pressure Distribution-Unlevel

* Selection Required

Benchmark Elev = 100 ft

Benchmark Location: NE corner of Cabin 9's slab

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

Type of Distribution Media: EZ Flo

3. SITE EVALUATION:

A. *Depth to Limiting Layer:* 17 in | 1.4 ft | Elevation & Location of Limiting Layer: 107.3 ft

B. *Measured Percent Land Slope:* 8 % | 0.0 | Location: West side of mound

C. Soil Texture: Loam | Coarse Fragments: <35% % | Perc Rate: MPI

D. Soil Hydraulic Loading Rate: 0.60 GPD/ft² | E. Contour Loading Rate: 11 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	3006 ft²	Bed Length	167 ft	Bed Width	9.0 ft
Absorption Width	18.0 ft	Clean Sand Lift	1.6 ft	Berm Width (slope 0-1%)	ft
Upslope Berm Width	8.7 ft	Downslope Berm Width	17.1 ft	Endslope Berm Width	13.0 ft
Total System Length	192.9 ft	Total System Width	34.8 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

Pressure Distribution Summary

No. of Perforated Laterals	3	Perforation Spacing	3 ft	Perforation Diameter	3/16 in
Lateral Diameter	2.00 in	Supply Pipe Diameter	2.00 in	Minimum Dose Volume	167 gal
Flow Rate	50 GPM	Total Head	35 ft	Maximum Dose Volume	450 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.

Eric Larson		2624	05/16/12
(Designer)	(Signature)	(License #)	(Date)

OSTP Mound Design Worksheet
>1% Slope

Minnesota Pollution Control Agency

University of Minnesota

v 12.04.25

1. SYSTEM SIZING: Project ID:

A. *Design Flow (Flow & Soil - 1.A) :*	1800	GPD
B. *Soil Loading Rate (Flow & Soil-3.C):*	0.60	GPD/ft²
C. *Depth to Limiting Condition:*	1.4	ft
D. *Percent Land Slope:*	8.0	%
E. *Design Media Loading Rate:*	1.2	GPD/ft²
F. *Mound Absorption Ratio* (Table IXa):	2.00	
G. *Design Contour Loading Rate:*	10.8	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	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/ft²)	Treatment Level C: Mound Absorption Ratio	Treatment Level A, A-2, B: Absorption Area Loading Rate (gpd/ft²)	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	0.6	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	6	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) = ft²

1800 GPD ÷ 1.20 GPD/ft² = 1500 ft²

If a larger dispersal media area is desired, enter size: 1500 ft²

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

10.8 ft ÷ 1.2 gpd/ft² = 9 ft

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

1500 ft² ÷ 9 ft = 167 ft

D. Select *Dispersal Media* : Ez Flo

E. If using a registered product, enter the *Component Length* : 120 in ÷ 12 = 10 ft

F. If using a registered product, enter the *Component Width* : 36 in ÷ 12 = 3 ft

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

167 ft ÷ 10 ft = 17 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.

9 ft ÷ 3 ft = 3.0 rows

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

17 X 3.0 = 51 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*

9.0 ft X 2.0 = 18.0 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

18.0 ft - 9.0 ft = 9.0 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 - 1.4 ft = 1.6 ft Design Sand Lift (optional): 1.6 1.6

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

1.6 ft + 1.0 ft + 1.0 ft = 3.6 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): 2.42 (figure D-34)

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

2.42 ft X 3.6 ft = 8.7 ft

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

9.0 ft X 8.0 % ÷ 100 = 0.72 ft

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

3.6 ft + 0.72 ft = 4.3 ft

G. Select *Downslope Berm Multiplier* (based on land slope): 3.95 (figure D-34)

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

3.95 x 4.3 ft = 17.1 ft

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

9.0 ft + 4 ft = 13.0 ft

J. *Design Downslope Berm* = greater of 4H and 4I: 17.1 ft

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

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

3.00 ft X 4.3 ft = 13.0 ft

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

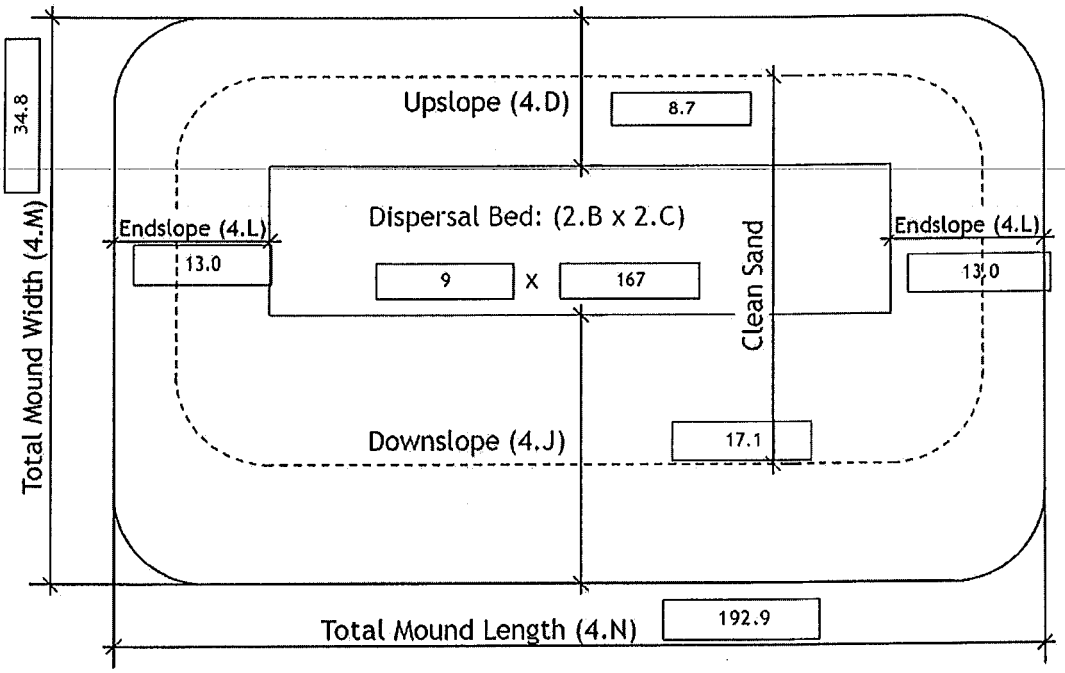
8.7 ft + 9.0 ft + 17.1 ft = 34.8 ft

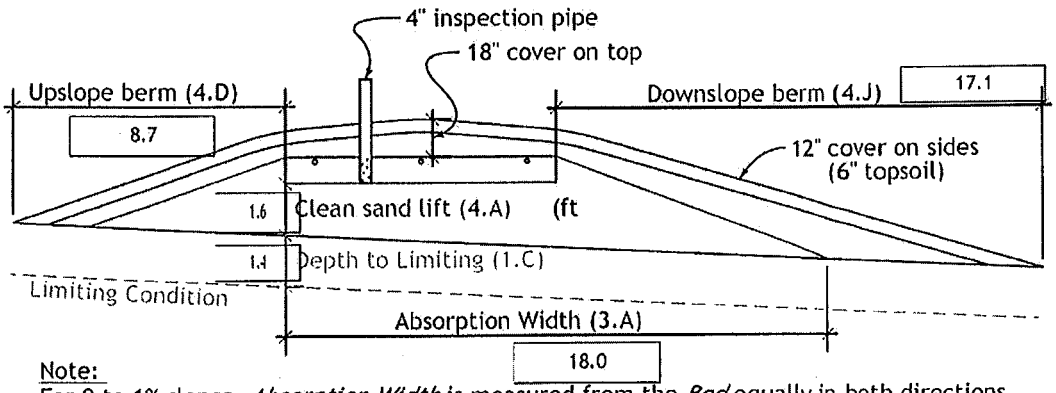
N. Calculate Mound Length: *Endslope Berm Width* (4.L) + *Bed Length* (2.C) + *Endslope Berm Width* (4.L) = ft

13.0 ft + 167.0 ft + 13.0 ft = 192.9 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 12.04.25

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

167.0 ft X 9.0 ft X 1.0 = 1503.0 ft^3

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

1503.0 ft^3 ÷ 27 = 55.7 yd^3

Add 20% for constructability: 55.7 yd^3 X 1.2 = 66.8 yd^3

B. Calculate *Clean Sand Volume*:

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

2.0 ft X 9.0 ft X 167.0 ft = 2945.9 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

((3.6 ft - 1) X 3.0 ft X 167.0) ÷ 2 = 651.3 ft^3

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

((4.3 ft - 1) X 9.0 ft X 167.0) ÷ 2 = 2495.0 ft^3

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

(4.3 ft - 1) X 3.0 ft X 9.0 ft = 89.6 ft^3

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

651.3 ft^3 + 2495.0 ft^3 + 89.6 ft^3 + 2945.9 ft^3 = 6181.8 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 6181.8 ft^3 ÷ 27 = 229.0 yd^3

Add 20% for constructability: 229.0 yd^3 X 1.2 = 274.7 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

(4.0 . 0.5)ft X 34.8 ft X 192.9) ÷ 2 = 11606.5 ft^3

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

11606.5 ft^3 - 6181.8 ft^3 - 1503.0 ft^3 = 3921.7 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 3921.7 ft^3 ÷ 27 = 145.2 yd^3

Add 20% for constructability: 145.2 yd^3 x 1.2 = 174.3 yd^3

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

34.8 ft X 192.9 ft X 0.5 ft = 3354.5 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 3354.5 ft^3 ÷ 27 = 124.2 yd^3

Add 20% for constructability: 124.2 yd^3 x 1.2 = 149.1 yd^3

Minnesota Pollution Control Agency

OSTP Pressure Distribution Each of Two Beds

University of Minnesota

Project ID: v 12.04.25

1. Media Bed Width: 9 ft

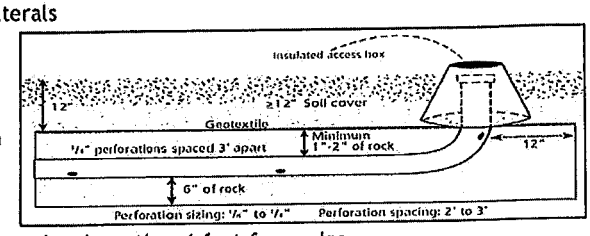
2. Minimum Number of Laterals in system/zone = [(Media Bed Width (Line1) - 4) ÷ 3] + 1 round up to the neareast whole number +-1.

(9 - 4) + 1 = 3 laterals

3. Designer Selected *Number of Laterals*: 3 laterals
Cannot be less than line 2

4. Select *Perforation Spacing*: 3.0 ft

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



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

84 - 2ft = 82 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 = 82 ft ÷ 3 ft = 27 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 = 27 Spaces + 1 = 28 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* (Line 8) multiplied by the *Number of Perforated Laterals* (Line 3).

28 Perf. Per Lateral X 3 Number of Perf. Laterals = 84 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 Each of Two Beds

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)

9	ft	X	84	ft	=	756 ft²

b. *Square Foot per Perforation* = *Bed Area* divided by the *Total Number of Perforations* (Line 9).

756	ft²	÷	84	perforations	=	9.0 ft²/perforations

13. Select *Minimum Average Head*: 2.0 ft

14. Select *Perforation Discharge* (GPM) based on Table: 0.59 GPM per Perforation

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

84	Perfs	X	0.59	GPM per Perforation	=	50 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	82	ft	X	0.170	gal/ft	=	41.8 Gallons

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

41.8	gals	X	4	= 167.3 Gallons

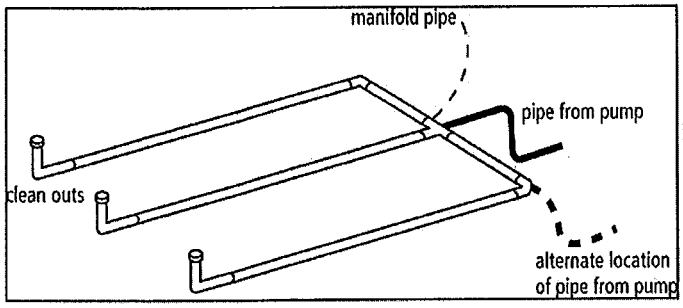
Perforation Discharge (GPM)

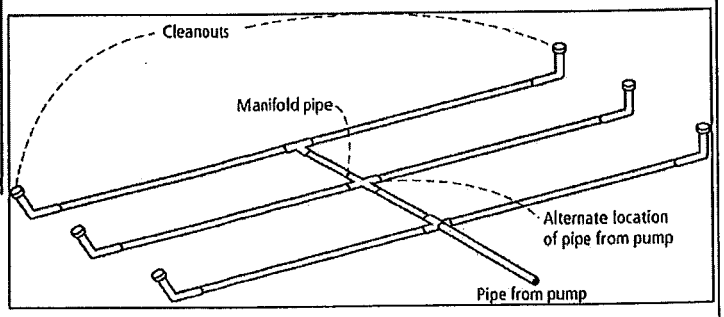
Head (ft)	Perforation Diameter 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0[b]	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0[c]	0.41	0.93	1.26	1.65

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

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v 12.04.25

1. PUMP CAPACITY

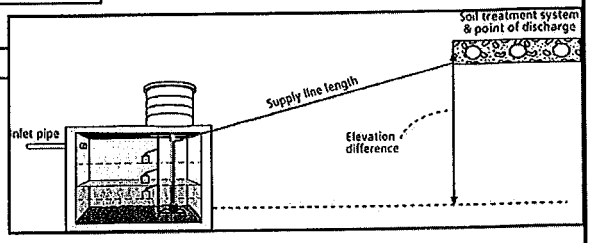
Project ID:

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: 50.0 GPM

(Line 11 of Pressure Distribution)



2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 19.7 ft

B. Distribution Head Loss: 6 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: 116 ft

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

Friction Loss = 6.10 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*

116 ft X 1.25 = 145.0 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 = 6.10 ft per 100ft X 145.0 ft + 100 = 8.8 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)

19.7 ft + 6.0 ft + _____ ft + 8.8 ft = 34.5 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **50** GPM (Line 1 or Line 2) with at least **35** feet of total head.

Comments:

Minnesota Pollution Control Agency

OSTP Pump Tank Sizing, Dosing and Float and Timer Setting Design Worksheet

University of Minnesota

v 12.04.25

DETERMINE TANK CAPACITY AND DIMENSIONS

Project ID:

1. A. *Design Flow (Design Sum. 1A)*: 1800 GPD

   B. Minimum required pump tank capacity: 1000 Gallons Duplex Pumps

MEASURED TANK CAPACITY (existing tanks):

2. A. Rectangle area = Length (L) X Width (W)

   ____ ft X ____ ft = ____ ft^2

   B. Circle area = $3.14r^2$ (3.14 X radius X radius)

   3.14 X ____ 2 ft = ____ ft^2

   C. Calculate Gallons Per Inch. There are 7.5 gallons per cubic foot. Therefore, multiply the area from 1.A or 1.B, by 7.5 to determine the gallons per foot the tank holds. Then divide that number by 12 to calculate the gallons per inch.

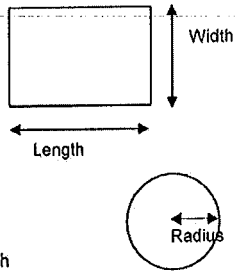
   ____ ft^2 X 7.5 gal/ft^3 ÷ 12 in/ft = ____ Gallons per inch

   D. Calculate *Total Tank Volume*

   Depth from bottom of inlet pipe to tank bottom: ____ in

   Total Tank Volume = *Depth from bottom of inlet pipe* (Line 4.A) X *Gallons/Inch* (Line 2)

   ____ in X ____ Gallons Per Inch = ____ Gallons



MANUFACTURER'S SPECIFIED TANK CAPACITY (when available):

3. A. Tank Manufacturer: Brown Wilbert

   B. Tank Model: 2500 combo

   C. Capacity from manufacturer: 1660 Gallons

   D. Gallons per inch from manufacturer: 29.6 Gallons per inch

   E. Liquid depth of tank from manufacturer: 56.0 inches

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

DETERMINE DOSING VOLUME

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

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

   (12 in + 2 inches) X 29.6 Gallons Per Inch = 415 Gallons

4. *Minimum Pumpout Volume* - 4 X Volume of Distribution Piping: 167.3 Gallons

   - Line 17 of the Pressure Distribution or Line 11 of Non-level

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

   Design Flow: 1800 GPD X 0.25 = 450 Gallons

6. *Select a pumpout volume that meets both items above (Line 4 & 5):* 180 Gallons

7. Calculate *Doses Per Day* = Design Flow ÷ *Dosing Volume*

   1800 gpd ÷ 180 gal = 10.0 *Doses*

8. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 116 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*

   116 ft X 0.170 gal/ft = 19.7 Gallons

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

   180 gal + 19.7 gal = 200 Gallons

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

    3 in X 29.6 gal/in = 88.9 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

Minnesota Pollution Control Agency

OSTP Pump Tank Sizing, Dosing and Float and Timer Setting Design Worksheet

University of Minnesota

TIMER or DEMAND FLOAT SETTINGS

Select Timer or Demand Dosing: (•) Timer ( ) Demand Dose

A. Timer Settings

11. Required *Flow Rate*:

A. From Design (Line 12 of Pressure Distribution or Line 10 of Non-Level*): 50 GPM

B. Or calculated: GPM = Change in Depth (in) x Gallons Per Inch / Time Interval in Minutes

[ ] in X [29.6] gal/in ÷ [ ] min = [ ] GPM

*Note: This value must be adjusted after field measurement & calculation.

12. Flow Rate from Line 11.A or 11.B above. 50 GPM

13. Calculate TIMER ON setting:

Total Dosing Volume/GPM

[200] gal ÷ [50.0] gpm = [4.0] Minutes ON

14. Calculate TIMER OFF setting:

Minutes Per Day (1440)/*Doses Per Day* - Minutes On

1440 min ÷ [10.0] doses/day - [4.0] min = [140.0] Minutes OFF

15. Pump Off Float - Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump / Gallons Per Inch:

[414.96] gal ÷ [29.6] gal/in = [14.0] Inches

16. Alarm Float - Measuring from bottom of tank:

Distance to set Alarm Float = Tank Depth(4A) X 90% of Tank Depth

[56] in X 0.90 = [50.4] in

B. DEMAND DOSE FLOAT SETTINGS

17. Calculate *Float Separation Distance* using *Dosing Volume*.

Total Dosing Volume /Gallons Per Inch

[ ] gal ÷ [ ] gal/in = [ ] Inches

18. Measuring from bottom of tank:

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

[ ] in + [ ] in = [ ] Inches

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

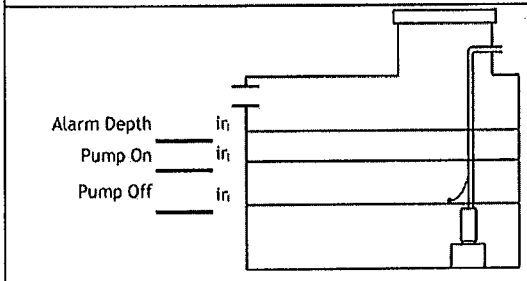
[ ] in + [ ] in = [ ] Inches

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

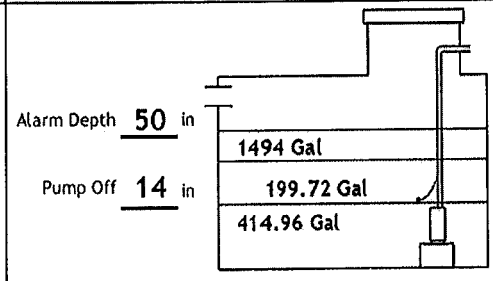
[ ] in + [ ] in = [ ] Inches

FLOAT SETTINGS

DEMAND DOSING



TIMED DOSING



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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 Steve & Cheryl Hedlund

Property Address 13471 North Beach Point Lake Park MN 56554 Property ID 061115000

System Designer Septic Check Phone 320-983-2447

System Installer Septic Check Phone 320-983-2447

Service Provider/Maintainer Phone

Permitting Authority Becker County Phone 218-846-7310

Permit # Date Inspected

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

- Attach permit information, designer drawings and as-builts 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*, call 1-800-876-8636 or go to http://shop.extension.umn.edu/

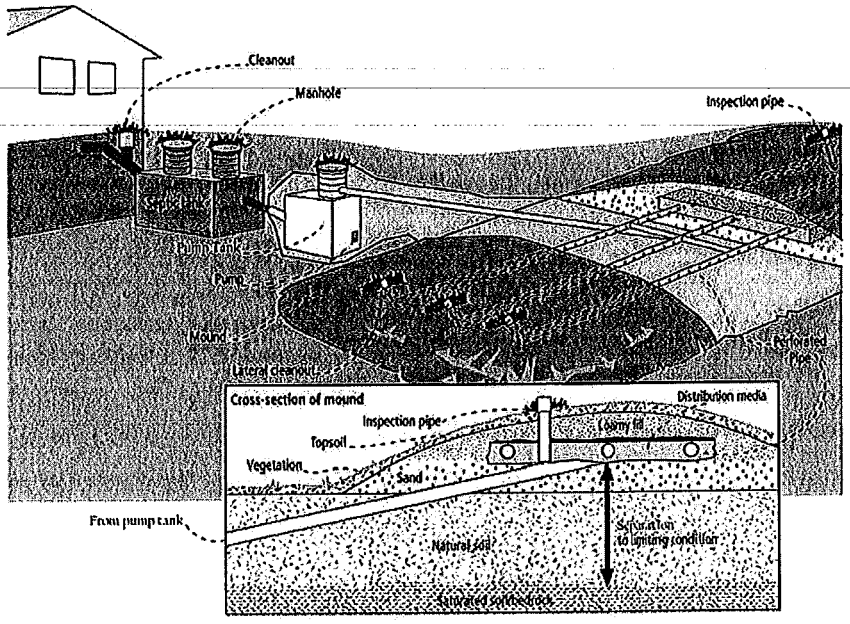
http://septic.umn.edu

Version 11/03/2010

UNIVERSITY OF MINNESOTA

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)

☑ System is subject to operating permit*

☐ System uses UV disinfection unit*

Type of advanced treatment unit _____

**Additional Management Plan required*

Dwelling Type

Number of bedrooms: 6 - 6 bed cabins

System capacity/ design flow (gpd): 1800

Anticipated average daily flow (gpd): 600

Comments 36 beds X 50 GPD per bed = 1800GPD

Business? X What type? Resort

Well Construction

Well depth (ft): _____

☑ Cased well Casing depth: _____

☐ Other (specify): _____

Distance from septic (ft): > 200' to drainfield

Is the well on the design drawing? ◉ Y ○ N

Septic Tank

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

Does tank have two compartments? ○ Y ○ N

☑ ~~Two~~ Four tanks *Tank volume:* 5630 *gallons*

☐ Tank is constructed of Concrete

☐ Effluent Screen *type:* _____

☑ Pump Tank 1660 gallons

☐ Effluent Pump *make/model:* Goulds WE07H

Pump capacity 50 GPM

TDH 35 Feet of head

☐ Alarm location Time Dose Power Post

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 34.8 ft x 192.9 ft

Rock bed size (width x length): 9 ft x 167 ft

Location of additional STA: NW Corner of parcel

☑ Cleanouts or inspection ports

☑ Surface water diversions

☐ Additional STA not available

Homeowner Management Tasks

These operation and maintenance activities are your responsibility. Use the chart on page 6 to track your activities.

Identify the service intervals recommended by your system designer and your local government. The tank assessment for your system will be the shortest interval of these three intervals. Your pumper/maintainer will determine if your tank needs to be pumped.

System Designer: check every 12 months

Local Government: check every _____ months

State Requirement: check every 36 months

My tank needs to be checked every _____ months

Seasonally or several times per year

- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Surfacing sewage.* 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, call your service professional. *Untreated sewage may make humans and animals sick.*
- *Alarms.* Alarms signal when there is a problem; contact your maintainer any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. Consider adding one after washing machine.
- *Effluent screen.* If you do not have one, consider having one added the next time the tank is cleaned.

Annually

- *Water usage rate.* A water meter 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.
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your pumper/maintainer.

During each visit by a pumper/maintainer

- Ask if your pumper/maintainer is licensed in Minnesota.
- Make sure that your pumper/maintainer services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- 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. Professionals should refer to the O/M Manual for detailed checklists for tanks, pumps, alarms and other components. Call 800-322-8642 for more details.

- Written record provided to homeowner after each visit.

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 drainfield.)
- *Inspection pipes.* Replace damaged 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 operating properly.
- *Event counter or run time.* Check to see if there is an event counter or run time log for the pump. If there is one, calculate the water usage rate and compare to the anticipated average daily flow listed on Page 2.

Soil Treatment Area

- *Inspection pipes.* Check to make sure they are properly capped. Replace caps that are damaged.
- *Surfacing of effluent.* Check for surfaced effluent or other signs of problems.
- *Lateral flushing.* Check lateral distribution; if cleanouts exist, flush and clean as needed.
- *Ponding.* Check for ponding. Excessive ponding in at-grade and mound beds indicates problems.

All other components – inspect as listed here:

_____

_____

_____

Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	• Uses additional water. • Adds solids to the tank. • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Use of a garbage disposal is not recommended. • Minimize garbage disposal use. Compost instead. • To prevent solids from exiting the tank, have your tank pumped more frequently. • Add an effluent screen to your tank.
Washing machine	• Washing several loads on one day uses a lot of water and may overload your system. • Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.	• Choose a front-loader or water-saving top-loader, these units use less water than older models. • Limit the addition of extra solids to your tank by using a liquid or easily biodegradable detergents. • Install a ling filter after the washer and an effluent screen on your tank. • Wash only full loads. • Limit use of bleach-based detergents. • Think even – spread your laundry loads throughout the week.
2nd floor laundry	• The rapid speed of water entering the tank may reduce performance.	• Install an effluent screen in the septic tank to prevent the release of excessive solids to the soil treatment area. • Be sure that you have adequate tank capacity.
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 into a sump pump or directly out of the house. Do not route furnace recharge 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 likely overload the system.	

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										
Check annually:										
Water usage rate (monitor frequency____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

Notes: _____

Mitigation/corrective action plan: If flow exceeds system capacity, check for and repair any leaks into the system, including household plumbing fixtures. If system ponds or otherwise cannot handle flow, repair options include; adjust time dosing, adding pre-treatment, or expanding the system.

"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: Eric Larson Certification # 4611

Permitting Authority: Becker County

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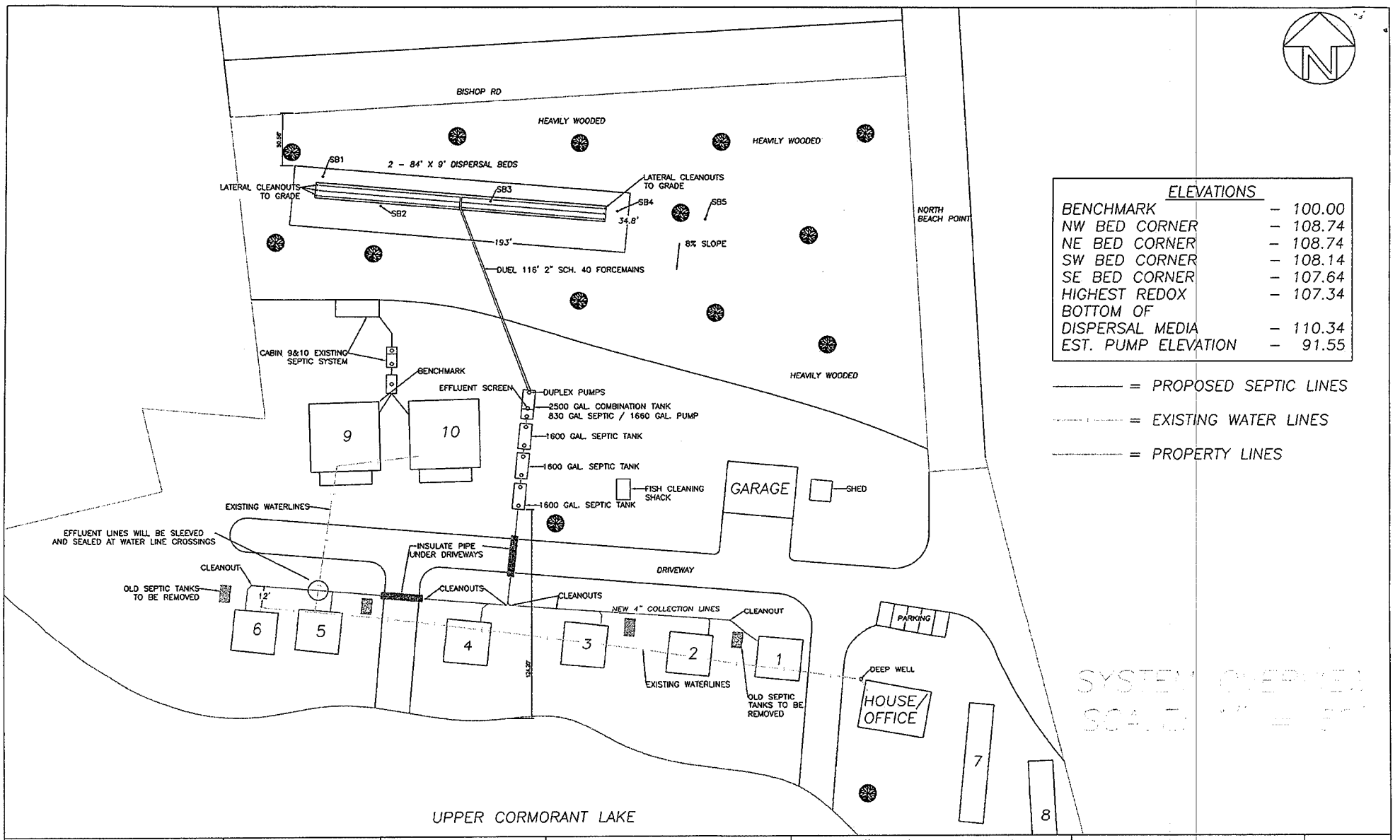


ELEVATIONS	
BENCHMARK	– 100.00
NW BED CORNER	– 108.74
NE BED CORNER	– 108.74
SW BED CORNER	– 108.14
SE BED CORNER	– 107.64
HIGHEST REDOX	– 107.34
BOTTOM OF DISPERSAL MEDIA	– 110.34
EST. PUMP ELEVATION	– 91.55

——— = PROPOSED SEPTIC LINES

- - - - = EXISTING WATER LINES

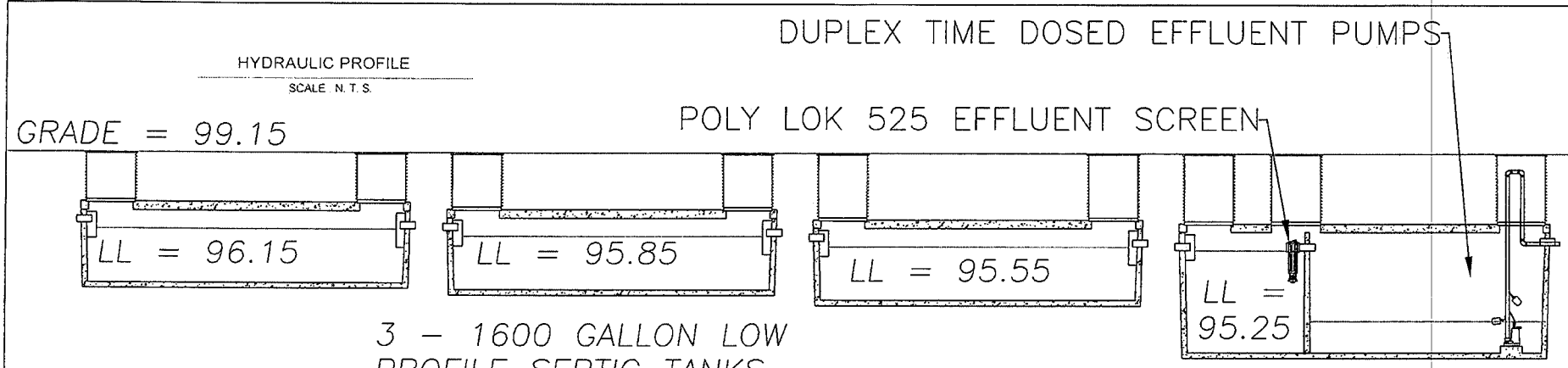
——— = PROPERTY LINES

SYSTEM OVERVIEW
SCALE: 1" = 50'

PREPARED FOR:	PROPERTY LOCATION	LEGAL DESCRIPTION	SEPTIC CHECK INC.		PAGE TITLE	SHEET NUMBER
End of the Road Resort	13471 North Beach Point Lake Park MN 56554	PID # 06111500G Becker County, Minnesota.	6349 KEYSTONE RD MILACA, MN 56353 (320)-983-2447 (FAX) (320)-983-2491	I hereby certify that this site plan was prepared by me or under my direct supervision. Brian Koski M. P. C. A. License # 2324 DATE 8/6/2012	SYSTEM OVERVIEW	1 OF 2

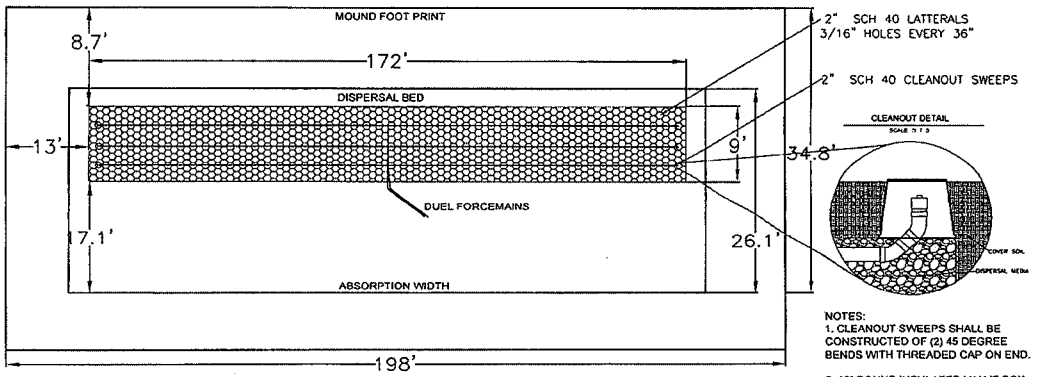
HYDRAULIC PROFILE

SCALE N. T. S.



3 – 1600 GALLON LOW PROFILE SEPTIC TANKS

2500 GALLON COMBINATION REVERSED. 830 SEPTIC TANK, 1660 DOSE TANK



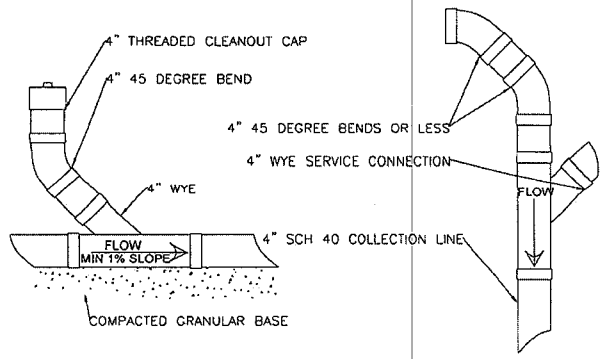
NOTES:
1. CLEANOUT SWEEPS SHALL BE CONSTRUCTED OF (2) 45 DEGREE BENDS WITH THREADED CAP ON END.

2. 10" ROUND INSULATED VALVE BOX SHALL BE BURIED FLUSH WITH GRADE.

MOUND DETAIL

SCALE : N. T. S.

NOTES: CLEANOUTS TO BE PLACED EVERY 100' MIN. MAINTAIN 1/8" PER FOOT SLOPE ON GRAVITY COLLECTION LINES.



COLLECTION LINE DETAIL

SCALE : N. T. S.

PREPARED FOR:	PROPERTY LOCATION	LEGAL DESCRIPTION			PAGE TITLE	SHEET NUMBER
End of the Road Resort	13471 North Beach Point Lake Park MN 56554	PID # 061115000 Becker County, Minnesota.	SEPTIC CHECK INC. 6549 KEYSTONE RD MILACA, MN 56353 (320)-983-2447 (FAX) (320)-983-2151	I hereby certify that this site plan was prepared by me or under my direct supervision. Eric Larson M. P. C. A. License # 2624 DATE 8/6/2012	SYSTEM DETAIL	2 OF 2

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

Application Approved by: Meba Motts Date: 9-5-12

Amount Paid 300.00 Receipt Number 101197 Permit Number 513689

NOTES:

****

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 SAME Alarm manufacturer ___

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

Number of bedrooms 1800 gpd

Component Information

Tank size 1600X3+2500 lift Tank manufacturer Brown & Wilbert

Drainfield size 1503 sq.ft.

Drainfield medium ___ Medium manufacturer 9' X 170' Rock bed

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'	+100'
Distance to Property Line	+10	+10
Distance to OHWof Lake	+100'	+100'
Distance to Pressure Line	~~N/A~~	~~N/A~~
Distance to Wetland/Protected Water		

Date System Installed 9/19/12 **Installer** Septic Check **Inspector** Lauren Stoll

****

****

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.

Lauren Stoll — Signature

ISTS inspector — Title

9/19/12 — 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

RECEIVED
MAY 10 2006
ZONING

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 R06111S000
(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 9 Township 138 Range 43 Township Name Cormorant
Lake Name Upper Cormorant Lake Classification RD
Legal Description: All of Sub Division

Project Address: 13471 North Beach Point Cabins 9 + 10

2. **PROPERTY OWNER INFORMATION** (as it appears on the tax statement, purchase agreement or deed).
Owner's First Name Steve Owner's Last Name Hedlund
Mailing Address 13471 North Beach Point City, State, Zip Lake Park
Phone Number 532-2365

3. **DESIGNER/INSTALLER INFORMATION**
Designer Name Rick Renner Company Name Renner Excavating License # 2567
Address 14306 Co Hwy 11 Phone Number 439-3514
Installer Name Same Company Name _____ License # _____
Address _____ Phone Number _____

4. **SYSTEM DESIGN INFORMATION**
Date of Site Evaluation 4-19-06

EXISTING SYSTEM STATUS – Check One
_____ No existing system-new structure
_____ Cesspool/Seepage
X Failing (other than cesspool)
_____ Undersized
_____ Replacement or repair to existing

What will new system serve? Check one
_____ Dwelling
X Resort/Commercial
_____ Commercial (non resort)
_____ Other – explain below

Design Flow 336 Gallons Per Day
Number of Bedrooms _____
Garbage Disposal ____ Yes X No
Grinder Pump in House ____ Yes X No
Lift station in House ____ Yes X No

Well Depth > 50'
Depth of other wells within 100 ft of system _____

Original Soil X Compacted Soil ____
Type of Soil Observation
____ Pit ____ Probe X Boring
Depth to Restricting Layer 24"
Maximum Depth of System Mound

Size of All Tanks to Be installed
_____ gal Septic Tank
330 gal Lift Station
_____ gal Holding Tank
_____ gal Other Tanks
existing 1250

Type of Drainfield Medium to be used
_____ Chamber
_____ H10 _____ EQ36
X Drainfield Rock
12" Rock Depth
_____ Gravelless
_____ Experimental
_____ No Drainfield

Type of Alarm Out Door Electric
Size of Lift Pump .4 hp
Size of Lift Line 2"

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

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

SETBACKS	TANK	DRAINFIELD
Distance to Well	> 75'	> 75'
Distance to Building	> 20'	> 20'
Distance to Property Line	> 30'	> 30'
Distance to OHW	> 84"	> 84"
Distance to Pressure Line	> 20'	> 30'

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

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0-12"	Top Soil	10yr 2/2	Blocky		0-10"	Top Soil	10yr 2/2	Blocky
12"-24"	clay loam	10yr 4/4	Blocky		10"-30"	clay loam	10yr 4/4	Blocky
24"-47"	water				30"-48"	water		
47"-84"					48"-84"			

5. **DESIGNER'S CERTIFIED STATEMENT**

I, Rick Renner (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).

Rick Renner
Signature of Designer

5-9-06
Date

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

Application Approved by: Kelli Mols Date: 5-10-06
Amount Paid 100 Receipt Number 104486 338612 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.

Paul A Stahl
Signature

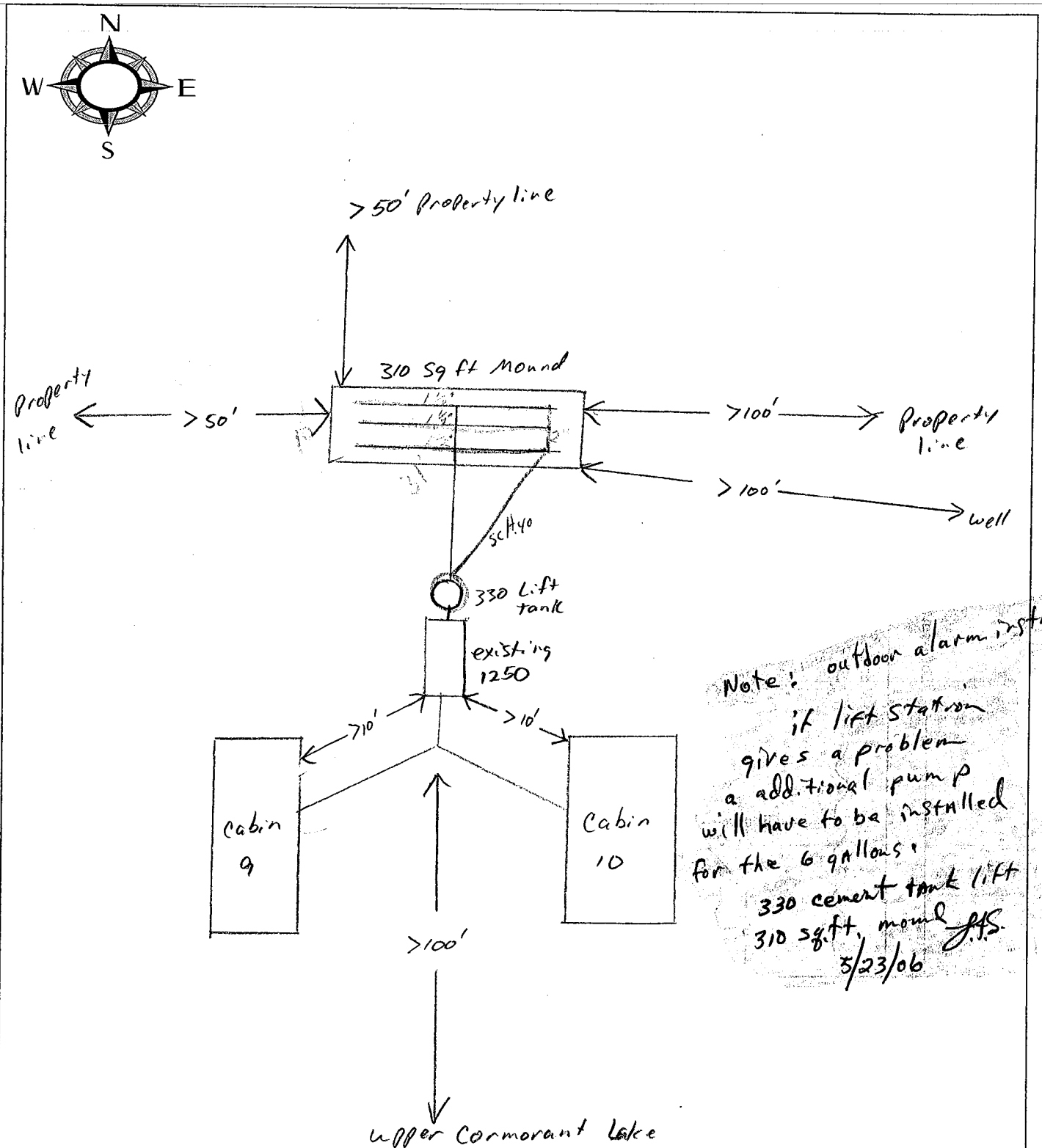
FSTS inspector
Title

5/23/06
Date

(Certificate of Compliance is not valid unless signed by a Registered Qualified Employee)
Date System Installed 5/23/06 Inspected by Paul A Stahl

SITE PLAN

I hereby agree to have flags, lathes, or ribbons in place for inspection by date: _____
I understand that Becker County will not issue the permit until staking has been approved.
Signature _____



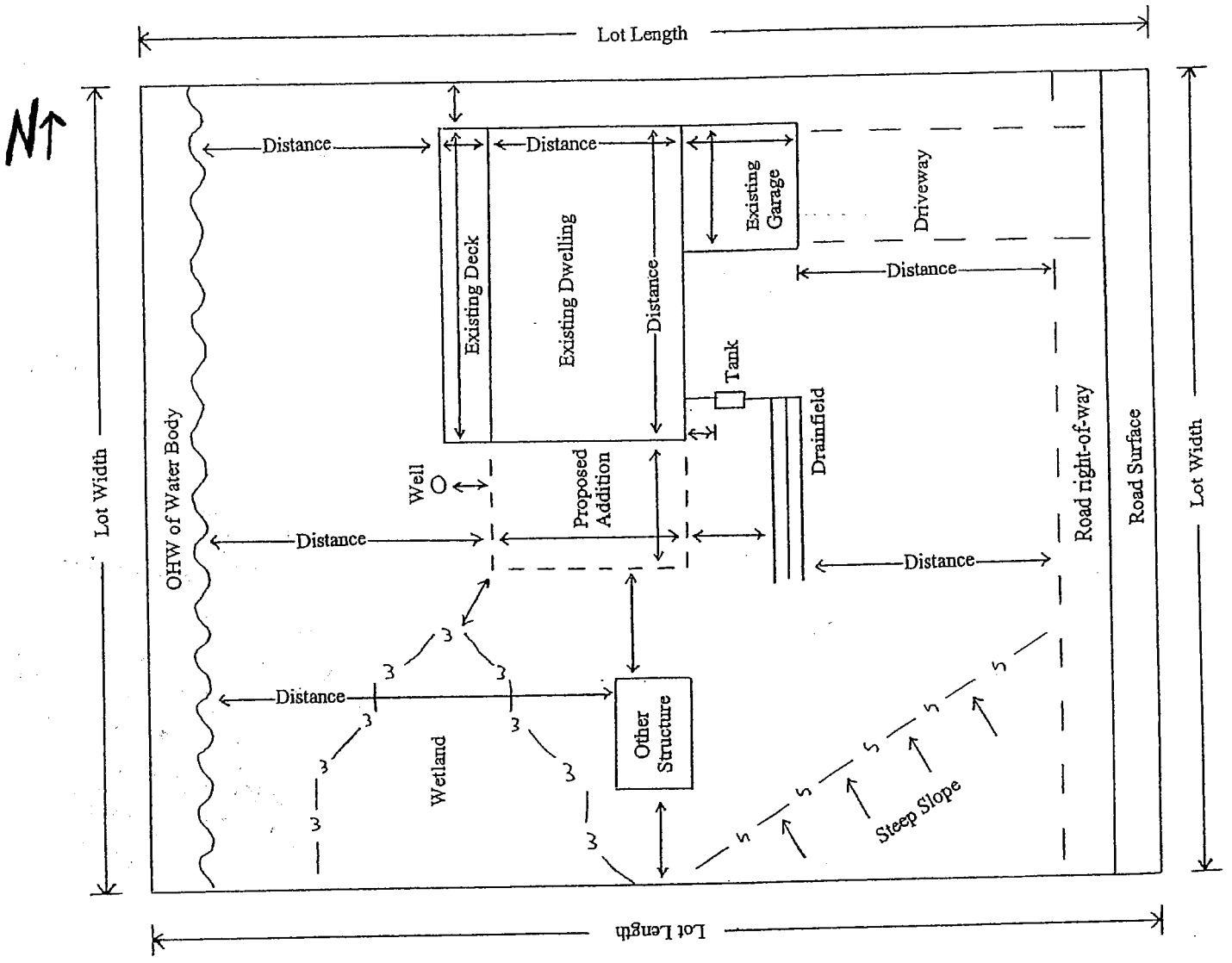
Note: outdoor alarm installed if lift station gives a problem a additional pump will have to be installed for the 6 gallons.
330 cement tank lift
310 sq.ft. mound J.F.S.
5/23/06

I hereby certify and agree that the above sketch accurately represents the work to be done in conjunction with this permit.

Rick Remer Date 5-9-06

Applicant or Agent

SITE PLAN EXAMPLE



Steve Hedlund
End of Road Resort

Mound Design Worksheet (For flows up to 1200 gpd)

All boxed rectangles must be entered, the rest will be calculated.

A. FLOW

Estimated: 366 gpd *(see figure A-1)*
or measured: ____ x 1.5 (safety factor) = 0 gpd

B. SEPTIC TANK LIQUID VOLUMES

Septic tank capacity: 1250 gallons *(see figure C-1)*

4 people per cabin

42 Gpd per person

C-1 Septic Tank Capacity in Gallons

Number of Bedrooms	Minimum Capacity	Capacity with Garb. Disp.	Capacity with Disp. and Lift
2 or less	750	1125	1500
3 or 4	1000	1500	2000
5 or 6	1500	2250	3000
7, 8 or 9	2000	3000	4000

C. SOILS *(Site evaluation data)*

1. Depth to restricting layer= 2 feet
2. Depth of percolation tests = 12 *inches*
3. Texture: clay loam
4. Soil loading rate *(see Figure D-33)* 0.24 gpd/ ft^2
   Percolation rate: 65 MPI
5. % Land Slope: 3 %

D. ROCK LAYER DIMENSIONS

1. Multiply average design flow (A) by 0.83 to obtain required area of rock layer: Item A x 0.83=
   366 gpd x 0.83 ft^2/gpd = 303.8 ft^2

2. Determine rock layer width = 0.83 ft^2/gpd x Linear Loading Rate (LLR) (see LLR chart)
   0.83 ft^2/gpd x 4 = 10.0 ft

LLR Chart	
Perk Rate	LLR
<120 MPI	<=12
>=120 MPI	<=6

3. Length of rock layer = area divided by width =
   303.78 ft^2 / 10 feet = 30.4 feet

E. ROCK VOLUME

1. Multiply rock area by rock depth to get cubic feet of rock
   303.78 X 1 ft = 303.8 ft^3

2. Divide ft^3 by 27 ft^3/yd^3 to get cubic yards
   303.8 ft^3 / 27 = 11.3 yd^3

3. Multiply cubic yards by 1.4 to get weight of rock in tons;
   11.3 yd^3 X 1.4 ton/yd^3 = 15.8 tons

F. ABSORPTION WIDTH

1. Absorption width equals absorption ratio (see Figure D-33) times rock layer width
   5 x 10.0 ft = 50.0 ft

G. MOUND SLOPE WIDTH & LENGTH (Greater than 1%)

1. Downslope absorption width = absorption width minus rock layer width

50 feet - 10 feet = 40 feet

2. Calculate mound size

UPSLOPE

a. Determine depth of clean sand at upslope edge of rock layer = 3 feet minus distance to restricting layer(C1)

3 ft - 2 ft = 1 feet

b. Mound height at the upslope edge of rock layer = depth of clean sand for separation (G2a) at upslope edge plus depth of rock layer (1 foot) to depth of cover (1 foot)

1 ft + 1ft + 1 ft = 3 feet

c. Upslope berm multiplier based on land slope *(see figure D-34)*

Select berm multiplier of 2.83

d. Upslope width = berm multiplier(G2c) times upslope mound height(G2b):

2.83 x 3 ft = 8.5 feet

DOWNSLOPE

e. Drop in elevation = rock layer width (D2) times percent landslope(C5) / 100

10 ft x 3 % / 100 = 0.3 feet

f. Downslope mound height = depth of clean sand for slope difference (G2e) at downslope rock edge plus the mound height at the upslope edge of rock layer (2b)

0.30 ft + 3 ft = 3.3 feet

g. Downslope berm multiplier based on percent land slope (see Figure D-34) 2.75

h. Downslope width = downslope multiplier(G2g) times downslope mound height(G2f)

2.75 x 3.3 = 9.1 feet

i. Select greater of G1 and G2h as the downslope width 40.0 feet

j. Total mound width is the sum of upslope (G2d) width plus rock layer width (D2) plus downslope width (G2i)

8.5 ft + 10.0 ft + 40.0 ft = 58.5 feet

k. Total mound length is the sum of upslope width (G2d) plus rock layer length (D3) plus upslope width (G2d)

8.5 ft + 30.4 ft + 8.5 ft = 47.4 feet

Final Dimensions (slope >1%)	58.5 ft x 47.4 ft

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

_____ (signature) _____ (license #) _____ (date)