

Septic 2002 07.0310.000

PERMIT MUST BE
POSTED AT THE
CONSTRUCTION SITE

Becker County Plar
835 Lake Ave, P O
Detroit Lakes, MN
Phone (218)-846-7314; Fax (218)-846-7266



070310000

Onsite Septic System Site Evaluation/Design Tax Parcel Number 607-0310.000 911 Address 14210 Leisure Lane

Legal Description: Serenity Shores Sub Div Blk 2 Lot 4 Section 34 TWP 140 Range 49

Lake Name N/A Lake Classification N/A Township Name Cuba

Owner's Name Loren Jettvig Address P.O. Box 339

City Hawley, MN State/Zip 56549 Phone Number 218-937-5752

Number of Bedrooms 3 Well Casing Depth Proposed Deep well Garbage Disposal (Yes) (No)
Design Flow 450 GPD Depth of other Wells within 100 ft of system N/A Grinder Pump/Lift Station In House (Yes) (No)

Type of Observation: Probe Pit Boring
Original Soil (Yes) (No) Compacted Soil (Yes) (No) Proposed Design
Depth to Restricting Layer 30" () Replace Septic Tank
Maximum of Depth of System MOUND (X) Septic Tank/Drainfield
Perc Rate 31 Soil Sizing Factor 2.0 () Drainfield Only
 () Holding Tank
 (X) Lift Station () Standard (gravelless/chamber)
 () Standard (rock depth _____)
 () Standard Bed
 (X) Mound () At Grade
 () Pressurized Bed

SOIL BORING LOG

DEPTH (INCHES)	TEXTURE	COLOR & MUNSELL NO.	STRUCTURE
0-8	Sandy Loam	TOP Soil	BLOCKY PLATY PRISMATIC NONE
8-30"	silt loam	2.5Y 5/3	BLOCKY PLATY PRISMATIC NONE
30"	matthies		BLOCKY PLATY PRISMATIC NONE
			BLOCKY PLATY PRISMATIC NONE

SOIL BORING LOG

DEPTH (INCHES)	TEXTURE	COLOR & MUNSELL NO.	STRUCTURE
0-7	Sandy Loam	TOP soil	BLOCKY PLATY PRISMATIC NONE
8-18"	silt loam	2.5Y 6/3	BLOCKY PLATY PRISMATIC NONE
18-30"	silt loam	2.5Y 5/4	BLOCKY PLATY PRISMATIC NONE
30"	matthies		BLOCKY PLATY PRISMATIC NONE

Type of alarm Device on lift Station or Holding tank Flac in House

Attach perc test Information if Required

Name and Address of Designer Dan Schluender Phone 947-6247

MPCA Number 418 Date of Site Evaluation 6-12-02 Signature of Designer Dan Schluender

Name of Installer (if different from Designer) Todd Boit MPCA Number _____

FOR USE BY BECKER COUNTY ENVIRONMENTAL SERVICES DEPARTMENT ONLY

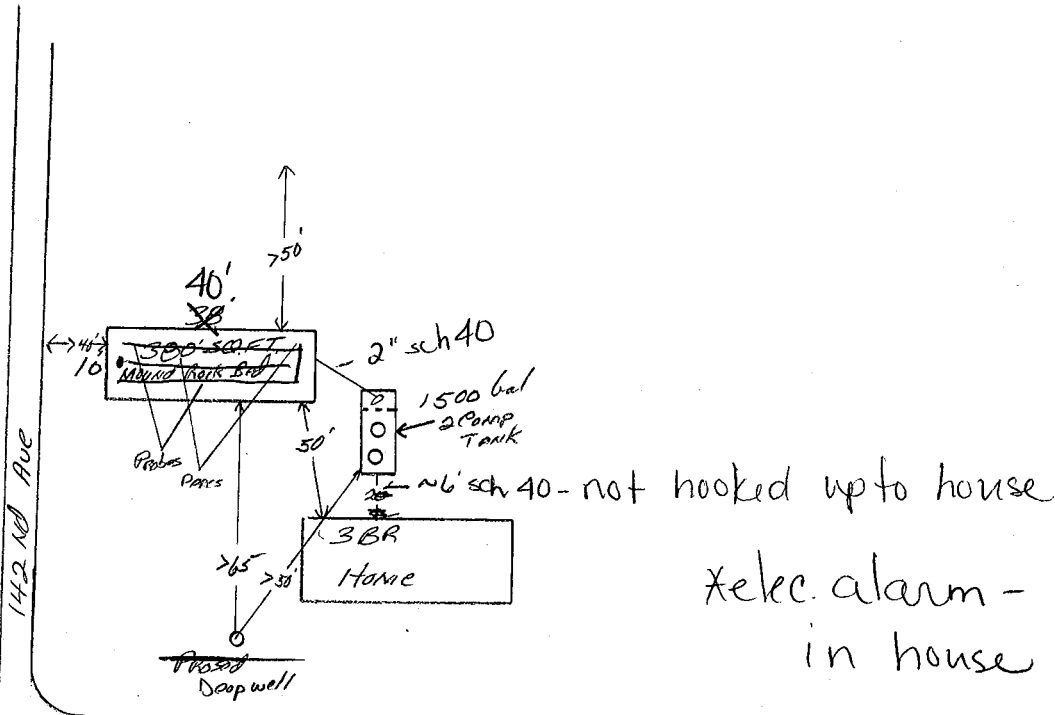
*** Any changes to the permit must first be approved by Becker County Planning & Zoning. No system shall be covered up without inspection by Becker County Planning & Zoning.
*** Inspections must be scheduled at least 24 hours prior to time requested.

Date Received 7-5-02 Application Fee 75⁰⁰ State Surcharge 0 Total 75⁰⁰

[] Application is hereby denied
[X] Application is hereby granted to LOREN JETTIG to install an individual septic system according to the specifications of the site evaluation, and design submitted to the Becker County Environmental Services Office. By Order of: Nancy Young Signature of Becker County Qualified Employee Date Permit Issued 7-5-02 Permit Number 17814
This permit expires on 7-5-02

The site plan must be drawn to dimension or to scale:

- Dimensions of Lot
- Existing & Proposed Buildings
- Easements & setbacks
- Scale - One inch = _____ ft
- Well & Water Line Locations within 100 ft of System
- Distance from Property Lines
- Tank Access Route
- Location of any Unsuitable Soil
- Distance from OIWM
- Distance from buildings
- Soil Borings & Per Test Locations
- Alternate Drainfield Location



	Tank (estimated)	Tank (actual)	Drainfield (estimated)	Drainfield (actual)
Distances to Well	>50'	+50'	>65'	+50'
Distance to Building	20'	+10'	50'	+20'
Distance to Property Line	>50'	+10'	>40'	+10'
Distance to Pressure Line	N/A	+20'	N/A	+20'
Distance to Ordinary High Water	N/A	N/A	N/A	N/A

B/W

400 sq ft Tank size 1500 gal 2-comp
 Lift station size 500 gal
 Drainfield size 300 sq ft mound
 Pump HP 1/2 HP
 Date Installed 7-5-02

FOR USE BY BECKER COUNTY ENVIRONMENTAL SERVICES DEPARTMENT ONLY

CERTIFICATE OF COMPLIANCE

() Certificate Is Hereby Denied
 (✓) 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.

Signature Nancy Young Title Zoning Inspector Date 7-5-02
 (Certificate of Compliance is not valid unless signed by a Registered Qualified Employee)

MOUND DESIGN WORKSHEET


(For Flows up to 1200 gpd)

Septic 07.0310.000 2002

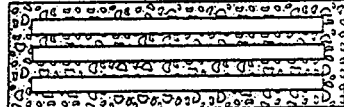
<p>A. FLOW Estimated <u>450</u> gpd or measured _____ x 1.5 = _____ gpd.</p> <p>B. SEPTIC TANK LIQUID VOLUMES <u>1000</u> gallons</p> <p>C. SOILS (refer to site evaluation)</p> <ol style="list-style-type: none"> Depth to restricting layer = _____ inches <u>2</u> feet Depth of percolation tests = <u>12</u> inches Texture <u>silt loam</u> Percolation rate <u>31</u> mpi Land slope <u>4</u> % 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5">Estimated Sewage Flows in Gallons per day (gpd)</th> </tr> <tr> <th>Number of Bedrooms</th> <th>Type I</th> <th>Type II</th> <th>Type III</th> <th>Type IV</th> </tr> <tr> <td>2</td> <td>300</td> <td>225</td> <td>180</td> <td rowspan="8" style="text-align: center; vertical-align: middle;">60% of the values in Type I, II or III columns</td> </tr> <tr> <td>3</td> <td>450</td> <td>300</td> <td>218</td> </tr> <tr> <td>4</td> <td>600</td> <td>375</td> <td>256</td> </tr> <tr> <td>5</td> <td>750</td> <td>450</td> <td>294</td> </tr> <tr> <td>6</td> <td>900</td> <td>525</td> <td>332</td> </tr> <tr> <td>7</td> <td>1050</td> <td>600</td> <td>370</td> </tr> <tr> <td>8</td> <td>1200</td> <td>675</td> <td>408</td> </tr> </table>	Estimated Sewage Flows in Gallons per day (gpd)					Number of Bedrooms	Type I	Type II	Type III	Type IV	2	300	225	180	60% of the values in Type I, II or III columns	3	450	300	218	4	600	375	256	5	750	450	294	6	900	525	332	7	1050	600	370	8	1200	675	408
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D. ROCK LAYER DIMENSIONS

- Multiply flow rate by 0.83 to obtain required area of rock layer: $A \times 0.83 =$
 $\frac{450}{\text{gpd}} \times 0.83 \text{ sq. ft./gpd} = \underline{380} \text{ sq. ft.}$
- Select width of rock layer (max 10' if <120 mpi max 5') = 10 ft.
- Length of rock layer = area ÷ width =
 $\frac{380 \text{ sq. ft.}}{10 \text{ ft.}} = \underline{38} \text{ ft.}$



Width 10 ft
<120mpi <10'
>120mpi <5'



Length 38 ft

E. ROCK VOLUME

- Multiply rock area by rock depth to get cubic feet of rock; $\underline{380} \text{ sq. ft.} \times \underline{1} \text{ ft.} = \underline{380} \text{ cu. ft.}$
- Divide cu. ft. by 27 cu. ft./cu. yd. to get cubic yards;
 $\frac{380 \text{ cu. ft.}}{27} = \underline{14} \text{ cu. yd.}$
- Multiply cubic yards by 1.4 to get weight of rock in tons; $\underline{14} \text{ cu. yd.} \times 1.4 \text{ ton/cu. yd.} = \underline{20} \text{ tons.}$

F. ABSORPTION WIDTH

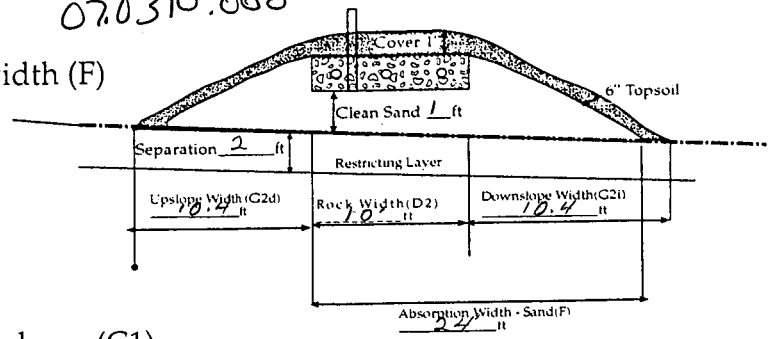
- Percolation rate in top 12 inches of soil is 31 mpi
 Texture silt loam
- Select allowable soil loading rate from table;
.50 gpd/ft²
- Calculate adsorption width ratio by dividing rock layer loading rate of 1.20 gpd/ft² by allowable soil loading rate;
 $\frac{1.20 \text{ gpd/ft}^2}{.5 \text{ gpd/ft}^2} = \underline{2.4}$
- Multiply adsorption width ratio by rock layer width to get required adsorption width;
 $\underline{2.4} \times \underline{10} \text{ ft} = \underline{24} \text{ ft}$

Absorption Width Sizing Table			
Percolation Rate in Minutes per Inch (MPI)	Soil Texture	Gallons per day per square foot	Ratio of Absorption width to Rock Layer Width
Faster than 0.1	Coarse Sand	1.20	1.00
0.1 to 5	Sand	1.20	1.00
0.1 to 5	Fine Sand	0.60	2.00
6 to 15	Sandy Loam	0.79	1.52
16 to 30	Loam	0.60	2.00
31 to 45	Silt Loam	0.50	2.40
46 to 60	Clay Loam	0.45	2.67
60 to 120	Clay	0.24	5.00
Slower than 120	Clay	0.20	6.00

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

Septic tank
07.0310.000

1. Downslope absorption width = absorption width (F) minus rock layer width (D2)
 $24 \text{ ft} - 10 \text{ ft} = 14 \text{ ft}$



2. Calculate mound size
 UPSLOPE

a. Depth of clean sand fill at upslope edge of rock layer = 3 ft minus the distance to restricting layer (C1)
 $3 \text{ ft} - 2 \text{ ft} = 1 \text{ ft}$

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 ft) plus depth of cover (1 ft)
 $1 \text{ ft} + 1 \text{ ft} + 1 \text{ ft} = 3 \text{ ft}$

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

d. Upslope width = berm multiplier (G2c) x upslope mound height (G2b):
 $3.45 \times 3 \text{ ft} = 10.4 \text{ ft}$

DOWNSLOPE

e. Drop in elevation = rock layer width (D2) x percent landslope (C5) ÷ 100
 $10 \text{ ft} \times 4\% \div 100 = .04 \text{ ft}$

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 (G2b)
 $.04 \text{ ft} + 3 \text{ ft} = 3.4 \text{ ft}$

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

h. Downslope width = downslope multiplier (G2g) times downslope mound height (G2f)
 $4.8 \times 3.4 \text{ ft} = 16 \text{ ft}$

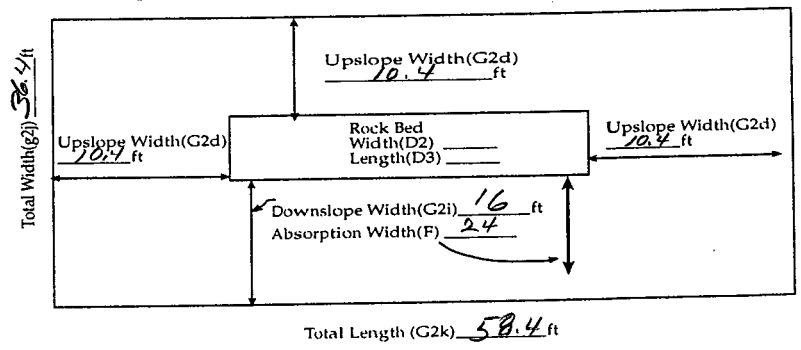
i. Select the greater of G1 and G2h as the downslope width: 16 ft

j. Total mound width is the sum of upslope width (G2d) width plus rock layer width (D2) plus downslope width (G2i)
 $10.4 \text{ ft} + 10 \text{ ft} + 16 \text{ ft} = 36.4 \text{ ft}$

k. Total mound length is the sum of upslope width (G2d) plus rock layer length (D3) plus upslope width (G2d)
 $10.4 \text{ ft} + 38 \text{ ft} + 10.4 \text{ ft} = 58.8 \text{ feet}$

D-34: SLOPE MULTIPLIER TABLE

Land Slope, in %	UPSLOPE multipliers for various slope ratios							DOWNSLOPE multipliers for various slope ratios				
	3:1	4:1	5:1	6:1	7:1	8:1	3:1	4:1	5:1	6:1	7:1	
0	3.0	4.0	5.0	6.0	7.0	8.0	3.0	4.0	5.0	6.0	7.0	
1	2.91	3.85	4.76	5.66	6.54	7.41	3.09	4.17	5.26	6.38	7.53	
2	2.83	3.70	4.54	5.36	6.14	6.90	3.19	4.35	5.56	6.82	8.14	
3	2.75	3.57	4.35	5.08	5.79	6.45	3.30	4.54	5.88	7.32	8.86	
4	2.68	3.45	4.17	4.84	5.46	6.06	3.41	4.76	6.25	7.89	9.72	
5	2.61	3.33	4.00	4.62	5.19	5.71	3.53	5.00	6.67	8.57	10.77	
6	2.54	3.23	3.85	4.41	4.93	5.41	3.66	5.26	7.14	9.38	12.07	
7	2.48	3.12	3.70	4.23	4.70	5.13	3.80	5.56	7.69	10.34	13.73	
8	2.42	3.03	3.57	4.05	4.49	4.88	3.95	5.88	8.33	11.54	15.91	
9	2.36	2.94	3.45	3.90	4.30	4.65	4.11	6.25	9.09	13.04	18.92	
10	2.31	2.86	3.33	3.75	4.12	4.44	4.29	6.67	10.00	15.00	23.33	
11	2.26	2.78	3.23	3.61	3.95	4.26	4.48	7.14	11.11	17.65	30.43	
12	2.21	2.70	3.12	3.49	3.80	4.08	4.69	7.69	12.50	21.43	43.75	



Final Dimensions:
36.4 X 58.8

I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.
Dan D. Danduff (signature) 418 (license #) 6-11-02 (date)

- PERCOLATION TEST SHEET -

Test hole location JRN Field Hole # 142 Date test hole was prepared: 6-11-02

Depth of hole bottom: 14 inches Diameter of hole: 5 inches

Soil Data from test hole:

depth, inches	soil texture:	soil color
_____	_____	_____
_____	_____	_____
_____	_____	_____

Method of scratching sidewall: Bpd w/ Nails Depth of pea size gravel in bottom of hole: 2 inches

Date and hour of initial water filling: 10 AM 6-11 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: Dan Schlauderer Percolation test started at 2 (am pm)

Maximum water depth above hole bottom during test: 0 inches

TIME	INTERVAL (MINUTES)	WATER DEPTH	WATER DROP (fraction)	WATER DROP (decimal)	PERC RATE CALCULATION	conversions
---	START <u>25</u>	<u>0</u> <u>7 1/8</u>	<u>7/8</u>	<u>.88</u>	$\frac{25}{\text{TIME}} \div \frac{.88}{\text{DROP (Decimal)}} = \frac{28.4}{\text{PERC}}$ A	1/16 = .06 1/8 = .13 3/16 = .19
---	REFILL <u>30</u>	<u>0</u> <u>7</u>	<u>1</u>	<u>1</u>	$\frac{30}{\text{TIME}} \div \frac{1}{\text{DROP (Decimal)}} = \frac{30}{\text{PERC}}$ B	1/4 = .25 5/16 = .31
---	REFILL <u>35</u>	<u>0</u> <u>6 7/8</u>	<u>1 1/8</u>	<u>1.13</u>	$\frac{35}{\text{TIME}} \div \frac{1.13}{\text{DROP (Decimal)}} = \frac{30.9}{\text{PERC}}$ C	3/8 = .38 7/16 = .44
---	REFILL	---	---	---	$\frac{\text{TIME}}{\text{DROP (Decimal)}} = \frac{\text{PERC}}{\text{PERC}}$ D	1/2 = .5
---	REFILL	---	---	---	$\frac{\text{TIME}}{\text{DROP (Decimal)}} = \frac{\text{PERC}}{\text{PERC}}$ E	9/16 = .56 5/8 = .63
---	REFILL <u>35</u>	<u>0</u> <u>6 7/8</u>	<u>1 1/8</u>	<u>1.13</u>	$\frac{35}{\text{TIME}} \div \frac{1.13}{\text{DROP (Decimal)}} = \frac{30.9}{\text{PERC}}$ F	11/16 = .69 3/4 = .75
---	REFILL <u>40</u>	<u>0</u> <u>6 3/4</u>	<u>1 1/4</u>	<u>1.25</u>	$\frac{40}{\text{TIME}} \div \frac{1.25}{\text{DROP (Decimal)}} = \frac{32}{\text{PERC}}$ G	13/16 = .81 7/8 = .88
---	REFILL <u>41</u>	<u>0</u> <u>6 3/4</u>	<u>1 1/4</u>	<u>1.25</u>	$\frac{41}{\text{TIME}} \div \frac{1.25}{\text{DROP (Decimal)}} = \frac{32.8}{\text{PERC}}$ H	15/16 = .94

Ten Percent Calculation *

A, B, C

Largest # of ABC - Smallest # of ABC = _____

Smallest # of ABC x 0.10 = _____

C, D, E

Largest # of CDE - Smallest # of CDE = _____

Smallest # of CDE x 0.10 = _____

E, F, G

Largest # of EFG - Smallest # of EFG = _____

Smallest # of EFG x 0.10 = _____

B, C, D

Largest # of BCD - Smallest # of BCD = _____

Smallest # of BCD x 0.10 = _____

D, E, F

Largest # of DEF - Smallest # of DEF = _____

Smallest # of DEF x 0.10 = _____

F, G, H

Largest # of FGH - Smallest # of FGH = _____

Smallest # of FGH x 0.10 = _____

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