



040114000

Septic System Application

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

PARCEL	
APP	SEPTIC
YEAR	
SCANNED	
LAKE	

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: 040114000

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 22 Township 141 Range 041 Township Name Callaway

Lake Name _____ Lake Classification _____

Legal Description: N 1/2 NW 1/4, SE 1/4 & NW 1/4 & NE 1/4 & SE 1/4

Project Address: 30462 Co Hwy 21 Callaway MN 56521

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

Owner's First Name Mark Owner's Last Name Weigel

Mailing Address 30462 Co Hwy 21 City, State, Zip Callaway MN 56521

Phone Number 651-402-1664

3. DESIGNER/INSTALLER INFORMATION

Designer Name Dan Thorson Company Name Nels Thorson Excavating Co License # 47

Address 22403 260th St Detroit Lakes MN Phone Number 218-841-1388

Installer Name Nels Thorson Company Name Nels Thorson Excavating Co License # 47

Address 22403 260th St Detroit Lakes MN Phone Number 218-439-3833

4. SYSTEM DESIGN INFORMATION

System Status

What will new system serve? Check one

- Vacant Lot-No existing system-new structure
- Replacement - structure removed and being rebuilt
- Failing -Replacement- cesspool/seepage pit or other
- Enlargement of system-Undersized
- Repairs Needed to existing
- Additional system on property
- Dwelling
- Resort/Commercial
- Commercial (Non-resort)
- Other -- explain below

25 April 16 Date of site evaluation

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

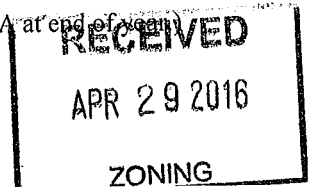
Well Depth >50'
Depth of other wells within 100 ft of system _____

Original Soil Compacted Soil _____
Type of Soil Observation
 Pit Probe Boring
Depth to Restricting Layer 30"
Maximum Depth of System Mound

Size of All Tanks to be installed
 gal Single Compartment Septic Tank gal Separate Lift Station
 1500 gal Compartmented Tank gal Holding Tank
 Pit Privy 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 MPCAs 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 375 sq ft ***

_____ Pressure Bed _____ sq ft ***

_____ Seepage Bed _____ sq ft ***

_____ At-grade _____ sq ft ***

_____ Alternative / _____ sq ft *** ***Attach Worksheets

Performance

Type of chamber _____

Depth of Rock _____

Alarm? Yes X No _____

Type of Alarm Electric

Size of Lift Pump .4

Size of Lift Line 1.5

PROPOSED SETBACKS

	TANK	DRAINFIELD
Distance to Well	<u> >100' </u>	<u> >100' </u>
Distance to Building	<u> 50' </u>	<u> 100' </u>
Distance to Property Line	<u> >10' </u>	<u> >10' </u>
Distance to OHW of Lake	<u> N/A </u>	<u> N/A </u>
Distance to Pressure Line	<u> N/A </u>	<u> N/A </u>
Distance to Wetland/Protected Water	<u> N/A </u>	<u> N/A </u>

Perc Rate _____ 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	BLK	Blocky		0'-12"	Loam	BLK	Blocky
12"-30"	Loam	2.5YR5/4	Blocky		12"-32"	Loam	2.5YR5/4	Blocky
30"		Redox			32"		Redox	

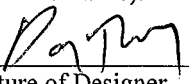
Depth	Texture	Color	Structure		Depth	Texture	Color	Structure

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


Signature of Designer

 28 April 2016
Date

COC 5-31-16

PARCEL	
APP	SEPTIC
YEAR	

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

Application Approved by: Hebe Moly Date: 5-2-16
 Amount Paid 150⁰⁰ Receipt Number 205190 Permit Number 017682

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 Electric Alarm manufacturer _____
 Lift pump in system? Yes No Pump manufacturer .4
 Number of bedrooms 3

Component Information

Tank size 1500 Tank manufacturer Brown
 Drainfield size 380 sq. ft. Medium manufacturer 10' x 38' mound
 Drainfield medium _____
 Drainfield medium size/depth _____

Soil Verification

Vertical separation verified for Boring #1 on _____ Depth 736"
 Vertical separation verified for Boring #2 on _____ Depth _____
 Vertical separation verified for Boring #3 on _____ Depth _____

Setback Verification

	TANK	DRAINFIELD
Distance to Well	<u>+50</u>	<u>+50</u>
Distance to Building	<u>+10</u>	<u>+20</u>
Distance to Property Line	<u>+10</u>	<u>+10</u>
Distance to OHW of Lake	<u>N/A</u>	<u>N/A</u>
Distance to Pressure Line	<u>N/A</u>	<u>N/A</u>
Distance to Wetland/Protected Water	<u>N/A</u>	<u>N/A</u>

Date System Installed 5/25/16 Installer Nels Thorson, EKC Inspector Laird A. 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.

Laird A. Stoll Signature ISTS Inspector Title 5/25/16 Date

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

Mound Design Worksheet (For flows up to 1200 gpd)

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

A. FLOW

Estimated 450 gpd (see figure A-1)
 or measured x 1.5 (safety factor) = 0 gpd

B. SEPTIC TANK LIQUID VOLUMES

Septic tank capacity 1000 gallons (see figure C-1)

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)

- Depth to restricting layer = 2.5 feet
- Depth of percolation tests = inches
- Texture Loam
- Soil loading rate (see Figure D-33) 0.6 gpd/ft²
- Percolation rate MPI
- % Land Slope 1 %

D. ROCK LAYER DIMENSIONS

- Multiply average design flow (A) by 0.83 to obtain required area of rock layer: Item A x 0.83 = 450 gpd x 0.83 ft²/gpd = 373.5 ft²
- Determine rock layer width = 0.83 ft²/gpd x Linear Loading Rate (LLR) (see LLR chart)
 0.83 ft²/gpd x 12 = 10.0 ft

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

- Length of rock layer = area divided by width = 373.5 ft² / 10 feet = 37.5 feet

E. ROCK VOLUME

- Multiply rock area by rock depth to get cubic feet of rock
373.5 X 1 ft = 373.5 ft³
- Divide ft³ by 27 ft³/yd³ to get cubic yards
373.5 ft³ / 27 = 13.8 yd³
- Multiply cubic yards by 1.4 to get weight of rock in tons;
13.8 yd³ X 1.4 ton/yd³ = 19.4 tons

F. ABSORPTION WIDTH

- Absorption width equals absorption ratio (see Figure D-33) times rock layer width
2 x 10.0 ft = 20.0 ft

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

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

$$\underline{20} \text{ feet} - \underline{10} \text{ feet} = \underline{10} \text{ feet}$$

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)

$$\underline{3} \text{ ft} - \underline{2.5} \text{ ft} = \underline{1} \text{ feet}$$

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)

$$1 \text{ ft} + 1 \text{ ft} + 1 \text{ ft} = \underline{3} \text{ feet}$$

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

Select berm multiplier of 3.85

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

$$\underline{3.85} \quad \times \quad \underline{3} \text{ ft} = \underline{11.6} \text{ feet}$$

DOWNSLOPE

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

$$\underline{10} \text{ ft} \quad \times \quad \underline{1} \% / 100 = \underline{0.1} \text{ feet}$$

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)

$$\underline{0.10} \text{ ft} \quad + \quad \underline{3} \text{ ft} = \underline{3.1} \text{ feet}$$

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

4.17

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

$$\underline{4.17} \quad \times \quad \underline{3.1} = \underline{12.9} \text{ feet}$$

i. Select greater of G1 and G2h as the downslope width 12.9 feet

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

$$\underline{11.6} \text{ ft} + \underline{10.0} \text{ ft} + \underline{12.9} \text{ ft} = \underline{34.4} \text{ feet}$$

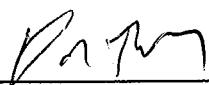
k. Total mound length is the sum of upslope width (G2d) plus rock layer length (D3)

plus upslope width (G2d)

$$\underline{11.6} \text{ ft} + \underline{37.5} \text{ ft} + \underline{11.6} \text{ ft} = \underline{60.6} \text{ feet}$$

Final Dimensions (slope >1%) 34.4 ft x 60.6 ft

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

 (signature) 47 (license #) 28 April 16

G. MOUND SLOPE WIDTH & LENGTH (Less than or equal to 1%)

1. Absorption width (F): 20.0 feet

2. Calculate minimum mound size

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

$$\underline{3.0} \text{ ft} - \underline{2.5} \text{ ft} = \underline{0.5} \text{ feet}$$

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

plus depth of rock layer (1 foot) plus depth of cover (1 foot)

$$\underline{0.5} \text{ ft} + 1\text{ft} + 1\text{ft} = \underline{2.5} \text{ feet}$$

c. Berm width = upslope mound height(G2b) times 4 (4 is recommended, but could be 3-12)

$$\underline{2.5} \times 4 = \underline{10.0} \text{ feet}$$

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm width (G2c)

$$\underline{10.0} \text{ feet} + \underline{10.0} \text{ feet} + \underline{10.0} \text{ feet} = \underline{30.0} \text{ feet}$$

e. Additional width necessary for absorption = the absorption width (F) minus the landscape width (G2d)

$$\underline{20.0} \text{ feet} - \underline{30.0} \text{ feet} = \underline{-10.0} \text{ feet}$$

if number is negative (<0) skip to g

f. Final berm width = additional width (G2e) plus the berm width (G2c)

$$\underline{-10} \text{ feet} + \underline{10} \text{ feet} = \underline{0} \text{ feet}$$

g. Total mound width is the sum of berm width(G2f or G2c) plus rock layer width (D2)

plus berm width (G2f or G2c)

$$\underline{10.0} \text{ ft} + \underline{10.0} \text{ ft} + \underline{10.0} \text{ ft} = \underline{30.0} \text{ feet}$$

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or G2c)

$$\underline{10.0} \text{ ft} + \underline{37.5} \text{ ft} + \underline{10.0} \text{ ft} = \underline{57.5} \text{ feet}$$

i. Setbacks from the rockbed are calculated as follows: the absorption width (F) minus the rock bed width

(D2) divided by 2: (20.0 feet - 10.0 feet) / 2 = 5.0 feet

Final Dimensions (slope < 1%)	30.0	ft	x	57.5	ft
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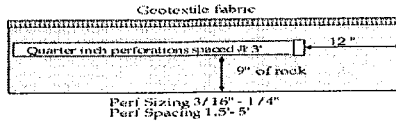
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Don Tim (signature) 47 (license #) 28 April 16 (date)

PRESSURE DISTRIBUTION SYSTEM

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

- Select number of perforated laterals: 3
- Select perforation spacing = 3 ft
- Since perforations should not be placed closer than 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length
 $\text{38} - 2 \text{ ft} = \text{36} \text{ ft}$



- Determine the number of spaces between perforations.
 Divide the length (3) by perforation spacing (2) and round down to nearest whole number.
 Perforation spacing = $\text{36} \text{ ft} / \text{3} \text{ ft} = \text{12}$
- Number of perforations is equal to one plus the number of perforation spaces (4).
 * Check figure E-4 to assure the number of perforations per lateral guarantees < 10% discharge variation.
 $\text{12} \text{ spaces} + 1 = \text{13} \text{ perforations/lateral}$

E-4 Maximum Number of 1/4 inch perforations per lateral to guarantee <10% discharge variation				
Perforation Spacing	Perforation Spacing			
	feet	1 inch	1.25 inch	1.5 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6 Perforation Discharge in GPM			
Head (feet)	Perforations diameter (inches)		
	3/16	7/32	1/4
1 ^a	0.42	0.56	0.74
2 ^b	0.59	0.80	1.04
5	0.94	1.26	1.65

a. Use 1.0 foot for single-family homes.
 b. Use 2.0 feet for anything else

- A. Total number of perforations = perforations per lateral (5) times number of laterals (1).
 $\text{13} \text{ perfs/lat} \times \text{3} \text{ laterals} = \text{39} \text{ perforations}$

B. Calculate the square footage per perforation.
 Recommended value is 6-10 sqft/perf. Does not apply to at-grades.

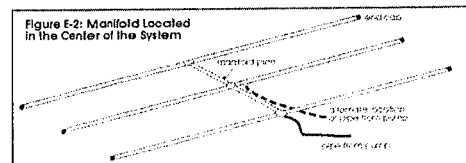
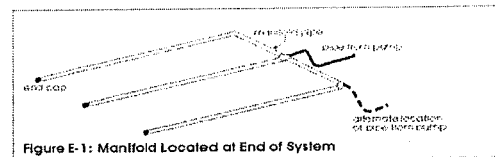
- Rock bed area = rock width (ft) x rock length (ft)
 $\text{10} \text{ ft} \times \text{38} \text{ ft} = \text{380} \text{ ft}^2$
- Square foot per perforation = Rock Bed Area / number of perfs (6)
 $\text{380.0} \text{ ft}^2 / \text{39} \text{ perfs} = \text{9.7} \text{ ft}^2 / \text{perf}$

- Determine required flow rate by multiplying the total number of perforations (6A) by flow per perforations (see figure E-6)
 $\text{39} \text{ perfs} \times \text{0.74} \text{ gpm / perfs} = \text{28.9} \text{ gpm}$

- If laterals are connected to header pipe as shown in Figure E-1, to select minimum required lateral diameter; enter figure E-4 with perforation spacing (2) and number of perforations per lateral (5).

Select minimum diameter for perforated laterals = 1.5 inches

- If perforated lateral system is attached to manifold pipe near the center, like Figure E-2, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral = 0.75 inches.



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

[Signature] (signature) 47 (license #) 28 April 16 (date)

PUMP SELECTION PROCEDURE

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

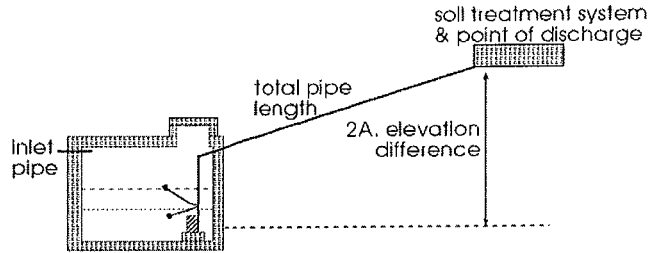
1. Determine pump capacity:

A. Gravity Distribution

1. Minimum required discharge is 10 gpm
 2. Maximum suggested discharge is 45 gpm
- For other establishments at least 10% greater than the water supply rate, but no faster than the rate at which effluent will flow out of the distribution device.

B. Pressure Distribution - see pressure design worksheet

Selected Pump Capacity: 29 gpm



2. Determine head requirements:

A. Elevation difference between pump and point of discharge.

15 feet

B. Special head requirement? (See Figure - Special Head Requirements)

5 feet

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft

C. Friction loss

1. Select pipe diameter 1.5 in
2. Enter Figure E-9 with gpm (1A or B) and pipe diameter (C1)

Read friction loss in feet per 100 feet from Figure E-9

Friction loss= 8.91 ft/ 100 ft of pipe

3. Determine total pipe length from pump discharge to soil system discharge point.

Estimate by adding 25 percent to pipe length for fitting loss.

Equivalent pipe length times 1.25 = total pipe length

25 ft x 1.25 = 31.25 feet

4. Calculate total friction loss by multiplying friction loss (C2)

by the equivalent pipe length (C3) and divide by 100.

FL= 8.91 ft/100ft X 31.25 ft / 100= 2.8 feet

D. Total head requirement is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4).

15 ft + 5 ft + 2.8 ft

Total Head: 22.8 feet

E-9 Friction Loss in Plastic Pipe per 100 ft			
Flow Rate	nominal pipe diameter		
	1.5"	2.0"	3"
gpm	1.5"	2.0"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.55	0.23
35	6.96	2.06	0.3
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.7
60		5.6	0.82
65		6.48	0.95
70		7.44	1.09

3. Pump Selection

1. A pump must be selected to deliver at least 29 gpm (1A or B)
with at least 22.8 feet of total head (2D).

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

(signature)

(signature)

47

(license #)

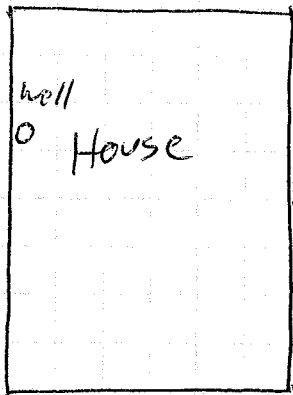
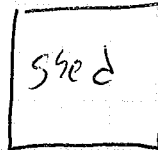
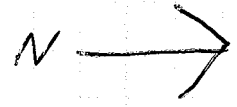
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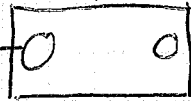
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(612) 545-PIPE • INWARD WATS--800 + 552-1158 • FAX (612) 545-8399

PROJECT _____

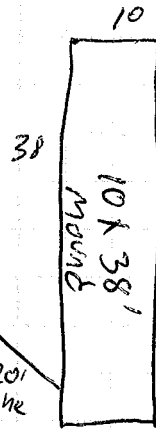
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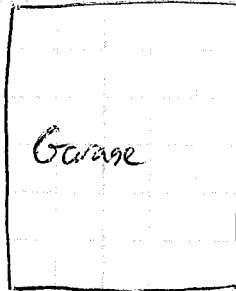
80'
Line



20'
Line



Drive way



Co Hwy 21