140084000

PARCEL	
APP	SEPTIC
YEAR	
SCANNED	
LAKE	

Onsite Septic System Application

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

1. **PROPERTY DATA (as it appears on the tax statement, purchase agreement or deed)**
Parcel Number(s) of property where the system will be installed: ___140084000_____

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 __17____ Township __140___ Range _042____ Township Name ___Hamden_____

Lake Name _____ Lake Classification _____

Legal Description: _____
_____

Project Address: __18540 Co Hwy 12 Audubon MN 56511_____

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

Owner's First Name ___Randy_____ Owner's Last Name __Boyer_____

Mailing Address ___18540 Co Hwy 12_____ City, State, Zip _Audubon MN 56511_____

Phone Number ___701-367-2140_____

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

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

What will new system serve? Check one

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

_18 Aug 16__ Date of site evaluation

Design Flow __450___ Gallons Per Day
Number of Bedrooms _____3_____
Garbage Disposal _____ Yes __X___ No
Dishwasher _X___Yes ___No
Lift station in House ____Yes __X__No
Grinder pump in House ____ Yes __X__ No

Well Depth _>50'_____
Depth of other wells within 100 ft of system _N/A___

Original Soil __X__ Compacted Soil _____
Type of Soil Observation
____ Pit _____Probe _X___Boring
Depth to Restricting Layer __34"_____
Maximum Depth of System _Mound____

Size of All Tanks to be installed
_____ gal Single Compartment Septic Tank
1500/2 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 _____1_____ (This # will be reported to MPCA at end of year.)

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Type of Drainfield	Full Size of Drainfield	Reduced/Warrantied size	
_____ Chamber Trench	_____ sq ft	_____ sq ft	Type of chamber _____
_____ Rock Trench	_____ sq ft	_____ sq ft	Depth of Rock _____
_____ Gravelless	_____ sq ft	_____ sq ft	
__X__ Mound	__380____ sq ft ***		
_____ Pressure Bed	_____ sq ft ***		Alarm? Yes ____X_____ No _____
_____ Seepage Bed	_____ sq ft ***		Type of Alarm __Indoor_____
_____ At-grade	_____ sq ft ***		Size of Lift Pump __.4_____
_____ Alternative / Performance	_____ sq ft ***	***Attach Worksheets	Size of Lift Line ___1.5"_____

PROPOSED SETBACKS

	TANK	DRAINFIELD
Distance to Well	__>50'___	____>50'____
Distance to Building	__>10'___	____>20'____
Distance to Property Line	__>10'____	____>10'____
Distance to OHWof Lake	___N/A__	____N/A_____
Distance to Pressure Line	___N/A__	____N/A_____
Distance to Wetland/Protected Water	___N/A___	____N/A____

Perc Rate ____12MPI_____ Soil Sizing Factor _____1.27_____*If SSF other than .83, attach Perc Test Data

Soil Borings (three are required)

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0"-18"	Blocky	BLK			0"-18"	Blocky	BLK	
18"-34"	Blocky	10YR5/4			18"-34"	Blocky	10YR5/4	
34"		Redox			34"		Redox	

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure
0"-18"	Blocky	BLK						
18"-34"	Blocky	10YR5/4						
34"		Redox						

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
(Print Name of Designer)
applicable requirements (including, but not limited to Minnesota Chapter 7080 and the Becker County Individual Sewage Treatment System Ordinance).

Dan Thorson

__24 Aug 16_____
Signature of Designer
Date

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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)*

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= 3 feet
2. Depth of percolation tests = 12 *inches*
3. Texture Sandy Loam
4. Soil loading rate *(see Figure D-33)* 0.79 gpd/ ft^2
   Percolation rate 12 MPI
5. % Land Slope 1 %

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=
   450 gpd x 0.83 ft^2/gpd = 373.5 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 12 = 10.0 ft

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

3. Length of rock layer = area divided by width =
   373.5 ft^2 / 10 feet = 37.5 feet

E. ROCK VOLUME

1. Multiply rock area by rock depth to get cubic feet of rock
   373.5 X 1 ft = 373.5 ft^3

2. Divide ft^3 by 27 ft^3/yd^3 to get cubic yards
   373.5 ft^3 / 27 = 13.8 yd^3

3. Multiply cubic yards by 1.4 to get weight of rock in tons;
   13.8 yd^3 X 1.4 ton/yd^3 = 19.4 tons

F. ABSORPTION WIDTH

1. Absorption width equals absorption ratio (see Figure D-33) times rock layer width
   1.5 x 10.0 ft = 15.0 ft

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

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

15 feet - 10 feet = 5 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(

3 ft - 3 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 3.85

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

3.85 x 3 ft = 11.6 feet

DOWNSLOPE

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

10 ft x 1 % / 100 = 0.1 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)

0.10 ft + 3 ft = 3.1 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)

4.17 x 3.1 = 12.9 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 (G:

11.6 ft + 10.0 ft + 12.9 ft = 34.4 feet

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

11.6 ft + 37.5 ft + 11.6 ft = 60.6 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

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

1. Absorption width (F): 15.0 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(
3.0 ft - 3.0 ft = 0.0 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)
0.0 ft+1ft+1ft = 2.0 feet

c. Berm width = upslope mound height(G2b) times 4 (4 is recommended, but could be 3-12)
2.0 x 4 = 8.0 feet

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm width (G2
8.0 feet + 10.0 feet + 8.0 feet = 26.0 feet

e. Additional width necessary for absorption = the absorption width (F) minus the landscape width (G2d)
15.0 feet - 26.0 feet = -11.0 feet
if number is negative (<0) skip to g

f. Final berm width =additional width (G2e) plus the berm width (G2c)
-11 feet + 8 feet = -3 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)
8.0 ft + 10.0 ft + 8.0 ft = 26.0 feet

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or G2c)
8.0 ft + 37.5 ft + 8.0 ft = 53.5 feet

i. Setbacks from the rockbed are calculated as follows: the absorption width (F) minus the rock bed width
(D2) divided by 2: (15.0 feet - 10.0 feet) / 2 = 2.5 feet

Final Dimensions (slope < 1%)	26.0 ft x 53.5 ft

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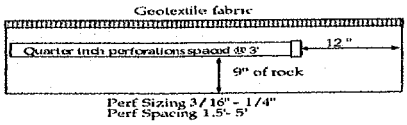
PRESSURE DISTRIBUTION SYSTEM

oxed rectangles must be entered, the rest will be calculated.

1. Select number of perforated laterals: [3]

2. Select perforation spacing = [3] ft



3. Since perforations should not be placed closer that 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length

[38] - 2 ft = 36 ft

4 Determine the number of spaces between perforations.
Divide the length (3) by perforation spacing (2) and round down to nearest whole number.

Perforation spacing = 36 ft / 3 ft = 12

5. 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.*

12 spaces + 1 = 13 perforations/lateral

E-4 Maximum Number of 1/4 inch perforations per lateral to guarantee <10% discharge variation

Perforation Spacing feet	1 inch	1.25 inch	1.5 inch	2.0 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

6. A. Total number of perforations = perforations per lateral (5) times number of laterals (1).

13 perfs/ lat x 3 laterals = 39 perforations

B. Calculate the square footage per perforation.
Recommended value is 6-10 sqft/perf. Does not apply to at-grades.
1. Rock bed area = rock width (ft) x rock length (ft)

[10] ft x 38 ft = 380 ft^2

2. Square foot per perforation=Rock Bed Area/number of perfs(6)

380.0 ft^2 / 39 perfs = 9.7 ft^2/ perf

7. Determine required flow rate by multiplying the total number of perforations(6A) by flow per perforations (see figure E-6)

39 perfs x [0.74] gpm / perfs = 28.9 gpm

8. 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).

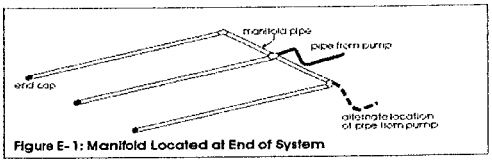
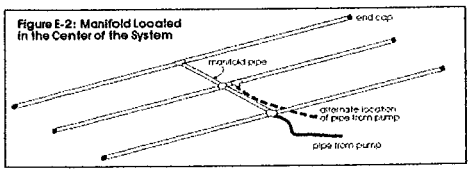


Figure E-1: Manifold Located at End of System

Select minimum diameter for perforated laterals = [1.5] inches

9. 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 = [ ] inches.



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

_____ (signature) 47 (license #) 24-Aug-16 (date)

PUMP SELECTION PROCEDURE

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

1. Determine pump capacity:

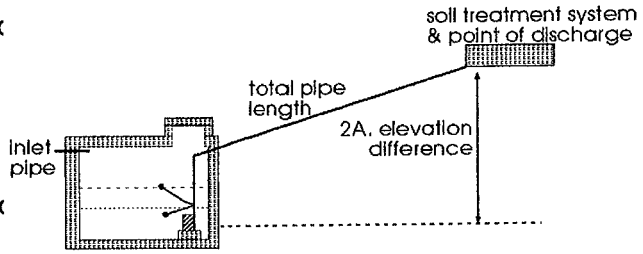
A. Gravity Distribution

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 wc

Selected Pump Capacity: [29] **gpm**



2. Determine head requirements:

A. Elevation difference between pump and point of disc

[10] feet

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

[5] feet

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distributic	5ft

C. Friction loss

1. Select pipe diame [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 [5.23] ft/ 100 ft of pipe

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

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= 5.23 ft/100ft X 31.25 ft / 10 1.6 feet

E-9 Friction Loss in Plastic Pipe per 100 ft

Flow Rate	nominal pipe diameter		
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

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

10 ft + 5 ft + 1.6 ft

Total Head: 16.6 **feet**

3. Pump Selection

1. A pump must be selected to deliver at 29 gpm (1A or B) with at least 16.6 feet of total head (2D).

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

(signature) 47 (license #) 24-Aug-16

JOB #

PERCOLATION TEST DATA SHEET

Company Nam Nels Thorson Excavating Inc License Number 47

Percolation Test Performed by Dan Thorson

Homeowner Name Randy Boyer

Address 18540 Co Hwy 12 Audubon MN

Test Hole # 1 Diameter of hole 4 inches

Location East side of drain field

Method of scratching sidewall Nail

Depth at bottom of hole 12 inches Depth of gravel at bottom 1 inches

Date presoak started 8/17/2016 Starting at 3:00pm AM / PM

Depth of initial water filling 6" above hole bottom

Method used to maintain 12" of water depth in hole for 4 hours kept adding water

Date presoak ended 8/18/2016 Ending at 3:00pm AM / PM

Date perc readings conducted 8/18/2016 Starting at 3:00pm AM / PM

Maximum depth above hole bottom during test 6" inches

Surface elevation (in reference to benchmark): _____ feet

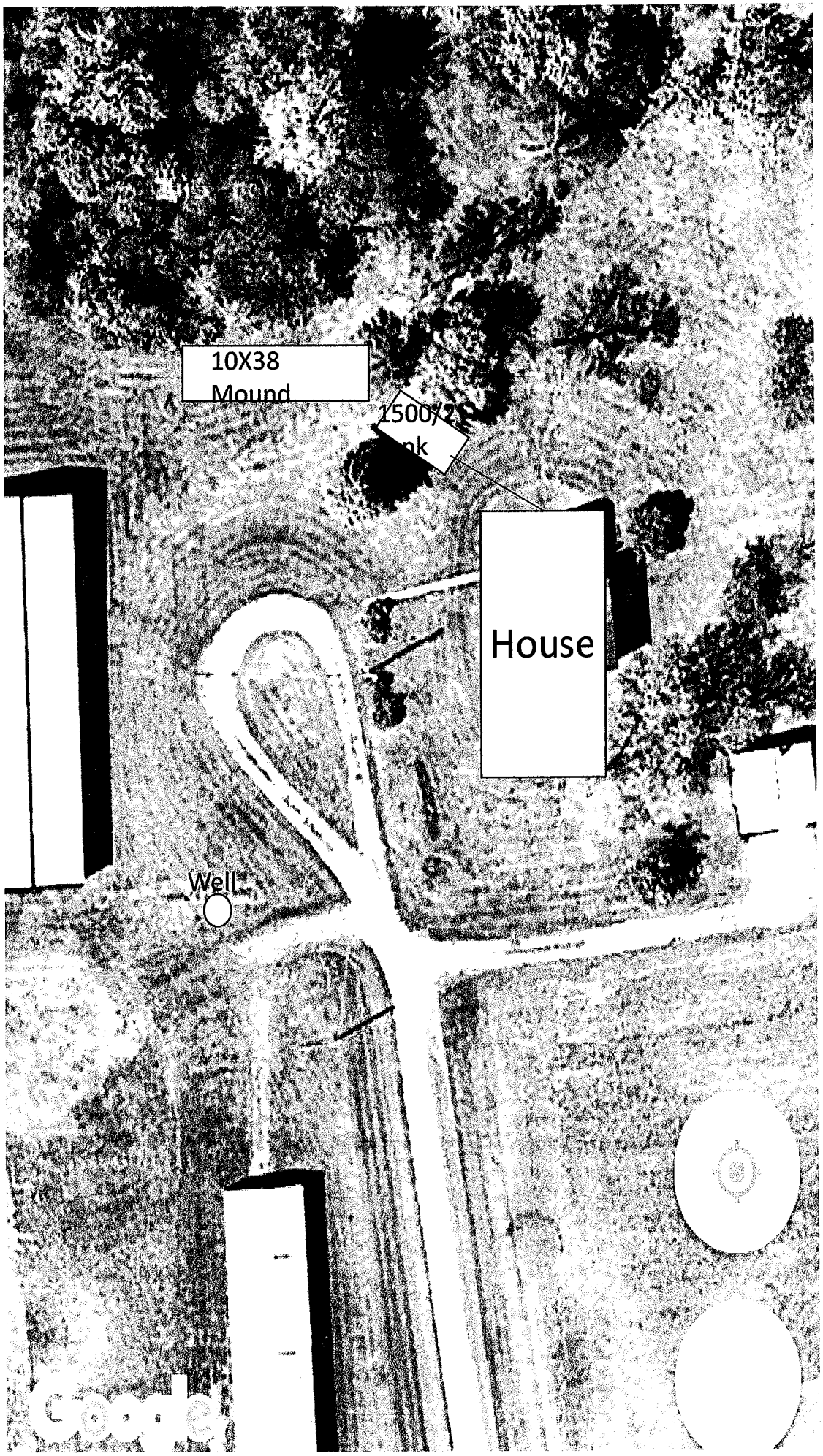
Directions: Enter elapsed time and drop in water level and the rest will be calculated

#	Elapsed Time (min)	Time Interval (min)	Drop in Water Level (inches)	Percolation Rate (mpi)	% Difference	10% Goal Reached*
1	3:45	15	1.25	12.0	NA	NA
2	4:00	15	1.25	12.0	0.0	YES
3	4:15	15	1.30	11.5	3.8	YES
4	4:30	15	1.30	11.5	0.0	YES
5		0		0.0	0.0	0
6		0		0.0	0.0	0
7		0		0.0	0.0	0
8		0		0.0	0.0	0

* 3 consecutive percolation rates must be within 10% or less of each other

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

_____ (signature) 47 (license #) 24-Aug-16 (date)


10X38
Mound
House
Well

PARCEL	
APP	SEPTIC
YEAR	

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

Application Approved by: Laird A Stoll Date: 8/30/16

Amount Paid $150.00 Receipt Number _____ Permit Number _____

NOTES: 215671 - 628163

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INSPECTION REPORT

Home Information

Does the structure contain any of the following elements?

Garbage disposer ____ Yes ✓ No Dishwasher ✓ Yes ____ No

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

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

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

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

Number of bedrooms 3

Component Information

Tank size 1500 2/c Tank manufacturer Brown

Drainfield size 380 sq ft.

Drainfield medium _____ Medium manufacturer 10' x 38' mound

Drainfield medium size/depth _____

Soil Verification

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

Vertical separation verified for Boring #2 on _____ Depth _____

Vertical separation verified for Boring #3 on _____ Depth _____

Setback Verification

	TANK	DRAINFIELD
Distance to Well	+50	+50
Distance to Building	+10	+20
Distance to Property Line	+10	+10
Distance to OHWof Lake		
Distance to Pressure Line	N/A	N/A
Distance to Wetland/Protected Water		

Date System Installed 8/31/16 **Installer** Nels Thorson Exc **Inspector** Laird Stoll

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CERTIFICATE OF COMPLIANCE

( ) Certificate Is Hereby Denied

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

Laird A Stoll — Signature

ISTS inspector — Title

8/31/16 — Date

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