3800-2

35-0-025406
35-0-025405

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE _Fall 2015_, FIELD EVALUATION DATE _4-23-16_
PROPERTY OWNER: _Scott Nelson_ _____ PHONE _____
ADDRESS: _10039 209th Ave NW_ CITY,STATE,ZIP: _Elk River, MN 55330_
LEGAL DESCRIPTION: _____
PIN# _35-0-025406_ SEC _16_ T _49_ R _26_ TWP NAME _Waukenabo_
FIRE# _____ LAKE/RIVER _Round_ _____ LAKE CLASS _RD_ OHWL ____ FT.

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES ___ NO ✗	YES ___ NO ___
COMPACTED AREAS	YES ___ NO ✗	YES ___ NO ___
FLOODING	YES ___ NO ✗	YES ___ NO ___
RUN ON POTENTIAL	YES ___ NO ✗	YES ___ NO ___
SLOPE %	0	
DIRECTION OF SLOPE	NA	
LANDSCAPE POSITION		
VEGETATION TYPES	Ash trees	

REFERENCE BM ELEV. _____ FT.
REFERENCE BM DESCRIPTION ___
_____
_____
_____
_____
_____

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 _6"_, 1A ____, 2 _6"_, 2A ____

BOTTOM ELEVATION--FIRST TRENCH OR BOTTOM OF ROCK BED: #1 _____ FT., #2 _____ FT.

SOIL SIZING FACTOR: SITE # 1 _1.27_, SITE #2 _____

CONSTRUCTION RELATED ISSUES: _3ft sand base mound_ _____

LIC# _211_ _____ SITE EVALUATOR SIGNATURE: _Rod Kern_

SITE EVALUATOR NAME: _Rod Kern_ _____ TELEPHONE# _8394735_

LUG REVIEW _____ 4/29/16 _____ DATE _____

Comments: _____
_____
_____
_____

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4" Topsoil		
4-12" Sandyloam		10yr 6/3
Mottles		

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4" Topsoil		
4-12" Sandyloam		10yr 6/3
mottles fill		
12-16" Black dirt		

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

MOUND DESIGN SHEET

PROPERTY OWNER _Scott Nelson_ TOWNSHIP _Waukenab_ FIRE# ___

PERMIT# _____ PIN# 35-0-02f5406 DATE 4-25-16

DESIGNER NAME _Rod Kern_ LICENSE # 211

DESIGNER SIGNATURE: _Rod K_ DATE _____

WATER USE APPLIANCES (CHECK ALL THAT APPLY)

CLOTHES WASHER _X_ WATER SOFTNER ___ DISHWASHER ___ WHIRLPOOL ___ HUMIDIFIER ___
NUMBER OF BEDROOMS _2_ TYPE: _I_ GARBAGE DISPOSAL:YES ___ NO _X_ AIR TEST YES ___ NO _X_
WELL: DEEP (50'+) _X_ SHALLOW ___ SETBACKS: TANK _50_ DRAINFIELD _50_ SEWER LINE _50_

FLOW

A. ESTIMATED _300_ GPD OR MEASURED GPD ___
B. SEPTIC TANK VOLUME _1130_ GALLONS _1650 Combo_
C. MINIMUM PUMP TANK VOLUME _500_ GALLONS
C1. ALARM TYPE _Post Level_

SOILS

D. DEPTH TO RESTRICTING LAYER _0_ FEET
E. DEPTH OF SAND ON UPSLOPE EDGE _3_ FEET
F. SOIL TEXTURE _Sandy loam_
G. PERCOLATION RATE _6-15_ MPI
H. SOIL SIZING FACTOR _1.27_ SQ FT/GPD
I. LAND SLOPE _0_ %

ROCK LAYER DIMENSIONS

J. (A) x 0.83= _250_ =SQ FT
K. SELECT ROCK LAYER WIDTH _10_ FT.
L. LENGTH OF ROCK BED= (J) ÷ (K)= _25_ FT.

ROCK VOLUME

M. MULTIPLY ROCK AREA BY ROCK DEPTH= (J) x 1 FT=
_250_ FT x 1 FT= _250_ CU. FT.
N. DIVIDE (M) BY 27= CU YD.= _250_ CU FT ÷ 27= _9.2_ CU YD.
O. MULTIPLY(N) _9.2_ x 1.4= _12.88_ TONS OF ROCK

ABSORBTION WIDTH

P. FOR TEXTURE, PERC. RATE, OR SOIL SIZING FACTOR
IN (F) (G) OR (H) ABOVE, SELECT ABSORBTION WIDTH
RATIO FROM TABLE 3 _1.52_
Q. MULTIPLY ABSORBTION WIDTH RATIO (P) BY ROCK
LAYER WIDTH (K)= _1.52_ x _10_ = _15.2_ FT.
ABSORBTION WIDTH

****

LUG APPROVAL: _____ DATE: _____

TABLE 1

EST SEWAGE FLOW IN GALLONS/ DAY (GPD)

NUMBER OF BEDROOMS	TYPE I	TYPE II	TYPE III
2	300	225	180
3	450	300	218
4	600	375	256
5	750	450	294
6	900	525	332
7	1050	600	370
8	1200	675	408

TABLE 2

NUMBER OF BEDROOMS	MINIMUM TANK CAPACITY GALLONS	MINIMUM CAPACITY GARBAGE DISPOSAL
2 OR LESS	1000	1500
3 OR 4	1000	1500
5 OR 6	1500	2250
7 OR 8	2000	3000
OVER 9	SEE FIG C-6	(x 1.5)

TABLE 3

PERC RATE P1	SOIL TEXTURE	SQFT GALLONS /DAY	GALLONS /DAY /SQFT.	ABSORPTION WIDTH RATIO
< THAN 0.1	COARSE SAND	-----	----	1.00
0.1 TO 5	SAND	0.83	1.20	1.00
0.1 TO 5	FINE SAND	1.67	0.60	2.00
6 TO 15	SANDY LOAM	1.27	0.79	1.52
16 TO 30	LOAM	1.67	0.60	2.00
31 TO 45	SILT LOAM	2.00	0.50	2.40
46 TO 60	CLAY LOAM	2.20	0.45	2.67
> THAN 60	CLAY	____	(0.24)	5.00
> THAN 120	CLAY	____	____	6.00

MINIMUM MOUND SIZE

1. Subtract rock layer width from absorption width to obtain minimum downslope berm toe

$\underline{15.2}$ ft - $\underline{10}$ ft = $\underline{5.2}$ feet

2. Determine depth of clean sand fill at upslope edge of rock layer:

Separation 3' - $\underline{0}$ ft = $\underline{3}$ feet

3. Add depth of clean sand for separation (2) at upslope edge, depth of rock layer (1 ft) to depth of cover (1 ft) to find the mound height at upslope edge of rock layer:

$\underline{3}$ ft + 1 ft + 1 ft = $\underline{5}$ feet

4. Enter table with landslope and upslope berm ratio. Select berm multiplier $\underline{4}$.

5. Multiply berm multiplier by upslope mound height to find upslope berm width:

$\underline{5}$ x $\underline{4}$ = $\underline{20}$ feet

6. Multiply rock layer width (K) by landslope to determine drop in elevation:

$\underline{10}$ x $\underline{0}$ % ÷ 100 = $\underline{0}$ feet

7. Add depth of clean sand for slope difference (6) at downslope edge to the mound height at the upslope edge of rock layer (3) to find the downslope height:

$\underline{5}$ ft + $\underline{0}$ ft = $\underline{5}$ feet

8. Enter table with landslope and downslope berm ratio. Select berm multiplier of $\underline{4}$.

9. Multiply berm multiplier by downslope mound height to get downslope berm width:

$\underline{5}$ x $\underline{4}$ = $\underline{20}$ feet

10. Compare the values of Step (1) $\underline{5.2}$ and Step(9) $\underline{20}$. Select the greater of the two values as the downslope berm width: $\underline{20}$ feet

11. Total mound width is the sum of upslope berm (5) width plus rock layer width (K) plus downslope berm width (9):

$\underline{20}$ ft + $\underline{10}$ ft + $\underline{20}$ ft = $\underline{50}$ feet

12. Total mound length is the sum of upslope berm width (5) plus rock layer length (L) plus upslope berm width (5):

$\underline{20}$ ft + $\underline{25}$ ft + $\underline{20}$ ft = $\underline{65}$ feet

Final Cover Dimension

$\underline{50}$ x $\underline{65}$

Slope:___ Cover 1'
Rock 1'
Clean Sand
Natural Soil___ 6" Topsoil
Limiting Layer
Upslope sand Rockbed width Downslope Sand
Upslope width Rock Width Down Slope width

Sand Total Width 40

Sand Upslope Width 16
Sand Upslope Width 16
Sand Upslope Width 15
Sand Upslope Width 15
Rock Bed Width 10
Length 25
Sand Downslope Width 16

Sand Total Length 55
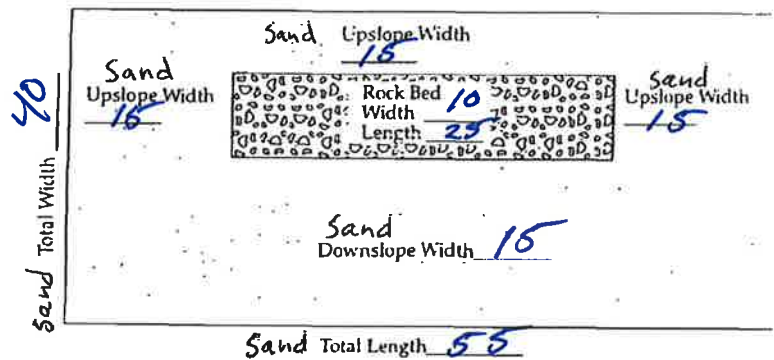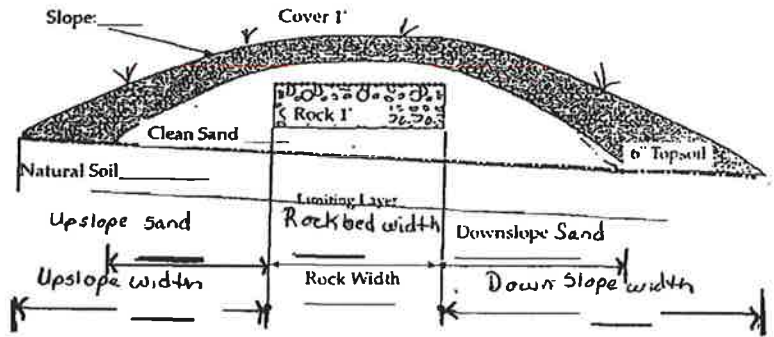
BERM SLOPE MULTIPLIERS

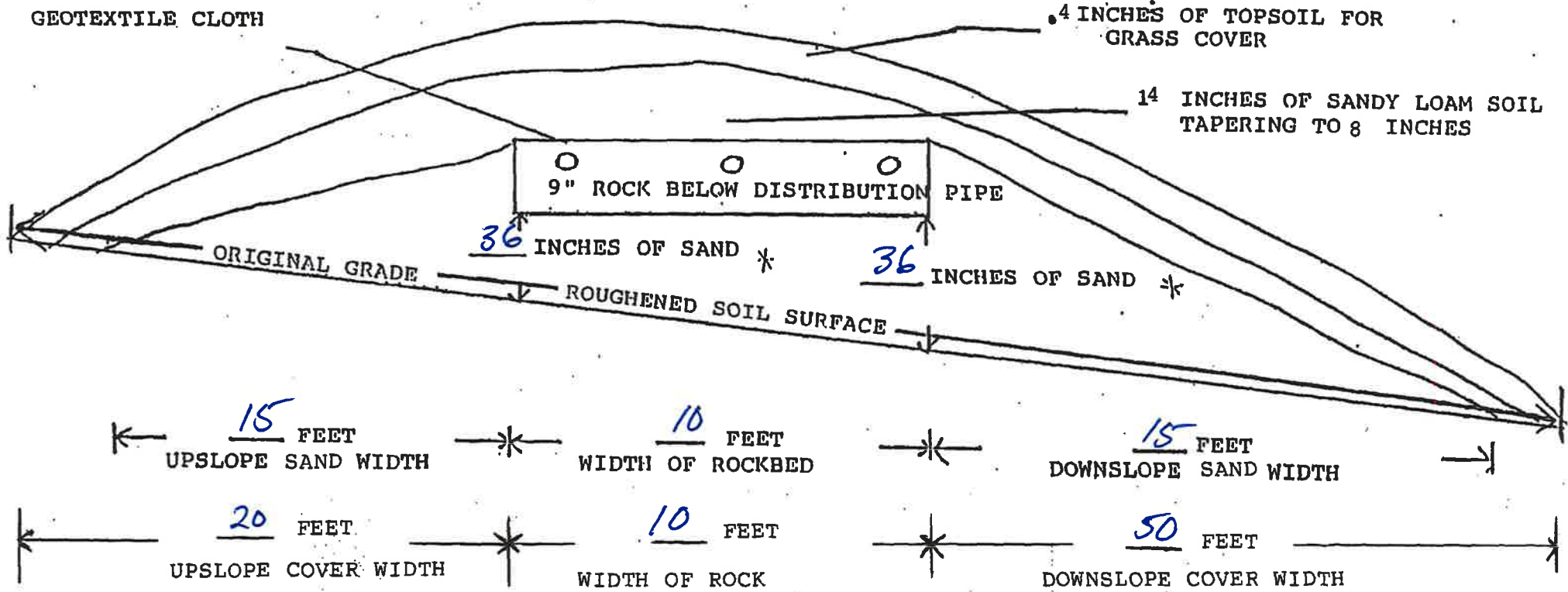| Land Slope, in %	DOWNSLOPE berm multipliers for various berm slope ratios					UPSLOPE berm multipliers for various berm slope ratios					
	3:1	4:1	5:1	6:1	7:1	3:1	4:1	5:1	6:1	7:1	8:1
0	3.0	4.0	5.0	6.0	7.0	3.0	4.0	5.0	6.0	7.0	8.0
1	3.09	4.17	5.26	6.38	7.53	2.91	3.85	4.76	5.66	6.54	7.41
2	3.19	4.35	5.56	6.82	8.14	2.83	3.70	4.54	5.36	6.14	6.90
3	3.30	4.54	5.88	7.32	8.86	2.75	3.57	4.35	5.08	5.79	6.43
4	3.41	4.76	6.25	7.89	9.72	2.68	3.45	4.17	4.84	5.46	6.06
5	3.53	5.00	6.67	8.57	10.77	2.61	3.33	4.00	4.62	5.19	5.71
6	3.66	5.26	7.14	9.38	12.07	2.54	3.23	3.85	4.41	4.93	5.41
7	3.80	5.56	7.69	10.34	13.73	2.48	3.12	3.70	4.23	4.70	5.13
8	3.95	5.88	8.33	11.54	15.91	2.42	3.03	3.57	4.05	4.49	4.88
9	4.11	6.25	9.09	13.04	18.92	2.36	2.94	3.45	3.90	4.30	4.65
10	4.29	6.67	10.00	15.00	23.33	2.31	2.86	3.33	3.75	4.12	4.44
11	4.48	7.14	11.11	17.65	30.43	2.26	2.78	3.23	3.61	3.95	4.26
12	4.69	7.69	12.50	21.43	43.75	2.21	2.70	3.13	3.49	3.80	4.08

Note: The product of the multiplier and the height results in the horizontal distance to where the berm meets the original land slope. Example: Height at upper edge of rock layer is 3.0 feet, rock layer is 10 feet wide, land slope is 6% and berm slope ratio is 4:1. Upslope berm width is 3.23 x 3.0 = 9.7 ft; height at lower edge of rock layer is 3.0 + 10 x 0.6 = 3.6 ft and downslope berm width is 5.26 x 3.6 = 18.9 ft.

MOUND CROSS-SECTION

_0_ PERCENT SLOPE OF ORIGINAL SOIL

_10_ FT. x _25_ FT. SIZE OF ROCKBED   _40_ FT. x _55_ FT. SIZE OF SANDBASE

GEOTEXTILE CLOTH

.4 INCHES OF TOPSOIL FOR GRASS COVER

14 INCHES OF SANDY LOAM SOIL TAPERING TO 8 INCHES

9" ROCK BELOW DISTRIBUTION PIPE

ORIGINAL GRADE

_36_ INCHES OF SAND   *   _36_ INCHES OF SAND *

ROUGHENED SOIL SURFACE

_15_ FEET UPSLOPE SAND WIDTH   _10_ FEET WIDTH OF ROCKBED   _15_ FEET DOWNSLOPE SAND WIDTH

_20_ FEET UPSLOPE COVER WIDTH   _10_ FEET WIDTH OF ROCK   _50_ FEET DOWNSLOPE COVER WIDTH

PUMP SELECTION PROCEDURE

A. Determine pump capacity

Gravity distribution
1. Minimum is 10 GPM
2. Maximum is 45 GPM

Pressure Distribution
3. a. Select number of perforated laterals __3__ .
   b. Select perforation spacing = __3__ ft.
   c. Subtract 2 ft from rock layer length:
      __25__ - 2 = __23__ feet. (length of laterals)

ROCK LAYER LENGTH

   d. Determine the number of spaces between perfs:

   $$\frac{23}{\text{(length of lateral)}} / \frac{3}{\text{(perf. spacing)}} = \underline{7}\ \text{spaces}$$

   e. __7__ spaces + 1 = __8__ perforations per lateral
   f. Multiply perforations per lateral by number of laterals to get total number of perforations:

   $$\frac{8}{\text{(perfs/lateral)}} \times \frac{3}{\text{(laterals)}} = \frac{24}{\text{(perforations)}}$$

   g. $\frac{24}{\text{(Perforations)}} \times \frac{.74}{\text{x (gpm/perfs)}} = \frac{17.76}{}$ GPM

SELECTED PUMP CAPACITY __17.76__ GPM

B. Determine head requirements:
1. Elevation difference beteween pump & point of discharge:
   __8__ feet
2. If pumping to a pressure distribution system, add 5 feet; for gravity add zero: __5__ feet
3. Friction Loss
   a. Enter friction loss table with GPM and pipe diameter.
      Read friction loss in feet per 100 ft in table.
      F.L. = __.73__ ft/100 of pipe
   b. Determine total pipe length from pump to discharge point.
      Add 25% to pipe length for fitting loss.
      __25__ length x 1.25 __31.25__ feet.
   c. Calculate total friction loss by multiplying friction loss in 100 ft. of pipe by equivalent pipe length (B):

Total friction loss = __31.25__ x __.73__ /100 = __.22__ feet

4. Total head required is the sum of the elevation difference, special head requirements and total friction loss:

$$\underset{(1)}{\underline{8}} + \underset{(2)}{\underline{5}} + \underset{(3c)}{\underline{.22}} \text{ TOTAL HEAD } \underline{13.22}$$

SELECT A PUMP TO DELIVER AT LEAST __17.76__ **GPM WITH AT LEAST** __13.22__ **FEET OF TOTAL HEAD.**

If laterals are connected to a header pipe in a pressure system, select the minimum size lateral diameter; enter the table with perforation spacing and the number of perforations per lateral.

Select minimum size of lateral __1½__

For a center manifold system the values will be ½ of above.

Perforation Discharges in GPM

Head (feet)	Perforation diameter (inches)	
	7/32	1/4
1.0a	0.56	0.74
1.5	0.69	0.90
2.0b	0.80	1.04

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

FRICTION LOSS IN PLASTIC PIPE

Flow Rate GPM	1.5"	2"	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	0.30
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.70
60		5.60	0.82
65		6.48	0.95
70		7.44	1.09

Max. No. of 1/4" perfs per lateral. (10%var)

Perforation spacing. (feet)	1 1/4"	1 1/2"	2"
2.5 feet	14	18	28
3.0 feet	13	17	26
3.3 feet	12	16	25
4.0 feet	11	15	23
5.0 feet	10	14	22

CLIENT: *Scott Nelson*   DATE: *4-23-16*

495th LN

Driveway

26'

7'

Garage

10'

Proposed 2 bedroom cabin

35'

40'

59'

10'

1650 combo

36'

100'

50'

10'

25'

65'

10'

25'

Property Line

100'

Round Lake
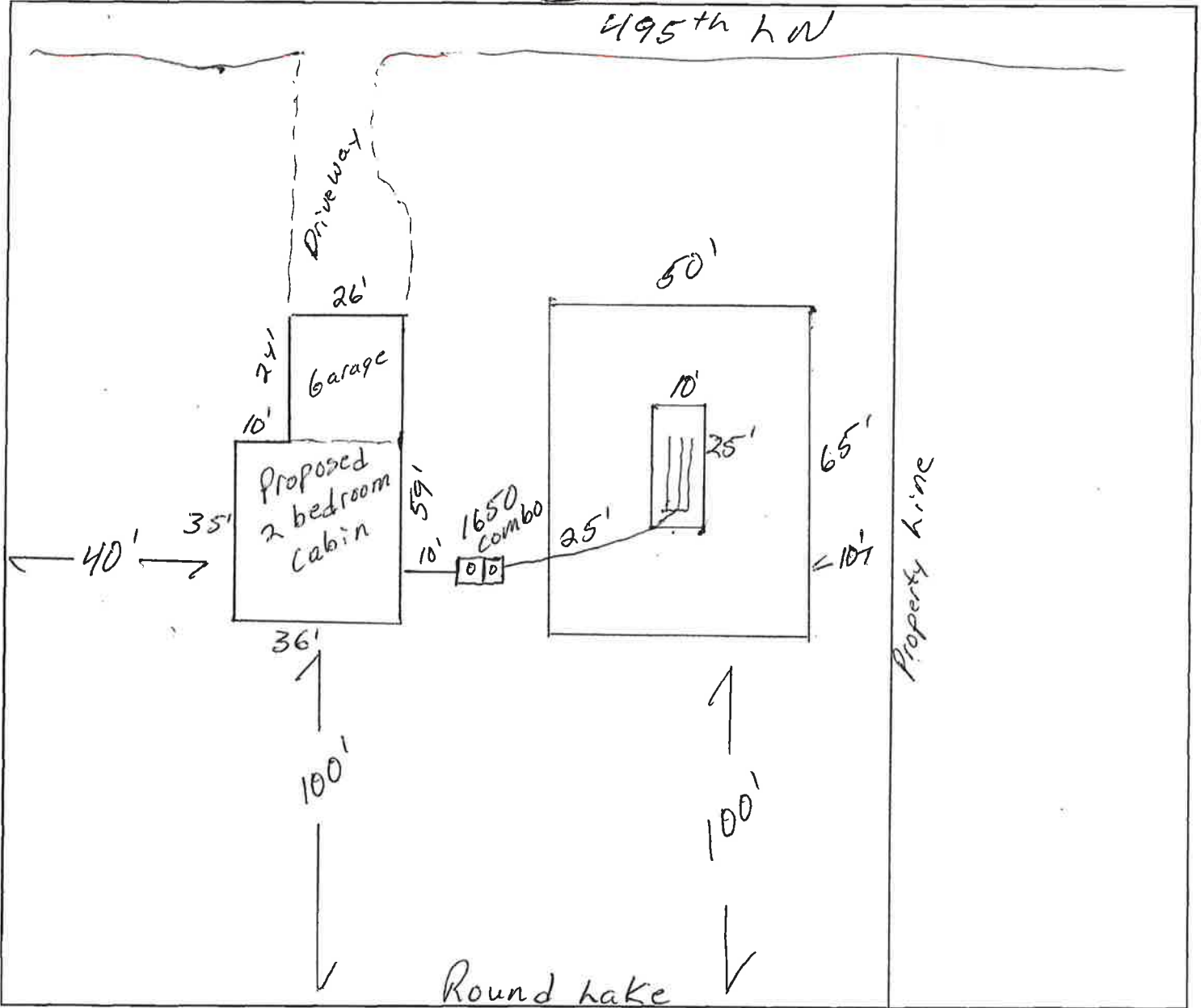
CHECK OFF LIST--HAVE ALL OF THE FOLLOWING BEEN DRAWN ON THE MAP??

SHOW EXISTING OR PROPOSED
- ☐ WATER WELLS WITHIN 100 FT OF TREATMENT AREAS
- ☐ PRESSURE WATER LINES WITHIN 10 FT OF TREATMENT AREAS
- ☐ STRUCTURES   ☐ LOT IMPROVEMENTS
- ☐ ALL SOIL TREATMENT AREAS   ☐ ALL ISTS COMPONENTS
- ☐ HORIZONTAL AND VERTICALREFERENCE
- ☐ POINT OF SOIL BORINGS   ☐ DIRECTION OF SLOPE
- ☐ LOT EASEMENTS   ☐ ALL LOT DIMENSIONS
- ☐ DISTURBED/ COMPACTED AREAS
- ☐ SITE PROTECTION--LATHE AND RIBBON EVERY 15 FT
- ☐ ACCESS ROUTE FOR TANK MAINTENANCE

REQUIRED SETBACKS
- ☐ STRUCTURES   ☐ PROPERTY LINES
- ☐ OHWL

COMMENTS:

DESIGNER SIGNATURE *Rod K*

LICENSE# *211*

INDICATE ELEVATIONS

BENCHMARK	
ELEVATION OF SEWER LINE @ HOUSE	*100*
ELEVATION @ TANK INLET	*100.5*
ELEVATION @ BOTTOM OF ROCK LAYER	*97.5*
ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER	*100.5*
ELEVATION OF PUMP	*104.5*
ELEVATION OF DISTRIBUTION DEVICE	*96.75*

4-23-16

DATE *4-23-16*

AITKIN COUNTY ENVIRONMENTAL SERVICES

APPLICATION for an
OPERATING PERMIT FOR WASTEWATER TREATMENT AND DISPERSAL

PERMITTEE _Scott Nelson_ PARCEL NUMBER _35-0-025406_

ADDRESS _37961 495th Ln_

LEGAL DESCRIPTION _APPROX 1/2 AC LOT 2 IN DOC 202633_

TELEPHONE # _612-940-9540_ GIS LOCATION _____

A. **DESCRIPTION OF WASTEWATER TREATMENT AND DISPERSAL SYSTEM:**
(Attach ISTS site evaluation and design; estimated cost of system construction, operation, monitoring, service, component replacement, and management; anticipated system life, hydraulic and organic loading rates)

3' sandbase mound

B. **MONITORING PLAN AND REPORTING FREQUENCY:**

PARAMETER	COMPLIANCE LIMIT	SAMPLE LOCATION	SAMPLE FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
FLOW	300	event counter	monthly	record on log sheet	annually
5-DAY BOD					
TOTAL NITROGEN					
TOTAL PHOSPHORUS					
TSS					
FATS, OILS AND GREASE					
FECAL COLIFORM					
SEPARATION DISTANCE	3'	dispersal system	annually	measure in field	annually

_____ will perform the monitoring of this septic system.

C. MAINTENANCE PLANS

PARAMETER	LOCATION	FREQUENCY
Flow	event counter	monthly
Surface discharge	dispersal system	annually

D. MITIGATION PLAN:

If system fails, holding tanks will be used.

I hereby certify with my signature as the designer, that all data for the operating permit application is true and correct to the best of my knowledge. I agree to indemnify and hold Aitkin County harmless from loses, damages, costs and charges that may be incurred by the County because of the information submitted with this application.

Rod K	211	4-29-16
Signature	**License Number**	**Date**

Rod Kern	45399 US 169	839-4735
Name (please print)	**Address**	**Telephone #**

c:operatpermit.doc

AITKIN COUNTY ENVIRONMENTAL SERVICES

OPERATING PERMIT FOR WASTEWATER
TREATMENT AND DISPERSAL

OPERATING PERMIT #: 491

ZONING PERMIT #:

PARCEL #: 35-0-025406

PERMITTEE: Scott Nelson

MAILING ADDRESS: 10039 209TH Ave NW

Elk River, MN 55330

ORGINAL DATE ISSUED: 4 /29/2016

RENEWAL PERIOD:

RENEWAL EXPIRATION: 5 /31/2019

PROPERTY ADDRESS:
37961 495th LN
Palisade, MN 56469

TELEPHONE: (612) 940-9540

LEGAL: APPROX 1/2 AC LOT 2 IN DOC 202633

FEE PAID: 100   **DATE PAID:** 4 /29/2016   **RECEIPT:**   **CK #:**

Aitkin County Environmental Services authorizes the Permittee to operate a wastewater treatment and dispersal system located on the above described property in accordance with the requirements of this permit.

This permit is effective on the issuance date identified above.

This permit and the authorization to treat and disperse from the above system shall expire on the above expiration date. The Permittee is not authorized to discharge after the date of expiration. The Permittee shall submit such information and forms as required by Aitkin County Environmental Services no later than thirty (30) days prior to the expiration date. When the required information is submitted and approved by Aitkin County Environmental Services, the permit may be renewed. This permit is not transferable from owner to owner.

I hereby certify with my signature as the permittee that I understand the provisions of this permit including the maintenance and monitoring requirements. I agree to indemnify and hold Aitkin County harmless from all loss, damages, costs and charges that may be incurred by use of this system and if I fail to comply with the provisions of this Operating Permit. If I sell this property during the life of the permit, I will inform the new owner(s) of the permit requirements and the need to renew the permit.

_____
Signature of Permittee

4-29-16
Date

_____
Signature of Permitting Authority

4-29-16
Date

If you have any questions regarding this permit, including the specific permit requirements, permit reporting or permit compliance status, please contact Aitkin County Environmental Services at 218-927-7342.

E. MITIGATION PLAN:

If system fails, holding tank will be used.