FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE_____, FIELD EVALUATION DATE 4-11-2022
PROPERTY OWNER: Dennis Daniello PHONE 320-777-3037
ADDRESS: 45745 Townline Rd CITY,STATE,ZIP: Aitkin Mn 56431
LEGAL DESCRIPTION: (NW NW) lot 3
PIN# 03-0-037900 SEC 19 T 46 R 27 TWP NAME Farm Island
FIRE# 45745 LAKE/RIVER Townline Lake LAKE CLASS_____ OHWL_____FT.

DESCRIPTION OF SOIL TREATMENT AREAS

	AREA #1	AREA #2
DISTURBED AREAS	YES___NO X	YES___NO___
COMPACTED AREAS	YES___NO X	YES___NO___
FLOODING	YES___NO X	YES___NO___
RUN ON POTENTIAL	YES___NO X	YES___NO___
SLOPE %	2%	
DIRECTION OF SLOPE	E	
LANDSCAPE POSITION	Summit	
VEGETATION TYPES	Maple Oak	

REFERENCE BM ELEV._____FT.
REFERENCE BM DESCRIPTION___

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 15", 1A 18", 2_____,2A_____

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

SOIL SIZING FACTOR: SITE # 1 2.20, SITE #2_____

CONSTRUCTION RELATED ISSUES:_____

LIC# 747 SITE EVALUATOR SIGNATURE: Raymond Schrupp

SITE EVALUATOR NAME: Raymond Schrupp TELEPHONE# 218-820-8090

LUG REVIEW_____DATE 4-11-22

Comments:

SOIL BORING LOGS ON REVERSE SIDE

Form des 2/20/98

Dennis Daniello

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0 to 15" =	T.S Clay loam Mottled	7.5YR 3/3 7.5YR 4/4

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0 to 18 =	T.S Clayloam Mottled	7.5YR 3/3 7.5YR 4/4

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-8	T.S.	7.5YR 3/3
8-18	clayloam mottled	7.5YR 4/4

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-8	T.S.	7.5YR 3/3
8-18	clay loam mottled	7.5YR 4/4

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

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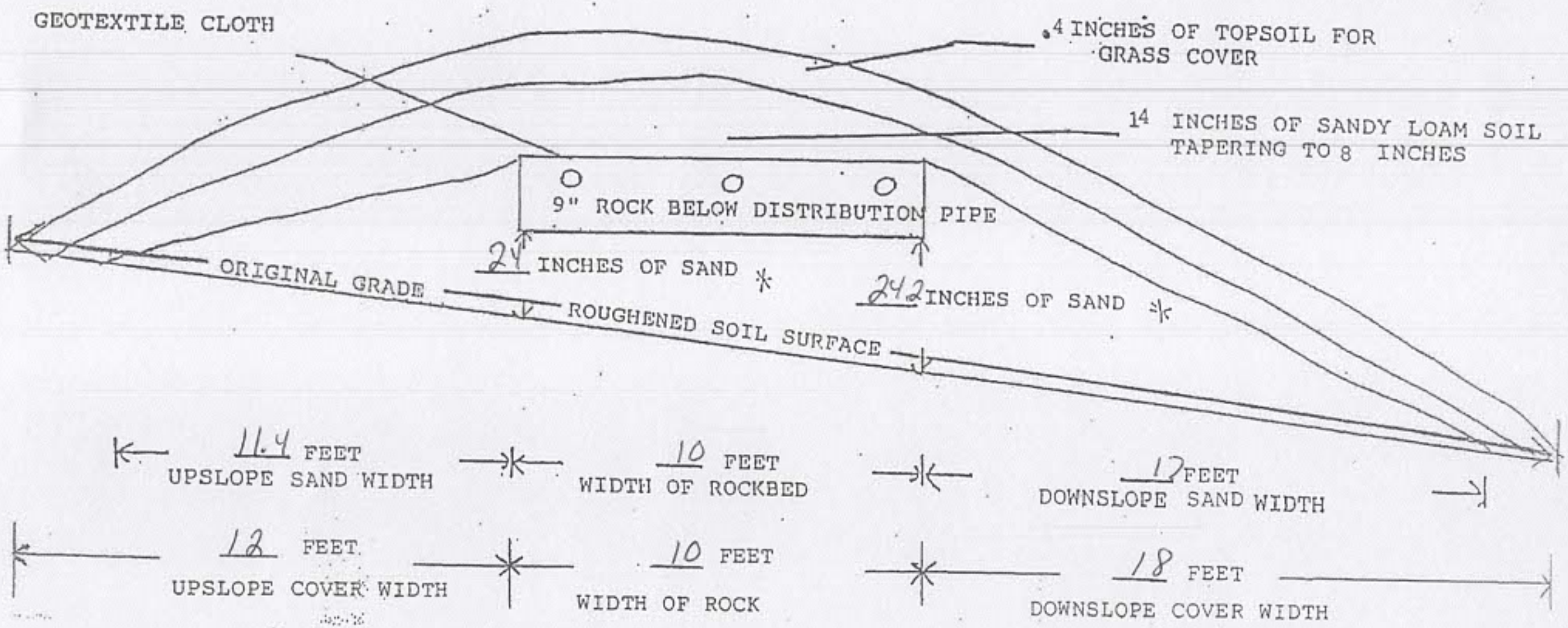
MOUND CROSS-SECTION

2 PERCENT SLOPE OF ORIGINAL SOIL

32.5 FT. X 10 FT. SIZE OF ROCKBED 38 FT. X 60 FT. SIZE OF SANDBASE



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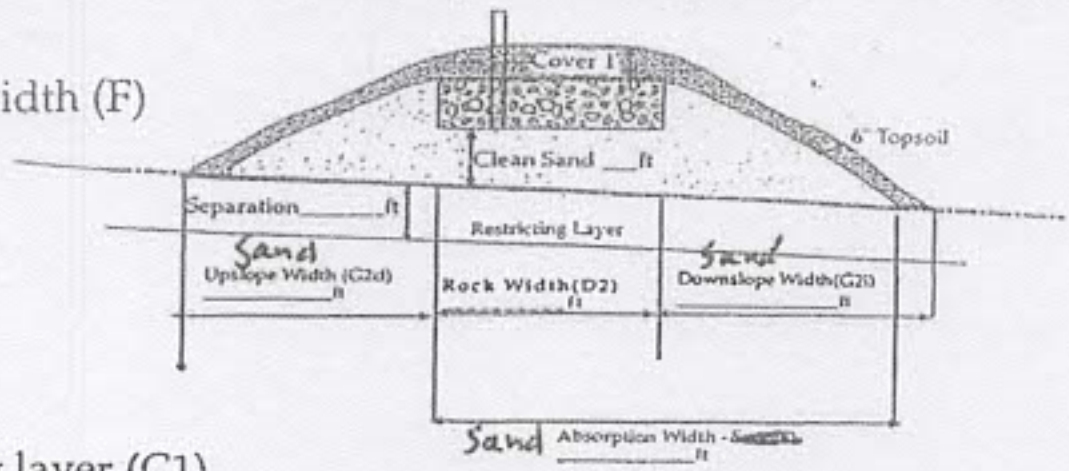
G. MOUND SLOPE WIDTH & LENGTH
(landslope greater than 1%)

1. Downslope absorption width = absorption width (F) minus rock layer width (D2)

27 ft - 10 ft = 17 ft

Landslope > 1% slope



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 ft - 1 ft = 2 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)

2 ft + 1ft + 1ft = 4 ft

c. Upslope berm multiplier based on land slope

2.83 *(see figure D-34)*

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

2.83 x 4 ft = 11.4 ft

DOWNSLOPE

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

10 ft x 2 % ÷ 100 = .2 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)

2. ft + 4 ft = 4.2' ft

g. Downslope berm multiplier based on percent land slc

3.09 *(see figure D-34)*

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

3.09 x 4.2 ft = 13 ft

i. Select the greater of G1 and G2h as the downslope width: 17 ft

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

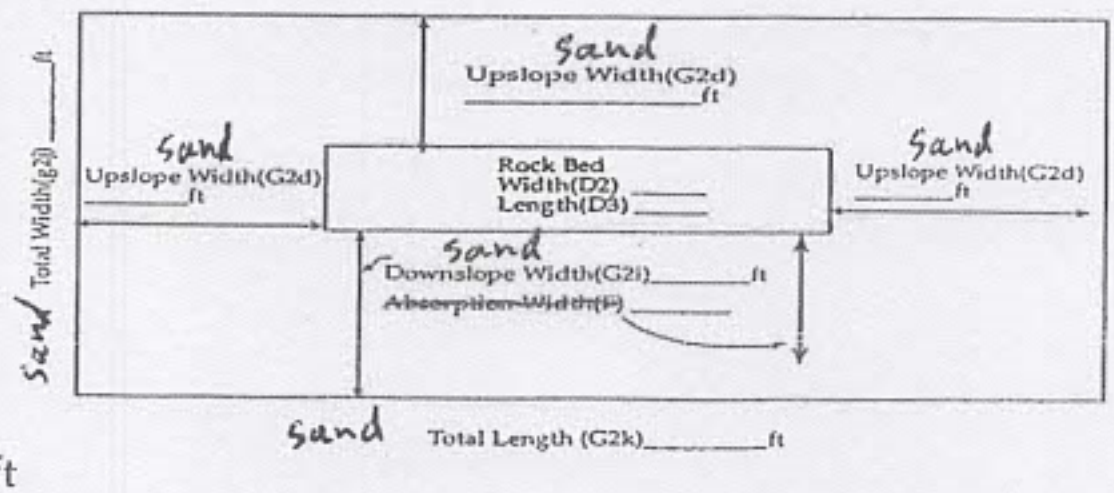
11.4 ft + 10 ft + 17 ft = 38.4 ft

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

11.4 ft + 37.5 ft + 11.4 ft = 60.3 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:

38.4 x 60.3

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

Dennis Schiff (signature) 747 (license #) 4-11-22 (date)

Dennis Daniello

MOUND DESIGN WORK SHEET (For Flows up to 1200 gpd)

A. Average Design FLOW

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

A-1: Estimated Sewage Flows in Gallons per Day

number of bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60% of the values in the Class 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	

B. SEPTIC TANK Capacity

1000 gallons *(see figure C-1)*

C-1: Septic Tank Capacities (in gallons)

Number of Bedrooms	Minimum Liquid Capacity	Liquid capacity with garbage disposal	Liquid capacity with disposal & lift inside
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 *(refer to site evaluation)*

1. Depth to restricting layer = 1' feet
2. Depth of percolation tests = _____ feet
3. Texture Clay loam
   Percolation rate 46 to 60 mpi
4. Soil loading rate 1.45 gpd/sqft *(see figure D-33)*
5. Percent land slope 2 %

D. ROCK LAYER DIMENSIONS

1. Multiply average design flow (A) by 0.83 to obtain required rock layer area.
   450 gpd x 0.83 sqft/gpd = 375 sqft
2. Determine rock layer width = 0.83 sqft/gpd x linear Loading Rate (LLR)
   0.83 sqft/gpd x 450 gpd/sqft = 10 ft
3. Length of rock layer = area ÷ width =
   375 sqft (D1) ÷ 10 ft (D2) = 37.5 ft

Mound LLR	
< 120 MPI	≤12
≥ 120 MPI	≤6

E. ROCK VOLUME

1. Multiply rock area (D1) by rock depth of 1 ft to get cubic feet of rock
   375 sqft x 1 ft = 375 cuft
2. Divide cuft by 27 cuft/cuyd to get cubic yards
   375 cuft ÷ 27 cuyd/cuft = 14 cuyd
3. Multiply cubic yards by 1.4 to get weight of rock in tons
   14 cuyd x 1.4 ton/cuyd = 20 tons

F. SEWAGE ABSORPTION WIDTH

Absorption width equals absorption ratio (See Figure D-33) times rock layer width (D2)

2.67 x 10 ft = 27 ft

D-33: Absorption Width Sizing Table

Percolation Rate in Minutes per Inch (MPI)	Soil Texture	Loading Rate Gallons per day per square foot	Absorption Ratio
Faster than 5	Coarse Sand Medium Sand Loamy Sand Fine Sand	1.20	1.00
6 to 15	Sandy Loam	0.79	1.50
16 to 30	Loam	0.60	2.00
31 to 45	Silt Loam Silt	0.50	2.40
46 to 60	Sandy Clay Loam Silty Clay Loam Clay Loam	0.45	2.67
61 to 120	Silty Clay Sandy Clay Clay	0.24	5.00
Slower than 120*			

*System designed for these soils must be other or performance

Dennis Daniello

PRESSURE DISTRIBUTION SYSTEM

1. Select number of perforated laterals 3

2. Select perforation spacing = 3 ft

3. 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.

$$\frac{37.5}{\text{Rock layer length}} - 2 \text{ ft} = 35 \text{ ft}$$

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 = 35 ft ÷ 3 ft = 11 spaces

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.*

11 spaces + 1 = 12 perforations/lateral

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

12 perfs/lat x 3 lat = 36 perforations

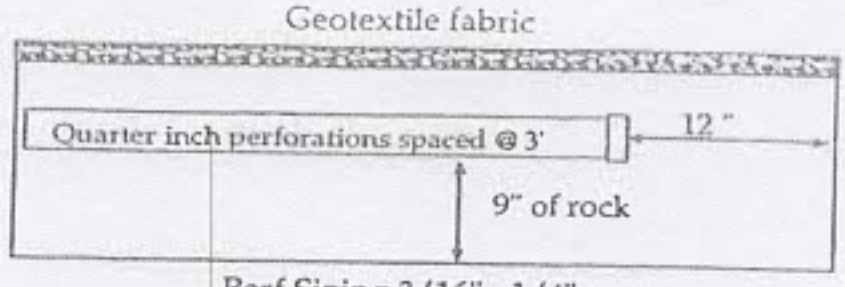
B. Calculate the square footage per perforation.
Should be 6-10 sqft/perf. *Does not apply to at-grades.*
Rock bed area = rock width (ft) x rock length (ft)
10 ft x 37.5 ft = 375 sqft
Square foot per perforation = Rock bed area ÷ number of perfs (6)
375 sqft ÷ 36 perfs = 10 sqft/perf

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

36 perfs x 74 gpm/perfs = 27 gpm

8. If laterals are connected to header pipe as shown on upper example, 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 lateral = 1¼ inches.

9. If perforated lateral system is attached to manifold pipe near the center, lower diagram, 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 = 1 inches.



Perf Sizing 3/16" - 1/4"
Perf Spacing 1.5'- 5'

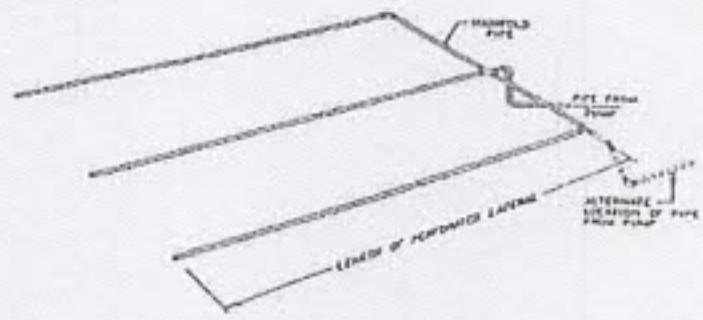
E-4: Maximum allowable number of 1/4-inch perforations per lateral to guarantee <10% discharge variation

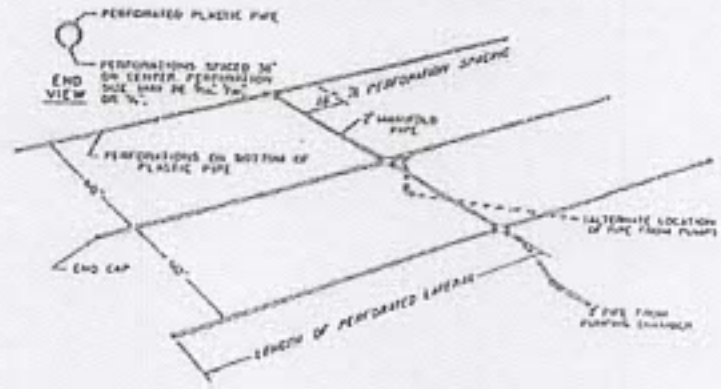
perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

head (feet)	perforation diameter (inches) 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.42	0.56	0.74
2.0[b]	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

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





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

Raymond Schupp (signature) 747 (license #) 4-11-22 (date)

Dennis Daniello

PUMP SELECTION PROCEDURE

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 distribution work sheet

From A or B Selected pump capacity: 27 gpm

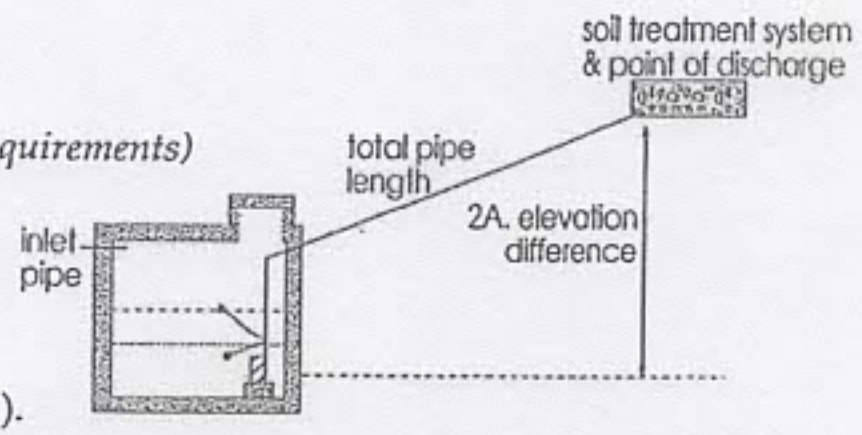
2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?

20 feet

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

5 feet



Special Head Requirements	
Gravity Distribution	0 ft
Pressure Distribution	5 ft

C. Calculate Friction loss

1. Select pipe diameter 2 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 = 1.55 ft/100ft of pipe
3. Determine total pipe length from pump discharge to soil treatment discharge point. Estimate by adding 25 percent to pipe length for fitting loss. Total pipe length times 1.25 = equivalent pipe length

   94 feet x 1.25 = 118 feet
4. Calculate total friction loss by multiplying friction loss (C2) in ft/100 ft by the equivalent pipe length (C3) and divide by 100.

   = 1.55 ft/100ft x 118 ÷100 = 1.8 ft

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

20 ft + 5 ft+ 1.8 ft =

Total head: 26.8 feet

E-9: Friction Loss in Plastic Pipe
Per 100 feet

flow rate gpm	nominal pipe diameter 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

3. Pump selection

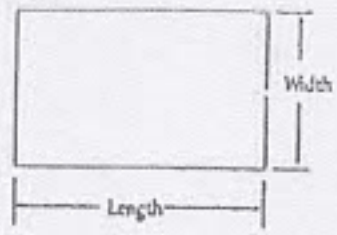
A pump must be selected to deliver at least 27 gpm (1A or B) with at least 26.8 feet of total head (2D)

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

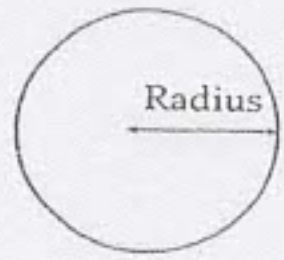
Raymond Schipp (signature) 747 (license #) 4-11-22 (date)

Dennis Daniello

DOSING CHAMBER SIZING



1. Determine area
   A. Rectangle area = L x W
   4' x 6.8 = 27.2 square feet
   B. Circle area = π (3.14) x radius in feet x radius in feet
   3.14 x _____ ft x _____ ft = _____ sqft
   C. Get area from manufacturer _____ sqft



2. Calculate gallons per inch
   There are 7.5 gallons per cubic foot of volume, therefore multiply the area (1A, B or C) times the conversion factor and divide by 12 inches per foot to calculate gallon per inch.
   Area x 7.5 ÷ 12 = 19 sqft x 7.5 ÷ 12 in/ft = 11.9 gallon per inch

3. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom 48 in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
   = 42 in x 11.9 gal/in = 500 gal

Legal Tank:
500 gallons or
100% the Daily flow
or
Alternating Pumps

4. Calculate gallons to cover pump (with 2-3 inches of water covering pump)
   (Pump and block height (inch) + 2 inch) x gallon/inch
   (13 in +2 in) x 11.9 gal/in = 178 gallon

A-1: Estimated Sewage Flows in Gallons per Day				
number of bedrooms	Class I	Class II	Class III	Class IV
2	300	225	180	60%
3	450	300	218	of the
4	600	375	256	values
5	750	450	294	in the
6	900	525	332	Class I,
7	1050	600	370	II, or III
8	1200	675	408	columns.

5. Calculate total pumpout volume
   A. Select pump size for 4-5 does per day. Gallon per dose = gpd (see *figure A-1)*
   / doses per day = 450 gpd ÷ 5 doses/day = 90 gallons
   B. Calculate drainback
      1. Determine total pipe length, 25 feet
      2. Determine liquid volume of pipe, 0.12 gal per ft (*see figure E-20)*
      3. Drainback quantity = 25 ft (5B1) x 0.12 gal per ft (5B2) = 13 gal
   C. Total pump out volume = dose volume (5A) + drainback (5B3)
   90 gal + 13 gal = 103 Total gallon

E-20: Volume of Liquid in Pipe	
Pipe Diameter *inches*	Gallons per foot
1	0.045
1.25	0.078
1.5	0.11
2	0.17
2.5	0.25
3	0.38
4	0.66

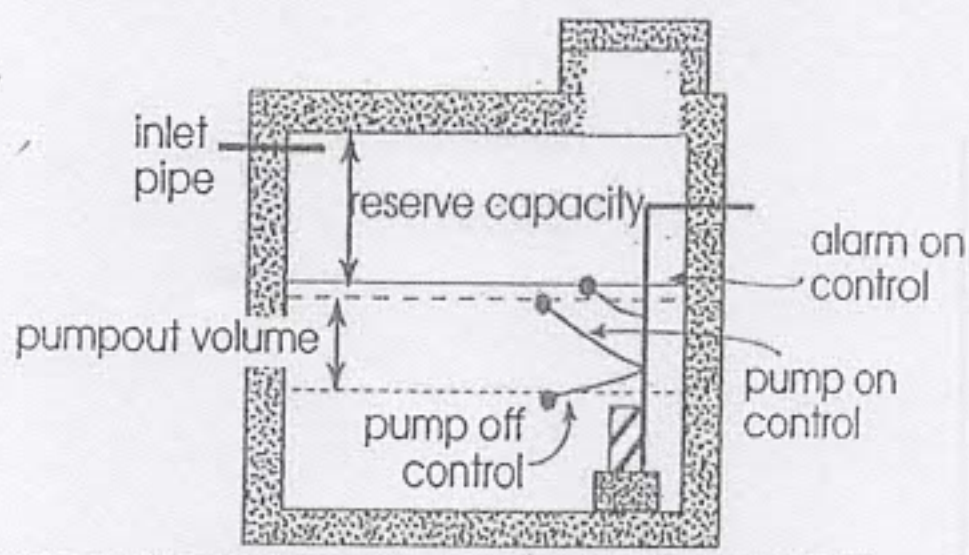
6. Float separation distance (using total pumpout volume)
   Total pumpout volume (5C) ÷ gal/inch (2)
   103 gal ÷ 11.9 gal/in= 8.6 inch

7. Calculate volume for alarm (typically 2 to 3 inches)
   Alarm depth (inch) x gallon/inch (2) = 2 in x 11.9 gal/in) = 23.8 gal

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   178 gal + 103 gal + 23.8 gal = 305 gallons

9. Total Tank Depth = total gallon (8) ÷ gallon/inch (2)
   305 gal ÷ 11.9 gal/in = 25.6 in

Recommended:
Calculate reserve capacity (75% the daily flow)
Daily flow x .75 = 450 x .75 = 337 gallons



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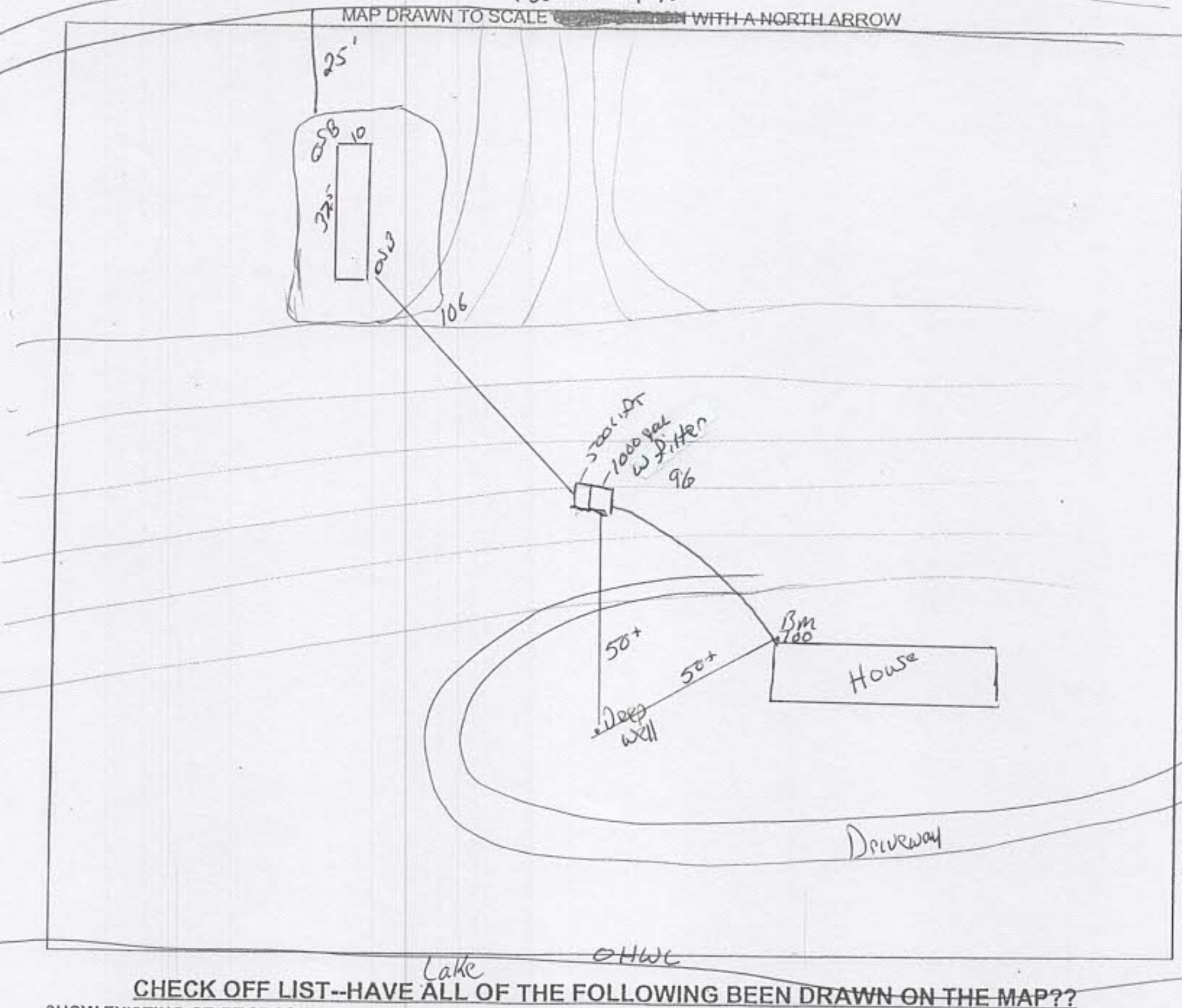
Jason Schyp (signature) 747 (license #) 4-11-22 (date)

SKETCH SHEET

CLIENT: Dennis Daniello

DATE: 4-11-22

MAP DRAWN TO SCALE ~~WITH A NORTH ARROW~~



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:

INDICATE ELEVATIONS

BENCHMARK 100

ELEVATION OF SEWER LINE @ HOUSE

ELEVATION @ TANK INLET

ELEVATION @ BOTTOM OF ROCK LAYER

ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER

ELEVATION OF PUMP

ELEVATION OF DISTRIBUTION DEVICE

DESIGNER SIGNATURE Raymond Schipp

LICENSE# 747

DATE 4-11-22

These data are provided on an "AS-IS" basis, without warranty of any type, expressed or implied, including but not limited to any warranty as to their performance, merchantability, or fitness for any particular purpose.

ArcGIS Web Map

1:4,514 | 0 0.0225 0.045 mi | 1 inch = 376 feet | Web AppBuilder for ArcGIS

Aitkin County

Date: 4/12/2022