FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 6-5-24, FIELD EVALUATION DATE 7-13-24
PROPERTY OWNER: Todd & Kellie Akins PHONE
ADDRESS: 19984 472 nd street CITY,STATE,ZIP: McGregor, MN 55760
LEGAL DESCRIPTION: Part of lot 2
PIN# 29-0-057304 SEC 28 T 49 R 23 TWP NAME Shamrock
FIRE# LAKE/RIVER Minnewawa 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 %		
DIRECTION OF SLOPE		
LANDSCAPE POSITION	Summit	
VEGETATION TYPES	Wooded	

REFERENCE BM ELEV. FT.
REFERENCE BM DESCRIPTION

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 68", 1A , 2 68", 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:

LIC# 910 SITE EVALUATOR SIGNATURE: Ernie Darlow Jr
SITE EVALUATOR NAME: Ernie Darlow Jr. TELEPHONE# 218-426-4320
LUG REVIEW DATE 7-13-24

Comments: Sewage will be pumped up from the walkout into a gravity line. 1650 gallon combo tank - Gravity to a settling pump tank. Pumped up to a pressure bed sized for 4 bedrooms.

SOIL BORING LOGS ON REVERSE SIDE

7-13-24
29-0-057304

SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4"	Top Soil	10yr 3/2
4" to 48"	Sand	10yr 4/4
48" to 68"	Sand	10yr 4/6
No mottling down to 68" or Redox		

2 (PROPOSED) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4"	Top Soil	10yr 3/2
4" to 48"	Sand	10yr 4/4
48" to 68"	Sand	10yr 4/6
No mottling down to 68" or Redox		

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

ADDITIONAL SOIL BORINGS MAY BE REQUIRED

TRENCH AND BED WORKSHEET

1. AVERAGE DESIGN FLOW

A. Estimated 600 gpd *(see figure A-1)*
or measured ___ x 1.5 *(safety factor)* = ___ gpd
B. Septic tank capacity _____ gal *(see figure C-1)*

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	

2. SOILS *(Site evaluation data)*

C. Depth to restricting layer = 5.7 ft (32")
D. Max depth of system Item 2C - 3 ft = 5.7 ft - 3 ft = 2.7 ft
E. Texture Sand Percolation rate _____ MPI
F. Soil Sizing Factor (SSF) 1.27 sqft/gpd *(see figure D-15)*
G. % Land Slope _____ %

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

3. TRENCH or BED BOTTOM AREA

H. For trenches with 6 inches of rock below the pipe:
A x F = 600 gpd x 1.27 sqft/gpd = 762 sqft
I. For trenches with 12 inches of rock below the pipe:
A x F x 0.8 = _____ gpd x _____ sqft/gpd x 0.8 = _____ sqft
J. For trenches with 18 inches of rock below the pipe:
A x F x 0.66 = _____ gpd x _____ sqft/gpd x 0.66 = _____ sqft
K. For trenches with 24 inches of rock below the pipe:
A x F x 0.6 = _____ gpd x _____ sqft/gpd x 0.6 = _____ sqft
L. For gravity beds with 6 or 12 inches of rock below the pipe;
1.5 x A x F = 1.5 x ___ gpd x ___ sqft/gpd = ___ sqft
For pressure beds with 6 or 12 inches of rock below the pipe;
A x F = ___ gpd x ___ sqft/gpd = _____ sqft

D-15: Soil Characteristics and Soil:Sizing Factor (SSF) (> 3' separation)

Percolation Rate minutes per inch (mpi)	Soil Texture	Soil Sizing Factor square feet/gallon per day (sqft/gpd)
faster than 0.1*	Coarse sand	0.83
0.1 to 5*	Medium sand Loamy sand	0.83
0.1 to 5**	Fine sand	1.67
6 to 15	Sandy loam	1.27
16 to 30	Loam	1.67
31 to 45	Silt loam Silt	2.00
46 to 60	Clay loam Sandy clay Silty clay	2.20
over 61 to 120***	Clay Sandy clay Silty clay	4.20
slower than 120****		

*Use systems for rapidly permeable soils: pressure distribution or serial distribution with no trench >25% of the total system.
**Soil having 50% or more fine sand plus very fine sand
***A mound must be used.
****An other or performance system must be used

4. DISTRIBUTION *(Check all that apply)*

X Bed (< 6% slope) ___ Drop boxes (any slope) X Rock
___ Trenches ___ Distribution box (< 3%) ___ Chamber
X Pressure ___ Gravity ___ Gravelless

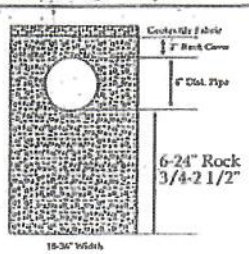
5. SYSTEM WIDTH, LENGTH and VOLUME

M. Select trench width = 18 ft
N. If using rock, divide bottom area by width: (H, I, J, K or L) ÷ M =
762 sqft ÷ 18 ft = 42.5 lineal feet
Rock depth below distribution pipe plus 0.5 foot times bottom area:
Rock depth in feet + 0.5 feet x Area (H, I, J, K, or L)
(.5 ft + 0.5 ft) x 762 sqft = 762 cuft
Volume in cubic yards = cuft ÷ 27
762 cuft ÷ 27 = 28.3 cuyds
Weight of rock in tons = cubic yds x 1.4
28.3 cuyds x 1.4 = 40 tons
O. If using 10" Gravelless Pipe, Flow (A) x Gravelless SSF *(see figure D-9)*
_____ gpd x ___ lineal feet/gpd = _____ lineal feet
P. If using Chambers, H, I, J, or K (based on hieght of chamber slats) ÷ width of chamber in feet (M)
_____ sqft ÷ _____ ft = _____ lineal ft

D-9: Soil Characteristics and Soil sizing factors (SSF) for Gravelless Pipe

percolation rate (minutes/inch)	soil texture	lineal feet/ gallon/day
Faster than 0.1 *	Coarse Sand	----
0.1 to 5	Medium Sand	0.28
	Loamy Sand	
0.1 to 5	Fine Sand **	0.6
6 to 15	Sandy Loam	0.42
16 to 30	Loam	0.56
31 to 45	Silt Loam	0.67
	Silt	
46 to 60	Clay Loam (CL)	0.74
	Sandy CL	
	Silty CL	
slower than 60***	Clay	----
	Sandy Clay	
	Silty Clay	

*Soil too coarse for sewage treatment. Use systems for rapidly permeable soils.
**Soil having 50% or more fine sand + very fine sand.
***Soil with too high a percentage of clay for installation of a standard inground system.



6. LAWN AREA

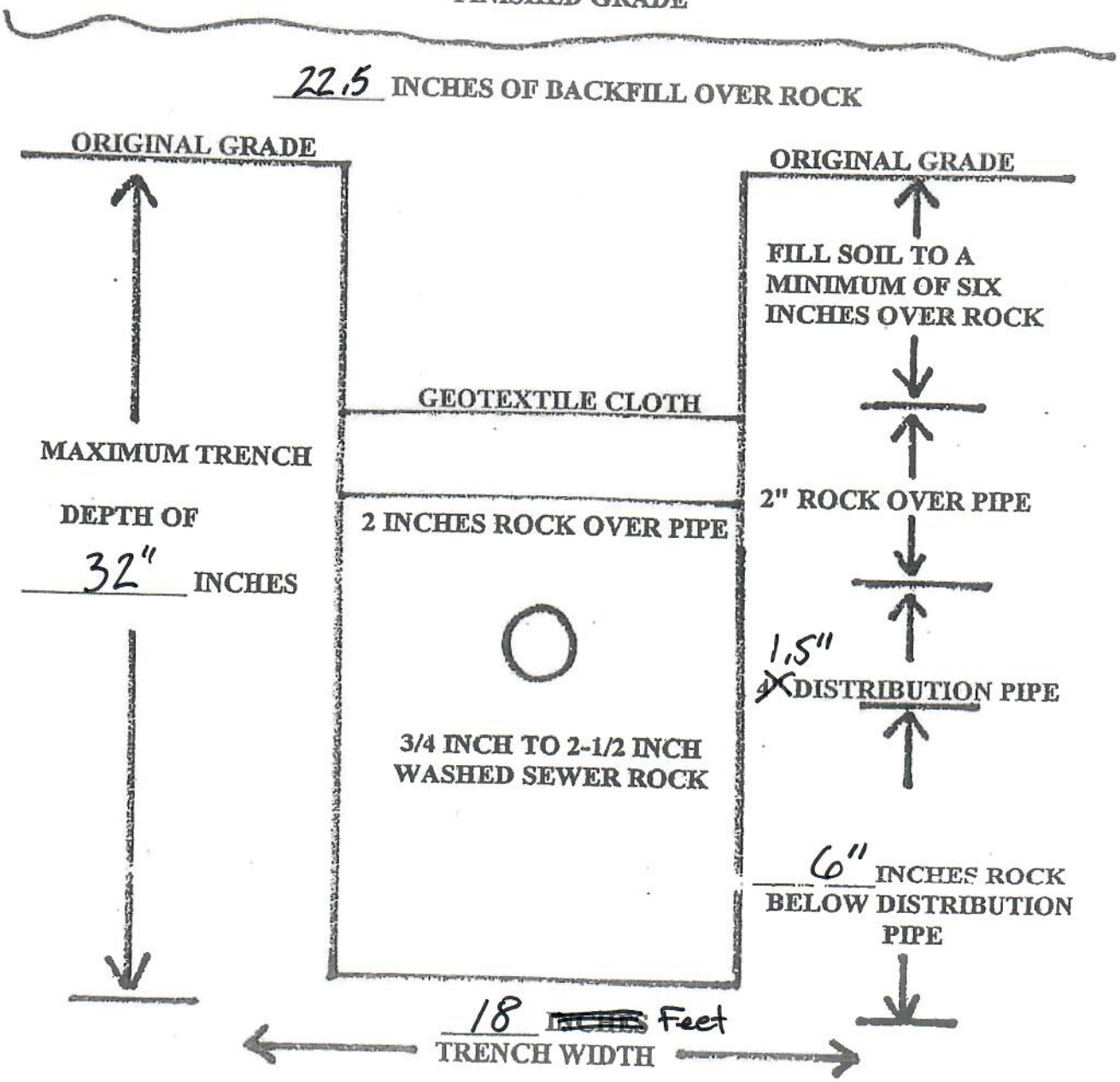
Q. Select trench spacing, center to center = 18 feet
R. Multiply trench spacing by lineal feet R x Q = sqft of lawn area
18 ft x 42.5 ft = 762 sqft

7. Include a drawing with scale (one inch = 40 ft). Show pertinent boundaries, right of way, easements, location of house, garage, driveway, all other imporvements, existing or proposed soil treatment system, well and dimensions of all elevations, setbacks and separation distances.

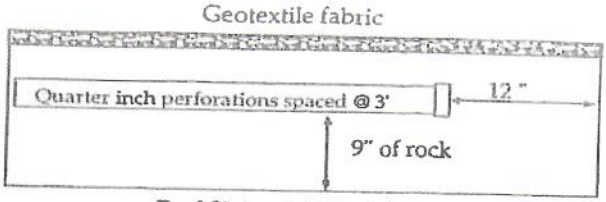
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Ernie Darby Jr (signature) 910 (license #) 7-13-24 (date)

TRENCH CROSS-SECTION



PRESSURE DISTRIBUTION SYSTEM



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

1. Select number of perforated laterals 5

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.

   42.5 (Rock layer length) - 2 ft = 40.5 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 = 40.5 ft ÷ 3 ft = 13.5 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.*

   13.5 spaces + 1 = 15 perforations/lateral

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

   15 perfs/lat x 5 lat = 75 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)
   18 ft x 42.5 ft = 765 sqft
   Square foot per perforation = Rock bed area ÷ number of perfs (6)
   765 sqft ÷ 75 perfs = 10.2 sqft/perf

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

   75 perfs x .56 gpm/perfs = 42 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 = 1.5 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 = 1.5 inches.

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

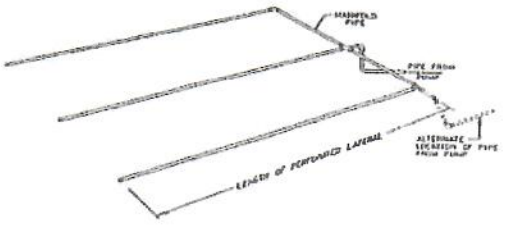
perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
(3.0)	8	13	(17)	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

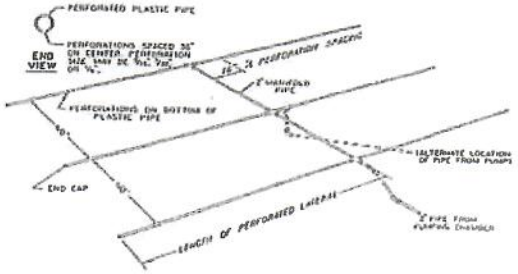
head (feet)	perforation diameter (inches) 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.42	0.56	0.74
2.0[b]	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

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

MANIFOLD LOCATED AT END OF PRESSURE DISTRIBUTION SYSTEM



LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION IN MOUND



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

Ernie Dark (signature) 910 (license #) 7-13-24 (date)

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

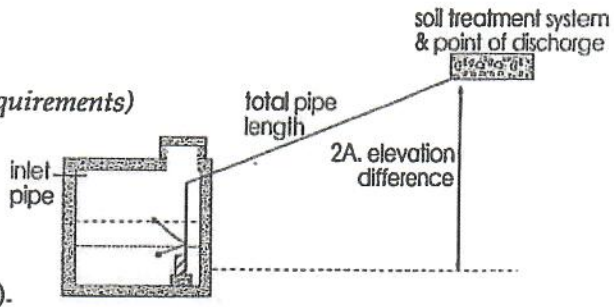
See pressure distribution work sheet

From A or B Selected pump capacity: 42 gpm

2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?
10 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 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 = 11.07 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
   45 feet x 1.25 = 56.25 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.
   = 11.07 ft/100ft x 56 ÷100 = 6.2 ft

D. Total head required is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4)
5 ft + 10 ft+ 6.2 ft =

Total head: 21.2 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

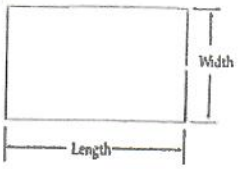
A pump must be selected to deliver at least 42 gpm (1A or B) with at least 21.2 feet of total head (2D)

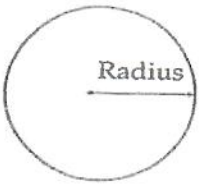
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Ernie Danks Jr (signature) 910 (license #) 7-13-24 (date)

1650 Combo

DOSING CHAMBER SIZING





1. Determine area
   A. Rectangle area = L x W
      _____ x _____ = _____ 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 = _____ sqft x 7.5 ÷ 12 in/ft = 12.69 gallon per inch

3. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom 48.5 in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
      = 48.5 in x 12.69 gal/in = 615 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
   (_____ in +2 in) x _____ gal/in = _____ gallon

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 = _____ gpd ÷ _____ doses/day = _____ gallons
   B. Calculate drainback
      1. Determine total pipe length, _____ feet
      2. Determine liquid volume of pipe, _____ gal per ft (*see figure E-20*)
      3. Drainback quantity = _____ ft (5B1) x _____ gal per ft (5B2) = _____ gal
   C. Total pump out volume = dose volume (5A) + drainback (5B3)
      _____ gal + _____ gal = _____ Total gallon

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

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

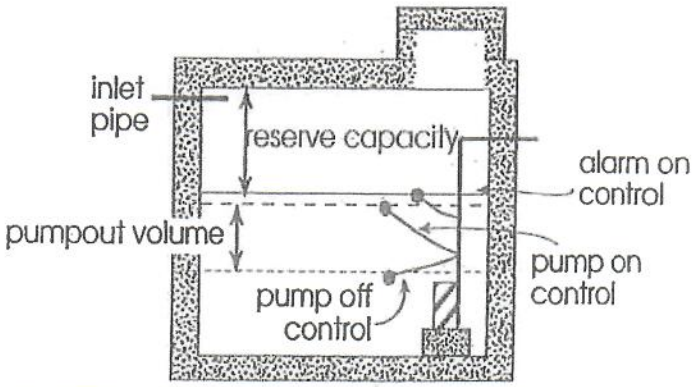
8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   _____ gal + _____ gal + _____ gal = _____ gallons

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

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

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.

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



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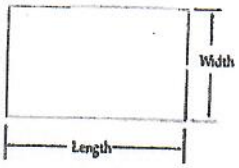
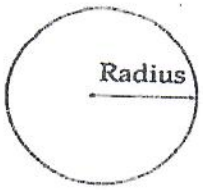
Ernie Dorsey (signature) 910 (license #) 7-13-24 (date)

760 Lift pump tank

DOSING CHAMBER SIZING

1. Determine area
   A. Rectangle area = L x W
   _____ x _____ = _____ 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 = _____ sqft x 7.5 ÷ 12 in/ft = 24.92 gallon per inch

3. Calculate total tank volume
   A. Depth from bottom of inlet pipe to tank bottom 33.5 in
   B. Total tank volume = depth from bottom of inlet pipe to tank bottom (3A) x gal/in (2)
   = 33.5 in x 24.92 gal/in = 834 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
   (14 in +2 in) x 24.92 gal/in = 399 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 = 600 gpd ÷ 5 doses/day = 120 gallons
   B. Calculate drainback
      1. Determine total pipe length, 45 feet
      2. Determine liquid volume of pipe, .11 gal per ft (*see figure E-20)*
      3. Drainback quantity = 45 ft (5B1) x .11 gal per ft (5B2) = 5 gal
   C. Total pump out volume = dose volume (5A) + drainback (5B3)
   120 gal + 5 gal = 125 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

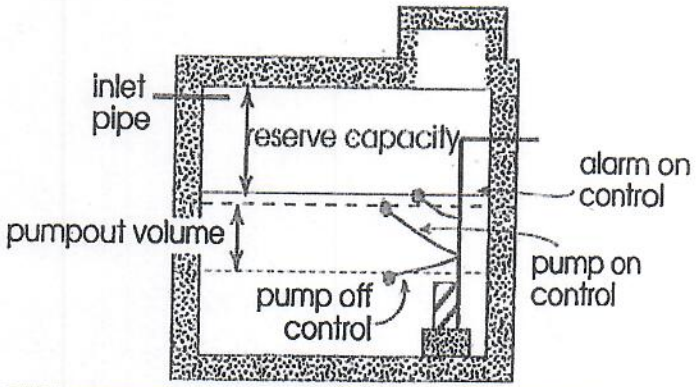
6. Float separation distance (using total pumpout volume)
   Total pumpout volume (5C) ÷ gal/inch (2)
   125 gal ÷ 24.92 gal/in= 5 inch

7. Calculate volume for alarm (typically 2 to 3 inches)
   Alarm depth (inch) x gallon/inch (2) = 2 in x 24.92 gal/in) = 49.9 gal

8. Calculate total gallon = gallons over pump (4) + gallons pumpout (5C) + gallons alarm (7)
   399 gal + 125 gal + 49.9 gal = 574 gallons

9. Total Tank Depth = total gallon (8) ÷ gallon/inch (2)
   574 gal ÷ 24.92 gal/in = 23 in

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



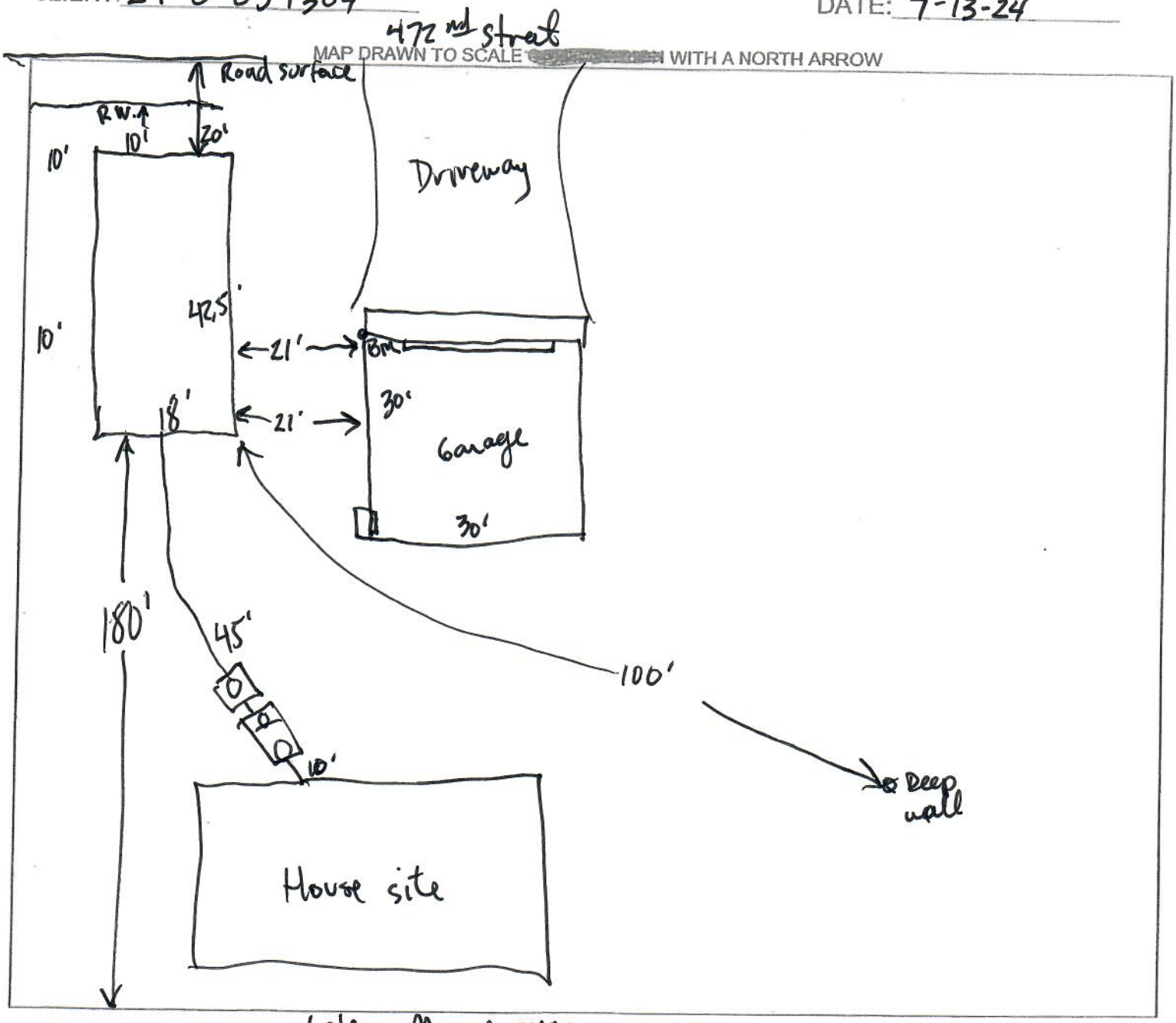
I hereby certify that I have completed this work in accordance with applicable ordinances, rules and laws.

Ernie Dark (signature) 910 (license #) 7-13-24 (date)

SKETCH SHEET

CLIENT: 29-0-057304 DATE: 7-13-24

MAP DRAWN TO SCALE [redacted] 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

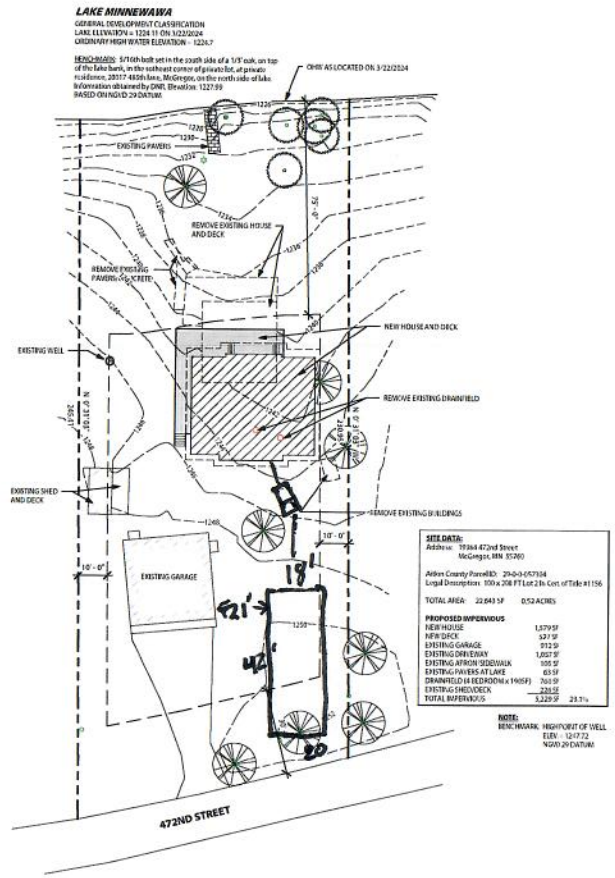
COMMENTS:

INDICATE ELEVATIONS

100.0	BENCHMARK Corner of Garage
105.0	ELEVATION OF SEWER LINE @ HOUSE
106.5	ELEVATION @ TANK INLET
102.5	ELEVATION @ BOTTOM OF ROCK LAYER
105.5	ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER
110.0	ELEVATION OF PUMP
102.0	ELEVATION OF DISTRIBUTION DEVICE

DESIGNER SIGNATURE Erica Dahl

LICENSE# 910 DATE 7-13-24



1 / A0.1 ARCHITECTURAL SITE PLAN
1" = 20'-0"

4/11/2024 3:19:52 PM

NOR-SON
CUSTOM BUILDERS

CHIPMUNK CORRAL

REVISIONS

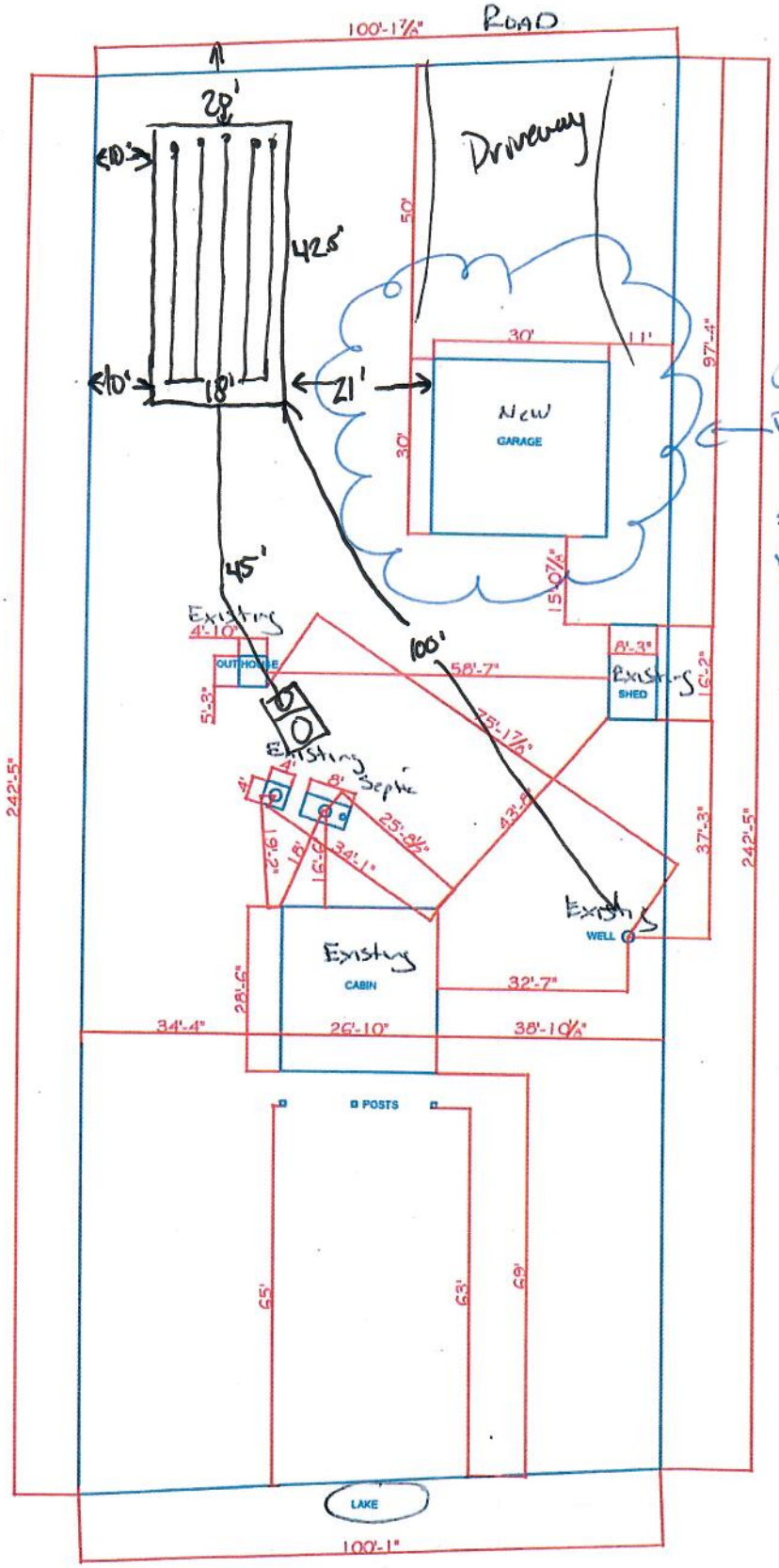
PRELIMINARY

4/08/2024

JOB NO. 4092

ARCHITECTURAL SITE PLAN

SHEET
A0.1



GARAGE IS Being Built on Existing Driveway

5-10 TREES MAY need to Be REMOVED 4-8" DIAMETER Typical SIZE of TRUNK