WEST SEPTIC SYSTEM

FIELD EVALUATION SHEET

PRELIMINARY EVALUATION DATE 10-10-22, FIELD EVALUATION DATE 4-2-23
PROPERTY OWNER: LYNWOOD + MICHELLE ELLIOTT PHONE
ADDRESS: 22100 320TH AVE CITY,STATE,ZIP: AITKIN MN 56431
LEGAL DESCRIPTION: (SW SW) LOT 3 LESS .5 AC + LESS .91 AC HY
PIN# 21-0-053400 SEC 33 T 45 R 25 TWP NAME MALMO
FIRE# LAKE/RIVER DEER LAKE LAKE CLASS NATURAL OHWL F

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 %	3	
DIRECTION OF SLOPE	SOUTH	
LANDSCAPE POSITION		
VEGETATION TYPES	GRASS - FIELD	

REFERENCE BM ELEV. 100 F
REFERENCE BM DESCRIPTION
GROUND ELEVATION BETWEEN QUONSET HUT AND SITE 1+2 BOUNDRY LINE

DEPTH TO STANDING WATER OR MOTTLED SOIL: BORING# 1 55", 1A 55", 2 ,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: 9 SITES. DRAINFIELD SIZING = 100 G.P.D.
TANK SIZING x3. 2700 GALLONS MIN. FOR TANKS

LIC# 127 SITE EVALUATOR SIGNATURE: Larry Liljenquist

SITE EVALUATOR NAME: LARRY LILJENQUIST TELEPHONE# 218-820-8886

LUG REVIEW DATE

Comments:

SOIL BORING LOGS ON REVERSE SIDE

TRENCH AND BED WORKSHEET

1. AVERAGE DESIGN FLOW

A. Estimated 900 gpd *(see figure A-1)*
or measured ___ x 1.5 *(safety factor)* = ___ gpd

B. Septic tank capacity 2,700 gal *(see figure C-1)*
x 3

2. SOILS *(Site evaluation data)*

C. Depth to restricting layer = 4.5 ft

D. Max depth of system Item 2C - 3 ft = 4.5 ft - 3 ft = 1.5 ft

E. Texture SAND Percolation rate 6-15 MPI

F. Soil Sizing Factor (SSF) 1.27 sqft/gpd *(see figure D-15)*

G. % Land Slope 3 %

3. TRENCH or BED BOTTOM AREA

H. For trenches with 6 inches of rock below the pipe:
A x F = _____ gpd x _____ sqft/gpd = _____ 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 = 900 gpd x 1.27 sqft/gpd = 1143 sqft

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 = 20 ft

N. If using rock, divide bottom area by width: (H, I, J,K or L) ÷ M =
1143 sqft ÷ 20 ft = 58 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)
(___ ft + 0.5 ft) x ___ sqft = 1143 cuft
Volume in cubic yards = cuft ÷27
1143 cuft ÷ 27 = 43 cuyds
Weight of rock in tons = cubic yds x 1.4
43 cuyds x 1.4 = 60.2 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

6. LAWN AREA

Q. Select trench spacing, center to center = ___ feet

R. Multiply trench spacing by lineal feet R x Q = sqft of lawn area
20 ft x 58 ft = 1160 sqft

7. Include a drawing with scale (one inch = _____ 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.

Larry Klymasuk (signature) 127 (license #) 4-1-23 (date)

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.

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

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

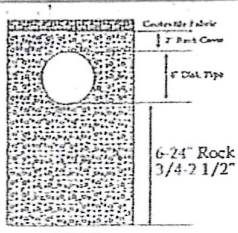
Percolation Rate minutes per inch (mpi)	Soil Texture	Soil Sizing Factor square feet/gallon per day (sqft/gpd)
faster than 0.1*	Coarse sand	0.83
0.1 to 5*	Medium sand	0.83
	Loamy sand	
0.1 to 5**	Fine sand	1.67
6 to 15	Sandy loam	1.27
16 to 30	Loam	1.67
31 to 45	Silt loam	2.00
	Silt	
46 to 60	Clay loam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

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

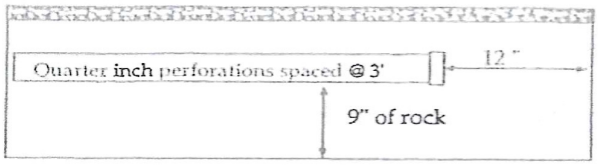
percolation rate (minutes/inch)	soil texture	lineal feet/ gallon/day
Faster than 0.1*	Coarse Sand	---
0.1 to 5	Medium Sand	0.28
	Loamy Sand	
0.1 to 5	Fine Sand **	0.6
6 to 15	Sandy Loam	0.42
16 to 30	Loam	0.56
31 to 45	Silt Loam	0.67
	Silt	
46 to 60	Clay Loam (CL)	0.74
	Sandy CL	
	Silty CL	
slower than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



2 PUMPS/ALT SWITCHES - THIS FEEDS ONE-HALF OF DRAINFIELD

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 = 2.5 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.

   29 (Rock layer length) - 2 ft = 27 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 = 27 ft ÷ 2.5 ft = 10.8 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.*

   10.8 spaces + 1 = 11 perforations/lateral

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

   11 perfs/lat x 5 lat = 55 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)
   20 ft x 29 ft = 580 sqft
   Square foot per perforation = Rock bed area ÷ number of perfs (6)
   580 sqft ÷ 55 perfs = 10.5 sqft/perf

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

   55 perfs x .80 gpm/perfs = 44 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 1/4 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 = _____ inches.

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

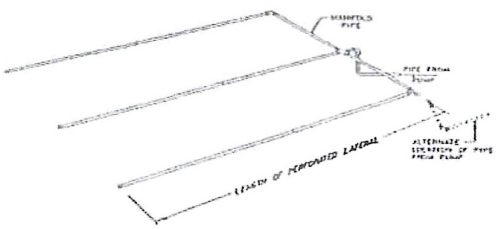
perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

E-6: Perforation Discharge in gpm

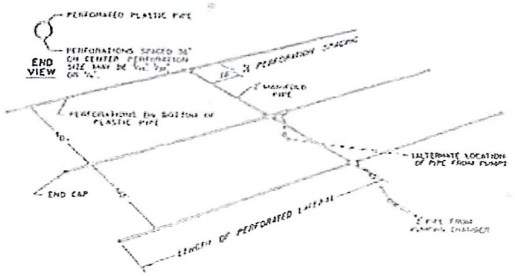
head (feet)	perforation diameter (inches) 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.42	0.56	0.74
2.0[b]	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

[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.

Larry Lyngaas (signature) 127 (license #) 4-2-23 (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: 44 gpm

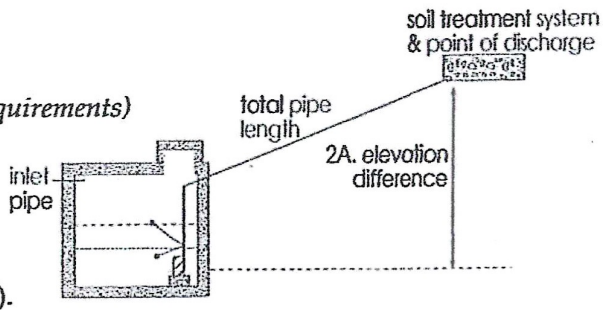
2. Determine pump head requirements:

A. Elevation difference between pump and point of discharge?

9 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 = 3.28 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
   280 feet x 1.25 = 350 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.
   = 3.28 ft/100ft x 350 ÷100 = 11.5 ft

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

9 ft + 5 ft+ 11.5 ft =

Total head: 25.5 feet

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

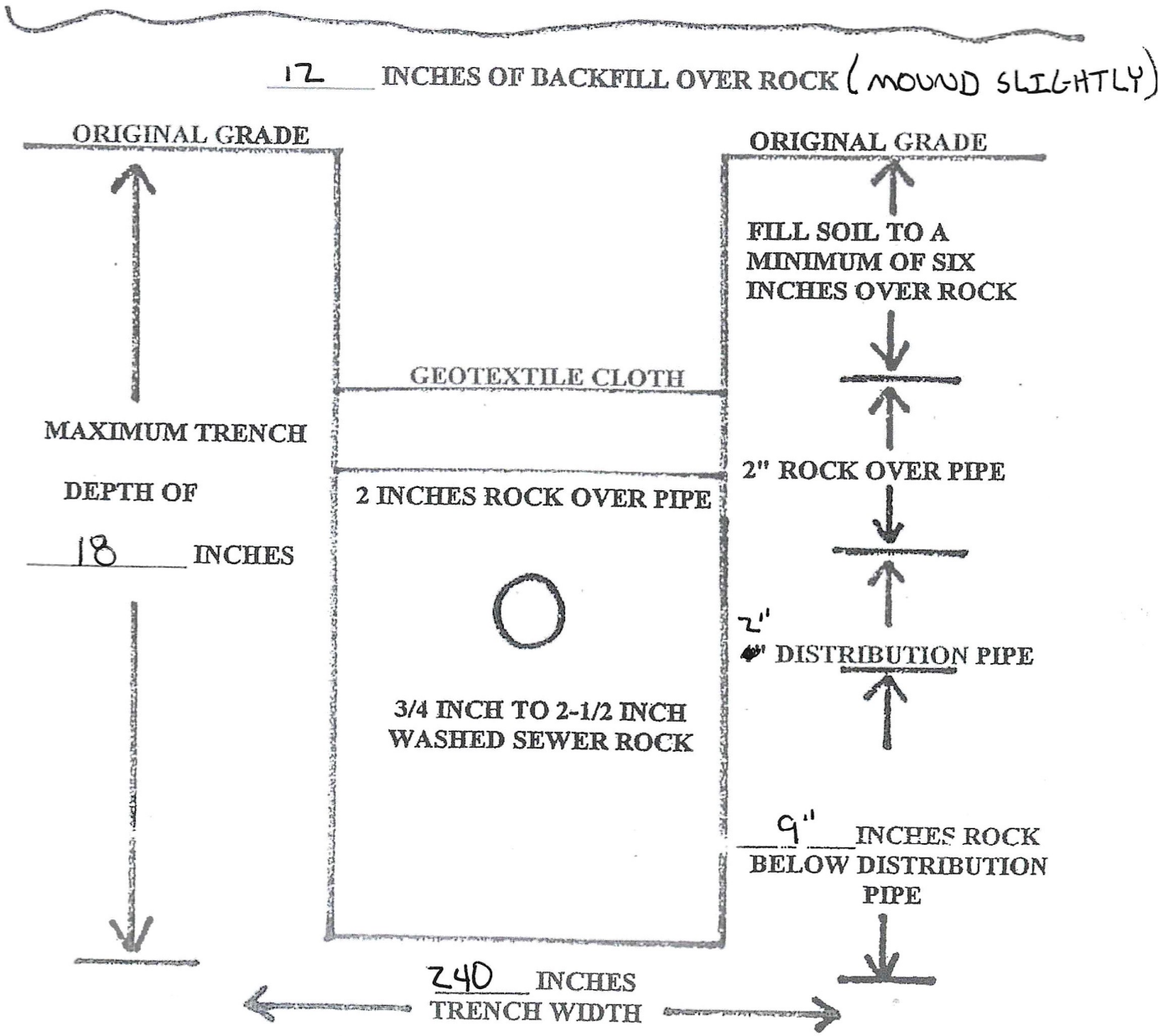
3. Pump selection

A pump must be selected to deliver at least 44 gpm (1A or B) with at least 25.5 feet of total head (2D)

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

Larry Lyngaas (signature) 127 (license #) 4-2-23 (date)

TRENCH CROSS-SECTION



SOILS CHARTS FOR BOTH PROPOSED AND ALTERNATE SITES

1 (PROPOSED) SOILS DATA

SOIL PIT

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0 - 4	TOPSOIL	
4-24	SANDY LOAM	7.5YR 5/4
24-40	SANDY LOAM	7.5YR 5/3
40-55	SANDY LOAM	7.5YR 5/6

NO REDOX FEATURES
DRY SOMEWHAT LOOSE MATERIAL

2 (PROPOSED) SOILS DATA

SOIL PIT

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0 - 4	TOPSOIL	
4-28	SANDY LOAM	7.5YR 5/4
28-44	SANDY LOAM	7.5YR 5/3
44-55	SANDY LOAM	7.5YR 5/6

NO REDOX FEATURES
DRY, LOOSE MATERIAL

1 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR
0-4	TOPSOIL	
4-24	SANDY LOAM	7.5YR 5/4
24-41	SANDY LOAM	7.5YR 5/3

NO REDOX FEATURES
DRY AND COULD NOT PULL UP SOIL. SIMILAR SOILS AS THE PITS.

2 (ALTERNATE) SOILS DATA

DEPTH (INCHES)	TEXTURE	MUNSELL COLOR

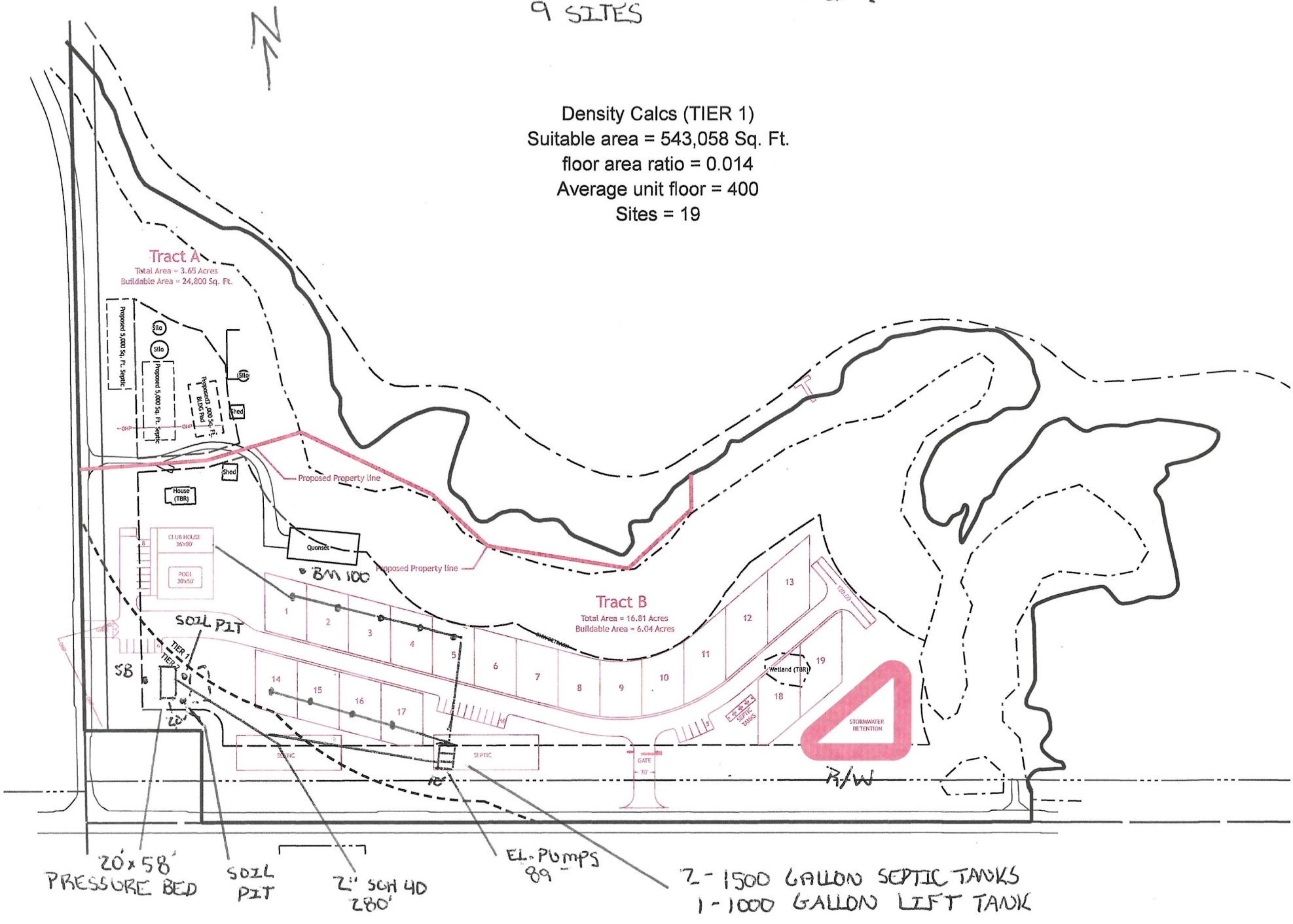
ADDITIONAL SOIL BORINGS MAY BE REQUIRED

Aitkin County, Minnesota (MN001)

Aitkin County, Minnesota (MN001)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
188B	Omega loamy fine sand, 2 to 6 percent slopes	0.6	100.0%
Totals for Area of Interest		**0.6**	**100.0%**

WEST SEPTIC SYSTEM
9 SITES



SKETCH SHEET

CLIENT: WEST SEPTIC SYSTEM DATE: 4-2-23

MAP DRAWN TO SCALE [redacted] WITH A NORTH ARROW

SEE

DRAWING

ELEVATIONS

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 BY QUONSET HUT
ELEVATION OF SEWER LINE @ HOUSE
ELEVATION @ TANK INLET 93
ELEVATION @ BOTTOM OF ROCK LAYER 97
ELEVATION @ BOTTOM OF BORING OR RESTRICTIVE LAYER 94
ELEVATION OF PUMP 89
ELEVATION OF DISTRIBUTION DEVICE 98

DESIGNER SIGNATURE Larry Ulmgrid DATE 4-2-23
LICENSE# 127

Subsurface Sewage Treatment System Management Plan

Property Owner: LYNWOOD ELLIOTT Phone: _____ Date: 4-2-23

Mailing Address: _____ City: _____ Zip: _____

Site Address: 22100 320TH AVE City: AITKIN Zip: 56431

This management plan will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic service provider or maintenance provider.

System Designer: Recommends SSTS check every 36 months.
Local Government: Recommends SSTS check every _____ months.
State Requirement: Requires SSTS check every 36 months.
(State requirements are based on MN Rules Chapter 7080.2450, Subp. 2 & 3)

My System needs to be checked every 36 months.

Homeowner Management Tasks:

Leaks – Check (look, listen) for leaks in toilets and dripping faucets. Repair leaks promptly.

Surfacing sewage – Regularly check for wet or spongy soil around your soil treatment area.

Effluent filter – Inspect and clean twice a year or more.

Alarms – Alarm signals when there is a problem. Contact a service or maintenance provider any time an alarm signals.

Event counter or water meter – Record your water use.

-recommend meter readings be conducted (*circle one:* DAILY WEEKLY (MONTHLY) N/A)
SUMMER MONTHS

Licensed septic service provider or maintenance provider (Check all that apply):

- ☒ Check to make sure tank is not leaking
- ☒ Check and clean the in-tank effluent filter (if exists)
- ☐ Check the sludge/scum layer levels in all septic tanks
- ☐ Recommend if tank should be pumped
- ☐ Check inlet and outlet baffles
- ☐ Check the drainfield effluent levels in the rock layer
- ☒ Check the pump and alarm system functions
- ☒ Check wiring for corrosion and function
- ☐ Check dissolved oxygen and effluent temperature in tank
- ☐ Provide homeowner with list of results and any action to be taken
- ☐ Flush and clean laterals if cleanouts exist

"I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in the Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Property Owner Signature: _____ Date: _____

Designer Signature: Larry Lynguist Date: 4-2-23

See Reverse Side for Management Log

Maintenance Log

Activity	Date Accomplished									
Check frequently:										
Leaks: check for plumbing leaks										
Soil treatment area check for surfacing										
Lint filter: check, clean if needed										
Effluent screen: if owner-maintained										
Water usage rate (monitor frequency _____)										
Check annually:										
Caps: inspect, replace if needed										
Sludge & Scum/Pump										
Inlet & Outlet baffles										
Drainfield effluent leaks										
Pump, alarm, wiring										
Flush & clean laterals if cleanouts exists										
Other:_____										
Other:_____										

Notes:_____

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1/2 hp

FL60-Series

6/10 hp

FL70-Series

3/4 hp

Submersible Effluent Pumps

3/4" Solids Handling

1-1/2" or 2" Discharge

Features:

- Semi-open impellers permit passage of solids without clogging
- Heavy cast iron construction
- Stainless steel fasteners
- 416 stainless steel rotor shaft
- Permanently lubricated upper and lower ball bearings
- Oil-filled hermetically sealed motors with thermal overload protection
- Unitized carbon and ceramic shaft seal
- Dual-sized discharge flange: 1-1/2: or 2"
- Quick-disconnect power cord in 10' standard length (25' and 35' optional lengths available on some models)

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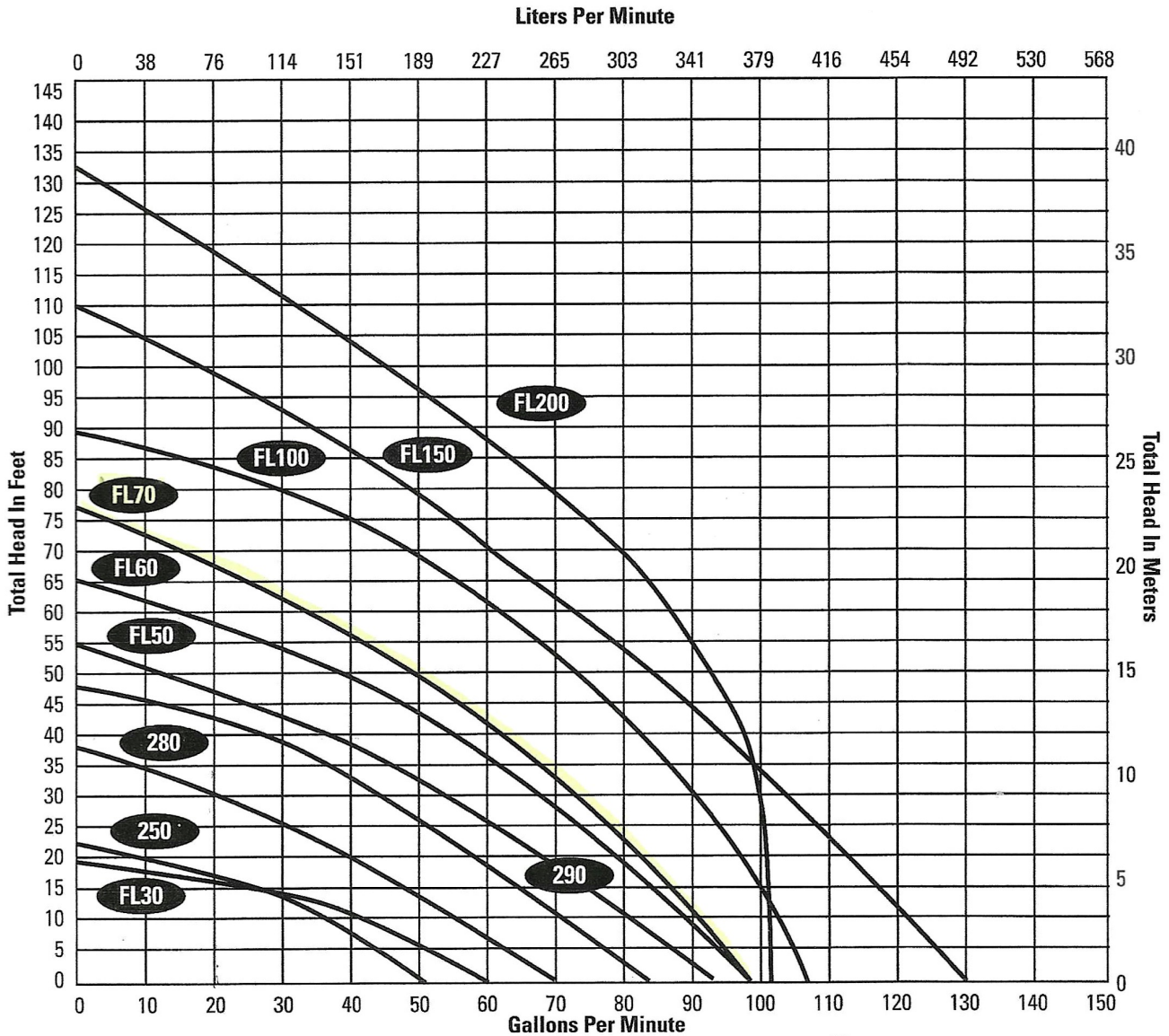
Effluent Pumps

Performance Curve Data

60 hz.



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