# University of Minnesota Site Evaluation Form 5/16/2005

Onsite Sewage Treatment Program

**Property Owner(s)** Christine Pierce

Address [redacted] Phone Number [redacted]

P.I.D. 29-1-146300 2 Bedroom mound design

Date 4/16/2021 Time 11:00 AM Section __ Township 48 N Range 23

Weather conditions sunny and clear

**Location Information** *(check all that apply)*

__ sewer sites __ dwelling x replacement system

__ protection area __ other establishment __ new home construction

**Homeowner Information**

No. of bedrooms *(if applicable)* 2 bedrooms (includes possible additions)

No. of residents in home 2 adults __ children

Estimated flow 300 gpd

Well casing depth Shallow feet

Water using devices *(check)* — Discharge location if checked

__ Garbage disposal __ Water softener

__ Dishwasher __ Sump pump

__ Large bathtub __ High eff. furnace

__ Laundry/large tub on 2nd floor __ Jucuzzi/hottub

Water use concerns *(check)*

__ Toilet/faucet leaks __ Max load laundry/day __ Long term prescription medications

__ Home business __ Lint screen __ Antibact. soap __ Frequent parties or out of town guests

**Soil Data**

Soil texture classification: sandy loam

| | | | | | |
|---|---|---|---|---|---|
| Unnatural soil *(check)* | __ Yes | x No | | | |
| Type of observation *(check)* | __ Probe | __ Pit | x Boring | | |
| Parent material *(check)* | x Till | __ Outwash | __ Loess | __ Bedrock | __ Alluvium |
| Vegetation type *(check)* | __ Wet | x Dry | __ Unknown | | |
| Slope form *(check)* | __ Summit | x Shoulder | __ Back | __ Foot | __ Toe |
| Drainage *(check)* | x Good | __ Fair | __ Poor | __ Ponding | __ Flooding |
| Located in floodplain *(check)* | __ Yes | x No | | | |

**Site Summary Data**

Standing water: n/a inches

Bedrock: n/a inches

Saturated soil: 42" inches

Maximum depth of system: plus 12" inches

Max elevation at system bottom: 101 feet

Soil sizing factor (SSF): 1.27 $gpd/ft^2$

Linear loading rate (LLR): 0.79 gpd/ft

Was a perc test done ? __ Yes _____ mpi

__ No

| Soil Survey Data | Soil #1 | Soil #2 |
|---|---|---|
| Map unit sym & name | | |
| Landscape position | | |
| Flooding | | |
| Slope | | |
| Watertable depth | | |
| Bedrock depth | | |
| Possible system depth | | |
| Texture at depth | | |
| Permeability (P) | | |
| Perc(MPI) = 60 / P | | |
| NRCS onsite suitability | | |

**Soil Boring Data**

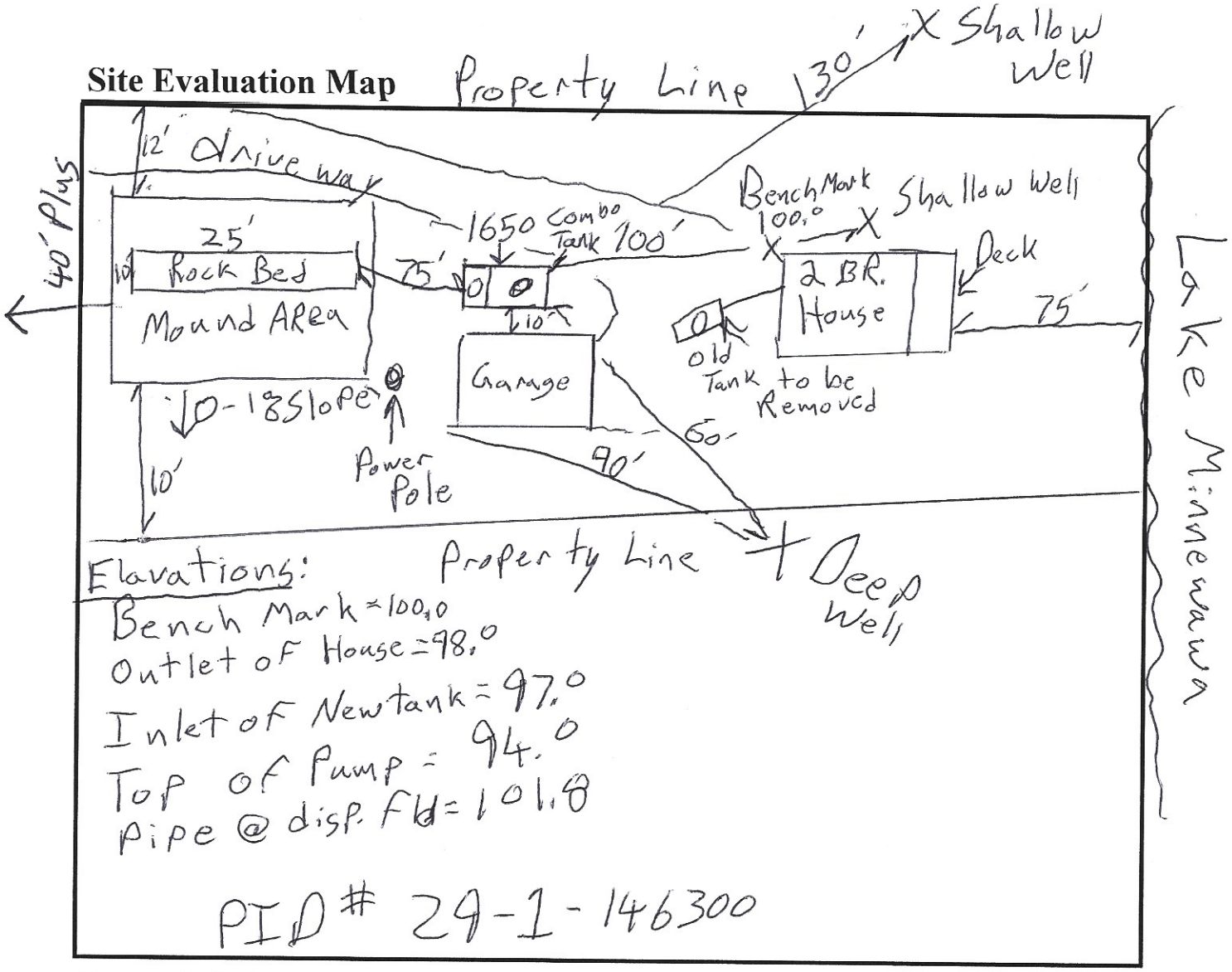
**Boring 1** Elevation: Location:

| Soil Horizons Depth (inches) | Texture | Color | Structure | Consistence |
|---|---|---|---|---|
| 0-6" | top soil | 10 yr 3/2 | s.g. | loose |
| 6-48" | Sandy loam | 7.5 yr 4/6 | s.g. | loose |
| | mottles @ 42" | | | |
| | | | | |
| | | | | |

**Boring 2** Elevation: Location:

| Soil Horizons Depth (inches) | Texture | Color | Structure | Consistence |
|---|---|---|---|---|
| 0-7" | Top soil | 10 yr 3/2 | s.g. | Loose |
| 7-48" | Sandy loam | 7.5 yr 4/6 | s.g. | Loose |
| | mottles @ 41" | | | |
| | | | | |
| | | | | |

## Site Evaluation Map




List any construction issues: _____

_____

### Mapping Checklist

Map scale: _____ ___ indicate north ___ show slope _____ % direction _____

**Locate**

___ lot dimensions/property lines
___ dwellings and other improvements
___ existing and/or proposed system(s)
___ replacement area
___ unsuitable area(s)
___ public water supply wells
___ pumping access
___ inner wellhead zone

**Easements**

___ phone
___ electric
gas

**Elevations**

___ borings
___ benchmark
___ perc tests
___ horiz&vert reference pts

**Setbacks**

___ building
___ all water wells within 100ft
___ pressure pipe
___ water suction pipe
___ streams, lakes, rivers
___ floodway and fringe

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

_____ (signature) 4/16/2021 (date)

L-1919 (license #) 218-839-4737 (phone number)

# University of Minnesota Mound Design Worksheet

Onsite Sewage Treatment Program

Job#

**Less Than or Equal To 1% Slopes**

## A. FLOW

| | | |
|---|---|---|
| Estimated | 300 | 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)* |
| Number of tanks/compartments | 1 | |
| Effluent filter (yes/no) | no | |

**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= | 2 | feet |
| 2. Depth of percolation tests = | | *inches* |
| 3. Texture | s-l | |
| 4. Soil loading rate *(see Figure D-33)* | 0.79 | gpd/ $ft^2$ |
| Percolation rate | | 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=
   300 gpd x 0.83 $ft^2$/gpd = 250.0 $ft^2$
2. Determine rock layer width = 0.83 $ft^2$/gpd x Linear Loading Rate (LLR) (see LLR chart)
   0.83 $ft^2$/gpd x 12.00 = 10.0 ft

**LLR Chart**

| Perc Rate | LLR |
|---|---|
| <120 MPI | <=12 |
| >=120 MPI | <=6 |

3. Length of rock layer = area divided by width =
   250 $ft^2$ / 10 feet = 25.0 ft

## E. ROCK VOLUME

1. Multiply rock area by rock depth to get cubic feet of rock
   250 X 1 ft = 250.0 $ft^3$
2. Divide $ft^3$ by 27 $ft^3/yd^3$ to get cubic yards
   250.0 $ft^3$ / 27 = 9.3 $yd^3$
3. Multiply cubic yards by 1.4 to get weight of rock in tons;
   9.3 $yd^3$ X 1.4 ton/$yd^3$ 13.0 tons

## F. ABSORPTION WIDTH

Absorption Ratio (Fig. D-33): 1.5

1. Absorption width equals absorption ratio (see Figure D-33) times rock layer width

1.50 x 10.0 ft = 15.0 ft

## 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(C1)

3.0 ft - 2.0 ft = 1.0 ft

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)

1.0 ft+1ft+1ft = 3.0 ft

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

3.0 x 4 = 12.0 ft

d. The total landscape width is the sum of berm (G2c) width plus rock layer width (D2) plus berm width (G2c)

12.0 feet + 10.0 feet + 12.0 feet = 34.0 ft

e. Additional width necessary for absorption = the absorption width (F) minus the landscape width (G2d)

15.0 feet - 34.0 feet = -19.0 ft

***if number is negative (<0) skip to g***

f. Final berm width =additional width (G2e) plus the berm width (G2c)

-19 feet + 12 feet = -7 ft

g. Total mound width is the sum of berm width(G2f or G2c) plus rock layer width (D2) plus berm width (G2f or G2c)

12.0 ft + 10.0 ft + 12.0 ft = 34.0 ft

h. Total mound length is the sum of berm (G2f or G2c) plus rock layer length (D3) plus berm (G2f or G2c)

12.0 ft + 25.0 ft + 12.0 ft = 49.0 ft

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 ft

| Final Dimensions (slope < 1%) | 34.0 ft x 49.0 ft |
|---|---|

I hereby certify that all work has been completed in accordance with all applicable ordinances, rules & laws.

(signature) L-1919 (license #) 4/16/2021 (date)

**H. SAND VOLUME**

1. Upslope Volume + Volume under rockbed + Downslope Volume

2.0 ft x 12.0 ft x 49.0 ft / 2 = 588.0 $ft^3$

b. Volume under rockbed: (average depth of sand under rock) x (rockbed width) x (mound length) = $ft^3$

1.0 ft x 10.0 ft x 49.0 ft = 490.0 $ft^3$

c. Downslope Volume: (depth of clean sand + 1) x (downslope berm) x (mound length) / 2 = $ft^3$

2.0 ft x 12.0 ft x 49.0 ft / 2 = 588.0 $ft^3$

Total cubic feet: = 1666.0 $ft^3$

2. Divide $ft^3$ by 27 $ft^3/yd^3$ to get cubic yards

1666.0 / 27 = 61.7 $yds^3$

3. Multiply cubic yards by 1.4 to get weight of sand in tons;

61.7 $yds^3$ x 1.4 = 86.4 tons

4 Add 10% for Constructability

86.4 tons x 1.1 = 95.0 tons

**A-1 Estimated Sewage Flows in GPD**

| No. of Bdrms | Class I | Class II | Class III | Class IV |
|---|---|---|---|---|
| 2 | 300 | 225 | 180 | 60% of |
| 3 | 450 | 300 | 218 | the |
| 4 | 600 | 375 | 256 | values |
| 5 | 750 | 450 | 294 | in the |
| 6 | 900 | 525 | 332 | Class I, |
| 7 | 1050 | 600 | 370 | II or II |
| 8 | 1200 | 675 | 408 | columns |

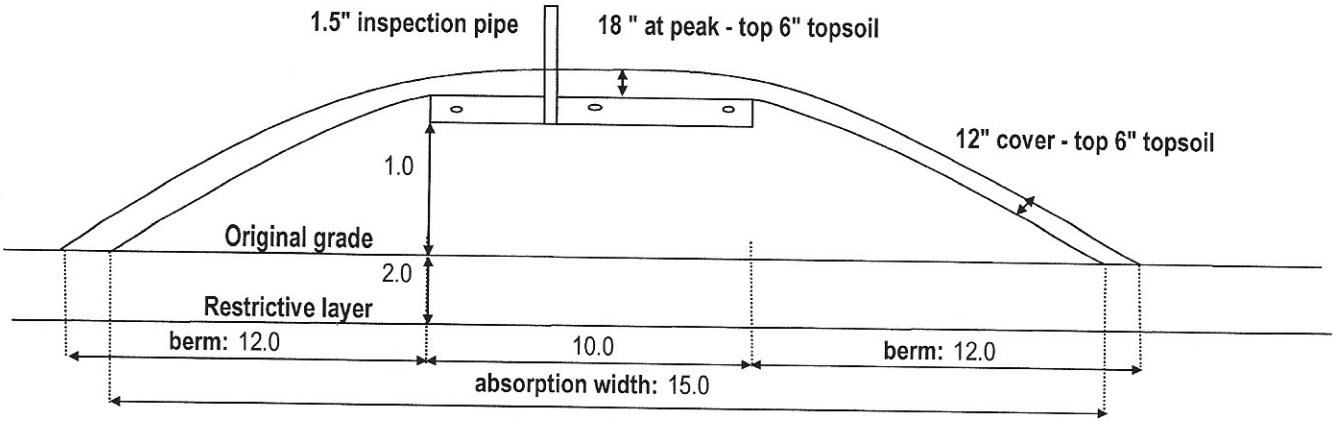
**D-33 Absorption Width Sizing Table**

| Perc Rate mpi | Soil Texture | Loading Rate gpd/sq ft | Absorption Ratio |
|---|---|---|---|
| <5 | Coarse sand<br>Loamy sand<br>Med., Fine sand | 1.20 | 1.00 |
| 6 -15 | Sandy loam | 0.79 | 1.50 |
| 16-30 | Loam | 0.60 | 2.00 |
| 31-45 | Silt Loam, Silt | 0.50 | 2.40 |
| 46 - 60 | Clay loam, Silty or Sandy Clay Loam | 0.45 | 2.67 |
| 61-120 | Silty or Sandy Clay or Clay | 0.24 | 5 |
| >120* | | | |

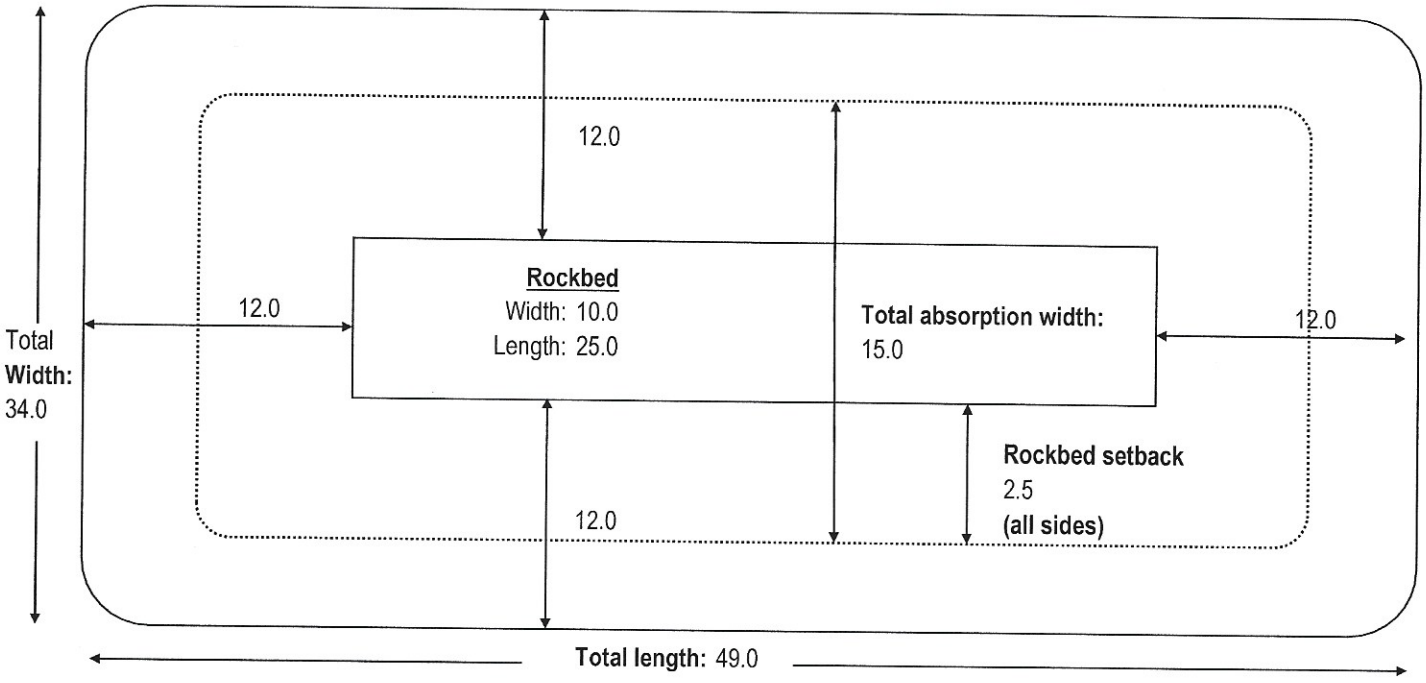
*Must be other or performance.

**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 | 3:1 | **4:1** | 5:1 | 6:1 | 7:1 |
| 0 | 3.00 | **4.00** | 5.00 | 6.00 | 3.00 | **4.00** | 5.00 | 6.00 | 7.00 |
| 1 | 2.91 | **3.85** | 4.76 | 5.66 | 3.09 | **4.17** | 5.26 | 6.38 | 7.53 |
| 2 | 2.83 | **3.70** | 4.54 | 5.36 | 3.19 | **4.35** | 5.56 | 6.82 | 8.14 |
| 3 | 2.75 | **3.57** | 4.35 | 5.08 | 3.30 | **4.54** | 5.88 | 7.32 | 8.86 |
| 4 | 2.68 | **3.45** | 4.17 | 4.84 | 3.41 | **4.76** | 6.25 | 7.89 | 9.72 |
| 5 | 2.61 | **3.33** | 4.00 | 4.62 | 3.53 | **5.00** | 6.67 | 8.57 | 10.77 |
| 6 | 2.54 | **3.23** | 3.85 | 4.41 | 3.66 | **5.26** | 7.14 | 9.38 | 12.07 |
| 7 | 2.48 | **3.12** | 3.70 | 4.23 | 3.80 | **5.56** | 7.69 | 10.34 | 13.73 |
| 8 | 2.42 | **3.03** | 3.57 | 4.05 | 3.95 | **5.88** | 8.33 | 11.54 | 15.91 |
| 9 | 2.36 | **2.94** | 3.45 | 3.90 | 4.11 | **6.25** | 9.09 | 13.04 | 18.92 |
| 10 | 2.31 | **2.86** | 3.33 | 3.75 | 4.29 | **6.67** | 10.00 | 15.00 | 23.33 |
| 11 | 2.26 | **2.78** | 3.23 | 3.61 | 4.48 | **7.14** | 11.11 | 17.65 | 30.43 |
| 12 | 2.21 | **2.70** | 3.12 | 3.49 | 4.69 | **7.69** | 12.50 | 21.43 | 43.75 |




## Mound Detail: Land slope < or = to 1%




**Notes:**

Divert surface water away from mound.

# University of Minnesota Pump Selection Procedure - 10/25/04

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

ONSITE SEWAGE TREATMENT PROGRAM

1. **Determine pump capacity:**

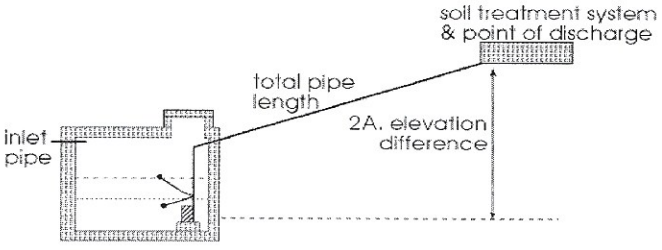
**A. Gravity Distribution**

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 worksheet

**Selected Pump Capacity:** [17.8] **gpm**




2. **Determine Total Dynamic Head (TDH)**

A. Elevation difference between pump and point of discharge.
[7] feet

B. Special head requirement? *(See Figure - Special Head Requirements)*
[5] feet

| Special Head Requirements | |
|---|---|
| Gravity Distribution | 0ft |
| Pressure Distribution | 5ft |

C. Friction loss in supply pipe

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= [0.73] ft/ 100 ft of pipe

| 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 |

3. Determine total pipe length from pump discharge to soil system discharge point.
Estimate by adding 25 percent to pipe length for friction loss in fittings.
Pipe length times 1.25 = equivalent pipe length
[75] ft x 1.25 = 93.75 feet

4. Calculate total friction loss by multiplying friction loss (C2) by the equivalent pipe length (C3) and divide by 100.
Friction Loss = 0.73 ft/100ft X 93.75 ft / 100 = 0.7 feet

D. Total head requirement is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4).
7 ft + 5 ft + 0.7 ft

**Total Head:** 12.7 feet

3. **Pump Selection**

1. A pump must be selected to deliver at least 17.8 gpm (1A or B)
with at least 12.7 feet of total head (2D).

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

(signature) L-1919 (license #) 4/16/2021

# Sewage Treatment System Management Plan

Property Owner: Criss Rinta Phone: _____ Date: _____

Mailing Address: 19147 484th ST, City: _____ Zip: _____

Site Address: McGregor, MN. City: _____ Zip: 55760

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.

System Designer: check every _____ months.
Local Government: check every _____ months.
State Requirement: check every 36 months.

**My System needs to be checked every 36 months.**

*(State requirements are based on MN Rules Chapter 7080.2450, Subp. 2 & 3)*

**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 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)

**Professional Management Tasks**

- ☑ Check to make sure tank is not leaking
- ☑ Check and clean the in-tank effluent filter
- ☑ 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 inspection pipes
- ☑ 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."

Designer

Property Owner Signature: _____ Date: 4-16-2021

Designer Signature: _____ Date: 4-16-2021

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:_____

_____

_____

_____

Mitigation/corrective action plan:_____

_____

_____

_____

_____