Septic System Management Plan Agreement

Property Owner: Brent Gessell Phone: _____ Date: 9-10-22

Site Address: 15174 Bison Rd Swanville MN Parcel # 070267000

System Designer: Darrell Bacon Company Name: Big Stone Excavating License # 4018

Management Tasks—Listed below are the operating and management activities necessary to ensure the long-term performance of your septic system. The list includes responsibilities of the system owner and those of the system designer and or other septic system professionals. Certain management activities will require a licensed septic system professional.

Service Intervals—The system designer and Morrison County are providing recommended Service Intervals for your septic system.

- State Code requires "septic tank assessment" every 36 months
- Morrison County code requires "septic tank assessment" every 36 months
- System Designer recommends "septic tank assessment" every **24** months

  - If the assessment identifies a need for pumping and cleaning of your tanks it must be done by a licensed professional.

Seasonal Tasks—or several times per year:

- ✓ **Leaks.** Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- ✓ **Surfacing sewage.** Regularly check for wet or spongy soil around your treatment area. If surfacing sewage or strong odors are not corrected by pumping the tank or fixing broken caps, call your service professional.
  - **Untreated sewage may make humans and animals sick.**
- ✓ **Alarms.** If there is an Alarm, the signal indicates there is a problem; contact your maintainer or a licensed septic system professional any time the alarm signals.
- ✓ **Lint filters.** If there is a lint filter, check for buildup and clean when necessary.
- ✓ **Effluent screen.** If there is an effluent screen, inspect and clean it twice a year or per manufacturer recommendations

Annual Tasks—or scheduled maintenance tasks:

- ✓ **Inspection Caps**. Check to make sure they are properly capped. Replace caps that are damaged.
- ✓ **Pumps and controls.** Check to make sure the pump and controls are operating correctly and inspect wiring for corrosion and function.
- ✓ **Event counter or water meter**. Monitor the average daily water use (if applicable).
- ✓ **Septic tank integrity.** Scheduling of pumping and cleaning of tanks at the recommended interval is very important.
  - This maintenance must be conducted through the manhole openings and include verification that tank and tank components are watertight and in good operating condition.

"*I understand it is task manager's responsibility* (property owner or contracted licensed maintainer) *to properly operate and maintain the sewage treatment system on this property, utilizing this Management Plan. If requirements of this Management Plan are not met, I (*a management professional*) will promptly notify Morrison County Planning & Zoning and take necessary corrective actions. If I* (property owner) *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: _____ Date: 9-10-22

Big Stone Excavating/Mark & Kody Throener/License # L4018

Morrison County P&Z Signature: Jeremy Bartkowicz Date: 9/12/2022

Existing 1500 gal 2 comp tank w/a 375 sq ft Type III replacement mound.

University of Minnesota Onsite Sewage Treatment Program

Preliminary Evaluation Worksheet

Minnesota Pollution Control Agency

1. Contact Information

v 04.01.2020

Property Owner/Client:	Brent Gessell	Date Completed:	9/11/2022
Site Address:	15174 bison rd Swanvile MN 56382	Project ID:	
Email:		Phone:	3202327912
Mailing Address:			
Legal Description:			

Parcel ID:	070267000	SEC:	16	TWP:	129	RNG:	031

2. Flow and General System Information

A. Client-Provided Information

Project Type: ☐ New Construction ☑ Replacement ☐ Expansion ☐ Repair

Project Use: ☑ Residential ☐ Other Establishment:

Residential use: # Bedrooms: 3 Dwelling Sq.ft.: Unfinished Sq. Ft.:

Adults: 1 # Children: # Teenagers:

In-home business (Y/N): No If yes, describe:

Water-using devices: *(check all that apply)*

☐ Garbage Disposal/Grinder	☐ Dishwasher	☐ Hot Tub*
☐ Sewage pump in basement	☐ Water Softener*	☐ Sump Pump*
☐ Large Bathtub >40 gallons	☐ Iron Filter*	☐ Self-Cleaning Humidifier*
☐ Clothes Washing Machine	☐ High Eff. Furnace*	☐ Other:

* Clear water source - should not go into system

Additional current or future uses:

Anticipated non-domestic waste:

The above is complete & accurate: ***Client signature & date***

B. Designer-determined flow Information

Attach additional information as necessary.

Design Flow: 450 GPD Anticipated Waste Type:

BOD: mg/L TSS mg/L Oil & Grease mg/L

3. Preliminary Site Information

A. Water Supply Wells

#	Description	Mn. ID#	Well Depth (ft.)	Casing Depth (ft.)	Confining Layer	STA Setback	Source
1							
2							
3							
4							

Additional Well Information:

University of Minnesota Onsite Sewage Treatment Program

Preliminary Evaluation Worksheet

Minnesota Pollution Control Agency

Site within 200' of noncommunity transient well (Y/N)	No	Yes, source:	
Site within a drinking water supply management area (Y/N)	No	Yes, source:	
Site in Well Head Protection inner wellhead management zone (Y/N)	No	Yes, source:	
Buried water supply pipes within 50 ft of proposed system (Y/N)	No		
B. Site located in a shoreland district/area?		Yes, name:	
Elevation of ordinary high water level:	ft	Source:	
Classification:	Tank Setback: ft.	STA Setbk: ft.	
C. Site located in a floodplain?	No	Yes, Type(s):	N/A
Floodplain designation/elevation (10 Year):	N/A ft	Source:	N/A
Floodplain designation/elevation (100 Year):	N/A ft	Source:	N/A

D. Property Line Id / Source: ☐ Owner ☐ Survey ☑ County GIS ☐ Plat Map ☐ Other:

E. ID distance of relevant setbacks on map: ☐ Water ☐ Easements ☐ Well(s) ☐ Building(s) ☐ Property Lines ☐ OHWL ☐ Other:

4. Preliminary Soil Profile Information From Web Soil Survey (attach map & description)

Map Units: 142 Slope Range: 0 %

List landforms: flats

Landform position(s): Shoulder

Parent materials: Till

Depth to Bedrock/Restrictive Feature: 46 in Depth to Watertable: 12 in

Map Unit Ratings

Septic Tank Absorption Field- At-grade:	Extremely Limited
Septic Tank Absorption Field- Mound:	Very Limited
Septic Tank Absorption Field- Trench:	Extremely Limited

5. Local Government Unit Information

Name of LGU: Morrison county

LGU Contact:

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:

Field Evaluation Worksheet

University of Minnesota Onsite Sewage Treatment Program

MINNESOTA POLLUTION CONTROL AGENCY

1. Project Information

v 04.01.2020

Property Owner/Client: Brent Gessell | Project ID:

Site Address: 15174 bison rd Swanvile MN 56382 | Date Completed: 9/10/2022

2. Utility and Structure Information

Utility Locations Identified ☐ Gopher State One Call # | ☐ Any Private Utilities:

Locate and Verify (*see Site Evaluation map*) ☐ Existing Buildings ☐ Improvements ☐ Easements ☐ Setbacks

3. Site Information

Vegetation type(s): Grass | Landscape position: Shoulder

Percent slope: 0 % | Slope shape: Linear, Linear | Slope direction: east

Describe the flooding or run-on potential of site:

Describe the need for Type III or Type IV system:

Note:

Proposed soil treatment area protected? (Y/N): Yes | If yes, describe:

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): No

If yes, describe:

Soil observations were conducted in the proposed system location (Y/N): Yes

A soil observation in the most limiting area of the proposed system (Y/N): Yes

Number of soil observations: 2 | Soil observation logs attached (Y/N): Yes

Percolation tests performed & attached (Y/N): No

5. Phase I. Reporting Information

	Depth		Elevation		
Limiting Condition*:	8	in	**98.0**	ft	**Most Restrictive Depth Identified from List Below*
Periodically saturated soil:		in		ft	Soil Texture: medium sandy loam
Standing water:		in		ft	Percolation Rate: min/inch
Bedrock:		in		ft	Soil Hyd Loading Rate: 0.78 gpd/ft^2
Benchmark Elevation:	100.0	ft			Elevations and Benchmark on map? (Y/N): Yes

Benchmark Elevation Location: septic tank lid

Differences between soil survey and field evaluation:

Site evaluation issues / comments:

Anticipated construction issues:

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

Minnesota Pollution Control Agency

1. PROJECT INFORMATION

v 04.01.2020

Property Owner/Client:	Brent Gessell	Project ID:	
Site Address:	15174 bison rd Swanvile MN 56382	Date:	09/10/22
Email Address:		Phone:	3202327912

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other Establishments

Design Flow: 450 GPD Anticipated Waste Type:

BOD: mg/L TSS: mg/L Oil & Grease: mg/L

Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

3. HOLDING TANK SIZING

Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Code Minimum **Holding Tank** Capacity: Gallons in Tanks or Compartments

Recommended **Holding Tank** Capacity: Gallons in Tanks or Compartments

Type of High Level Alarm: (Set @ 75% tank capacity)

Comments:

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 3

Code Minimum **Septic Tank** Capacity: 1000 Gallons in 1 Tanks or Compartments

Recommended **Septic Tank** Capacity: 1000 Gallons in 1 Tanks or Compartments

Effluent Screen & Alarm (Y/N): Optional Model/Type:

B. Other Establishments:

Waste received by: GPD x Days Hyd. Retention Time

Code Minimum **Septic Tank** Capacity: Gallons In Tanks or Compartments

Recommended **Septic Tank** Capacity: Gallons In Tanks or Compartments

Effluent Screen & Alarm (Y/N): Model/Type:

5. PUMP TANK SIZING

Pump Tank 1 Capacity (Minimum):	500 Gal	Pump Tank 2 Capacity (Minimum):	Gal
Pump Tank 1 Capacity (Recommended):	0 Gal	Pump Tank 2 Capacity (Recommended):	Gal
Pump 1	27.0 GPM	Total Head 13.2 ft	Pump 2 GPM Total Head ft
Supply Pipe Dia.	2.00 in	Dose Vol: 80.0 gal	Supply Pipe Dia. Dose Vol: Gal

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

Soil Treatment Type:	Mound	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	100 ft	Benchmark Location:	septic tank lid
MPCA System Type:	Type III	Distribution Media:	Rock
Type III/IV Details:	water level is at 12 in		

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (yes/no) No If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note:

	Depth		Depth		Elevation of Limiting Condition	
Limiting Condition:	8	inches	0.7	ft		ft
Minimum Req'd Separation:	36	inches	3.0	ft		
					Elevation	
Code Max System Depth:	Mound	inches	-2.3	ft	3.00	ft

Critical for system compliance

This is the maximimum depth to the bottom of the distribution media for required separation. Negative Depth (ft) means it must be a mound.

Soil Texture:	Loam		
Soil Hyd. Loading Rate:	0.60 GPD/ft^2	Percolation Rate:	MPI
Contour Loading Rate:	12	Note:	
Measured Land Slope:	0 %	Note:	
Comments:			

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	ft^2	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	ft^2	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Mound:

Dispersal Area	375.0 ft^2	Bed Length	37.5 ft	Bed Width	10.0 ft
Absorption Width	15.0 ft	Clean Sand Lift	3.0 ft	Berm Width (0-1%)	19.3 ft
Upslope Berm Width	19.2 ft	Downslope Berm	19.2 ft	Endslope Berm Width	19.3 ft
Total System Length	76.1 ft	System Width	48.6 ft	Contour Loading Rate	12.0 gal/ft

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

At-Grade:

Bed Width		ft	Bed Length		ft	Finished Height		ft
Contour Loading Rate		gal/ft	Upslope Berm		ft	Downslope Berm		ft
Endslope Berm		ft	System Length		ft	System Width		ft

Level & Equal Pressure Distribution

No. of Laterals	3		Perforation Spacing	3	ft	Perforation Diameter	1/4	in
Lateral Diameter	2.00	in	Min Dose Volume	72	gal	Max Dose Volume	113	gal

Non-Level and Unequal Pressure Distribution

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perf Size (in)	Spacing (ft)	Spacing (in)
Lateral 1							
Lateral 2							
Lateral 3							
Lateral 4							
Lateral 5							
Lateral 6							

Minimum Dose Volume: _____ gal

Maximum Dose Volume: _____ gal

9. Additional Info for At-Risk, HSW or Type IV Design

A. Starting BOD Concentration = Design Flow X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs. BOD/day

B. Target BOD Concentration = Design Flow X Target BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs. BOD/day

Lbs. BOD To Be Removed: _____

PreTreatment Technology: _____ *Must Meet or Exceed Target

Disinfection Technology: _____ *Required for Levels A & B

C. Organic Loading to Soil Treatment Area:

_____ mg/L X _____ gpd x 8.35 ÷ 1,000,000 ÷ _____ ft^2 = _____ $lbs./day/ft^2$

10. Comments/Special Design Considerations:

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

Kody Throener		4018	9/10/2022
(Designer)	(Signature)	(License #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Mound Design Worksheet
<1% Slope

Minnesota Pollution Control Agency

1. SYSTEM SIZING:

Project ID:

v 04.01.2020

A. Design Flow :	450	GPD
B. Soil Loading Rate:	0.60	GPD/ft^2
C. Depth to Limiting Condition:	0.7	ft
D. Percent Land Slope:	0	%
E. Design Media Loading Rate:	1.2	GPD/ft^2
F. Mound Absorption Ratio:	1.50	

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio		Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

TABLE IXa

LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate Dispersal Bed Area: Design Flow (1.A) ÷ Design Media Loading Rate

450 GPD ÷ 1.2 GPD/ft^2 = 375 ft^2

If a larger dispersal media area is desired, enter size: _____ ft^2

B. Enter Dispersal Bed Width: 10 ft *Can not exceed 10 feet.*

C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate

10 ft^2 X 1.2 GPD/ft^2 = 12.0 gal/ft *Can not exceed Table 1*

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area ÷ Bed Width

375 ft^2 ÷ 10 ft = 37.5 ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio

10.0 ft X 1.5 = 15.0 ft

B. For slopes from 0 to 1%, the Absorption Width is measured from the bed equally in both directions.

Absorption Width Beyond the Bed: Absorption Width - Bed Width ÷ 2

(15.0 ft - 10.0 ft) ÷ 2 = 2.5 ft

4. DISTRIBUTION MEDIA: ROCK Project ID:

A. Rock Depth Below Distribution Pipe

6 in 0.50 ft

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media:

B. Enter the Component: Length: ft Width: ft Depth: ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)

ft ÷ ft = components/row

D. Actual Bed Length = Number of Components/row X Component Length:

components **X** ft =

Check registered product information for specific application and design

E. Number of Rows = Bed Width divided by Component Width

ft ÷ ft = rows *Adjust width so this is a whole number.*

F. Total Number of Components = Number of Components per Row X Number of Rows

X = components

6. MOUND SIZING

A. Clean Sand Lift: Required Separation - Depth to Limiting Condition = Clean Sand Lift (1 ft minimum)

3.0 ft - 0.7 ft = 2.3 ft Design Sand Lift (optional): 3.0 ft

B. Upslope Height = Clean Sand Lift + Depth of Media + Depth to Cover Pipe + Depth of Cover (1 ft)

3.0 ft + 0.50 ft + 0.33 ft + 1.00 ft = 4.8 ft

C. Berm Width = Upslope Mound Height X 4 (4 is recommended, but could be 3-12)

4.8 ft X 4.0 ft = 19.3 ft

D. Total Landscape Width = Berm Width + Dispersal Bed Width + Berm Width

19.3 ft + 10.0 ft + 19.3 ft = 48.6 ft

E. Additional Berm Width necessary for absorption - Absorption Width - Total Landscape Width

15.0 ft - 48.6 ft = 0 ft if number is negative (<0), value is **ZERO**

F. Final Berm Width = Additional Berm Width + Berm Width

0 ft + 19.3 ft = 19.3 ft

G. Total Mound Width = Final Berm Width + Dispersal Bed Width + Final Berm Width

19.3 ft + 10.0 ft + 19.3 ft = 48.6 ft

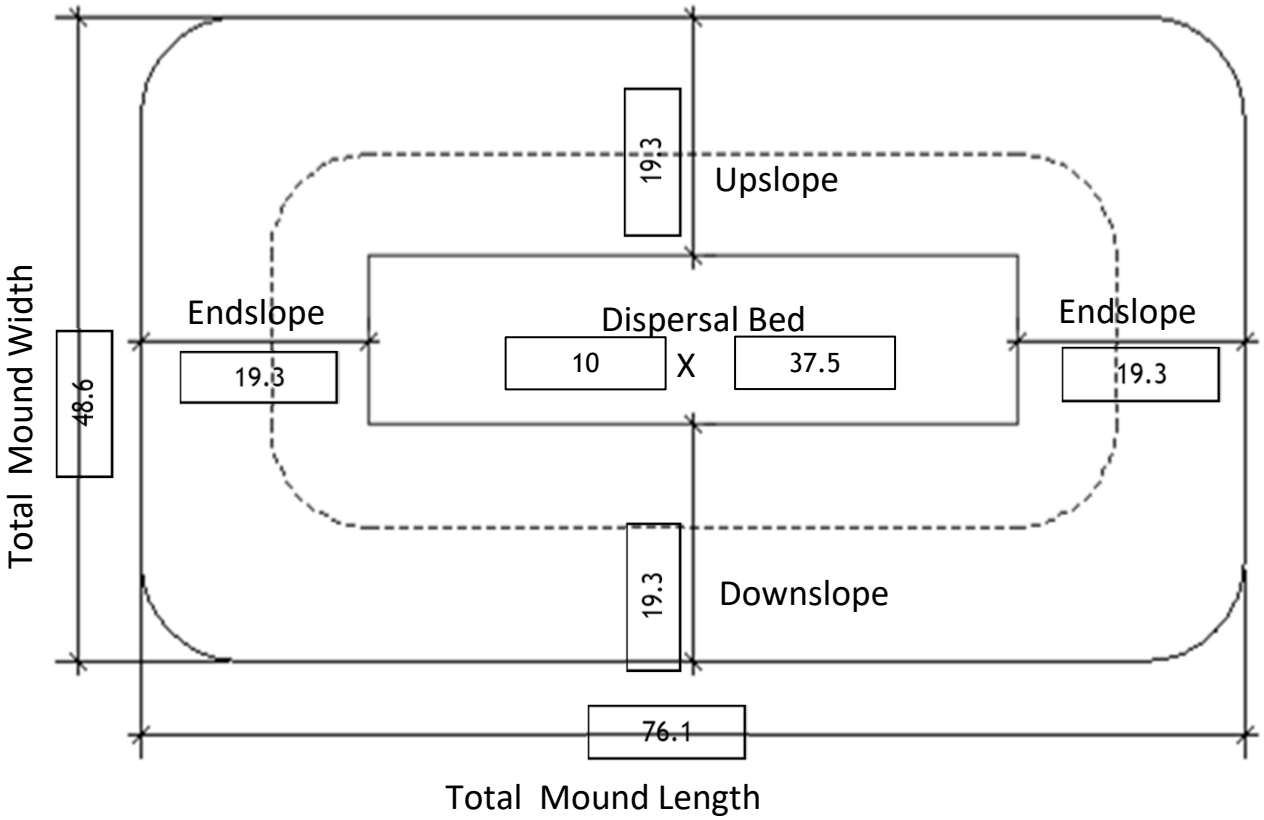
H. Total Mound Length = Final Berm Width + Dispersal Bed Length + Final Berm Width

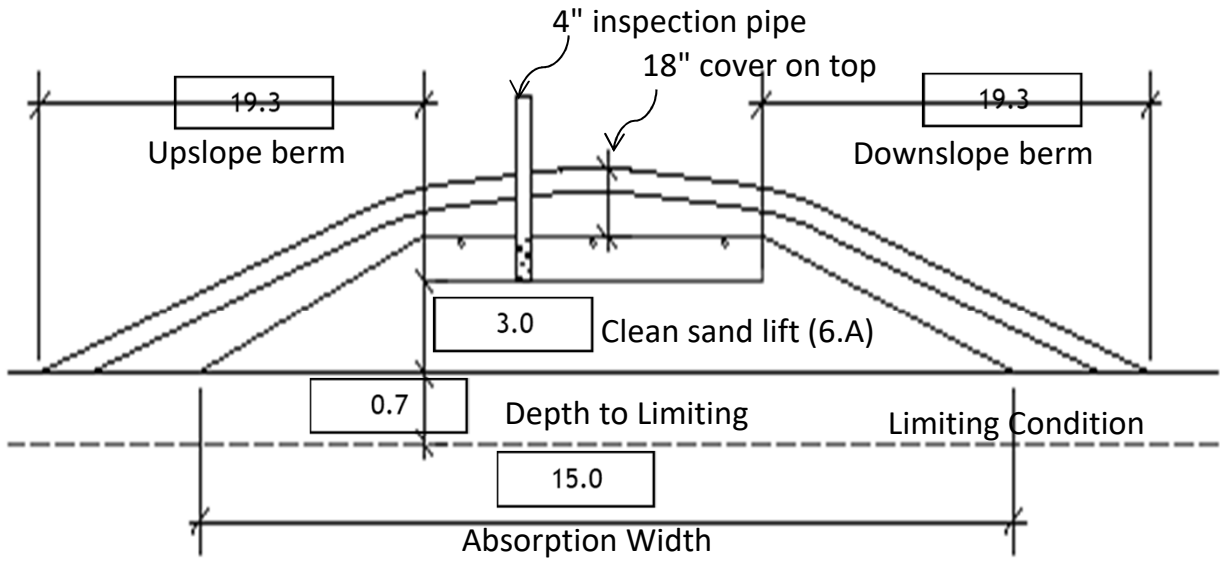
19.3 ft + 37.5 ft + 19.3 ft = 76.1 ft

I. Setbacks from the Bed: Absorption Width - Dispersal Bed Width divided by 2

(15.0 ft - 10.0) / 2 = 2.5 ft

7. MOUND DIMENSIONS Project ID:





Comments:

University of Minnesota Onsite Sewage Treatment Program

Mound Materials Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

v 04.01.2020

A. Rock *Volume* : (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch)*) X *Bed Length* X *Bed Width* = *Volume*

(6 in + [ ] in) ÷ 12 X 37.5 ft X 10.0 ft = 187.5 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 187.5 ft^3 ÷ 27 = 6.9 yd^3

Add 30% for constructability: 6.9 yd^3 X 1.3 = 9.0 yd^3

B. Calculate *Clean Sand Volume:*

Volume Under Rock bed : *Average Sand Depth* x *Media Width* x *Media Length* = cubic feet

3.0 ft X 10.0 ft X 37.5 ft = 1125.0 ft^3

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

4.83 ft - 1) X 2.50 X 37.5 ft = 359.06

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

4.83 ft - 1) X 2.50 X 10 ft = 95.75

Total Clean Sand Volume : *Volume from Length + Volume from Width + Volume Under Media*

359.1 ft^3 + 95.8 ft^3 + 1125 ft^3 = 1579.8 ft^3

For a Mound on a slope greater than 1%

Upslope Volume : ((*Upslope Mound Height - 1*) x 3 x *Bed Length*) ÷ 2 = cubic feet

((4.8 ft - 1) X 3.0 ft X 37.5) ÷ 2 = 213.8 ft^3

Downslope Volume : ((*Downslope Height - 1)* x Downslope Absorption Width x *Media Length*) ÷ 2 = cubic feet

((4.8 ft - 1) X 5.0 ft X 37.5) ÷ 2 = 356.3 ft^3

Endslope Volume : (*Downslope Mound Height - 1)* x 3 x *Media Width* = cubic feet

(4.8 ft - 1) X 3.0 ft X 10.0 ft = 114.0 ft^3

Total Clean Sand Volume : *Upslope Volume* + *Downslope Volume* + *Endslope Volume* + *Volume Under Media*

213.8 ft^3 + 356.3 ft^3 + 114.0 ft^3 + 1125.0 ft^3 = 1809.0 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1809.0 ft^3 ÷ 27 = 67.0 yd^3

Add 30% for constructability: 67.0 yd^3 X 1.3 = 87.1 yd^3

C. Calculate *Sandy Berm Volume:*

Total Berm Volume (approx) : ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2

(4.8 - 0.5)ft X 48.6 ft X 76.1) ÷ 2 = 8018.0 ft^3

Total Mound Volume - Clean Sand volume -Rock Volume = cubic feet

8018.0 ft^3 - 1809.0 ft^3 - 187.5 ft^3 = 6021.5 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 6021.5 ft^3 ÷ 27 = 223.0 yd^3

Add 30% for constructability: 223.0 yd^3 x 1.3 = 289.9 yd^3

D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

48.6 ft X 76.1 ft X 0.5 ft = 1851.7 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 1851.7 ft^3 ÷ 27 = 68.6 yd^3

Add 30% for constructability: 68.6 yd^3 x 1.3 = 89.2 yd^3

University of Minnesota Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.01.2020

1. Media Bed Width: 10 ft

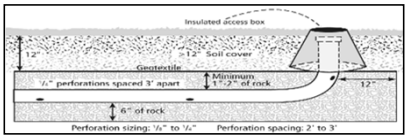
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(10 - 4) ÷ 3] + 1 = 3 laterals *Does not apply to at-grades*

3. Designer Selected *Number of Laterals*: 3 laterals
Cannot be less than line 2 (Except in at-grades)

4. Select *Perforation Spacing*: 3.00 ft

5. Select *Perforation Diameter Size:* 1/4 in



6. *Length of Laterals* = Media Bed Length - 2 Feet.

37.5 - 2ft = 35.5 ft *Perforation can not be closer then 1 foot from edge.*

7. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals* by the *Perforation Spacing* and round down to the nearest whole number.

Number of Perforation Spaces = 35.5 ft ÷ 3.0 ft = 11 Spaces

8. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces*. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

Perforations Per Lateral = 11 Spaces + 1 = 12 Perfs. Per Lateral

Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

¼ Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	10	13	18	30	60
2½	8	12	16	28	54
3	8	12	16	25	52

7/32 Inch Perforations

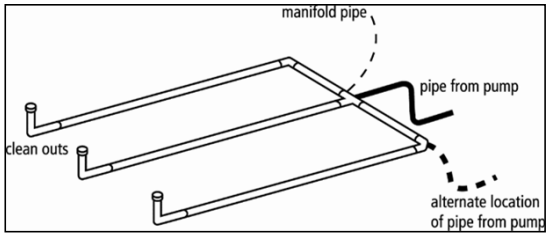
Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

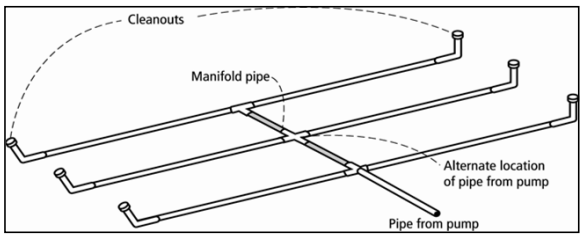
3/16 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	12	18	26	46	87
2½	12	17	24	40	80
3	12	16	22	37	75

1/8 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	21	33	44	74	149
2½	20	30	41	69	135
3	20	29	38	64	128





9. *Total Number of Perforations* equals the *Number of Perforations per Lateral* multiplied by the *Number of Perforated Laterals.*

12 Perf. Per Lat. X 3 Number of Perf. Lat. = 36 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 2.0 ft

11. Select *Type of Manifold Connection* (End or Center): End

12. *Select Lateral Diameter (See Table)*: 2.00 in

University of Minnesota Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

13. Calculate the *Square Feet per Perforation.*

Recommended value is 4-11 ft2 per perforation, Does not apply to At-Grades

a. *Bed Area* = Bed Width (ft) X Bed Length (ft)

10	ft	X	38	ft =	375	ft^2

b. *Square Foot per Perforation* = *Bed Area* ÷ by the *Total Number of Perfs*

375	ft^2 ÷		36	perf =	10.4	ft^2/perf

14. Select *Minimum Average Head* : 1.0 ft

15. Select *Perforation Discharge* based on Table: 0.74 GPM per Perf

16. *Flow Rate* = *Total Number of Perfs X Perforation Discharge.*

36	Perfs	X	0.74	GPM per Perforation =	27	GPM

17. *Volume of Liquid Per Foot of Distribution Piping (Table II)* : 0.170 Gallons/ft

18. *Volume of Distribution Piping* =

= [*Number of Perforated Laterals* X *Length of Laterals* X (Volume of Liquid Per Foot of Distribution Piping]

3	X		36	ft X	0.170	gal/ft =	18.1	Gallons

19. Minimum Delivered Volume = Volume of Distribution Piping X 4

18.1	gals	X	4	=	72.4	Gallons

Perforation Discharge (GPM)

Head (ft)	Perforation Diameter 1/8	3/16	7/32	1/4
1.0[a]	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0[b]	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0[c]	0.41	0.93	1.26	1.65

1 foot	Dwellings with 3/16 inch to 1/4 inch perforations
2 feet	Dwellings with 1/8 inch perforations
	Other establishments and MSTS with 3/16 inch to 1/4 inch perforations
5 feet	Other establishments and MSTS with 1/8 inch perforations

Table II Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

Comments/Special Design Considerations:

Pump Tank Design Worksheet (Demand Dose)

DETERMINE TANK CAPACITY AND DIMENSIONS — Project ID: — v 04.01.2020

1. A. *Design Flow (Design Sum.1A)*: 450 GPD — C. Tank Use:
   B. Min. required pump tank capacity: 500 Gal — D. Recommended pump tank capacity: ____ Gal

2. A. Tank Manufacturer: ____ — B. Tank Model: ____
   C. Capacity from manufacturer: 500 Gallons
   D. Gallons per inch from manufacturer: 11.0 Gallons per inch
   E. Liquid depth of tank from manufacturer: 46.0 inches

Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.

DETERMINE DOSING VOLUME

3 Calculate *Volume to Cover Pump* (The inlet of the pump must be at least 4-inches from the bottom of the pump tank & 2 inches of water covering the pump is recommended)

(Pump and block height + 2 inches) X *Gallons Per Inch*

(12 in + 2 inches) X 11.0 Gallons Per Inch = 154 Gallons

4 ***Minimum*** *Delivered Volume* = 4 X Volume of Distribution Piping:

-Item 18 of the Pressure Distribution or Item 11 of Non-level 72 **Gallons (Minimum dose)** 6.6 inches/dose

5 Calculate ***Maximum*** *Pumpout Volume* (25% of Design Flow)

Design Flow: 450 GPD X 0.25 = 113 **Gallons (Maximum dose)** 10.2 inches/dose

6 *Select a pumpout volume that meets both Minimum and Maximum:* 80 Gallons

7 Calculate *Doses Per Day* = Design Flow ÷ *Delivered Volume*

450 gpd ÷ 80 gal = 5.63 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 50 feet

C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.170 Gallons/ft

D. *Drainback = Length of Supply Pipe* X *Volume of Liquid Per Lineal Foot of Pipe*

50 ft X 0.170 gal/ft = 8.5 Gallons

9. *Total Dosing Volume = Delivered Volume* plus *Drainback*

80 gal + 8.5 gal = 89 Gallons

10. Minimum Alarm Volume = Depth of alarm (2 or 3 inches) X gallons per inch of tank

2 in X 11.0 gal/in = 22.0 Gallons

Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

DEMAND DOSE FLOAT SETTINGS

11. Calculate *Float Separation Distance* using *Dosing Volume*.

Total Dosing Volume /Gallons Per Inch

89 gal ÷ 11.0 gal/in = 8.0 Inches

12. Measuring from bottom of tank:

A. *Distance to set Pump Off Float* = Pump + block height + 2 inches

12 in + 2 in = 14 Inches

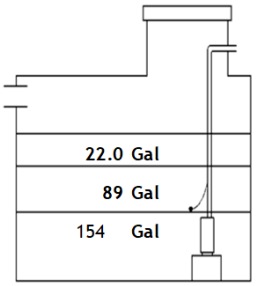
B. *Distance to set Pump On Float=Distance to Set Pump-Off Float* + *Float Separation Distance*

14 in + 8.0 in = 22 Inches

C. *Distance to set Alarm Float* = *Distance to set Pump-On Float* + *Alarm Depth* (2-3 inches)

22 in + 2.0 in = 24 Inches

Inches for Dose:	8.0	in
Alarm Depth	24.0	in
Pump On	22.0	in
Pump Off	14.0	in



University of Minnesota Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	Brent Gessell			Location / Address:	15174 bison rd Swanvile MN 56382
Soil parent material(s): (Check all that apply)	☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter				
Landscape Position: (select one)	Shoulder	Slope %: 0	Slope shape	Linear, Linear	Elevation-relative to benchmark: 100.0
Vegetation:	Grass	Soil survey map units:	142		Limiting Layer Elevation: 101
Weather Conditions/Time of Day:	sunny 75	12:00	Date	09/10/22	
Observation #/Location:	1		Observation Type:	Pit	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	I-------- Structure----------I		
							Shape	Grade	Consistence
0"to8"	Loam	<35%	10YR 2/2				Granular	Weak	Friable
8"16"	Sandy Loam	<35%	10YR 5/2	10YR 5/6			Platy	Weak	Friable

Comments

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

Kody Throener		4018	9/10/2022
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

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Landscape Position: (select one)	Shoulder	Slope %: 0	Slope shape	Linear, Linear	Elevation-relative to benchmark: 100.0
Vegetation:	Grass	Soil survey map units:	142		Limiting Layer Elevation: 101
Weather Conditions/Time of Day:	sunny 75	12:00	Date	09/10/22	
Observation #/Location:	2		Observation Type:	Pit	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	I-------- Structure----------I		
							Shape	Grade	Consistence
0-9	Loam	<35%	10YR 2/2				Granular	Weak	Friable
9-14	Sandy Loam	<35%	10YR 5/2	10YR 5/6			Platy	Weak	Friable

Comments

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

Kody Throener		4018	9/10/2022
(Designer/Inspector)	(Signature)	(License #)	(Date)

Textures:	
C	Clay
SiC	Silty Clay
SC	Sandy Clay
CL	Clay Loam
SiCL	Silty Clay Loam
SCL	Sandy Clay Loam
Si	Silt
SiL	Silt Loam
L	Loam
SL	Sandy Loam*
LS	Loamy Sand*
S	Sand*

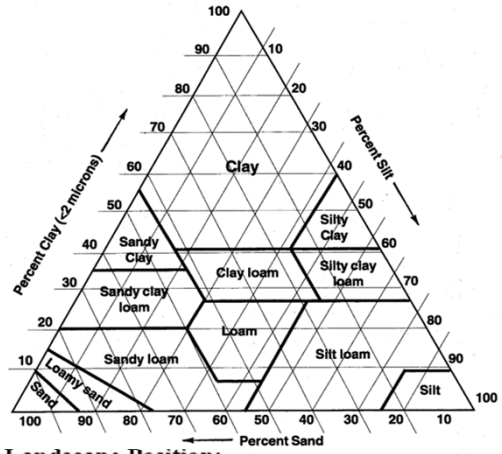
*Sand Modifiers:	
Co	Coarse
M	Medium
F	Fine
VF	Very Fine

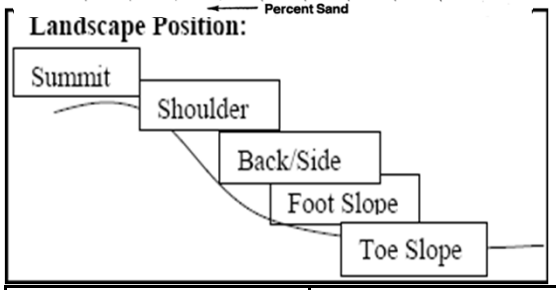
Topsoil Indicator(s) of Saturation:

T1. Wetland Vegetation
T2. Depressional Landscape
T3. Organic texture or organic modifiers
T4. N 2.5/ 0 color
T5. Redox features in topsoil
T6. Hydraulic indicators

Subsoil Indicator(s) of Saturation:

S1. Distinct gray or red redox features
S2. Depleted matrix (value >/=4 and chroma </=2)
S3. 5Y chroma </= 3
S4. 7.5 YR or redder faint redox concentrations or redox depletions



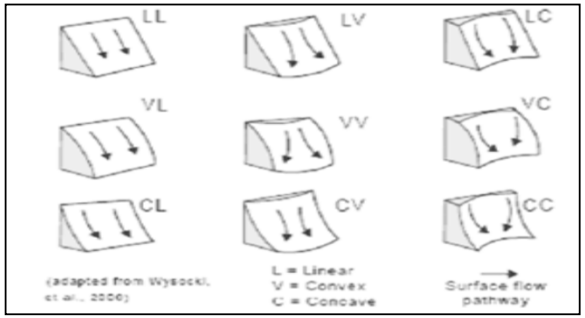


Shape:

Granular	The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots when soil is turned over.
Platy	The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas just below the leaf litter or shallow topsoil.
Blocky	The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are castings of the faces of surrounding peds. Blocky structure is commonly found in the lower topsoil and subsoil.
Prismatic	Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically casts or molds of adjoining peds. Prismatic structure is commonly found in the lower subsoil.
Single Grain	The structure found in a sandy soil. The individual particles are not held together.

Slope Shape:

Slope shape is described in two directions:
up and down slope (perpendicular to the contour),
and across slope (along the horizontal contour);
e.g. Linear, Convex or LV'.

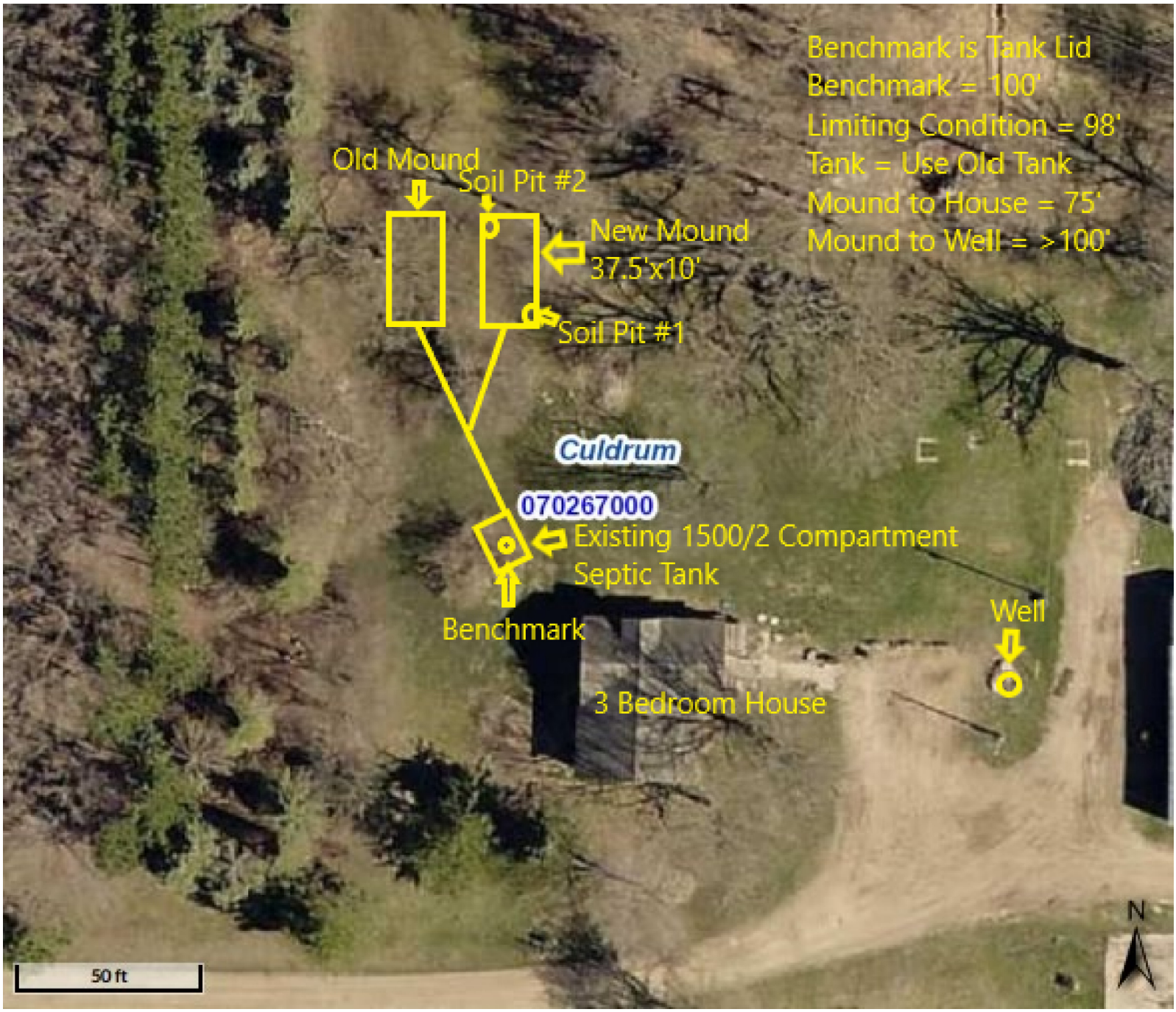


Grade:

Loose	No peds, sandy soil
Weak	Poorly formed, indistinct peds, barely observable in place
Moderate	Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed soil
Strong	Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed
Massive	No observable aggregates, or no orderly arrangement of natural lines of weakness

Consistence:

Loose	Intact specimen not available
Friable	Slight force between fingers
Firm	Moderate force between fingers
Extremely Firm	Moderate force between hands or slight foot pressure
Rigid	Foot pressure


Benchmark is Tank Lid
Benchmark = 100'
Limiting Condition = 98'
Tank = Use Old Tank
Mound to House = 75'
Mound to Well = >100'
Old Mound
Soil Pit #2
New Mound
37.5'x10'
Soil Pit #1
Culdrum
070267000
Existing 1500/2 Compartment
Septic Tank
Benchmark
Well
3 Bedroom House
50 ft
N