



100324000-2024



Becker County Planning & Zoning
915 Lake Ave
Detroit Lakes, MN 56501
(218) 846-7314
www.co.becker.mn.us

Certificate of Compliance

Inspection Report - Permit #: SS2024-2013

Owner & Property Information

Owner Name:	MICHAEL ERB	Site Address:	31224 ST HWY 34
Mailing Address:	MICHAEL ERB 31224 ST HWY 34 DETROIT LAKES MN 56501	Township - Sec/Twp/Rng:	ERIE - 21/139/040
Parcel #:	100324000	Legal Description:	21-139-40 PT SW1/4: E1/2 SW1/4 LESS E 880'. PT W1/2 SW1/4: E 495' OF N 2112'.
Secondary Parcel #:		Designer:	JenCo Services, LLC, L4041 (James Piper)
		Installer:	Tony Stenger Excavating, L388 (Tony Stenger)

Inspector Verified Specifications

Insp- Effluent Screen Installed:	No	Insp- Tank Nbr/Size:	2/1500/2 625 PUMP TANK
Insp- Alarm Required:	Yes	Insp- Drainfield Type:	Mound
Insp- Lift Pump in System:	Yes	Insp- Drainfield Size:	10X50 ROCK BED
Insp- Number of Bedrooms:	4	Insp- Soil Verification:	#1:24"LL #2:N/A #3:N/A

Inspector Verified Setbacks

Insp- Tank Dist to Road	10+	Insp- Drainfield Dist to Road	10+
Insp- Tank Dist to Nearest Prop Line	10+	Insp- Drainfield Dist to Nearest Prop Line	10+
Insp- Tank Dist to Nearest Structure	10+	Insp- Drainfield Dist to Nearest Structure	20
Insp- Tank Dist to Well	50'	Insp- Drainfield Dist to Well	50+
Insp- Tank Dist to OHW	NA	Insp- Drainfield Dist to OHW	NA
Insp- Tank Dist to Pond/Wetland	40	Insp- Drainfield Dist to Pond/Wetland	50
Insp- Tank Dist to Pressure Line	NA	Insp- Drainfield Dist to Pressure Line	NA

Certificate of Compliance

(Yes) Certificate is hereby granted based upon the application, addendum from, plans, specifications and all other supporting data. With proper maintenance, this system can be expected to function satisfactory, however this is not a guarantee.

Certification Date: 07/02/2024

Zoning Office Signature:

Jeff Rusness - ISTS Inspector

* Certificate of Compliance is not valid unless signed by a Registered Qualified Employee *

Field Review Form

Permit # SS2024-2013

Property and Owner

Owner: MICHAEL ERB

Parcel Number: 100324000

Site Address: 31224 ST HWY 34

Secondary Parcel:

Home Information

Does the structure contain any of the following elements?

Designer submitted

Inspector verified

Garbage disposal: No
Dishwasher:
Grinder pump:
Lift pump in bsmt:

Garbage disposal? Y N
Dishwasher? Y N
Grinder pump? Y N
Lift pump in basement? Y N

Number of bedrooms: 4

Review - Number of bedrooms: 4

Effluent screen

Effluent screen installed? Y N Mfr:

Alarm: Yes Type: ELECTRIC

Review - Alarm? Y N Type & Mfr: Electric SPATRONICS

Lift pump in system: Yes

Review - Lift pump in system? Y N Mfr: Goulds 4/10

Component Information

Tank size: 1500, 625

Review - Tank nbr: 2 size: 500/2625 Mfr: Brown Wilbert

Drainfield type: Mound

Review - Drainfield type: MOUND

Drainfield size: Full size - 500
Reduced/warr. size -

Review - Drainfield status: none / installed / next spring
Review - Drainfield size: 10x50 Rock bed

Absorption area size: 6

Review - Absorption area size:

Chamber type/num:
Trench sqft/chamber -

Review - Chamber type: MA Num:
Review - Trench sqft/chamber: MA

Drainfield rock depth: 6

Review - Rock depth: 12"

Soil Verification

Vertical separation verified

24" LL

Boring #1:
Boring #2:
Boring #3:

Setback Verification

Distance to...	Designer submitted		Inspector verified	
	Tank	Drainfield	Tank	Drainfield
Road	+50'	+50'	50+	50+
Nearest prop line	+50'	+50'	10+	10+
Nearest structure	18'	30'	10	20+
Well	+50'	+50'	50	50+
OHW			NA	NA
Pond/Wetland	+50'	+50'	50	50
Pressure line	+20'	+50'	NA	NA

Date System Installed: 6-25-2024

Installer: Tony Stenger

Inspector: [Signature]

0531



Preliminary Evaluation Worksheet

Site within 200' of noncommunity transient well (Y/N) Yes, source:

Site within a drinking water supply management area (Y/N) Yes, source:

Site in Well Head Protection inner wellhead management zone (Y/N) Yes, source:

Buried water supply pipes within 50 ft of proposed system (Y/N)

B. Site located in a shoreland district/area? Yes, name:

Elevation of ordinary high water level: ft Source:

Classification: Tank Setback: ft. STA Setback: ft.

C. Site located in a floodplain? Yes, Type(s):

Floodplain designation/elevation (10 Year): ft Source:

Floodplain designation/elevation (100 Year): ft Source:

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: Slope Range: %

List landforms:

Landform position(s):

Parent materials:

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

Map Unit Ratings

Septic Tank Absorption Field- At-grade:

Septic Tank Absorption Field- Mound:

Septic Tank Absorption Field- Trench:

5. Local Government Unit Information

Name of LGU:

LGU Contact:

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:



Field Evaluation Worksheet

1. Project Information		v 03.15.2023																														
Property Owner/Client:	<input type="text" value="MICHAEL P ERB & JESSICA ERB"/>	Project ID: <input type="text"/>																														
Site Address:	<input type="text" value="31224 ST HWY 34, DETROIT LAKES, MN 56501"/>	Date Completed: <input type="text" value="5/10/2024"/>																														
2. Utility and Structure Information																																
Utility Locations Identified	<input type="checkbox"/> Gopher State One Call # <input type="text"/>	<input type="checkbox"/> Any Private Utilities: <input type="text"/>																														
Locate and Verify (see Site Evaluation map)	<input type="checkbox"/> Existing Buildings	<input type="checkbox"/> Improvements <input type="checkbox"/> Easements <input type="checkbox"/> Setbacks																														
3. Site Information																																
Vegetation type(s):	<input type="text" value="Lawn"/>	Landscape position: <input type="text" value="Back/ Side Slope"/>																														
Percent slope:	<input type="text" value="14"/> %	Slope shape: <input type="text" value="Linear, Convex"/> Slope direction: <input type="text" value="east"/>																														
Describe the flooding or run-on potential of site:	<input type="text" value="NONE"/>																															
Describe the need for Type III or Type IV system:	<input type="text" value="NONE"/>																															
Note:	<input type="text"/>																															
Proposed soil treatment area protected? (Y/N):	<input type="text" value="Yes"/>	If yes, describe: <input type="text" value="FLAGGED"/>																														
4. General Soils Information																																
Filled, Compacted, Disturbed areas (Y/N):	<input type="text" value="No"/>																															
If yes, describe:	<input type="text"/>																															
Soil observations were conducted in the proposed system location (Y/N):	<input type="text" value="Yes"/>																															
A soil observation in the most limiting area of the proposed system (Y/N):	<input type="text" value="Yes"/>																															
Number of soil observations:	<input type="text" value="3"/>	Soil observation logs attached (Y/N): <input type="text" value="Yes"/>																														
Percolation tests performed & attached (Y/N):	<input type="text" value="No"/>																															
5. Phase I. Reporting Information																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">Depth</th> <th style="width: 15%;">in</th> <th style="width: 15%;">Elevation</th> <th style="width: 15%;">ft</th> </tr> </thead> <tbody> <tr> <td>Limiting Condition*:</td> <td>24</td> <td>in</td> <td>97.4</td> <td>ft</td> </tr> <tr> <td>Periodically saturated soil:</td> <td>24</td> <td>in</td> <td>97.4</td> <td>ft</td> </tr> <tr> <td>Standing water:</td> <td>>80</td> <td>in</td> <td></td> <td>ft</td> </tr> <tr> <td>Bedrock:</td> <td>>80</td> <td>in</td> <td></td> <td>ft</td> </tr> <tr> <td>Benchmark Elevation:</td> <td>100.0</td> <td></td> <td></td> <td>ft</td> </tr> </tbody> </table>		Depth	in	Elevation	ft	Limiting Condition*:	24	in	97.4	ft	Periodically saturated soil:	24	in	97.4	ft	Standing water:	>80	in		ft	Bedrock:	>80	in		ft	Benchmark Elevation:	100.0			ft	<p style="font-size: small;">*Most Restrictive Depth Identified from List Below</p> <p>Soil Texture: <input type="text" value="Sandy Clay Loam"/></p> <p>Percolation Rate: <input type="text"/> min/inch</p> <p>Soil Hyd Loading Rate: <input type="text" value="0.45"/> gpd/sq.ft</p>	
	Depth	in	Elevation	ft																												
Limiting Condition*:	24	in	97.4	ft																												
Periodically saturated soil:	24	in	97.4	ft																												
Standing water:	>80	in		ft																												
Bedrock:	>80	in		ft																												
Benchmark Elevation:	100.0			ft																												
Benchmark Elevation Location:	<input type="text" value="CONCRETE NEXT TO DECK STEP"/>																															
Differences between soil survey and field evaluation:	<input type="text"/>																															
Site evaluation issues / comments:	<input type="text"/>																															
Anticipated construction issues:	<input type="text"/>																															



Soil Observation Log

Project ID:

v 03.15.2023

Client: MICHAEL P ERB & JESSICA ERB Location / Address: 31224 ST HWY 34, DETROIT LAKES, MN 56501

Soil parent material(s): (Check all that apply) Outwash Lacustrine Loess Till Alluvium Bedrock Organic Matter Disturbed/Fill

Landscape Position: Back/Side Slope Slope %: 14.0 Slope shape: Linear, Convex Flooding/Run-On potential: No

Vegetation: Lawn Soil survey map units: 267C Surface Elevation-Relative to benchmark: 97.4

Date/Time of Day/Weather Conditions: 5/10/2024 AFTERNOON CLOUDY Limiting Layer Elevation: 95.4

Observation #/Location: #1 SE CORNER Observation Type: Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-6	Medium Loamy Sand	4	10YR 2/2	None	None	None	Granular	Weak	Loose
6-16	Medium Loamy Sand	4	10YR 5/4	None	None	None	Granular	Weak	Loose
16-30	Sandy Clay Loam	4	10YR 5/4	None	None	None	Blocky	Moderate	Friable
30+	Sandy Clay Loam	4	10YR 5/4	5YR 4/6	Concentrations	51	Blocky	Moderate	Friable

Comments:

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

JAMES PIPER

(Designer/Inspector)

[Signature]

(Signature)

L4041

(License #)

5/10/2024

(Date)

Optional Verification: I hereby certify that this soil observation was verified according to Minn. R. 7082.0500 subp. 3 A. The signature below represents an infield verification of the periodically saturated soil or bedrock at the proposed soil treatment and dispersal site.

(LGU/Designer/Inspector)

(Signature)

(Cert #)

(Date)



Soil Observation Log

Project ID:

v 03.15.2023

Client: MICHAEL P ERB & JESSICA ERB

Location / Address: 31224 ST HWY 34, DETROIT LAKES, MN 56501

Soil parent material(s): (Check all that apply)

Outwash Lacustrine Loess Till Alluvium Bedrock Organic Matter Disturbed/Fill

Landscape Position:

Back/Side Slope

Slope %: 14.0

Slope shape:

Linear, Convex

Flooding/Run-On potential:

No

Vegetation:

Lawn

Soil survey map units:

267C

Surface Elevation-Relative to benchmark:

98.7

Date/Time of Day/Weather Conditions:

5/10/2024

AFTERNOON

CLOUDY

Limiting Layer Elevation:

96.2

Observation #/Location:

#2

SW CORNER

Observation Type:

Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-8	Medium Loamy Sand	4	10YR 2/2	None	None	None	Granular	Weak	Loose
			10YR 5/4	None	None	None	Granular	Weak	Loose
8-18	Medium Loamy Sand	4	10YR 5/4	None	None	None	Granular	Weak	Loose
			10YR 5/4	None	None	None	Blocky	Moderate	Friable
18-30	Sandy Clay Loam	4	10YR 5/4	None	None	None	Blocky	Moderate	Friable
			10YR 5/4	5YR 4/6	Concentrations	S1	Blocky	Moderate	Friable
30+	Sandy Clay Loam	4	10YR 5/4	5YR 4/6	Concentrations	S1	Blocky	Moderate	Friable
			10YR 5/4	5YR 4/6	Concentrations	S1	Blocky	Moderate	Friable

Comments:

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

JAMES PIPER

(Designer/Inspector)

(Signature)

L404

(License #)

5/10/2024

(Date)

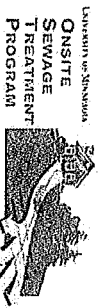
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(LGU/Designer/Inspector)

(Signature)

(Cert #)

(Date)



Soil Observation Log

Project ID:

v 03.15.2023

Client: MICHAEL P ERB & JESSICA ERB Location / Address: 31224 ST HWY 34, DETROIT LAKES, MN 56501

Soil parent material(s): (Check all that apply) Outwash Lacustrine Loess Till Alluvium Bedrock Organic Matter Disturbed/Fill

Landscape Position: Back/Side Slope Slope %: 14.0 Slope shape: Linear, Convex Flooding/Run-On potential: NO

Vegetation: Lawn Soil survey map units: 267C Surface Elevation-Relative to benchmark: 97.4

Date/Time of Day/Weather Conditions: 5/10/2024 AFTERNOON CLOUDY Limiting Layer Elevation: 95.4

Observation #/Location: #3 NE CORNER Observation Type: Auger

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-6	Medium Loamy Sand	2	10YR 2/2	None	None	None	Granular	Weak	Loose
6-16	Medium Loamy Sand	4	10YR 5/4	None	None	None	Granular	Weak	Loose
16-24	Sandy Clay Loam	2	10YR 5/4	None	None	None	Blocky	Moderate	Friable
25+	Sandy Clay Loam	2	10YR 5/4	5YR 4/6	Concentrations	S1	Blocky	Moderate	Friable

Comments:

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

JAMES PIPER

(Designer/Inspector)

(Signature)

L4041

(License #)

5/10/2024

(Date)

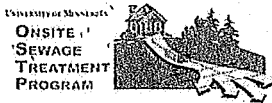
Optional Verification: I hereby certify that this soil observation was verified according to Minn. R. 7082.0500 subp. 3 A. The signature below represents an infield verification of the periodically saturated soil or bedrock at the proposed soil treatment and dispersal site.

(LGU/Designer/Inspector)

(Signature)

(Cert #)

(Date)



Design Summary Page

1. PROJECT INFORMATION		v 03.15.2023
Property Owner/Client:	MICHAEL P ERB & JESSICA ERB	Project ID: <input type="text"/>
Site Address:	31224 ST HWY 34, DETROIT LAKES, MN 56501	Date: 05/12/24
Email Address:	UNKNOWN	Phone: 218-396-0097
2. DESIGN FLOW & WASTE STRENGTH <i>Attach waste strength data/estimated strength for Other Establishments</i>		
Design Flow:	600 GPD	Anticipated Waste Type: Residential
BOD:	170 mg/L	TSS: 60 mg/L
		Oil & Grease: 25 mg/L
Treatment Level:	C <i>Select Treatment Level C for residential septic tank effluent</i>	
3. HOLDING TANK SIZING		
Minimum Capacity: Residential =1000 gal or 400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons		
Code Minimum Holding Tank Capacity:	<input type="text"/> Gallons	with <input type="text"/> Tanks or Compartments
Recommended Holding Tank Capacity:	<input type="text"/> Gallons	with <input type="text"/> Tanks or Compartments
Type of High Level Alarm:	<input type="text"/> (Set @ 75% tank capacity)	
Comments:	<input type="text"/>	
4. SEPTIC TANK SIZING		
A. Residential dwellings:		
Number of Bedrooms (Residential):	4	
Code Minimum Septic Tank Capacity:	1500 Gallons	with 1 Tanks or Compartments
Recommended Septic Tank Capacity:	1500 Gallons	with 2 Tanks or Compartments
Effluent Screen & Alarm (Y/N):	No	Model/Type: <input type="text"/>
B. Other Establishments:		
Waste received by:	<input type="text"/>	<input type="text"/> GPD x <input type="text"/> Days Hyd. Retention Time
Code Minimum Septic Tank Capacity:	<input type="text"/> Gallons	with <input type="text"/> Tanks or Compartments
Recommended Septic Tank Capacity:	<input type="text"/> Gallons	with <input type="text"/> Tanks or Compartments
Effluent Screen & Alarm (Y/N):	<input type="text"/>	Model/Type: <input type="text"/>
* Other Establishments Require Department of Labor and Industry Approval and Inspection for Building Sewer *		
5. PUMP TANK SIZING		
Soil Treatment Dosing Tank		Other Component Dosing Tank:
Pump Tank Capacity (Minimum):	500 Gal	Pump Tank Capacity (Minimum): <input type="text"/> Gal
Pump Tank Capacity (Recommended):	500 Gal	Pump Tank Capacity (Recommended): <input type="text"/> Gal
Pump Req:	45.0 GPM Total Head 16.6 ft	Pump Req: <input type="text"/> GPM Total Head <input type="text"/> ft
Supply Pipe Dia.	2.00 in Dose Vol: 130.0 gal	Supply Pipe Dia. <input type="text"/> in Dose Vol: <input type="text"/> Gal
* Flow measurement device must be incorporated for any system with a pump; Elapsed Time Meter and/or Event Counter *		

6. SYSTEM AND DISTRIBUTION TYPE		Project ID: _____	
Soil Treatment Type:	<input type="text" value="Mound"/>	Distribution Type:	<input type="text" value="Pressure Distribution-Level"/>
Elevation Benchmark:	<input type="text" value="100.0"/> ft	Benchmark Location:	<input type="text" value="CONCRETE NEXT TO DECK STEP"/>
MPCA System Type:	<input type="text" value="Type I"/>	Distribution Media:	<input type="text" value="Rock"/>
Type III/IV/V Details:	<input type="text"/>		<input type="text"/>

7. SITE EVALUATION SUMMARY:			
Describe Limiting Condition: <input type="text" value="Redoximorphic Features/Saturated Soils"/>			
Layers with >35% Rock Fragments? (yes/no) <input type="text" value="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: <input type="text"/>			
Limiting Condition:	<input type="text" value="24"/> inches	Depth	<input type="text" value="2.0"/> ft
Minimum Req'd Separation:	<input type="text" value="36"/> inches	Depth	<input type="text" value="3.0"/> ft
Code Max System Depth*:	<input type="text" value="Mound"/> inches	Depth	<input type="text" value="-1.0"/> ft
Designed Distribution Elevation:	<input type="text" value="98.4"/> ft	Minimum Sand Depth:	<input type="text" value="12.0"/> inches
		Elevation of Limiting Condition	<input type="text" value="95.40"/> ft Critical for system compliance
		Elevation	<input type="text" value="98.40"/> ft Elevation OK
*This is the maximum depth to the bottom of the distribution media for required separation. Negative Depth (ft) requires a mound.			
A. Soil Texture:		<input type="text" value="Sandy Clay Loam"/>	B. Organic Loading Rate (optional): <input type="text"/> lbs/sq.ft/day 0
C. Soil Hyd. Loading Rate:		<input type="text" value="0.45"/> GPD/ft ²	D. Percolation Rate: <input type="text"/> MPI
E. Contour Loading Rate:		<input type="text" value="6"/>	Note: <input type="text"/>
F. Measured Land Slope:		<input type="text" value="14.0"/> %	Note: <input type="text"/>
Comments: <input type="text"/>			

8. SOIL TREATMENT AREA DESIGN SUMMARY			
Trench:			
Dispersal Area	<input type="text"/>	Sidewall Depth	<input type="text"/> in
Total Lineal Feet	<input type="text"/> ft	Trench Width	<input type="text"/> ft
Contour Loading Rate	<input type="text"/> ft	No. of Trenches	<input type="text"/>
		Code Max. Trench Depth	<input type="text"/> in
		Minimum Length	<input type="text"/> ft
		Designed Trench Depth	<input type="text"/> in
Bed:			
Dispersal Area	<input type="text"/> sq.ft	Sidewall Depth	<input type="text"/> in
Bed Width	<input type="text"/> ft	Maximum Bed Depth	<input type="text"/> in
		Bed Length	<input type="text"/> ft
		Designed Bed Depth	<input type="text"/> in
Mound:			
Dispersal Area	<input type="text" value="500.0"/> sq.ft	Bed Length	<input type="text" value="50.0"/> ft
Absorption Width	<input type="text" value="26.0"/> ft	Bed Width	<input type="text" value="10.0"/> ft
Upslope Berm Width	<input type="text" value="6.4"/> ft	Clean Sand Lift	<input type="text" value="1.0"/> ft
Total System Length	<input type="text" value="76.4"/> ft	Berm Width (0-1%)	<input type="text"/>
		Downslope Berm	<input type="text" value="23.1"/> ft
		Endslope Berm Width	<input type="text" value="13.2"/> ft
		System Width	<input type="text" value="39.4"/> ft
		Contour Loading Rate	<input type="text" value="12.0"/> gal/ft

Project ID: _____

At-Grade:

Dispersal Area sq.ft Bed Length ft Bed Width ft
 Upslope Berm ft Downslope Berm ft Finished Height ft
 System Length ft Endslope Berm ft System Width ft

Level & Equal Pressure Distribution Soil Treatment Area

No. of Laterals Lateral Diameter in Lateral Spacing ft
 Perforation Spacing ft Perforation Diameter in Drainback Volume gal
 Min Dose Volume gal Max Dose Volume gal Total Dosing Volume gal

Non-Level and Unequal Pressure Distribution Soil Treatment Area

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perf Size (in)	Spacing (ft)	Spacing (in)	Minimum Dose Volume <input type="text"/> gal
Lateral 1								
Lateral 2								Maximum Dose Volume
Lateral 3								<input type="text"/> gal
Lateral 4								Total Dosing Volume
Lateral 5								<input type="text"/> gal
Lateral 6								<input type="text"/> gal

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

Organic Loading to Soil Treatment

A. Starting BOD Concentration = Design Flow X 0.7 X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

gpd X mg/L X 8.35 ÷ 1,000,000 = lbs. BOD/day (Organic Loading Design)

B. Organic Loading to Soil Treatment Area: (enter loading value in 7B)

mg/L X gpd X 0.7 X 8.35 ÷ 1,000,000 ÷ sq.ft = lbs./day/sqft

HSW Technology Strength Reduction

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 (HSW Technology Design)

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 (HSW Technology Design)

Lbs. BOD To Be Removed: lbs. BOD/day (HSW Technology Design)

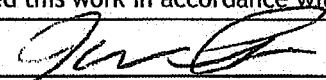
Pretreatment Technology: *Must Meet or Exceed Target

Disinfection Technology: *Required for Levels A & B

10. Comments/Special Design Considerations:

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

JAMES PIPER
(Designer)


(Signature)

L4041
(License #)

5/12/2024
(Date)



Mound Design Worksheet

≥1% Slope

1. SYSTEM SIZING:

Project ID:

v 03.15.2023

- A. Design Flow: GPD
- B. Soil Loading Rate: GPD/sqft
- C. Depth to Limiting Condition: ft
- D. Percent Land Slope: %
- E. Media (Sand) Loading Rate: GPD/sqft
- F. Mound Absorption Ratio:

Table 1
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. Hydraulic Absorption Required Bottom Area: Design Flow (1A) ÷ Design Media Loading Rate(1E)

$$\frac{600 \text{ GPD}}{1.2 \text{ GPD/sqft}} = 500 \text{ sq.ft}$$

Organic Sizing (OPTIONAL)

B. Organic Absorption Bed Area = Organic Loading (Summary 9A) ÷ Organic Soil Loading Rate (Summary 7B)

$$\text{[] lbs BOD} \div \text{[] lbs BOD/sq.ft} = \text{[] sq.ft}$$

C. Required Bed Area = Greater of Hydraulic (1D) or Organic Bed Area (1E) sq.ft

D. Designed Dispersal Media Area: sq.ft *Optional upsizing of area to be larger than 2C*

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

C. Calculate Contour Loading Rate: Bed Width(2B) X Design Media Loading Rate(1E)

$$10 \text{ ft} \times 1.2 \text{ GPD/sqft} = 12.0 \text{ gal/ft} \quad \text{Can not exceed Table 1}$$

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area(2A) ÷ Bed Width(2B)

$$\frac{500 \text{ sqft}}{10.0 \text{ ft}} = 50.0 \text{ ft}$$

If a larger dispersal media Length is desired, enter size: ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width(2B) X Mound Absorption Ratio(1F)

$$10.0 \text{ ft} \times 2.6 = 26.0 \text{ ft}$$

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

Calculate Downslope Absorption Width: Absorption Width(1F) - Bed Width(2B)

$$26.0 \text{ ft} - 10.0 \text{ ft} = 16.0 \text{ ft}$$

4. DISTRIBUTION MEDIA:

Project ID:

Select Dispersal Media:

Enter Either 4A or 4B

A. Rock Depth Below Distribution Pipe

in

B. Registered Media

Registered Media Depth in

Check registered product information for specific application details and design

Specific Media Comments:

5. MOUND SIZING

Project ID:

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

ft - ft = ft Design Sand Lift (optional): ft

B. Upslope Height: Clean Sand Lift(6A) + Depth of Media(4AorB) + Depth to Cover Pipe+ Depth of Cover (1 ft)

ft + ft + ft + ft = ft

Land Slope %	0	1	2	3	4	5	6	7	8	9	10	11	12	
Upslope Berm Ratio	3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
	4:1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70

C. Select Upslope Berm Multiplier (based on land slope):

D. Calculate Upslope Berm Width: Multiplier (5C) X Upslope Mound Height (5B)

X ft = ft

E. Calculate Drop in Elevation Under Bed: Bed Width(2B) X Land Slope(1D) ÷ 100 = Drop (ft)

ft X % ÷ 100 = ft

F. Calculate Downslope Mound Height: Upslope Height(5B) + Drop in Elevation(5E)

ft + ft = ft

Land Slope %	0	1	2	3	4	5	6	7	8	9	10	11	12	
Downslope Berm Ratio	3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
	4:1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69

G. Select Downslope Berm Multiplier (based on land slope):

H. Calculate Downslope Berm Width: Downslope Multiplier(5G) X Downslope Height (5F)

x ft = ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width(3A) + 4 feet

ft + ft = ft

J. Design Downslope Berm = greater of 5H and 5I: ft

K. Select Endslope Berm Multiplier: (usually 3.0 or 4.0)

L. Calculate Endslope Berm Width = Endslope Berm Multiplier(5K) X Downslope Mound Height(5F)

X ft = ft

M. Calculate Mound Width: Upslope Berm Width(5D) + Bed Width(2B) + Downslope Berm Width(5J)

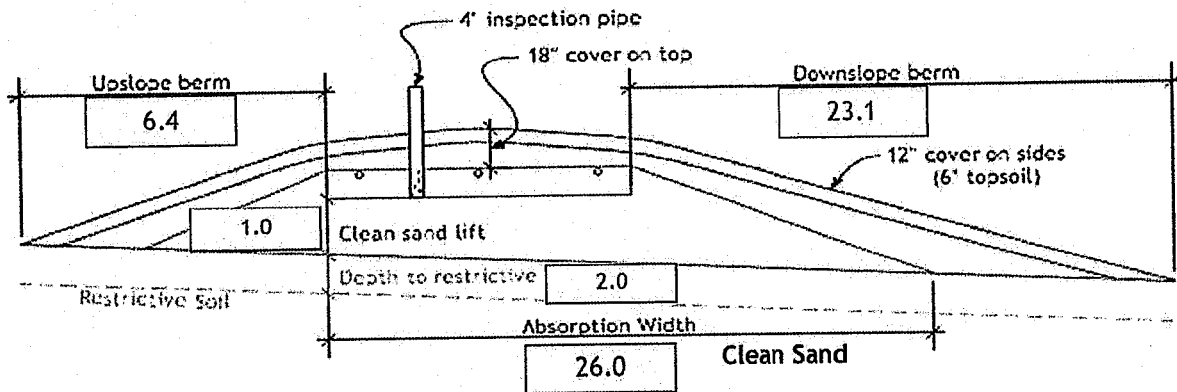
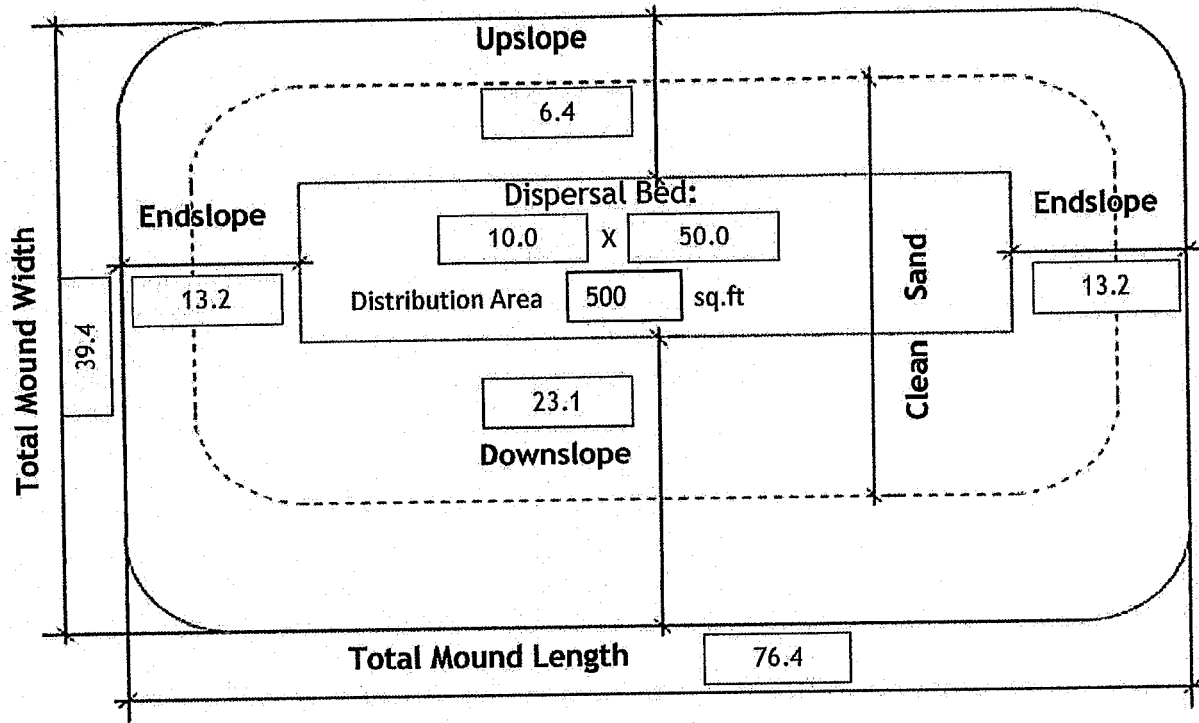
ft + ft + ft = ft

N. Calculate Mound Length: Endslope Berm Width (5L) + Bed Length(2D) + Endslope Berm Width(5L)

ft + ft + ft = ft

6. MOUND DIMENSIONS (Feet)

Project ID:



Required Separation:	<input type="text" value="36"/> (in)	Elevation Limiting Layer:	<input type="text" value="97.4"/> ft
Distribution Media:	<input type="text" value="Rock"/>	Elevation required Separation:	<input type="text" value="100.4"/> ft
Media Depth:	<input type="text" value="6.0"/> (in)	Elevation Distribution Media Bottom:	<input type="text" value="100.4"/> ft
Manifold Connection:	<input type="text" value="End"/>	Elevation Top of Media(min):	<input type="text" value="101.4"/> ft
Lateral Pipe Diameter:	<input type="text" value="2.00"/> (in)	Elevation Top of System(min):	<input type="text" value="102.4"/> ft
Perforation Size:	<input type="text" value="1/4"/> (in)	Perforation Spacing:	<input type="text" value="30.0"/> (in)

If Split and Non-Level Pressure Distribution Used: See Non-Level Pressure Distribution Form

Comments:



Mound Materials Worksheet

Project ID:

v 03.15.2023

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

$$\left(\boxed{6} \text{ in} + \boxed{4.0} \text{ in} \right) \div 12 \times \boxed{50.0} \text{ ft} \times \boxed{10.0} \text{ ft} = \boxed{416.7} \text{ cu.ft}$$

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: $\boxed{416.7} \text{ cu.ft} \div 27 = \boxed{15.4} \text{ cu.yd}$

Add 30% for constructability: $\boxed{15.4} \text{ cu.yd} \times 1.3 = \boxed{20.1} \text{ cu.yd}$

B. Calculate Clean Sand Volume:

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

$$\boxed{1.7} \text{ ft} \times \boxed{10.0} \text{ ft} \times \boxed{50} \text{ ft} = \boxed{850} \text{ cu.ft}$$

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)

$$\boxed{} \text{ ft} - 1) \times \boxed{} \times \boxed{} \text{ ft} = \boxed{}$$

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

$$\boxed{} \text{ ft} - 1) \times \boxed{} \times \boxed{} \text{ ft} = \boxed{}$$

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

$$\boxed{} \text{ cu.ft} + \boxed{} \text{ cu.ft} + \boxed{} \text{ cu.ft} = \boxed{} \text{ cu.ft}$$

For a Mound on a slope greater than 1%

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

$$\left((\boxed{3.0} \text{ ft} - 1) \times 3.0 \text{ ft} \times \boxed{50.0} \right) \div 2 = \boxed{150.0} \text{ cu.ft}$$

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

$$\left((\boxed{4.4} \text{ ft} - 1) \times \boxed{16.0} \text{ ft} \times \boxed{50.0} \right) \div 2 = \boxed{1360.0} \text{ cu.ft}$$

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

$$(\boxed{4.4} \text{ ft} - 1) \times 3.0 \text{ ft} \times \boxed{10.0} \text{ ft} = \boxed{102.0} \text{ cu.ft}$$

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

$$\boxed{150.0} \text{ cu.ft} + \boxed{1360.0} \text{ cu.ft} + \boxed{102.0} \text{ cu.ft} + \boxed{850.0} \text{ cu.ft} = \boxed{2462.0} \text{ cu.ft}$$

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: $\boxed{2462.0} \text{ cu.ft} \div 27 = \boxed{91.2} \text{ cu.yd}$

Add 30% for constructability: $\boxed{91.2} \text{ cu.yd} \times 1.3 = \boxed{118.5} \text{ cu.yd}$

C. Calculate Sandy Berm Volume:

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

$$\left(\boxed{3.7} - 0.5 \right) \text{ ft} \times \boxed{39.4} \text{ ft} \times \boxed{76.4} \div 2 = \boxed{4821.9} \text{ cu.ft}$$

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

$$\boxed{4821.9} \text{ cu.ft} - \boxed{2462.0} \text{ cu.ft} - \boxed{416.7} \text{ cu.ft} = \boxed{1943.2} \text{ cu.ft}$$

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: $\boxed{1943.2} \text{ cu.ft} \div 27 = \boxed{72.0} \text{ cu.yd}$

Add 30% for constructability: $\boxed{72.0} \text{ yd}^3 \times 1.3 = \boxed{93.6} \text{ cu.yd}$

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

$$\boxed{39.4} \text{ ft} \times \boxed{76.4} \text{ ft} \times 0.5 \text{ ft} = \boxed{1506.8} \text{ cu.ft}$$

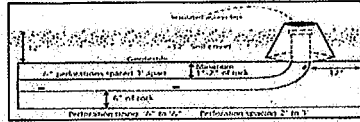
Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: $\boxed{1506.8} \text{ cu.ft} \div 27 = \boxed{55.8} \text{ cu.yd}$

Add 30% for constructability: $\boxed{55.8} \text{ cu.yd} \times 1.3 = \boxed{72.6} \text{ cu.yd}$

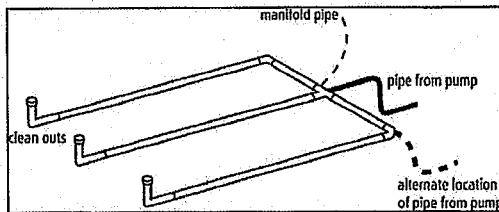
Project ID:

v 03.15.2023

- Media Bed Width: ft
- Minimum Number of Laterals in system/zone = Rounded up number of $[(\text{Media Bed Width} - 4) \div 3] + 1$.
 $[(\text{10} - 4) \div 3] + 1 = \text{3}$ laterals *Does not apply to at-grades*
- Designer Selected Number of Laterals: laterals
Cannot be less than line 2 (Except in at-grades)
- Select Perforation Spacing: ft
- Select Perforation Diameter Size: in
- Length of Laterals = Media Bed Length(1.) - 2 Feet.
 - 2ft = ft *Perforation can not be closer then 1 foot from edge.*
- Determine the Number of Perforation Spaces. Divide the Length of Laterals(6.) by the Perforation Spacing(4.) and round down to the nearest whole number.
 Number of Perforation Spaces = ft \div ft = Spaces
- Number of Perforations per Lateral is equal to 1.0 plus the Number of Perforation Spaces(7.). 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 = Spaces + 1 = Perfs. Per Lateral

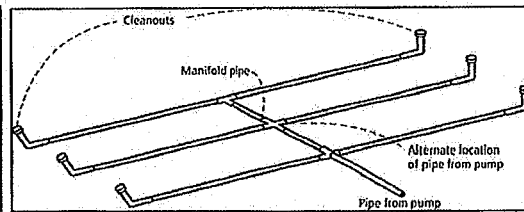


Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation											
1/4 Inch Perforations						7/32 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1 1/4	1 1/2	2	3		1	1 1/4	1 1/2	2	3
2	10	13	18	30	60	2	11	16	21	34	68
2 1/2	8	12	16	28	54	2 1/2	10	14	20	32	64
3	8	12	16	25	52	3	9	14	19	30	60
3/16 Inch Perforations						1/8 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1 1/4	1 1/2	2	3		1	1 1/4	1 1/2	2	3
2	12	18	26	46	87	2	21	33	44	74	149
2 1/2	12	17	24	40	80	2 1/2	20	30	41	69	135
3	12	16	22	37	75	3	20	29	38	64	128



END Connection

Perf Per Lateral:



CENTER Connection

Perf Per Lateral Equal Split: |

OPTIONAL Perf Per Lateral Non-Equal Split*: |

* must not exceed maximum number perfs per lateral in table

- Total Number of Perforations equals the Number of Perforations per Lateral (8.) multiplied by the Number of Perforated Laterals.(3.)
 Perf. Per Lat. X Number of Perf. Lat. = Total Number of Perf.
- Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: ft
- Select Type of Manifold Connection (End or Center): *If Center Manifold Connection the max number of perfs per lateral in the table can be doubled.*
- Select Lateral Diameter (See Table): in



Pressure Distribution Design Worksheet

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)

ft X ft = sq.ft

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

sqft ÷ perf = sq.ft/perf

14. Select Minimum Average Head:

ft

15. Select Perforation Discharge based on Table:

GPM per Perf

16. Flow Rate = Total Number of Perfs(9.) X Perforation Discharge(15.)

Perfs X GPM per Perforation = GPM

17. Volume of Liquid Per Foot of Distribution Piping (Table II):

Gallons/ft

18. Volume of Distribution Piping = Number of Perforated Laterals(3.) X Length of Laterals(6.) X Volume of Liquid Per Foot of Distribution Piping (17.)

X ft X gal/ft = Gallons

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

gals X = Gallons

20. Maximum Delivered Volume = Design flow x 25%

gpd X = Gallons

21. Minimum Delivered vs Maximum Delivered evaluation:

Perforation Discharge (GPM)				
Head (ft)	Perforation Diameter			
	1/4	3/16	7/16	1/4
1.0'	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0'	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'	0.41	0.93	1.26	1.65
1 foot	Dwellings with 3/16 inch to 1/4 inch perforations			
	Dwellings with 1/8 inch perforations			
2 feet	Other establishments and MSTS with 3/16 inch to 1/4 inch perforations			
5 feet	Other establishments and MSTS with 1/8 inch perforations			

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:

1. PUMP CAPACITY

Project ID:

Pumping to Gravity or Pressure Distribution:

Pressure

A. If pumping to gravity enter the gallon per minute of the pump:

GPM (10 - 45 gpm)

B. If pumping to a pressurized distribution system:

45.0 GPM

C. Enter pump description:

Demand Dosing

2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge:

10 ft

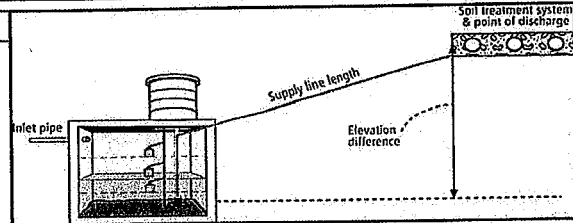
B. Distribution Head Loss:

5 ft

C. Additional Head Loss*:

ft (due to special equipment, etc.)

* Common additional head loss: gate valve = 1 ft each, globe valve = 1.5 ft each, splitter valve = see manufacturers details



Distribution Head Loss	
Gravity Distribution = 0ft	
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:	
Minimum Average Head	Distribution Head Loss
1ft	5ft
2ft	6ft
5ft	10ft

Table I. Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (Inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

D. 1. Supply Pipe Diameter:

2.0 in

2. Supply Pipe Length:

25 ft

E. Friction Loss in Plastic Pipe per 100ft from Table I:

Friction Loss = 5.02 ft per 100ft of pipe

F. Determine Equivalent Pipe Length from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss.
Supply Pipe Length X 1.25 = Equivalent Pipe Length

25 ft X 1.25 = 31.3 ft

G. Calculate Supply Friction Loss by multiplying Friction Loss Per 100ft(E.) by the Equivalent Pipe Length(F.) and divide by 100.

Supply Friction Loss = 5.02 ft per 100ft X 31.3 ft + 100 = 1.6 ft

H. Total Head requirement is the sum of the Elevation Difference(2A) + Distribution Head Loss(2B) + Additional Head Loss(2C) + Supply Friction Loss(2G)

10.0 ft + 5.0 ft + ft + 1.6 ft = 16.6 ft

3. PUMP SELECTION

A pump must be selected to deliver at least 45.0 GPM with at least 16.6 feet of total head.

Comments:



STA Dosing Pump Tank Design Worksheet (Demand Dose)

DETERMINE TANK CAPACITY AND DIMENSIONS

Project ID:

1. A. Design Flow (Design Sum. 1A): GPD C. Tank Use:
- B. Min. required pump tank capacity: Gal D. Recommended pump tank capacity: Gal

2. A. Tank Manufacturer: B. Tank Model:
- C. Capacity from manufacturer: Gallons
- D. Gallons per inch from manufacturer: Gallons per inch
- E. Liquid depth of tank from manufacturer: 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 (2D)

(in + 2 inches) X Gallons Per Inch = Gallons

4. Minimum Delivered Volume = 4 X Volume of Distribution Piping:
 -Item 19 of the Pressure Distribution STA or Item 11 of Non-level STA Gallons (Minimum dose) inches/dose

5. Calculate Maximum Pumpout Volume (25% of Design Flow(1A))
 Design Flow: GPD X 0.25 = Gallons (Maximum dose) inches/dose

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

7. Calculate Doses Per Day = Design Flow(1A) ÷ Delivered Volume(6.)
 gpd ÷ gal = Doses*
- * Doses need to be equal to or greater than 4

8. Calculate Drainback:
- A. Diameter of Supply Pipe = inches
- B. Length of Supply Pipe = feet
- C. Volume of Liquid Per Lineal Foot of Pipe = Gallons/ft
- D. Drainback = Length of Supply Pipe(8B) X Volume of Liquid Per Lineal Foot of Pipe(8C)
 ft X gal/ft = 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

9. Total Dosing Volume = Delivered Volume(6.) + Drainback (8D)
 gal + gal = Gallons

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

11. Reserve Capacity Volume = [Tank Liquid Depth(2E) - Alarm Float Depth(10.)] x gallons per inch of tank(2D)
 in - in] X gal/in = Gallons

DEMAND DOSE FLOAT SETTINGS

Alarm and Pump are to be wired on separate circuits and inspected by the electrical inspector

12. Calculate Float Separation Distance using Dosing Volume.

Total Dosing Volume(9.) ÷ Gallons Per Inch(2D)
 gal ÷ gal/in = inches

13. Measuring from bottom of tank:

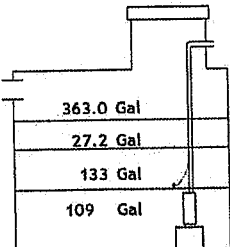
- A. Distance to set Pump Off Float = Pump + block height + 2 inches
 in + 2 in = inches
- B. Distance to set Pump On Float = Distance to Set Pump-Off Float(13A) + Float Separation Distance(12.)
 in + in = inches
- C. Distance to set Alarm Float = Distance to set Pump-On Float(13B) + Alarm Depth (2-3 inches)(10.)
 in + in = inches

Inches for Dose: in

Alarm Depth: in

Pump On: in

Pump Off: in



1. Tank Specifications

Project ID:

A. Tank Manufacturer: Tank Model:

B. Outside Tank Dimensions and Specifications: Tank Use:

Length: in Width: in Height: in Diameter: in

Length: ft Width: ft Height: ft Radius of Tank: in

2. Outside Volume of Tank

Rectangular Tank	Circular Tank
A. Area of Tank = Length (ft) X Width (ft) <input type="text" value="12.3"/> ft X <input type="text" value="5.7"/> ft = <input type="text" value="69.4"/> sq.ft	A. Area of Tank = $\pi r^2 = (3.14 \times (\text{Radius of Tank})^2)$ 3.14 X (<input type="text"/> ft) ² = <input type="text"/> sq.ft
B. Volume of Tank = Area of Tank (2.A) X Height (ft) <input type="text" value="69.4"/> sq.ft X <input type="text" value="5.1"/> ft = <input type="text" value="352.9"/> cu.ft	B. Volume of Tank = Area of Tank X Height (ft) <input type="text"/> sq.ft X <input type="text"/> ft = <input type="text"/> cu.ft

3. Force of Tank Weight (F_{TW})

Weight of Tank (provided by manufacturer) lbs

4. Force of Soil Weight Over Tank (F_{SW})

A. Depth of Cover Over Tank: in ft

B. Weight of Soil Per Cubic Foot: lbs/cu.ft

C. Volume of Soil Over Tank = Depth of Cover(4A) (ft) X Area of Tank(2A) (ft²)
 ft X sq.ft = cu.ft

D. Weight of Soil Over Tank = Volume of Soil Over Tank(4C) X Weight of Soil Per Cubic Foot
 cu.ft X lbs/cu.ft = lbs

Note: Assumes saturation does not get over the lid of the tank

Soil Type	Weight of Soil (lbs/ft ³)
Sandy	120
Loamy	100
Clay	90

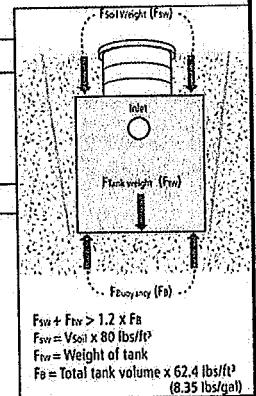
5. Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank(2B) X Weight of Water Per Cubic Foot (62.4 lbs/ft³) X 1.2 (Safety Factor)
 X 62.4 lbs/cu.ft X 1.2 = lbs

6. Evaluation of Net Forces

A. Downward Force = Force of Tank Weight (F_{TW})(3.) + Force of Soil Weight of Soil (F_{SW})(4.)
 lbs + lbs = lbs

B. Net Difference = Downward Force(6A) - Buoyant Force Including Safety Factor (5.)
 lbs - lbs = lbs



If the Net Difference is negative, counter measures will need to be taken to prevent the tank from floating out of the ground.
Comments/Solution:

1. Tank Specifications

Project ID:

A. Tank Manufacturer: Tank Model:

B. Outside Tank Dimensions and Specifications: Tank Use:

Length: in Width: in Height: in Diameter: in

Length: ft Width: ft Height: ft Radius of Tank: in

2. Outside Volume of Tank

Rectangular Tank	Circular Tank
A. Area of Tank = Length (ft) X Width (ft) <input type="text" value="5.5"/> ft X <input type="text" value="5.7"/> ft = <input type="text" value="30.9"/> sq.ft	A. Area of Tank = $\pi r^2 = (3.14 \times (\text{Radius of Tank})^2)$ 3.14 X (<input type="text"/> ft) ² = <input type="text"/> sq.ft
B. Volume of Tank = Area of Tank (2.A) X Height (ft) <input type="text" value="30.9"/> sq.ft X <input type="text" value="0.5"/> ft = <input type="text" value="15.5"/> cu.ft	B. Volume of Tank = Area of Tank X Height (ft) <input type="text"/> sq.ft X <input type="text"/> ft = <input type="text"/> cu.ft

3. Force of Tank Weight (F_{TW})

Weight of Tank (provided by manufacturer) lbs

4. Force of Soil Weight Over Tank (F_{SW})

A. Depth of Cover Over Tank: in ft

B. Weight of Soil Per Cubic Foot: lbs/cu.ft

C. Volume of Soil Over Tank = Depth of Cover(4A) (ft) X Area of Tank(2A) (ft²)
 ft X sq.ft = cu.ft

D. Weight of Soil Over Tank = Volume of Soil Over Tank(4C) X Weight of Soil Per Cubic Foot
 cu.ft X lbs/cu.ft = lbs *Note: Assumes saturation does not get over the lid of the tank*

Soil Type	Weight of Soil (lbs/ft ³)
Sandy	120
Loamy	100
Clay	90

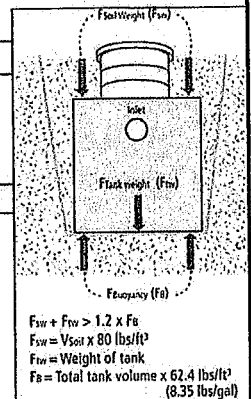
5. Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank(2B) X Weight of Water Per Cubic Foot (62.4 lbs/ft³) X 1.2 (Safety Factor)
 X 62.4 lbs/cu.ft X 1.2 = lbs

6. Evaluation of Net Forces

A. Downward Force = Force of Tank Weight (F_{TW})(3.) + Force of Soil Weight of Soil (F_{SW})(4.)
 lbs + lbs = lbs

B. Net Difference = Downward Force(6A) - Buoyant Force Including Safety Factor (5.)
 lbs - lbs = lbs



If the Net Difference is negative, counter measures will need to be taken to prevent the tank from floating out of the ground.
Comments/Solution:

Becker County, Minnesota

267C—Snellman sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2v0lk
Elevation: 590 to 2,030 feet
Mean annual precipitation: 24 to 30 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Snellman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Snellman

Setting

Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 16 inches: loamy sand
Bt - 16 to 31 inches: sandy clay loam
C - 31 to 79 inches: sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Becker County Restrictive Layer Verification

Client: Mike Srb- Parcel: 105224D00 Date: 5-17-2024

Address: 31824 Hwy 39

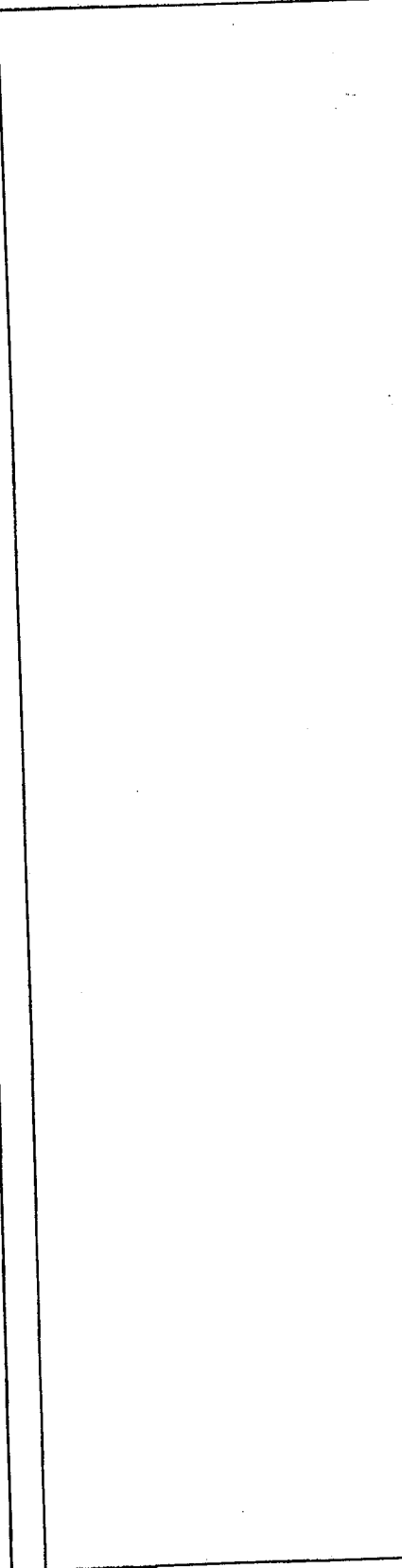
Vegetation: _____ Observation#/Location/Method: PRGAL

Weather Conditions/Time of Day: Mid Morning Matrix Color(s) _____ Mottle Color(s) _____

Depth (in) _____

24" Lk _____ 10YR 4/6 _____

Comments/Notes: _____



Certified Statement: I hereby certify that I have completed this work in accordance with all applicable ordinance, rules and laws.

(Designer) JMCD (Inspector) Stella Rivas (License #) 0-5-31 (Date) 5-17-2024

BM = 100

SB #1 = 97.4

B#2 = 98.7

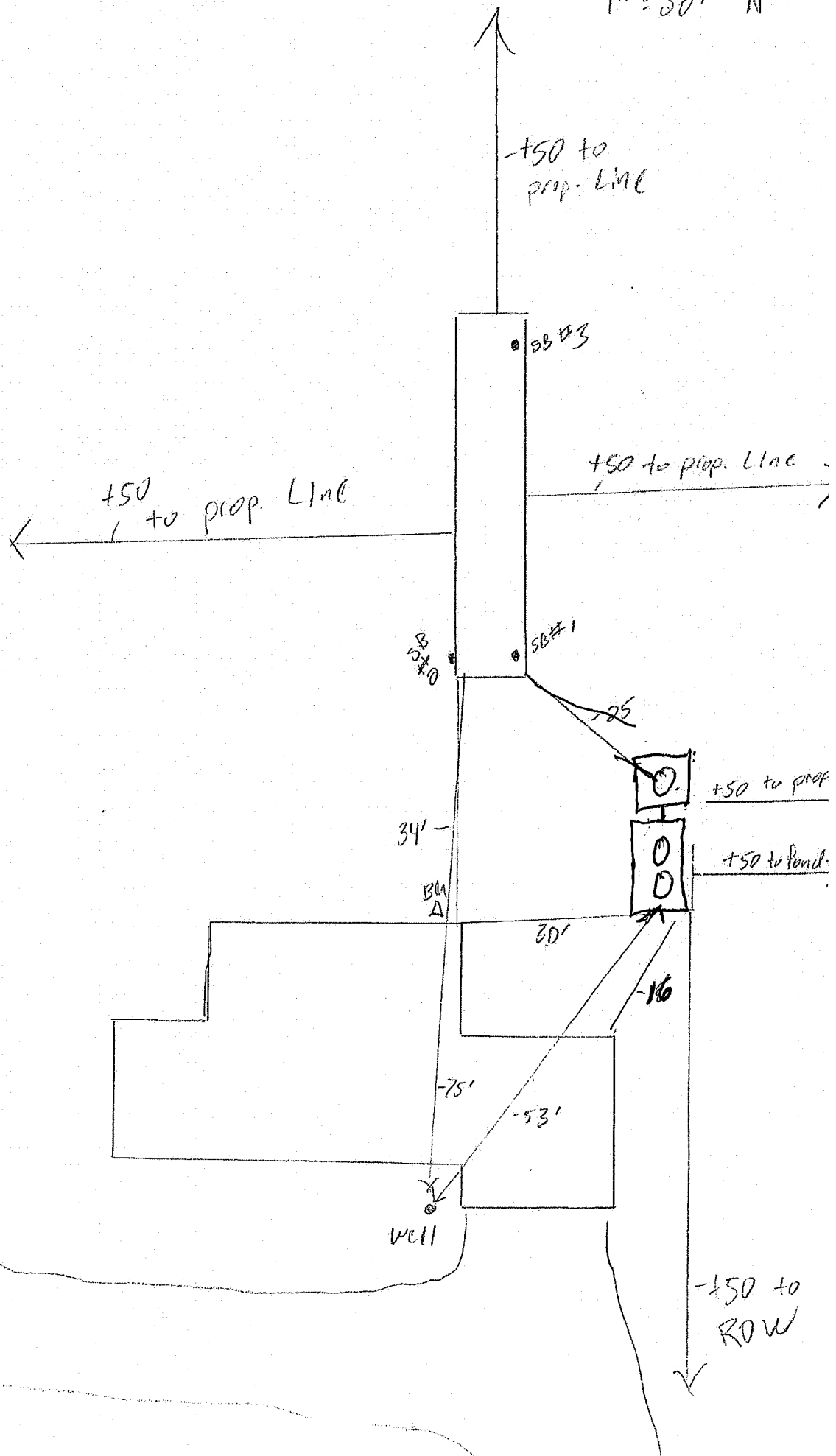
B#3 = 97.4

ank = 92.28

, tank = 92.78

JAMES T. PE

1" = 20'





Compliance inspection report form

Existing Subsurface Sewage Treatment System (SSTS)

Doc Type: Compliance and Enforcement

Instructions: Inspection results based on Minnesota Pollution Control Agency (MPCA) requirements and attached supporting documentation – additional local requirements may also apply. Further information can be found here: <https://www.pca.state.mn.us/sites/default/files/wq-wwists4-31a.pdf>.

Inspector must submit completed form to Local Governmental Unit (LGU) and system owner within 15 days of final determination of compliance or noncompliance.

Property information

Local tracking number:

Parcel ID# or Sec/Twp/Range: 100324000 Local regulatory authority: BECKER COUNTY
Property address: 31224 ST HWY 34, DETROIT LAKES, MN 56501
Owner/representative: MICHAEL P ERB & JESSICA ERB Owner's phone: UNKNOWN
Brief system description: 1000GAL TANK TO DRAINFIELD

System status

System status on date (mm/dd/yyyy): 5/28/2024

Compliant – Certificate of compliance*

(Valid for 3 years from report date unless evidence of an imminent threat to public health or safety requiring removal and abatement under section 145A.04, subdivision 8 is discovered or a shorter time frame exists in Local Ordinance.)

***Note: Compliance indicates conformance with Minn. R. 7080.1500 as of system status date above and does not guarantee future performance.**

Noncompliant – Notice of noncompliance

An imminent threat to public health and safety (ITPHS) must be upgraded, replaced, or its use discontinued within ten months of receipt of this notice or within a shorter period if required by local ordinance or under section 145A.04 subdivision 8.

Systems failing to protect ground water must be upgraded, replaced, or use discontinued within the time required by local ordinance.

Reason(s) for noncompliance (check all applicable)

- Impact on public health (Compliance component #1) – *Imminent threat to public health and safety*
- Tank integrity (Compliance component #2) – *Failing to protect groundwater*
- Other Compliance Conditions (Compliance component #3) – *Imminent threat to public health and safety*
- Other Compliance Conditions (Compliance component #3) – *Failing to protect groundwater*
- System not abandoned according to Minn. R. 7080.2500 (Compliance component #3) – *Failing to protect groundwater*
- Soil separation (Compliance component #5) – *Failing to protect groundwater*
- Operating permit/monitoring plan requirements (Compliance component #4) – *Noncompliant - local ordinance applies*

Comments or recommendations

COMPLIANCE INSPECTION DOES NOT GUARANTEE HYDRAULIC PERFORMANCE
IT IS AN OLDER SYSTEM BUT THERE WAS NO INDICATION THAT IT WASN'T WORKING PROPERLY
NON COMPLIANT DUE TO SOIL SEPERATION

Certification

I hereby certify that all the necessary information has been gathered to determine the compliance status of this system. No determination of future system performance has been nor can be made due to unknown conditions during system construction, possible abuse of the system, inadequate maintenance, or future water usage.

By typing my name below, I certify the above statements to be true and correct, to the best of my knowledge, and that this information can be used for the purpose of processing this form.

Business name: JENCO SERVICES, LLC

Certification number: C1202

Inspector signature: JAMES PIPER

License number: L4041

(This document has been electronically signed)

Phone: 218-850-1248

Necessary or locally required supporting documentation (must be attached)

- Soil observation logs
- Locally required forms
- Tank Integrity Assessment
- Operating Permit
- Other information (list):

1. Impact on public health – Compliance component #1 of 5

Compliance criteria:

System discharges sewage to the ground surface	<input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No
System discharges sewage to drain tile or surface waters.	<input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No
System causes sewage backup into dwelling or establishment.	<input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No

Attached supporting documentation:

Other: _____

Not applicable

Any "yes" answer above indicates the system is an imminent threat to public health and safety.

Describe verification methods and results:

SEARCHED FOR SURFACE OUTLET-NONE FOUND
 SEARCHED FOR SEEPING IN YARD/BACKUP IN HOME-NONE FOUND
 HOMEOWNER TESTIMONY-STATED THERE WAS NO PROBLEMS WITH SYSTEM

2. Tank integrity – Compliance component #2 of 5

Compliance criteria:

System consists of a seepage pit, cesspool, drywell, leaching pit, or other pit?	<input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No
Sewage tank(s) leak below their designed operating depth?	<input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No
If yes, which sewage tank(s) leaks:	

Any "yes" answer above indicates the system is failing to protect groundwater.

Attached supporting documentation:

Pumped at time of inspection

Name of maintenance business: STENGER'S SEPTIC PUMPING

License number of maintenance business: L2911

Date of maintenance: 5/28/2029

Existing tank integrity assessment (Attach)

Date of maintenance (mm/dd/yyyy): _____ (must be within three years)

(See form instructions to ensure assessment complies with Minn. R. 7082.0700 subp. 4 B (1))

Tank is Noncompliant (pumping not necessary – explain below)

Other: _____

Describe verification methods and results:

PROBED TANK(S) BOTTOM-SOLID
 EXAMINED CONSTRUCTION RECORDS-SOLID TANK INSTALLED
 PROBED OUTSIDE TANKS FOR "BLACK SOIL"-NONE FOUND

3. Other compliance conditions – Compliance component #3 of 5

3a. Maintenance hole covers appear to be structurally unsound (damaged, cracked, etc.), or unsecured?

Yes* No Unknown

3b. Other issues (*electrical hazards, etc.*) to immediately and adversely impact public health or safety? Yes* No Unknown

***Yes to 3a or 3b - System is an imminent threat to public health and safety.**

3c. System is non-protective of ground water for other conditions as determined by inspector? Yes* No

3d. System not abandoned in accordance with Minn. R. 7080.2500? Yes* No

***Yes to 3c or 3d - System is failing to protect groundwater.**

Describe verification methods and results:

OBSERVED MAINTENANCE HOLE COVERS-SOUND AND SECURE

Attached supporting documentation: Not applicable

4. Operating permit and nitrogen BMP* – Compliance component #4 of 5 Not applicable

Is the system operated under an Operating Permit? Yes No **If "yes", A below is required**

Is the system required to employ a Nitrogen BMP specified in the system design? Yes No **If "yes", B below is required**

BMP = Best Management Practice(s) specified in the system design

If the answer to both questions is "no", this section does not need to be completed.

Compliance criteria:

a. Have the operating permit requirements been met? Yes No

b. Is the required nitrogen BMP in place and properly functioning? Yes No

Any "no" answer indicates noncompliance.

Describe verification methods and results:

Attached supporting documentation: Operating permit (Attach)

5. Soil separation – Compliance component #5 of 5

Date of installation 6/21/1977 Unknown
(mm/dd/yyyy)

Shoreland/Wellhead protection/Food beverage lodging? Yes No

Compliance criteria (select one):

<p>5a. For systems built prior to April 1, 1996, and not located in Shoreland or Wellhead Protection Area or not serving a food, beverage or lodging establishment:</p> <p>Drainfield has at least a two-foot vertical separation distance from periodically saturated soil or bedrock.</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No*
<p>5b. Non-performance systems built April 1, 1996, or later or for non-performance systems located in Shoreland or Wellhead Protection Areas or serving a food, beverage, or lodging establishment:</p> <p>Drainfield has a three-foot vertical separation distance from periodically saturated soil or bedrock.*</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No*
<p>5c. "Experimental", "Other", or "Performance" systems built under pre-2008 Rules; Type IV or V systems built under 2008 Rules 7080. 2350 or 7080.2400 (Advanced Inspector License required)</p> <p>Drainfield meets the designed vertical separation distance from periodically saturated soil or bedrock.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No*

Attached supporting documentation:

- Soil observation logs completed for the report (Attach)
- Two previous verifications of required vertical separation (Attach)
- Not applicable (No soil treatment area)
- _____

Indicate depths or elevations

A. Bottom of distribution media	20"
B. Periodically saturated soil/bedrock	24"
C. System separation	4"
D. Required compliance separation*	24"

*May be reduced up to 15 percent if allowed by Local Ordinance.

***Any "no" answer above indicates the system is failing to protect groundwater.**

Describe verification methods and results:

CHECKED SOIL WITH AUGER:

0-6" LS 10YR 2/2

6-10" LS 10YR 5/4

10-24" SCL 10YR 5/4

24"+ SCL 10YR 5/4:REDOX 10YR 4/6

Upgrade requirements: (Minn. Stat. § 115.55) An imminent threat to public health and safety (ITPHS) must be upgraded, replaced, or its use discontinued within ten months of receipt of this notice or within a shorter period if required by local ordinance. If the system is failing to protect ground water, the system must be upgraded, replaced, or its use discontinued within the time required by local ordinance. If an existing system is not failing as defined in law, and has at least two feet of design soil separation, then the system need not be upgraded, repaired, replaced, or its use discontinued, notwithstanding any local ordinance that is more strict. This provision does not apply to systems in shoreland areas, Wellhead Protection Areas, or those used in connection with food, beverage, and lodging establishments as defined in law.

Each grid equals _____ feet/inches.

GRID PLOT PLAN SKETCHING FORM

Application for Building Permit Dated _____ 19 _____

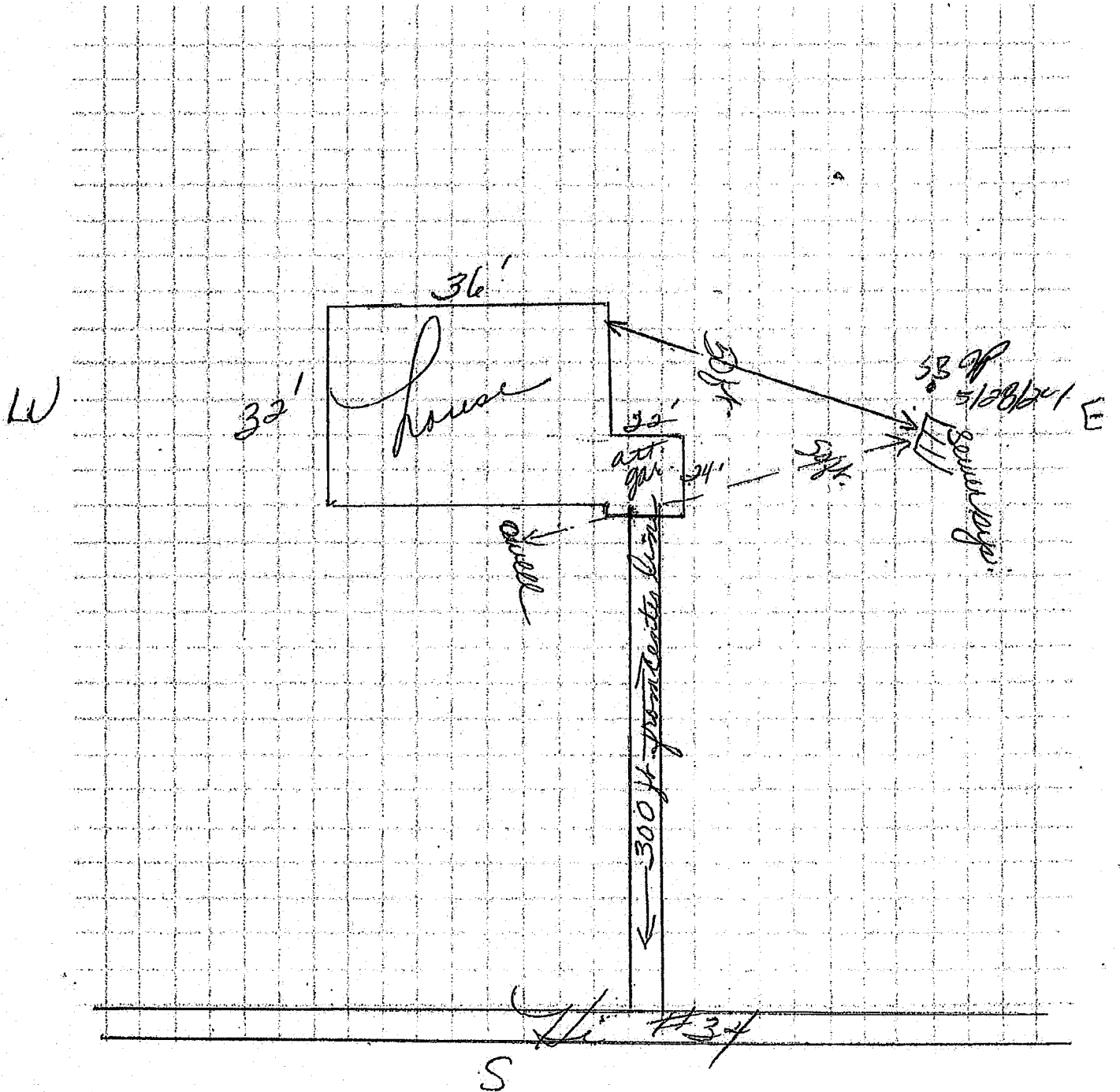
Application for Sewage System Permit Dated _____ 19 _____

Building Permit Number _____ Sewage System Permit Number _____

Applicant agrees that this plot plan is a part of application (s) indicated above.

Dated _____ 19 _____

N *Thomas E. Johnson*
Signature



- W — File
- Y — Owner
- B — Building Inspector

Purpose: This form may be used to certify the compliance status of the sewage tank components of the SSTS. This form is not a complete SSTS inspection report, only a tank integrity assessment, and may only certify sewage tank compliance status when entirely completed and signed by a qualified professional. SSTS compliance inspection report forms can be found at: <https://www.pca.state.mn.us/water/inspections>.

Instructions: This form may be completed, and signed, by a Designated Certified Individual (DCI) of a licensed SSTS inspection, maintenance, installation, or service provider business who personally conducts the necessary procedures to assess the compliance status of each sewage tank in the system. A copy of this information should be submitted to the system owner and be maintained by the licensed SSTS business for a period of five (5) years from the assessment date.

When this form is signed by a qualified certified professional, it becomes *necessary supporting documentation* to an Existing System Compliance Inspection Report: *Compliance inspection form - Existing system (wq-wwists4-31b)*. This form can be found on the MPCA website at <https://www.pca.state.mn.us/water/inspections>.

The information and certified statement on this form is **required** when existing septic tank compliance status is determined by an individual other than the SSTS Inspector that submits an inspection report. This form represents a third party assessment of SSTS component compliance and is allowable under Minn. R. 7082.0700, subp. 4 Item (B) subitem (1). This form is valid for a period of three years beyond the signature date on this form unless a new evaluation is requested by the owner or owner's agent or is required according to local regulations. Additional Administrative Rule references for this activity can be found at Minn. R. 7082.0700, subp. 4 Items B, C, and D; 7083.0730 Item C.

Certificate of sewage tank compliance

Affirm all three statements:

- The SSTS does not contain a seepage pit, cesspool, drywell, leaching pit, or other pit.
- It does not contain a sewage tank that was designed to be watertight, but subsequently leaks below the designed operating depth.
- It does not represent an imminent safety threat by reason of unsecured, damaged, or weak maintenance hole cover(s) or other unsafe condition.

Notice of sewage tank non-compliance

Select all that apply:

- The SSTS has a seepage pit, cesspool, drywell, leaching pit, or other pit – "Failure to Protect Groundwater."
- It has a sewage tank that was designed to be watertight, but subsequently leaks below the designed operating depth – "Failure to Protect Groundwater."
- It presents a threat to public safety by reason of unsecured, damaged, or weak maintenance hole cover(s) or other unsafe condition – "Imminent Threat to Public Health or Safety."

Company information

Company name: JENCO SERVICES

Business license number: L4041

Designated Certified Individual (DCI) information

Print name: JAMES PIPER

Certification number: C1202

I personally conducted the work described above as a Designated Certified Individual of a Minnesota-licensed SSTS inspection, maintenance, installation, or service provider Business. I personally conducted the necessary procedures to assess the compliance status of each sewage tank in this SSTS.

By typing/signing my name below, I certify the above statements to be true and correct, to the best of my knowledge, and that this information can be used for the purpose of processing this form.

Designated Certified Individual's signature: JAMES PIPER
(This document has been electronically signed.)

Date (mm/dd/yyyy): 5/28/2024