ST. LOUIS COUNTY BOARD OF ADJUSTMENT STAFF REPORT

INSPECTION DATE: 6/11/2024 **REPORT DATE: 6/21/2024** **MEETING DATE: 7/11/2024**

APPLICANT INFORMATION

APPLICANT NAME: Brian Reinhart

APPLICANT ADDRESS: 11217 Old Rockford Road, Minneapolis, MN 55441

OWNER NAME:
(IF DIFFERENT THAN ABOVE)

SITE ADDRESS: 3073 Pelo Lane, Ely, MN 55731

LEGAL DESCRIPTION: That part of Govt Lot 1, described as follows: From an iron pin located on the north shore of Little Long Lake, being 480.2 feet South and 137.3 feet West of section corner common to Sections 8, 9, 16 and 17, Township 63, Range 12, point of beginning; thence running North a distance of 481.2 feet intersecting an iron pin on the east and west section line and north boundary line of said Lot 1, Section 17, at a point 131.0 feet West of said described section corner; thence at an angle of 90deg18' to the left, following section line for a distance of 155.34 feet intersecting the southerly right of way line of the Somero Road (County Highway No. 752); thence following the right of way of said road, at an angle of 32deg50' to the left a distance of 53.15 feet; thence at an angle of 56deg50' to the left a distance of 523.6 feet to iron pin on the north shore of Little Long Lake; thence following the shore of Little Long Lake at an angle of 109deg51' to the left for a distance of 212.6 feet to iron pin, point of beginning and there terminating. S17, T63N, R12W (Morse).

PARCEL IDENTIFICATION NUMBER (PIN): 465-0020-02325

VARIANCE REQUEST: The applicant is requesting relief from St. Louis County SSTS Ordinance 61 adopted Technical Standards 7080.2150, Subpart 2 (F), to allow a subsurface sewage treatment system installation at a reduced shoreline setback.

PROPOSAL DETAILS: The applicant is proposing a replacement subsurface sewage treatment system at a reduced shoreline setback of 35 feet where 75 feet is required for a recreational development lake. The system is replacing a noncompliant system.

PARCEL AND SITE INFORMATION

ROAD ACCESS NAME/NUMBER: Pelo Lane

ROAD FUNCTIONAL CLASS: Private

LAKE NAME: Little Long Lake

LAKE CLASSIFICATION: RD

RIVER NAME: N/A

RIVER CLASSIFICATION: N/A

DESCRIPTION OF DEVELOPMENT ON PARCEL: The property is developed with a house, sauna, and failed septic system.

ZONE DISTRICT: RES 10

PARCEL ACREAGE: 2.3 ACRES

LOT WIDTH: Approximately 200 FEET

FEET OF ROAD FRONTAGE: Approximately 45 FEET

FEET OF SHORELINE FRONTAGE: 213 FEET

PARCEL AND SITE INFORMATION

VEGETATIVE COVER/SCREENING: Adequate Screening.

TOPOGRAPHY: Steep slope throughout the property with overall elevation change of 46 feet. Bluff located behind dwelling.

FLOODPLAIN ISSUES: N/A

WETLAND ISSUES: N/A

ADDITIONAL COMMENTS ON PARCEL: Exposed bedrock in bluff area.

FACTS AND FINDINGS

A. Official Controls:

1. Ordinance 61 and technical standards states that septic systems shall meet setbacks as required in section 7080.2150, subpart 2, item F, table VII. The table requires a 75 foot setback to a recreational development lake and the applicant is requesting a 35 foot setback.

B. Practical Difficulty:

1. There is exposed bedrock in the bluff directly behind the dwelling.
2. An alternative would be to install a grinder / ejector station either inside or outside the structure (under 100 gallons) to pump up to a tank that meets shoreline setback, however; tank placement would require significant blasting into the bedrock.

C. Essential Character of the Locality:

1. The area consists of developed lakeshore lots containing both conforming and nonconforming seasonal and year round homes.
2. There have been no similar septic variance requests in the area.

D. Other Factor(s):

1. The proposed septic system replaces a noncompliant septic system and a drain field that is failing to protect groundwater.

BOARD OF ADJUSTMENT CRITERIA FOR APPROVAL OF A VARIANCE

1. **Is the variance request in harmony with the general purpose and intent of official controls?**
2. **Has a practical difficulty been demonstrated in complying with the official controls?**

3. **Will the variance alter the essential character of the locality?**

4. **What, if any, other factors should be taken into consideration on this case?**

CONDITIONS

Conditions that may mitigate the variance for relief from St. Louis County SSTS Ordinance 61 adopted Technical Standards 7080.2150 Subpart 2 (F) to allow the replacement of a subsurface sewage treatment system at a reduced shoreline setback as proposed include, but are not limited to:

1. All other Onsite Wastewater SSTS standards shall be met.
2. Following system installation, an inspection shall be performed by a qualified inspector to ensure setbacks are met prior to issuing Certificate of Compliance.
3. All other local, county, state and federal regulations shall be met.

ST. LOUIS COUNTY, MN
PLANNING AND ZONING DEPARTMENT
(Onsite Wastewater Division)

Duluth
Government Services Center

320 West 2nd Street, Suite 301
Duluth, MN 55802
Phone (218) 725-5200
Toll Free (800) 450-9278

Virginia
Government Services Center
201 South 3rd Avenue West
Virginia, MN 55792
Phone (218) 749-0625
Toll Free (800) 450-9278

Permit Construction Application Subsurface Sewage Treatment System

General

- This permit application form is used to apply for a Permit to Construct. Additional information: www.stlouiscountymn.gov/septic

Enter the Primary PIN and Associated PIN (if applicable) of the property to be reviewed.
PIN is found on your Property Tax Statement. For example, 123-1234-12345. Primary PIN: Parcel where Structure/SSTS are located. Associated PIN: Additional and/or adjacent property that you own or that is related to the project.
County Land Explorer: https://www.stlouiscountymn.gov/explorer
Property Lookup: http://apps.stlouiscountymn.gov/auditor/parcelInfo2005Iframe

Primary PIN	**465-0020-02325**
Associated PINs	

Enter Applicant Information

I am a:	**Contractor**
Are you an LLC Business?	**No**
Applicant Name:	**Michael Heiman**
Address:	**PO Box 356**
	--
City:	**Ely**
State:	**MN**
Zip:	**55731**
Primary Phone:	**218-235-3491**
Mobile Phone:	**--**
Email:	**mheiman@northerngeoseptic.com**
Preferred Contact Method:	**Any**
Contact Person Name:	**--**
Contact Person Phone:	**--**

Property Owner Name and Contact Information.

If the property owner information we have on file is not correct, please enter the current owner information.
Property Owner Name: **REINHART BRIAN R**

Site Address:	**3073 PELO LA**
	--
City:	**ELY**
State/Province:	**MN**
Zip:	**55731**
Primary Phone:	**(949)678-9812**
Mobile Phone:	**--**
Email:	**parents@reinhart.family**
Preferred Contact Method:	**Any**
Contact Person Name	**--**
Contact Person Phone	**--**

Mailing Address Information

This address can default from the address you selected. If the values defaulted are not correct, please enter the correct information.

Same as Property address?	☐ **Yes**
Same as Applicant address?	☐ **Yes**
Name:	**Brian Reinhart**
Address:	**11217 Old Rockford Road**
	--
City:	**Minneapolis**
State/Province:	**MN**
Zip:	**55441**
Primary Phone:	**(949)678-9812**
Mobile Phone:	**--**
Email:	**parents@reinhart.family**

Provide additional email recipients ☑ **Yes**

The Property Owner receives all Permit documents. List any additional recipient emails separated by a semicolon.

Additional email recipients **jschulze.excavating2@gmail.com**

SITE INFORMATION

Enter Site information

Do you need to request a 911 address number and sign? **No**

Is this a leased property? **No**

Is this for Residential or Commercial?

Residential

Is the property used year round or used seasonally?

Year round

Is this project within 300 feet of a river/stream or 1,000 feet of a lake?
Yes

River/Lake Name **Little Long Lake**

Is this property connected to a Common Interest Community?
No

Is this serving multiple dwellings sharing a SSTS component?
No

Is this related to a Point of Sale Requirement?
No

Is the SSTS located in a floodplain?
No

APPLICATION REASON

What are you applying for?	**Replacing the existing SSTS**
Explain why:	**Non-compliant**
Permit Number (being replaced, if known):	**--**

WORKSHEET

Select the System Type

Type I System

"Type I System" means an ISTS that follows a standard trench, bed, at-grade, mound, or graywater system design in accordance with MPCA rules, Minnesota Rules, Chapter 7080.2200 through 7080.2240.

No

Type II System

"Type II System" means an ISTS with acceptable modifications or sewage containment system that may be permitted for use on a site not meeting the conditions acceptable for a standard Type I system. These include systems on lots with rapidly permeable soils or lots in floodplains and privies or holding tanks.

No

Type III System

"Type III System" means a custom designed ISTS having acceptable flow restriction devices to allow its use on a lot that cannot accommodate a standard Type I soil treatment and dispersal system.

Yes

System Type	**Other System**
Note:	**MPCA Type III Systems must be installed by a licensed septic installation contractor.**
Please explain	**Time-dosed mound**

Type IV System

"Type IV System" means an ISTS, having an MPCA registered pretreatment device and incorporating pressure distribution and dosing, that is capable of providing suitable treatment for use where the separation distance to a shallow saturated zone is less than the minimum allowed.

No

Type V System

"Type V System" means an ISTS, which is a custom engineered design to accommodate the site taking into account pretreatment effluent quality, loading rates, loading methods, groundwater mounding, and other soil and other relevant soil, site, and wastewater characteristics such that groundwater contamination by viable fecal coliforms is prevented.

No

Select the gallons per day (GPD) for the system.

Gallons per Day	**Less than 2,500 GPD**

WELL INFORMATION

Enter information about the well.

Do you have a proposed water source?

Yes

Proposed Water Source Type	**Well**
Proposed Well Type	**Drilled**

Enter # of existing water sources on the property

1

After completing the following information for the 1st water source, please use the Add Another Water Source button to add the additional water source(s) information.

Water Source Type	**Surface/Lake Water**
Well #	**--**
Well Depth (Feet)	**--**
Case Depth (Feet)	**--**
Well Type	**--**

DESIGNER & INSTALLER INFORMATION

Select the Designer

Licensed Business Name or Designer Name	**Northern Geoseptic**
License #	**4321**
Certification #	**10163**
Designer's Comments (To On-Site Wastewater Staff)	**CABIN IS CURRENTLY SERVED BY A LAKE WATER SYSTEM. THE OWNER WISHES TO DRILL A WELL IN THE FUTURE.**

Select the Installer (if known)

Licensed Business Name or Installer Name	**Schulze Excavating**
License #	**L1826**
Certification #	**--**
Installer's Comments (To On-Site Wastewater Staff)	**--**

STRUCTURE - RESIDENTIAL

Enter Building Type and Water Uses
Home, mobile home, hunting shack, cabin, RV

Dwelling	**Yes**

Dwelling

# of Bedrooms	**3**
Plumbing	☑ **Yes**
Basement Plumbing	☑ **Yes**
Garbage Disposal	☐ **Yes**
Clothes Washer	☑ **Yes**
Dishwasher	☑ **Yes**
Water Conditioning Unit	☐ **Yes**
Furnace w/Humidifier	☐ **Yes**
Bathtub > 40 gal.	☐ **Yes**
Sewer Grinder Pump	☑ **Yes**
Multi-Family	**No**
Accessory Dwelling	**No**
Accessory Structure w/water	**--**
Other	**No**

Other information to be considered for this application

--

Will this project require a Septic Variance?

Yes

VARIANCE WORKSHEET

Enter Variance information. About SSTS Variances Pursuant to Ordinance 61, Article V, Section 3.0 A property owner may request a variance from the standards specified in the Ordinance pursuant to county policies and procedures. Variances shall only be permitted when they are in harmony with the general purposes and intent of this Ordinance where there are practical difficulties or particular hardship in meeting the strict letter of this Ordinance, excluding the technical standards. Certain deviations may require the approval of the MPCA or the MN Department of Health.

Describe the specific provision(s) in the ordinance from which the variance is requested.

The variance is requested to install the septic and pump tank 35 feet from the Ordinary High Water level of Little Long Lake. Little Long Lake is classified as recreational development and the required setback is 75 feet.

Describe the practical difficulty that prevents compliance with the rule.

The existing cabin on the property is located between a steep, rocky slope and Litte Long Lake. There is not sufficient room behind the cabin to place the tanks (north), rocky soils are located to the west of the cabin and would likely require blasting to set the tanks, and Little Long Lake is located closer to the structure to the east. The only practical location to place the tanks is located to the south of the cabin.

Describe the alternative measures that will be taken to achieve a comparable degree of compliance with the purposes and intent of the applicable provisions.

The Owner wishes to install a septic system to replace a non-compliant system. The requested 35-foot setback to Little Long Lake is the shortest possible distance that also allows the tanks to meet the 10-foot setback from the structure. This location will also allow for vehicle access to properly maintain the tanks.

Identify cost considerations preventing reasonable use of the property under the terms of this ordinance

If the tanks were set to the west of the structure, the septic installer indicated that blasting would likely be required. This would significantly increase the cost of installing the septic system.

OFFICE USE ONLY

ES Area	**EB**
Office	**Virginia**
Section	**17**
Township	**63**
Range	**12**
Variance Department Recommendation	**--**

Specify reasons for recommendation:
Hint: (Reference pertinent sections of the Ordinance and ISTS Construction Standards)

--

Hearing Info. and Outcome	**--**
Board of Adjustment Hearing Date	**--**
Permit #	**--**
Variance Granted	**--**
Case #	**--**

VARIANCE AGREEMENT

By submitting this request for variance from the Ordinance and the Construction Standards, I certify and agree that no substantial health hazard is likely to occur therefrom and an unnecessary hardship might result in strict compliance with the Ordinance and Standards.
I further agree to install a sewage treatment system in accordance with the permit application, plans, and specification that are made as part of this variance request, in addition to paying the Variance Fee associated with this request.

10 5 0 10 20 30 40 Feet

Scale: 1:400

Legend

- Well
- Soil Pit
- Pump Line
- Sewer Line
- 2-foot Contours
- Tank
- Soil Treatment Area
- St. Louis County Tax Parcels

Notes:

- Parcel boundaries as shown are estimated from St. Louis County GIS data and are approximate.
- Septic and pump tanks to be located 35 feet from Little Long Lake.

Figure 1
Septic Design Sketch

Client: Brian Reinhart

Parcel ID: 465-0020-02325

Address: 3073 Pelo Lane City: Ely

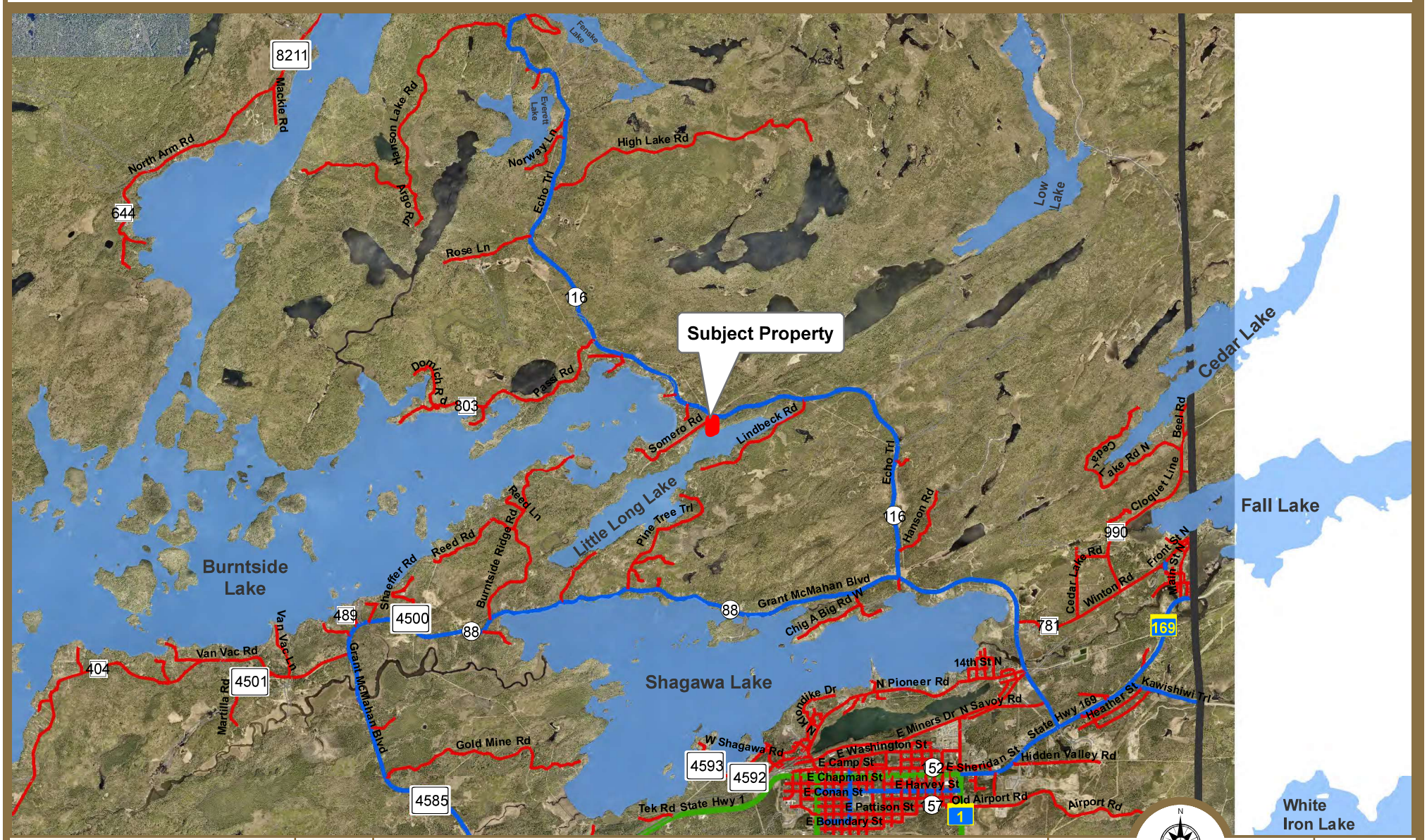
County: St. Louis

NORTHERN GEOSEPTIC
ENGINEERING. SITE DEVELOPMENT. SEPTIC SERVICES.

Date: 6/6/2024 10:01 AM Drawn by: MTH

St. Louis County

July BOA Meeting



Prepared By:	**Planning & Zoning Department** (218) 725-5000 www.stlouiscountymn.gov
Source:	St. Louis County
Map Created:	6/17/2024

Disclaimer: This is a compilation of records as they appear in the St. Louis County Offices affecting the area shown. This drawing is to be used only for reference purposes and the County is not responsible for any inaccuracies herein contained.

Brian Reinhart

Location Map

465-0020-02325

0 0.75 1.5

Miles

St. Louis County MN

St. Louis County

July BOA Meeting

Prepared By:	Planning & Zoning Department (218) 725-5000 www.stlouiscountymn.gov
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Brian Reinhart

Location Map

465-0020-02325

N

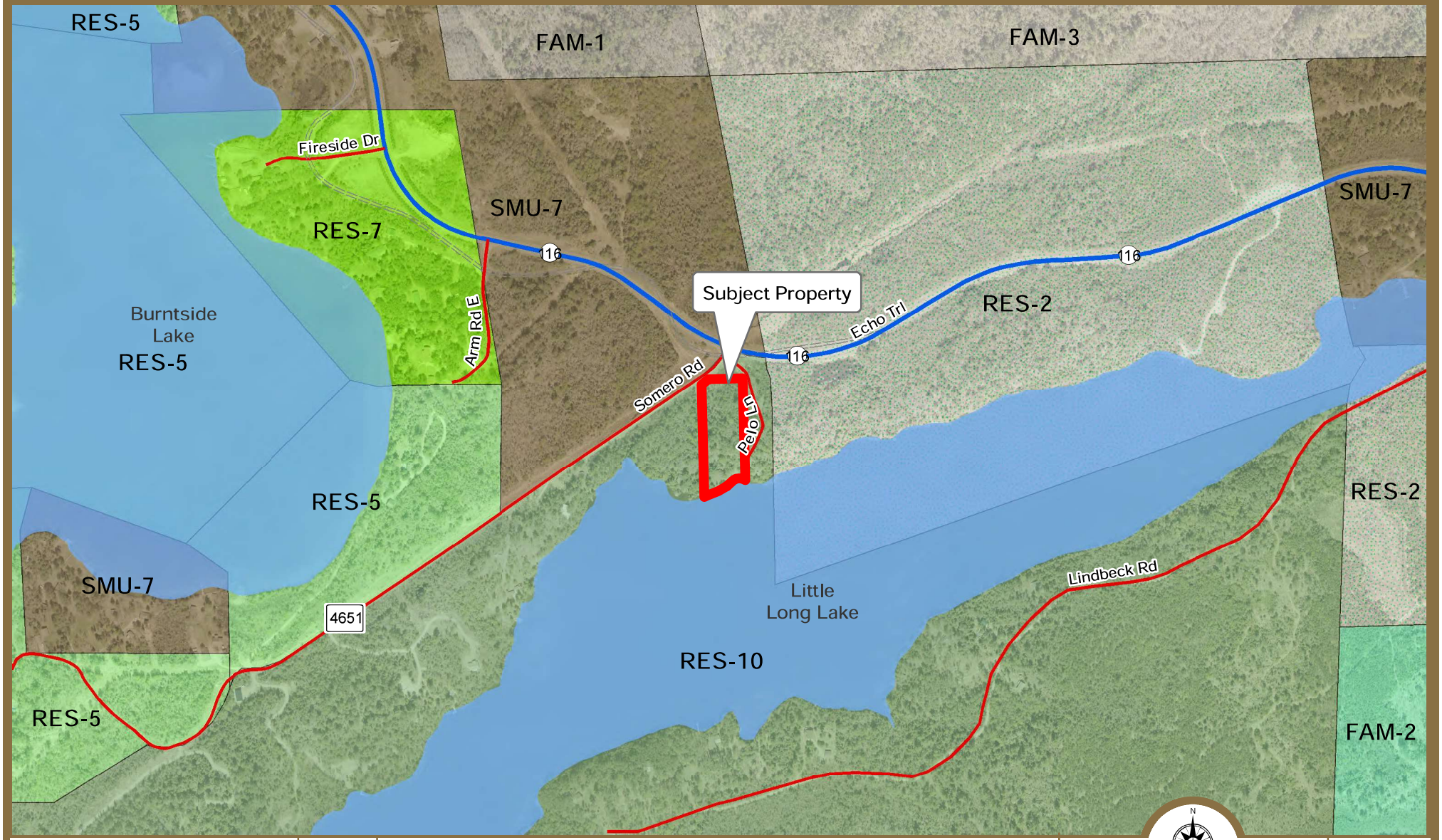
0 400 800

Feet

St. Louis County MN

St. Louis County

July BOA Meeting



Prepared By: Planning & Zoning Department
(218) 725-5000
www.stlouiscountymn.gov

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Brian Reinhart

Zoning Map

465-0020-02325

0 400 800

Feet

St. Louis County MN

St. Louis County

July BOA Meeting

Prepared By: Planning & Zoning Department
(218) 725-5000
www.stlouiscountymn.gov

Source: St. Louis County

Map Created: 6/17/2024

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Brian Reinhart

Site Map

465-0020-02325

N

0 75 150

Feet

St. Louis County MN

St. Louis County

July BOA Meeting

Prepared By:	Planning & Zoning Department (218) 725-5000 www.stlouiscountymn.gov
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Brian Reinhart

Elevation Map

465-0020-02325

0 75 150

Feet

St. Louis County MN

St. Louis County, MN

VARIANCE

Variance Worksheet

Subsurface Sewage Treatment System

Form **3090** Rev. 03-2021

About SSTS Variances Pursuant to Ordinance 61, Article V, Section 3.0

A property owner may request a variance from the standards specified in the Ordinance pursuant to county policies and procedures. Variances shall only be permitted when they are in harmony with the general purposes and intent of this Ordinance where there are practical difficulties or particular hardship in meeting the strict letter of this Ordinance, excluding the technical standards. Certain deviations may require the approval of the MPCA or the MN Department of Health.

Please Complete the Following Sections

Describe the specific provision or provisions in the ordinance from which the variance is requested.

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AGREEMENT

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St. Louis County, MN

PERMIT

Residential Construction Application

Subsurface Sewage Treatment System

Form **3000** Rev. 01-02-2024

This permit application form is used to apply for a Permit to Construct. Additional Information: www.stlouiscountymn.gov/septic.

PROPERTY IDENTIFICATION NUMBER (PIN) and **SITE**

Primary PIN	4	6	5	-	0	0	2	0	-	0	2	3	2	5	Associated PIN														

PIN is found on your Property Tax Statement (E.g. 123-1234-12345), searching the County Land Explorer at https://gis.stlouiscountymn.gov/landexplorer/, or searching the Property Lookup at http://apps.stlouiscountymn.gov/auditor/parcelInfo2005Iframe/.

Site Address **3073 Pelo Lane**	City **Ely**	Zip **55731**

☐ Check to request a 911 address number and sign. Visit https://www.stlouiscountymn.gov/departments-a-z/sheriff/emergency/911-emergency#5143571-obtaining-a-911-address for addressing information.

APPLICANT (Property Owner)

Name **Brian Reinhart**			Date **06/06/2024**
Address **11217 Old Rockford Road**	City **Minneapolis**	State **MN**	Zip **55441**
Email **parents@reinhart.family**	Phone **949-678-9812**	Phone	

CONTACT (If Different than Applicant Above)

Name **Jeff Schulze**		
Email **Jschulze.excavating2@gmail.com**	Phone **218-343-6699**	Phone

MAILING INFORMATION (If Different than Site Address)

☐ US Mail	Address	City	State	Zip
✓ Email	Email **mheiman@northerngeoseptic.com**			

REASON FOR APPLICATON

☐ New SSTS	✓ Replacing the Existing SSTS **Why Non-compliant**	☐ Point of Sale Requirement

SYSTEM TYPE (refer to design summary) and **PERMIT FEES**

Type I		**Type II**		**Type III**		**Type IV**		**Type V**	
☐ Non-Shoreland	$325	☐ Holding Tank	$270	✓ System	$365	☐ System	$420	☐ System	$525
☐ Shoreland	$565	☐ Privy/Outhouse	$110	☐ Component Add/Replace	$215	☐ Component Add/Replace	$215	☐ Component Add/Replace	$215
☐ Component Add/Replace	$215	☐ Floodplain-Shoreland	$330						
		☐ Component Add/Replace	$215						

Please make checks payable to: St. Louis County Auditor

SITE INFORMATION *(Check all that apply)*

✓ Yes	☐ No	Is the SSTS within 1,000 feet of a lake or 300 feet of a river? **Lake/River Name Little Long Lake**
✓ Yes	☐ No	Is the property used year round?
☐ Yes	✓ No	Is the property part of a CIC (Common Interest Community)? If yes, include the Associated PIN on this Application.
☐ Yes	✓ No	Is this property serving multiple dwellings sharing a SSTS component?
☐ Yes	✓ No	Is this leased property? If yes, you must obtain & attach the Lessor's written authorization for this project.

Leased From	☐ MN Power	☐ St. Louis County	☐ MN DNR	☐ US Forest Service	☐ Other

WELL INFORMATION *(Check all that apply)*

Water Source	✓ Proposed Well	☐ Existing Well	☐ Hand Carried	✓ Surface/Lake Water	☐ Municipal
Well Type	✓ Drilled	☐ Sandpoint	☐ Dug	More than one well? ☐ Yes ✓ No	
Well #		Well Depth Feet		Case Depth Feet	

St. Louis County, MN

PERMIT

Residential Construction Application

Subsurface Sewage Treatment System

Form **3000** Rev. 01-02-2024

DESIGNER

Licensed Business Name **Northern GeoSeptic, Inc.**

License # **L4321** | Certification # **C10163**

Designer's Comments *(To Onsite Wastewater Staff)*

Cabin is currently served by a lake water system. The owner wishes to drill a well in the future.

STRUCTURE

Building Type and Water Uses Check all that apply		# of Bedrooms	Seasonal Use Only	Plumbing	Basement Plumbing	Garbage Disposal	Clothes Washer	Dishwasher	Water Conditioning Unit	Furnace w/Humidifier	Bathtub > 40 gal	Sewer Grinder Pump
✓ Dwelling	Home, mobile home, hunting shack, cabin, RV	**3**	☐	✓	✓	☐	✓	✓	☐	☐	☐	✓
☐ Multi-Family	Multiple units		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☐ Accessory Dwelling	Guest cottage, bunk house		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☐ Accessory Structure	Garage, pole building, shed, sauna, gazebo screen-house	**0**	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☐ Other			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Other information to be considered for this application

AGREEMENT

By submitting this application, the entire contents of which are considered to be public data, I certify and agree that I am the owner or the authorized agent of the owner of the above property, and that all uses will conform to the provisions of St. Louis County. I further certify and agree that I will comply with all conditions imposed in connection with the approval of the application. Applicants may be required to submit additional property descriptions, property surveys, site plans, building plans and other information before the application is accepted or approved. ***Intentional or unintentional falsification of this application or any attachments thereto will make the application, any approval of the application and any resulting permit invalid.*** I authorize St. Louis County staff to inspect the property to review the application and for compliance inspections. Furthermore, by submitting this application, I release St. Louis County and its employees from any and all liability and claims for damages to person or property in any manner or form that may arise from the approval of the application or any related plans, the issuance of any resulting permit or the subsequent location, construction, alteration, repair, extension, operation or maintenance of the subject matter of the application.

CONTACT Planning and Zoning (Onsite Wastewater Division)

Duluth Office		**Virginia Office**	
Government Services Center 320 W 2nd Street, Suite 301 Duluth, MN 55802	Phone (218) 725-5200 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic	Government Services Center 201 South 3rd Avenue West Virginia, MN 55792	Phone (218) 749-0625 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic

OFFICE USE ONLY

Amount Paid	Paid by	Cash	Check #	Permit #
Revenue Code	Received By	☐ Mail ☐ IP	Date RIO	

St. Louis County, MN

PERMIT

SSTS Design Summary

Subsurface Sewage Treatment System

Form **3002** Rev. 01-02-2024

This form is used to complete a SSTS Design. Additional Information: www.stlouiscountymn.gov/septic

SITE INFORMATION

Site Address **3073 Pelo Lane**	City **Ely**	Zip **55731**	Parcel ID **465-0020-02325**

DESIGNER

Name **Michael Heiman**		Date **06/06/2024**
Email **mheiman@northerngeoseptic.com**	Phone **218-235-3491**	Phone

SYSTEM INFORMATION

MPCA Type ☐ Type I ☐ Type II ✓ Type III ☐ Type IV ☐ Type V		Dwelling Classification ✓ I ☐ II ☐ III ☐ IV	
✓ Residential ☐ Commercial ✓ Seasonal ☐ Other			Well Casing Depth
# Bedrooms **3**	# Water using devices **3**	Total Finished Sq ft **1550**	Sq ft / Bedroom **517**
Design Flow **450**	Water Meter **No**	Pressure Test **No**	Grinder or Disposal **Yes**
CLR **5.5**	SLR **0.6**	Limiting Soil Type **Bedrock**	Limiting Layer Depth (in) **14**

SSTS Flow Description

3 bedroom house to 1,500 gal septic tank to 500 gal pump tank to 1,000 gal dose tank to pressure mound with 5.5' x 70' rock cell

TANK INFORMATION

Type (Septic, Pump, Holding etc.)	Size (gallons)	Status (New, Existing)	Material (Precast, Plastic)	Alarm (Yes, No)	Insulated (Yes, No)	Bedded (Yes, No)	Building Sewer (Gravity, Pressure, Both)
Septic	**1,500**	**New**	**Precast**	**Yes**	**	**Yes**	**Pressure**
Pump	**500**	**New**	**Precast**	**Yes**	**	**Yes**	**Gravity**
Dosing	**1,000**	**New**	**Precast**	**Yes**	**	**Yes**	**Pressure**

Gallons per inch of pump tank **35.1**

Tank Installation & Pumping comments

****Tanks should be buried at least 24 inches or insulated to an R-value of 10**

DISTRIBUTION INFORMATION

☐ Gravity	☐ Drop Box ☐ Distribution Box			
✓ Pressure	Gal/Min **31.0**	Ft Head **22.0**	Pump Model **Goulds PE 51**	
✓ Event Counter ✓ ETM	Time Dose Panel **Yes**		Timer On **2m55s**	Timer Off **6h48m**
Max Dose **112.5**	Min. Dose **59.8**	Drainback **13.6**	Dose + Drainback **90.6**	Float Tether (in) **1.5**

Manifold		Laterals	
Location ✓ Center ☐ End		Number **4**	Length (ft) **34/34**
Size (in) **2**		Size (in) **1.5**	
Insulated **Yes**		Orifices	
		Size (in) **3/16**	# Per lateral **11/12**
		Spacing (in) **36**	Shields **No**

St. Louis County, MN

PERMIT

SSTS Design Summary

Subsurface Sewage Treatment System

Form **3002** Rev. 01-02-2024

DRAINFIELD INFORMATION							
Trench							
Number		Width (ft)		Length (ft)		Media Type	
Max Depth (in)		Rock (in)		Cover (in)		Sand Liner (in)	
Bed							
Number		Width (ft)		Length (ft)		Media Type	
Max Depth (in)		Rock (in)		Cover (in)		Sand Liner (in)	
At-Grade							
Width (ft)	Length (ft)		Number	Up Berm (ft)		Down Berm (ft)	
Mound							
Number	**1**	Bed Width (ft)	**5.5**	Bed Length (ft)	**70**	Media Type	**Rock**
Sand (in)	**22** to **24**	Rock (in)	**10**	Cover (in)	**12**	Total Width (ft)	**36**
Up Berm (ft)	**13**	Down Berm (ft)	**17**	Sand (yd^3)	**235**	Total Length (ft)	**92**

Registered Filter Product							
Filter Class	☐ Intermittent/Single Pass	☐ Recirculating	☐ Subsurface Flow	☐ Other			
Media Type	☐ Sand	☐ Peat	☐ Textile/Synthetic	☐ Constructed Wetlands			
No. of Filters		Rock Bed Dimensions (ft)		x		Bed Media Depth (in)	
Manufacturer							

Registered Aerobic Treatment System							
Type	☐ Suspended Growth	☐ Fixed Film	☐ Sequencing Batch	☐ Other			
Gallons/day	No. of Units		Disinfection (yes or no)		If yes, chermical or UV		
Manufacturer							

Designer Comments

There is sufficient room for 70-foot rock cell and is likely the only available location for a drain field. The mound is time-dosed to account for the additional flow and help maintain the life of the system.

Pump in 500-gallon pump tank should consist of 35 GPM at 38 feet of head. Goulds 1 HP or equivalent.

CONTACT Planning and Zoning (Onsite Wastewater Division)

Duluth Office		Virginia Office	
Government Services Center 320 W 2nd Street, Suite 301 Duluth, MN 55802	Phone (218) 725-5200 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic	Government Services Center 201 South 3rd Avenue West Virginia, MN 55792	Phone (218) 749-0625 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic

10 5 0 10 20 30 40 Feet

Scale: 1:400

Legend

- Well
- Soil Pit
- Pump Line
- Sewer Line
- 2-foot Contours
- Tank
- Soil Treatment Area
- St. Louis County Tax Parcels

Notes:

- Parcel boundaries as shown are estimated from St. Louis County GIS data and are approximate.
- Septic and pump tanks to be located 35 feet from Little Long Lake.

Figure 1
Septic Design Sketch

Client: Brian Reinhart

Parcel ID: 465-0020-02325

Address: 3073 Pelo Lane City: Ely

County: St. Louis

NORTHERN GEOSEPTIC
ENGINEERING. SITE DEVELOPMENT. SEPTIC SERVICES.

Date: 6/6/2024 10:01 AM Drawn by: MTH

UNIVERSITY OF MINNESOTA

OSTP Soil Observation Log

Project ID:

v 03.19.15

Client/ Address:	3073 Pelo Lane, Ely, MN			Legal Description/ GPS:	465-0020-02325		
Soil parent material(s): (Check all that apply)	☐ Outwash	☐ Lacustrine	☐ Loess	☑ Till	☐ Alluvium	☐ Bedrock	☐ Organic Matter
Landscape Position: (check one)	☑ Summit	☐ Shoulder	☐ Back/Side Slope	☐ Foot Slope	☐ Toe Slope	Slope shape	LL
Vegetation	Pine, Birch	Soil survey map units	F35D	Slope%	5.0	Elevation:	1465
Weather Conditions/Time of Day:	P. Sunny - 64 deg F. - 3:25 p.m.				Date	05/31/24	
Observation #/Location:	SP-01 / Mound				Observation Type:	Soil Pit	

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	I-------- Structure----------I		
							Shape	Grade	Consistence
0 - 3	Sandy Loam	<35%	7.5YR 2.5/1	None			Granular	Moderate	Friable
3 - 14	Sandy Loam	<35%	7.5YR 3/3	None			Granular	Moderate	Friable
14+	Bedrock	>50%							

Comments: End of soil pit at 14 inches.

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

Michael Heiman		L4321	6/6/2024
(Designer/Inspector)	(Signature)	(License #)	(Date)

Document ID: 9df262d927537a3a954674e817ca2997e4f3090127f9ea3bf3c41d6eedcff2c5

Additional Soil Observation Logs

Project ID: #REF!

University of Minnesota Onsite Sewage Treatment Program

Client/ Address:	3073 Pelo Lane, Ely, MN	Legal Description/ GPS:	465-0020-02325

Soil parent material(s): (Check all that apply) ☐ Outwash ☐ Lacustrine ☐ Loess ☑ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (check one) ☑ Summit ☐ Shoulder ☐ Back/Side Slope ☐ Foot Slope ☐ Toe Slope Slope shape: LL

Vegetation	Pine, Birch	Soil survey map units	F35D	Slope%	5.0	Elevation:	1465

Weather Conditions/Time of Day:	P. Sunny - 64 deg F. - 3:25 p.m.	Date	05/31/24

Observation #/Location:	SP-02 / Mound	Observation Type:	Soil Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0 - 2	Sandy Loam	<35%	7.5YR 2.5/1	None			Blocky	Moderate	Friable
2 - 14	Sandy Loam	<35%	7.5YR 3/3	None			Granular	Moderate	Friable
14+	Bedrock	>50%							

Comments: End of soil pit at 14 inches.

Observation #/Location:	SP-03 / Mound	Observation Type:	Soil Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0 - 4	Sandy Loam	<35%	7.5YR 2.5/1	None			Granular	Moderate	Friable
4 - 13	Loamy Sand	<35%	7.5YR 3/3	None			Granular	Moderate	Friable
13 - 25	Loamy Sand	<35%	7.5YR 4/4	None			Granular	Moderate	Friable
25+	Bedrock	>50%							

Comments: End of soil pit at 25 inches.

Pressure Distribution Design Worksheet

Project ID: #REF! v 9.9.2021

1. Media Bed Width: 5.50 ft

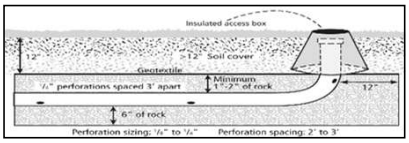
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

[(5.50 - 4) ÷ 3] + 1 = laterals *Does not apply to at-grades*

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

4. Select *Perforation Spacing*: 3.00 ft

5. Select *Perforation Diameter Size:* 3/16 in



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

68.0 - 2ft = 66.0 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 = 66.0 ft ÷ 3.0 ft = 22 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 = 22 Spaces + 1 = 23 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

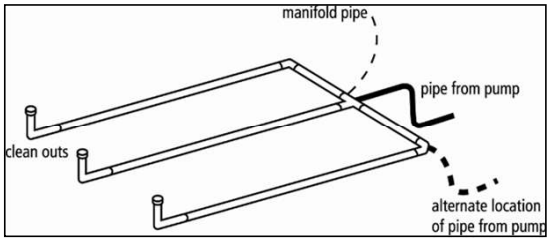
Perforation Spacing (Feet)	Pipe Diameter (Inches) 1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

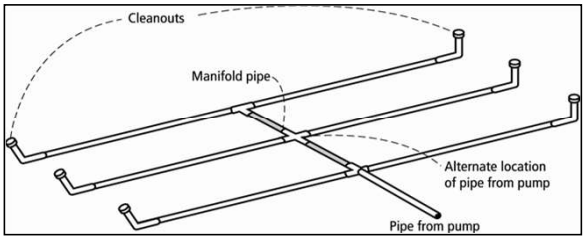
3/16 Inch Perforations

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.*

23 Perf. Per Lat. X 2 Number of Perf. Lat. = 46 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3.5 feet: 2.5 ft

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

12. *Select Lateral Diameter (See Table)*: 1.50 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)

5.5 ft X 68 ft = 374 ft^2

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

374 ft^2 ÷ 46 perf = 8.1 ft^2/perf

14. Select *Minimum Average Head* : 2.5 ft

15. Select *Perforation Discharge* based on Table: 0.66 GPM per Perf

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

46 Perfs X 0.66 GPM per Perforation = 31 GPM

17. *Volume of Liquid Per Foot of Distribution Piping (Table II)* : 0.110 Gallons/ft

18. *Volume of Distribution Piping* =

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

2 X 66 ft X 0.110 gal/ft = 14.5 Gallons

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

14.5 gals X 4 = 58.1 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

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:

Basic Pump Selection Design Worksheet

ONSITE SEWAGE TREATMENT PROGRAM — MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY Project ID: #REF! v 9.9.2021

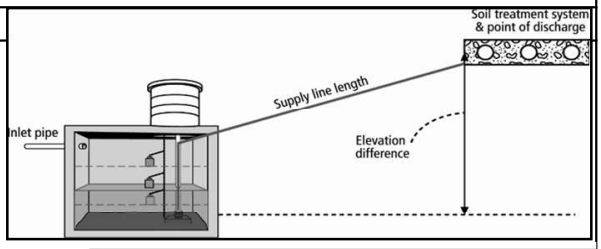
Pumping to Gravity or Pressure Distribution: Pressure

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: 31.0 GPM

C. Enter pump description: Equalization/Time Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 13 ft

B. Distribution Head Loss: 6.5 ft

C. Additional Head Loss: _____ ft (due to special equipment, etc.)

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: 80 ft

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

Friction Loss = 2.52 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*

80 ft X 1.25 = 100.0 ft

G. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft* by the *Equivalent Pipe Length* and divide by 100.

Supply Friction Loss =

2.52 ft per 100ft X 100.0 ft ÷ 100 = 2.5 ft

H. *Total Head* requirement is the sum of the *Elevation Difference* + Distribution Head Loss, + Additional Head Loss + Supply Friction Loss

13.0 ft + 6.5 ft + _____ ft + 2.5 ft = 22.0 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **31.0** GPM with at least **22.0** feet of total head.

Comments:

Pump should consist of Goulds PE51 or equivalent.

STA Dosing Pump Tank Design Worksheet (Time Dose)

University of Minnesota Onsite Sewage Treatment Program

Minnesota Pollution Control Agency

Project ID: v 04.02.2024

DETERMINE TANK CAPACITY AND DIMENSIONS

1. A. Design Flow: 450 GPD B. Tank Use: Equalization

   C. Percentage of Design Flow 60 % 270 Gal Up to 75% design flow is normal for Design percentage

   D. Code minimum pump tank capacity: 1000 Gal E. Recommended capacity: 1000 Gal

2. A. Tank Manufacturer: Del Zotto B. Tank Model: DZ-1000C Lowboy

   C. Capacity from manufacturer: 1023 Gallons

   D. Liquid depth of tank from manufacturer: 30.0 inches

   E. Gallons per inch: 35.1 Gallons per inch

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. *Volume to Cover Pump* (The inlet of pump should be 4 inches from the bottom of the tank & 2 inches covering the pump recommended)

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

   (16 in + 2 inches) X 35.1 Gallons Per Inch = 631.8 Gallons

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

   -Item 19 of the Pressure Distribution or Item 11 of Non-level 59.8 Gallons (minimum dose) 1.70 inches/dose

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

   Design Flow: 450 GPD X 0.25 = 112.5 Gallons (maximum dose) 3.21 inches/dose

6. *Select a pumpout volume that meets both Minimum and Maximum:* 77.0 Gallons

7. Calculate *Doses Per Day* = Percentage Design Flow(1C) ÷ *Delivered Volume(6.)*

   270 gpd ÷ 77.0 gal = 3.5 *Doses*

8. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 80 feet

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

   D. *Drainback = Length of Supply Pipe(8B)* X *Volume of Liquid Per Lineal Foot of Pipe(8C)*

   80 ft X 0.170 gal/ft = 13.6 Gallons

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

   77.0 gal + 13.6 gal = 90.6 Gallons

10. Working Storage Volume = Tank Volume (2C) - Volume to Cover Pump(3.) - Reserve Capacity (22.)

    1023.0 gal - 631.8 gal - 105.3 = 285.9 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

11. Required *Flow Rate* :

    A. From Pump Curve - **Must verify after Install**: 31 GPM*

    B. Calculated GPM = Change in Depth (in) x Gallons Per Inch(2E) / Time Interval in Minutes

    in X 35.1 gal/in ÷ min = GPM

12. Select Flow Rate from 11 A or B: 31.0 GPM*

Note: This value must be adjusted after installation based on pump calibration.

University of Minnesota Onsite Sewage Treatment Program

STA Dosing Pump Tank Design Worksheet (Time Dose)

MINNESOTA POLLUTION CONTROL AGENCY

NORMAL OPERATION TIMER SETTINGS*

13. Calculate **TIMER ON** setting*:

Total Dosing Volume(9.) ÷ GPM(12.)

91	gal ÷	31.0	gpm =	2.9	Minutes **ON***

HR	MIN	SEC	
0	2.0	55	**ON Time**

14. Calculated **TIMER OFF** setting*:

Minutes Per Day (1440)/*Doses Per Day(7.)* - Minutes On(13.)

1440 min ÷	4	doses/day -	2.9	min =	407.7	Minutes **OFF***

HR	MIN	SEC	
6	47.0	45	**OFF Time**

OPTIONAL PEAK ENABLE DOSING* - *Designers option for peak flow operation*

15. Peak Percentage of Design Flow ____ %

16. Peak Pump Volume that meets both Minimum and Maximum Volume ____ gal + Drainback 13.6 gal

17. Peak Dose Volume ____ gal

18. Peak TIMER ON ____ gal ÷ ____ gpm = ____ min ON

HR	MIN	SEC	
			Peak ON

**Note: This value must be adjusted after installation based on pump calibration.*

19. Peak TIMER OFF:1440 min ÷ ____ doses/day - ____ min On ____ min Off

HR	MIN	SEC	
			Peak OFF

FLOAT SETTINGS

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

20. Pump Off Float - Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump(3.) ÷ Gallons Per Inch(2E):

632	gal ÷	35.1	gal/in =	18.0	inches

Alarm Depth **27.0** in

21. Alarm Float - Measuring from bottom of tank (90% recommended):

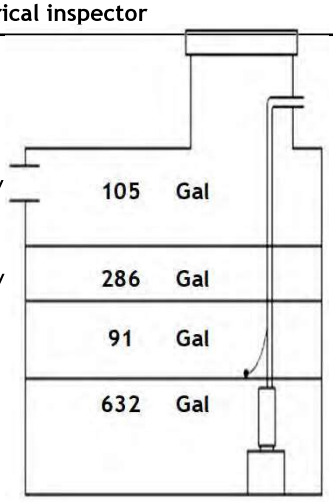
Distance to set Alarm Float = Tank Depth(2D) X % of Tank Depth (90% recommended)

30.0	in X	90	% =	27	inches

Pump Off **18.0** in

22. Reserve Capacity in gallons = Tank Depth(2D) - Alarm Depth(21.) X Gallons Per Inch(2E)

(30.0 in - 27.0 in) X 35.1 = 105.3 gallons



Tank Buoyancy Worksheet

Project ID: #REF! v 9.9.2021

1. Tank Specifications

A. Tank Manufacturer: DelZotto Tank Model: 500-gallon Pump

B. Outside Tank Dimensions and Specifications: Tank Use: Dosing

Length:	78	in	Width:	48	in	Height:	50	in	Diameter:		in
Length:	6.5	ft	Width:	4.0	ft	Height:	4.2	ft	Radius of Tank:		in

2. Outside Volume of Tank

Rectangular Tank

A. Area of Tank = Length (ft) X Width (ft)

6.5 ft X 4.0 ft = 26.0 ft^2

B. Volume of Tank = Area of Tank (2.A) X Height (ft)

26.0 ft X 4.2 ft = 108.3 ft^3

Circular Tank

A. Area of Tank = πr^2 (3.14 X (Radius of Tank)$^{2)}$

3.14 X _____ ft^2 = _____ ft^2

B. Volume of Tank = Area of Tank X Height (ft)

_____ ft^2 X _____ ft = _____ ft^3

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

Weight of Tank (provided by manufacturer) 4332 lbs/ft^3

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

A. Depth of Cover Over Tank: 18 in 1.5 ft

B. Weight of Soil Per Cubic Foot: 100 lbs/ft^3

C. Volume of Soil Over Tank = Depth of Cover (ft) X Area of Tank (ft^2)

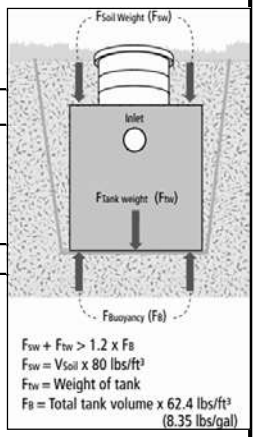
1.5 ft X 26.0 ft^2 = 39.0 ft^3

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

D. Weight of Soil Over Tank = Volume of Soil Over Tank X Weight of Soil Per Cubic Foot

39.0 ft^3 X 100 lbs/ft^3 3,900.0 lbs

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



$F_{SW} + F_{TW} > 1.2 \times F_B$
$F_{SW} = V_{SOIL} \times 80$ lbs/ft³
F_{TW} = Weight of tank
F_B = Total tank volume x 62.4 lbs/ft³ (8.35 lbs/gal)

5.Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank X Weight of Water Per Cubic Foot (62.4 lbs/ft^3) X 1.2 (Safety Fctr)

108 X 62.4 lbs/ft^3 X 1.2 = 8,112.0 lbs

6. Evaluation of Net Forces

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

4332 lbs + 3900 lbs = 8,232.0 lbs

B. Net Difference = Downward Force - Buoyant Force Including Safety Factor

8232 lbs - 8112 lbs = 120.0 lbs

If the Net Difference is negative, countermeasures will need to be taken to prevent the tank from floating out of the ground.

Comments/Solution: Tank should be buried at least 18 inches or anchored to prevent uplift.

Tank Buoyancy Worksheet

1. Tank Specifications

Project ID: #REF! v 9.9.2021

A. Tank Manufacturer: DelZotto Tank Model: 1000 Gallon Lowboy - Time Dose

B. Outside Tank Dimensions and Specifications: Tank Use: Equalization

Length:	138	in	Width:	69	in	Height:	46	in	Diameter:		in
Length:	11.5	ft	Width:	5.8	ft	Height:	3.8	ft	Radius of Tank:		in

2. Outside Volume of Tank

Rectangular Tank

A. Area of Tank = Length (ft) X Width (ft)

11.5 ft X 5.8 ft = 66.1 ft^2

B. Volume of Tank = Area of Tank (2.A) X Height (ft)

66.1 ft X 3.8 ft = 253.5 ft^3

Circular Tank

A. Area of Tank = πr^2 (3.14 X (Radius of Tank)$^{2)}$

3.14 X _____ ft^2 = _____ ft^2

B. Volume of Tank = Area of Tank X Height (ft)

_____ ft^2 X _____ ft = _____ ft^3

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

Weight of Tank (provided by manufacturer) 9576 lbs/ft^3

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

A. Depth of Cover Over Tank: 18 in 1.5 ft

B. Weight of Soil Per Cubic Foot: 100 lbs/ft^3

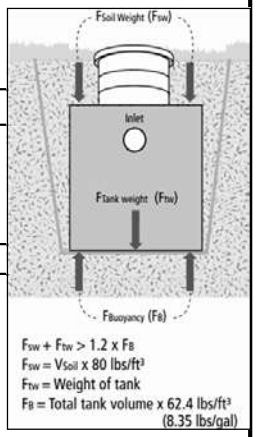
C. Volume of Soil Over Tank = Depth of Cover (ft) X Area of Tank (ft^2)

1.5 ft X 66.1 ft^2 = 99.2 ft^3

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

D. Weight of Soil Over Tank = Volume of Soil Over Tank X Weight of Soil Per Cubic Foot

99.2 ft^3 X 100 lbs/ft^3 9,918.8 lbs *Note: Assumes saturation does not get over the lid of the tank*



$F_{SW} + F_{TW} > 1.2 \times F_B$
$F_{SW} = V_{SOIL} \times 80$ lbs/ft³
F_{TW} = Weight of tank
F_B = Total tank volume x 62.4 lbs/ft³ (8.35 lbs/gal)

5.Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank X Weight of Water Per Cubic Foot (62.4 lbs/ft^3) X 1.2 (Safety Fctr)

253 X 62.4 lbs/ft^3 X 1.2 = 18,980.5 lbs

6. Evaluation of Net Forces

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

9576 lbs + 9919 lbs = 19,494.8 lbs

B. Net Difference = Downward Force - Buoyant Force Including Safety Factor

19495 lbs - 18981 lbs = 514.2 lbs

If the Net Difference is negative, countermeasures will need to be taken to prevent the tank from floating out of the ground.

Comments/Solution: Tank should be buried at least 18 inches or anchored to prevent uplift.

Tank Buoyancy Worksheet

1. Tank Specifications Project ID: #REF! v 9.9.2021

A. Tank Manufacturer: DelZotto Tank Model: 1,500-gallon Single Compartment

B. Outside Tank Dimensions and Specifications: Tank Use: Septic

Length: 147 in Width: 68 in Height: 59 in Diameter: in

Length: 12.3 ft Width: 5.7 ft Height: 4.9 ft Radius of Tank: in

2. Outside Volume of Tank

Rectangular Tank	Circular Tank
A. Area of Tank = Length (ft) X Width (ft)	A. Area of Tank = πr^2 (3.14 X (Radius of Tank)$^{2)}$
12.3 ft X 5.7 ft = 69.4 ft^2	3.14 X ft^2 = ft^2
B. Volume of Tank = Area of Tank (2.A) X Height (ft)	B. Volume of Tank = Area of Tank X Height (ft)
69.4 ft X 4.9 ft = 341.3 ft^3	ft^2 X ft = ft^3

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

Weight of Tank (provided by manufacturer) 11406 lbs/ft^3

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

A. Depth of Cover Over Tank: 25 in 2.1 ft

B. Weight of Soil Per Cubic Foot: 100 lbs/ft^3

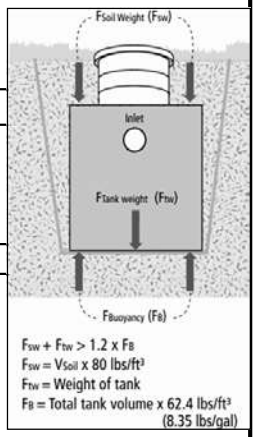
C. Volume of Soil Over Tank = Depth of Cover (ft) X Area of Tank (ft^2)

2.1 ft X 69.4 ft^2 = 144.6 ft^3

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

D. Weight of Soil Over Tank = Volume of Soil Over Tank X Weight of Soil Per Cubic Foot

144.6 ft^3 X 100 lbs/ft^3 14,461.8 lbs *Note: Assumes saturation does not get over the lid of the tank*



5.Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank X Weight of Water Per Cubic Foot (62.4 lbs/ft^3) X 1.2 (Safety Fctr)

341 X 62.4 lbs/ft^3 X 1.2 = 25,556.4 lbs

6. Evaluation of Net Forces

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

11406 lbs + 14462 lbs = 25,867.8 lbs

B. Net Difference = Downward Force - Buoyant Force Including Safety Factor

25868 lbs - 25556 lbs = 311.4 lbs

If the Net Difference is negative, countermeasures will need to be taken to prevent the tank from floating out of the ground.

Comments/Solution: Tank should be buried at least 25 inches or anchored to prevent uplift.

St. Louis County, MN

OPERATING PERMIT

OPERATING PERMIT WORKSHEET

Subsurface Sewage Treatment System

Form **3010** Rev. 01-02-2024

This form is for an operating permit. Additional Information: www.stlouiscountymn.gov/septic.

PROPERTY IDENTIFICATION NUMBER (PIN) and SITE

Primary PIN	Associated PIN
465-0020-02325	

Site Address	City	Zip	Date
3073 Pelo Lane	**Ely**	**55731**	**06/06/2024**

DESIGNER

Licensed Business Name	License #
Northern GeoSeptic, Inc.	**L4321**

REASON FOR OPERATION PERMIT

☐ Holding Tank	✓ Type III	☐ Type IV	☐ Type V
☐ Other Establishment	☐ High Strength Waste	☐ Other	

SYSTEM INFORMATION

Design flow **450**	Treatment level **C**
System components **See Attached Sketch.**	

MONITORING REQUIREMENTS (flows, pump calibration, timer settings, BOD, TSS, FOG, Fecal Coliform, etc.)

Parameter	Effluent limits	Frequency	Location
Pump run times	**306.25 min / month**	**MONTHLY**	**Panel**
Event counter	**105**	**MONTHLY**	**Panel**
Alarm		**AS NEEDED**	**Tank / Panel**

MAINTENANCE REQUIREMENTS

System component	Maintenance	Frequency
Effluent Filter	**Clean**	**Annually**
Alarm	**Check if working**	**Annually**
Operating Permit	**Renew**	**Per County**
Tanks	**Pump**	**As Required**

OTHER INFORMATION

SIGNATURE

Signer ID: 71T7VRLM12...

Date 06/06/2024 PDT

CONTACT Planning and Zoning (Onsite Wastewater Division)

Duluth Office		Virginia Office	
Government Services Center 320 W 2nd Street, Suite 301 Duluth, MN 55802	Phone (218) 471-7103 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic	Government Services Center 201 South 3rd Avenue West Virginia, MN 55792	Phone (218) 471-7103 Toll Free (800) 450-9777 www.stlouiscountymn.gov/septic

UNIVERSITY OF MINNESOTA

Septic System Management Plan for Above Grade Systems

The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

This **management plan** will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is **YOUR** responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota's *Septic System Owner's Guide* contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

Property Owner	Brian Reinhart	Email	parents@reinhart.family
Property Address	3073 Pelo Lane, Ely, MN	Property ID	465-0020-02325
System Designer	Northern GeoSeptic, Inc.	Contact Info	218-235-3491
System Installer	Schulze Excavating, Inc.	Contact Info	218-343-6699
Service Provider/Maintainer		Contact Info	
Permitting Authority	St. Louis County Planning & Zoning	Contact Info	218-749-7103
Permit #		Date Inspected	

Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-built of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the *Septic System Owner's Guide*, visit www.bookstores.umn.edu and search for the word "septic" or call 800-322-8642.

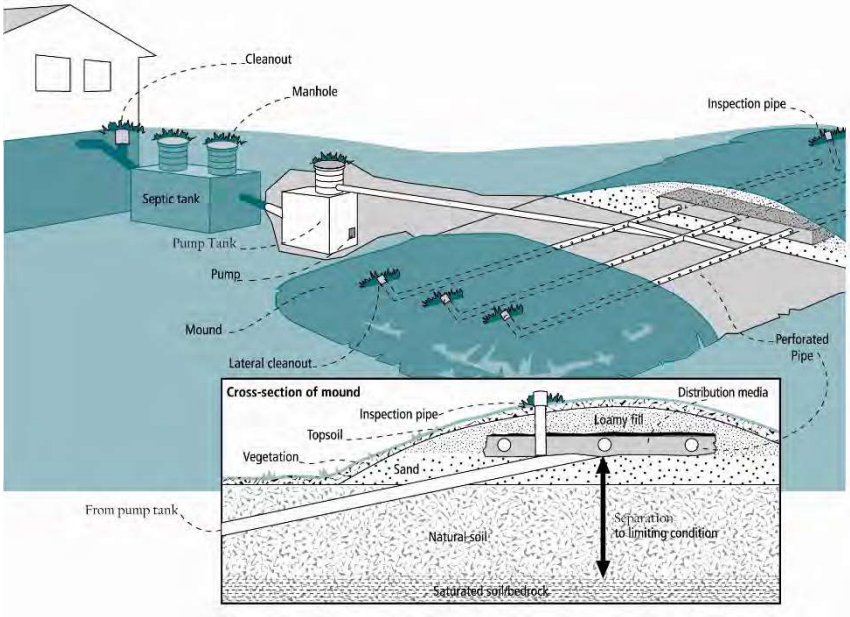
For more information see http://septic.umn.edu

Version: August 2015

UNIVERSITY OF MINNESOTA

Septic System Management Plan for Above Grade Systems

Your Septic System



Septic System Specifics

System Type: ◯ I ◯ II ◯ III ◯ IV* ◯ V*

(*Based on MN Rules Chapter 7080.2200 – 2400)*

**Additional Management Plan required*

☑ System is subject to operating permit*

☐ System uses UV disinfection unit*

Type of advanced treatment unit _____

Dwelling Type

Number of bedrooms: 3

System capacity/ design flow (gpd): 450

Anticipated average daily flow (gpd): 315

Comments_____

Business? : ◯ Y ◯ N What type? _____

Well Construction

Well depth (ft): N/A

- ☐ Cased well Casing depth: _____
- ☐ Other (specify): _____

Distance from septic (ft):_____

Is the well on the design drawing? ◯ Y ◯ N

Septic Tank

- ☐ First tank *Tank volume:* 1,500 *gallons*
  Does tank have two compartments? ◯ Y ◯ N
- ☐ Second tank *Tank volume:* 500 *gallons*
- ☐ Tank is constructed of Concrete
- ☐ Effluent screen: ◯ Y ◯ N Alarm ◯ Y ◯ N

- ☐ Pump Tank 1000 *gallons*
- ☐ Effluent Pump *make/model:* Goulds PE51
  Pump capacity 31.0 GPM
  TDH _____ Feet of head
- ☐ Alarm location Pump Panel

Soil Treatment Area (STA)

Mound/At-Grade area (width x length): 36 ft x 92 ft

Rock bed size (width x length): 5.5 ft x 70 ft

Location of additional STA: N/A

Type of distribution media: Rock

☑ Inspection ports ☑ Cleanouts

☐ Surface water diversions

☐ Additional STA not available

Homeowner Management Tasks

These op*eration and maintenance ac*tivities are your responsibility. *Chart on page 6 can help track your activities.*

Your toilet is not a garbage can. Do not flush anything besides human waste and toilet paper. No wet wipes, cigarette butts, disposal diapers, used medicine, feminine products or other trash!

The system and septic tanks needs to be checked every 36 months

Your service provider or pumper/maintainer should evaluate if your tank needs to be pumped more or less often.

Seasonally or several times per year

- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Soil treatment area.* Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. *Untreated sewage may make humans and animals sick.* Keep bikes, snowmobiles and other traffic off and control borrowing animals.
- *Alarms.* Alarms signal when there is a problem; contact your service professional any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. If you do not have one, consider adding one after washing machine.
- *Effluent screen.* If you do not have one, consider having one installed the next time the tank is cleaned along with an alarm.

Annually

- *Water usage rate.* A water meter or another device can be used to monitor your average daily water use. Compare your water usage rate to the design flow of your system (listed on the next page). Contact your septic professional if your average daily flow over the course of a month exceeds 70% of the design flow for your system.
- *Caps.* Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- *Water conditioning devices.* See Page 5 for a list of devices. When possible, program the recharge frequency based on *water demand (gallons)* rather than *time (days)*. Recharging too frequently may negatively impact your septic system. Consider updating to demand operation if your system currently uses time,
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your service provider or pumper/maintainer.

During each visit by a service provider or pumper/maintainer

- Make sure that your service professional services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- Ask how full your tank was with sludge and scum to determine if your service interval is appropriate.
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.

Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. At each visit a written report/record must be provided to homeowner.

Plumbing/Source of Wastewater

- Review the Water Use Appliance Chart on Page 5 with homeowner.
  Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

Septic Tank/Pump Tanks

- *Manhole lid*. A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- *Liquid level*. Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the soil treatment area.)
- *Inspection pipes*. Replace damaged or missing pipes and caps.
- *Baffles*. Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- *Effluent screen*. Check to make sure it is in place; clean per manufacturer recommendation. Recommend retrofitted installation if one is not present.
- *Alarm*. Verify that the alarm works.
- *Scum and sludge*. Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

Pump

- *Pump and controls.* Check to make sure the pump and controls are operating correctly.
- *Pump vault.* Check to make sure it is in place; clean per manufacturer recommendations.
- *Alarm*. Verify that the alarm works.
- *Drainback.* Check to make sure it is draining properly.
- *Event counter or elapsed time meter.* Check to see if there is an event counter or elapsed time meter for the pump. If there is one or both, calculate the water usage rate and compare to the anticipated use listed on Design and Page 2. Dose Volume: _____ gallons: Pump run time: _____ Minutes

Soil Treatment Area

- *Inspection pipes*. Check to make sure they are properly capped. Replace caps and pipes that are damaged.
- *Surfacing of effluent*. Check for surfacing effluent or other signs of problems.
- *Lateral flushing.* Check lateral distribution; if cleanouts exist, flush and clean at recommended frequency.
- *Vegetation* - Check to see that a good growth of vegetation is covering the system.

All other components – evaluate as listed here:

Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	• Uses additional water. • Adds solids to the tank. • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Use of a garbage disposal is not recommended. • Minimize garbage disposal use. Compost instead. • To prevent solids from exiting the tank, have your tank pumped more frequently. • Add an effluent screen to your tank.
Washing machine	• Washing several loads on one day uses a lot of water and may overload your system. • Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.	• Choose a front-loader or water-saving top-loader, these units use less water than older models. • Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents. Limit use of bleach-based detergents and fabric softeners. • Install a lint filter after the washer and an effluent screen to your tank • Wash only full loads and think even – spread your laundry loads throughout the week.
Dishwasher	• Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area. • New models promote “no scraping”. They have a garbage disposal inside.	• Use gel detergents. Powdered detergents may add solids to the tank. • Use detergents that are low or no-phosphorus. • Wash only full loads. • Scrape your dishes anyways to keep undigested solids out of your septic system.
Grinder pump (in home)	• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Expand septic tank capacity by a factor of 1.5. • Include pump monitoring in your maintenance schedule to ensure that it is working properly. • Add an effluent screen.
Large bathtub (whirlpool)	• Large volume of water may overload your system. • Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.	• Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time. • Use oils, soaps, and cleaners in the bath or shower sparingly.
Clean Water Uses	**Impacts on System**	**Management Tips**
High-efficiency furnace	• Drip may result in frozen pipes during cold weather.	• Re-route water directly out of the house. Do not route furnace discharge to your septic system.
Water softener Iron filter Reverse osmosis	• Salt in recharge water may affect system performance. • Recharge water may hydraulically overload the system.	• These sources produce water that is not sewage and should not go into your septic system. • Reroute water from these sources to another outlet, such as a dry well, draintile or old drainfield. • When replacing, consider using a demand-based recharge vs. a time-based recharge. • Check valves to ensure proper operation; have unit serviced per manufacturer directions
Surface drainage Footing drains	• Water from these sources will overload the system and is prohibited from entering septic system.	

Homeowner Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

Activity	Date accomplished									
Check frequently:										
Leaks: check for plumbing leaks*										
Soil treatment area check for surfacing**										
Lint filter: check, clean if needed*										
Effluent screen (if owner-maintained)***										
Alarm**										
Check annually:										
Water usage rate (maximum gpd _____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

*Monthly

**Quarterly

***Bi-Annually

Notes:

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

Property Owner Signature: _____ Signer ID: 7117VRLM12... Date 06/06/2024 PDT

Management Plan Prepared By: Michael Heiman Certification # C10163

Permitting Authority: St. Louis County Planning & Zoning