



# ST. LOUIS COUNTY BOARD OF ADJUSTMENT STAFF REPORT

INSPECTION DATE: 2/9/2024

REPORT DATE: 2/26/2024

MEETING DATE 3/14/2024

## APPLICANT INFORMATION

**APPLICANT NAME:** Peter and Anne Goldschmidt

**APPLICANT ADDRESS:** 3221 Ewing St, Duluth, MN 55803

**OWNER NAME:**  
(IF DIFFERENT THAN ABOVE)

**SITE ADDRESS:** 4821 Datka Road, Duluth, MN 55803

**LEGAL DESCRIPTION:** Lots 13 and 14 of Rearrangement of Bay Park, S13, T52N, R15W (Fredenberg)

**PARCEL IDENTIFICATION NUMBER (PIN):** 365-0021-00130

**VARIANCE REQUEST:** The applicant is requesting relief from St. Louis County Zoning Ordinance 62, Article IV, Section 4.3 D, to allow an addition to a nonconforming principal structure outside the shore impact zone to exceed the 400 square feet allowed.

**PROPOSAL DETAILS:** The applicant is proposing an addition to the rear of an existing nonconforming dwelling. The proposed addition is 50 feet by 15 feet (750 square feet). The existing nonconforming dwelling is 50 feet by 32 feet (1,600 square feet) located 56 feet from Flowage Lake where 100 feet is required. The addition is to the rear of the structure and will not decrease the shoreline setback. The proposed height of the addition is 12 feet.

## PARCEL AND SITE INFORMATION

**ROAD ACCESS NAME/NUMBER:** 4821 Datka Road

**ROAD FUNCTIONAL CLASS:** Local

**LAKE NAME:** Flowage Lake

**LAKE CLASSIFICATION:** RD

**RIVER NAME:** N/A

**RIVER CLASSIFICATION:** N/A

**DESCRIPTION OF DEVELOPMENT ON PARCEL:** The property is developed with a dwelling, two garages, wood shed, septic system and well.

**ZONE DISTRICT:** SMU 7

**PARCEL ACREAGE:** 2.70 ACRES

**LOT WIDTH:** 275 FEET

**FEET OF ROAD FRONTAGE:** 260 FEET

**FEET OF SHORELINE FRONTAGE:** 400 FEET

## PARCEL AND SITE INFORMATION

**VEGETATIVE COVER/SCREENING:** There is good vegetative screening from the road and property lines. There is adequate screening within the shoreland area. The applicant stated they have removed some dead Trembling Aspen and Birch Trees.

**TOPOGRAPHY:** The property contains steep slope which is approximately 20 percent slope.

**FLOODPLAIN ISSUES:** There is floodplain on the parcel. Any future development will be required to conform to floodplain standards. The proposed project is outside of the floodplain.

**WETLAND ISSUES:** N/A

## FACTS AND FINDINGS

### A. Official Controls:

1. Zoning Ordinance 62, Article IV, Section 4.3 states addition requirements for nonconforming principal structures.
  - a. The applicant is requesting an addition of 750 square feet where a 400 square foot addition may be allowed through a performance standard permit.
2. Goal LU-3 of the St. Louis County Comprehensive Land Use Plan is to improve the integrity of the county's planning-related regulation by minimizing and improving management of nonconformities.
3. Objective LU-3.1 of the St. Louis County Comprehensive Land Use Plan is to base variance decisions on uniform approval criterion to ensure all applicants are treated equitably, that community health and safety is protected, and that the overall character of a given area is preserved.
4. Objective LU-3.3 of the St. Louis County Comprehensive Plan is to acknowledge why nonconformities are a concern and that variances should be for exceptional circumstances as noted in Minnesota Statute 394.22 Subd. 10.

### B. Practical Difficulty:

1. A variance is not the only option, as there are alternatives.
  - a. A 400 square foot addition may be allowed to the existing nonconforming dwelling through a Performance Standard Permit.
  - b. If the existing dwelling is relocated to the conforming shoreline setback, an addition may be allowed with a land use permit.

### C. Essential Character of the Locality:

1. The applicant is not proposing a new use to the area. Most of the parcels on Flowage Lake are utilized for seasonal or year-round residential use.
2. There have been no past variance requests within the proximity of the proposed project.

### D. Other Factors:

1. Zoning Ordinance 62 states that it shall be the burden of the applicant to demonstrate sufficient practical difficulty to sustain the need for a variance. Absent a showing of practical difficulty as provided in Minnesota Statutes and this ordinance, the Board of Adjustment shall not approve any variance.



## **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 to allow an addition to a nonconforming principal structure outside the shore impact zone to exceed the 400 square feet allowed as proposed include, but are not limited to:

1. The structure shall be unobtrusive earth-toned colors, including siding, trim, and roof.
2. Stormwater runoff from the proposed structure shall not discharge directly into the lake or on adjacent parcels.
3. St. Louis County Onsite Wastewater SSTS standards shall be followed.
4. Excavation shall meet all land alteration standards in St. Louis County Zoning Ordinance 62, Article VI, Section 6.16.
5. The shore impact zone shall be preserved in a natural state and screening shall be retained.

## ST. LOUIS COUNTY, MN PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

### Duluth

Government Services Center

320 West 2nd Street, Suite 301  
Duluth, MN 55802  
(218) 725-5000

### Virginia

Government Services  
Center

201 South 3rd Avenue West  
Virginia, MN 55792  
(218) 749-7103

## VARIANCE REQUEST PERMIT APPLICATION

**General** - This application is used to apply for a Land Use Permit. Applicants will need to attach the appropriate worksheet(s) in order to process. Incomplete applications will be returned. Note that the 'clock' does not begin until after payment has been processed for the application. For more information, see our website at:

[www.stlouiscountymn.gov/BuildingStructures](http://www.stlouiscountymn.gov/BuildingStructures)

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

**365-0021-00130**

Associated PINs

### Is this application being submitted for a Rehearing?

*If this application is being submitted because a previous Variance Permit application was denied or disapproved, please select Yes.*

**No**

### Enter Applicant Information

I am a: **Landowner**  
 Applicant Name: **Peter & Anne Goldschmidt**  
 Address Line 1: **3221 Ewing Ave**  
 Address Line 2: **--**  
 City: **Duluth**  
 State: **MN**  
 Zip: **55803**  
 Primary Phone: **(218)393-7453**  
 Cell Phone: **--**  
 Fax: **--**  
 Email: **pdgoldschmidt@charter.net**  
 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 Applicant  
address? ☐ Yes

Name: **Peter & Anne Goldschmidt**  
 Address: **3221 Ewing Ave**

City: **Duluth**  
 State/Province: **MN**  
 Zip: **55803**  
 Primary Phone: **--**  
 Cell Phone: **--**  
 Fax: **--**  
 Email: **pdgoldschmidt@charter.net**

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#### Site Information

*If there is no site address, the application will be forwarded to 911/Communications to assign one.*

Is there a site address for this property? **Yes**

Site Address: **4821 Dakota Rd, Duluth**

Is this leased property? **No**

Leased From? **--**

#### US Forest Service

US Forest Service  
 Superior National Forest  
 8901 Grand Avenue Place  
 Duluth, MN 55808

#### MN Power

MN Power  
 Shore Land Traditions  
 30 West Superior Street  
 Duluth, MN 55802

#### MN DNR, Area Hydrologist

MN DNR, Area Hydrologist  
 7979 Highway 37  
 Eveleth, MN 55734

#### MN DNR Land and Minerals

MN DNR Land and Minerals  
 1201 East Highway 2  
 Grand Rapids, MN 55744

#### St. Louis County - Duluth

St. Louis County - Duluth  
 Government Services Center  
 320 West 2nd Street, Suite 301  
 Duluth, MN 55802  
 (218) 725-5000

#### St. Louis County - Virginia

St. Louis County - Virginia  
 Land and Minerals  
 7820 Highway 135  
 Virginia, MN 55792  
 (218) 749-7103

#### Do you have written authorization from the leased property owner?

*If Yes, you must attach written authorization form.*

**--**

#### How is the property accessed?

- ☐ Public Road  
☒ Private Road  
☐ Easement

☐ Water

☐ Other

Enter Project Information.

*If you answered 'Yes' to any of the questions below, it is required that you submit a copy of a septic permit to construct or certificate of compliance approval or municipal/sanitary district approval when applying for a land use permit.*

**Is this project on a parcel less than 2.5 acres?**

**No**

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

**Yes**

**Is this project adding a bedroom?**

*Include home, garage, and accessory dwelling.*

**No**

**Total # of bedrooms on property after project completion.**

**1**

**Does this project include plumbing or pressurized water in proposed structure?**

**Yes**

**If Yes, please explain:**

**This will add a 1/2 bath and expand the kitchen.**

**Is this project connected to a municipal or sanitary district system?**

**No**

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## VARIANCE REQUEST WORKSHEET

A variance allows the use of property in a manner otherwise forbidden by a zoning ordinance by varying one or more of the performance standards such as lot size, setbacks, etc. Variances from official zoning controls are defined under Minnesota Statutes 394.27 and require the landowner to prove that the property could not otherwise be used or enjoyed in the proposed way by complying with ordinance requirements and that there will be no negative impact on surrounding properties.

It is advisable that you discuss your request with Planning and Community Development staff prior to submitting the application. Approval or denial of your request is dependent on the justification you provide in answering the questions on this application. For more information, please check our website at: [www.stlouiscountymn.gov/VarianceRequired](http://www.stlouiscountymn.gov/VarianceRequired)

## VARIANCE REQUEST INFORMATION

Complete this form along with the Land Use Permit Application

**What kind of variance request is this?**

*If this is a Variance After the Fact, you must answer additional questions below.*

### Variance Request

Describe what you are varying from and the situation that makes it difficult to comply with county ordinances.

*If your proposal includes a structure, please also list the length, width and height of the structure.*

**We are attempting to convert the cabin from seasonal cabin to a more functional home, including a larger kitchen with indoor seating for our family and increasing storage. The addition would also include a tv room as the cabin currently has no tv and 1/2 bath for guests to use. To add this would require more than 400 square feet.**

Describe the intended/planned use of the property.

**We are approaching retirement and plan to see our house in Duluth and move tot he cabin.**

Describe the current use of your property.

**Currently we use the cabin more in the summer and when we are off from work. As we plan our retirement we plan to move out to the cabin and need more space for this to function as our primary residence.**

Describe other alternatives, if any.

**The current allowance of 400 square feet does not allow us to achieve our goals. We want to add usable square footage without changing the appearance of the cabin. We want to keep the overall shape of the cabin by adding on to the non-lake side. We need to add enough depth to have usable space and want to extend along the entire back of the cabin. We feel the minimum depth to add on would be 12' 8", which results in a square footage which exceeds the allowed addition square footage.**

If approved, how will the proposed use, with the variance, fit into the character of the neighborhood/area?

**The addition will not change the way the cabin fits into the neighborhood and would only minimally change the appearance of the cabin in the winter as the current steps down to the cabin from the driveway are quite steep and would be moved to an area that is not quite as steep and less affected by snow drifts coming off the lake and over cabin.**

Describe how neighboring properties and the use of those properties will be impacted by the proposed use with the variance.

**Neighboring properties would not be impacted. The width of the cabin would not change and there would be no change in the distance from the property lines.**

Describe how negative impact to the local environment and landscape will be avoided.

**Contractor will utilize a silt fence during construction and see and straw the site immediately upon completion. The project is on the opposite side of the cabin from the lake.**

Describe the expected benefits of a variance to use of this property.

**The would allow us to use the cabin as our retirement home and allow us to sell our home in Duluth.**

Include additional comments that will clarify your request for the Planning and Community Development staff members and the Board of Adjustment.

**The property has been in our family for more than 55 years. During the time we have been good stewards of the lake and have worked hard to enhance the property while minimizing any impact on the lake. This addition would us to retire at the cabin and allow us to continue to enjoy the beautiful spot.**

**IF YOU ARE RESPONDING TO A PERMIT VIOLATION, PLEASE ANSWER THESE ADDITIONAL QUESTIONS**

Describe your reasons county zoning ordinance requirements were not followed.

--

Describe your effort to comply with the ordinance and to obtain a land use permit and/or other required permits.

--

Describe any substantial investments, construction and/or repairs made to the property before you discovered you needed a variance.

--

If there was construction or repair, on what date did it begin? What date did it end?

Start Date                      --

End Date                        --

Who performed the construction or repair work?

--

Was a survey of your property boundaries obtained?

--

Prior to the construction or repair work, did you speak with anyone from the Planning and Community Development Department?

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By submitting this application, 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 result 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.

*If your name, contact information or email address have changed, you should update your contact information in the portal by selecting 'Maintain Contact Information' at the top of this page.*

Submitted By:                      --

Address:                            --

City:                                --

State:                               --

Postal Code:                      --

Email Address:                    --

I have read and agree to the statement above.

☐ I agree

SV

**Individual Sewage Treatment System  
Certificate of Compliance  
Authorization to Use System**

**Site:** PETER GOLDSCHMIDT  
4821 DATKA RD  
**Address:** DULUTH MN 55803

GOLDSCHMIDT PETER  
3221 EWING ST  
DULUTH MN 55803

**Permit Number:** 32090  
**Date of Permit:** 12/04/2017  
**Date of Inspection:** 05/25/2018  
**Parcel Code:** 365-21-130  
**Township:** FREDENBERG (5215)  
**Designer:**  
Spectrum Research, Inc.  
**Installer:**  
Haugan Construction

**Legal Description:**

LOTS 13 AND 14

The system was sized for a Single Family Dwelling with 2 Bedrooms.

The permit was granted for:

A Replacement Standard System

ONE 500 Gallon Septic Tank(s) and ONE 1,500 Gallon Additional Tank(s)

ONE 500 Gallon Pump Chamber(s)

System consists of 36 Feet of 9 Foot wide Seepagebed with a total of 12 Inches of Rock

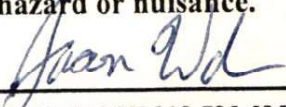
**AUTHORIZATION TO USE THIS SYSTEM IS:**

- ☒ Approved upon completion of the final cover.  
☐ Approved upon completion of the following items as noted in comments.  
☐ Denied  
☐ Allowed because of the following items as noted in comments.

Comments:

**DISCLAIMER:** St. Louis County issues Certificates of Compliance as part of its discretionary activities on behalf of the public. St. Louis County disavows and assumes no liability for damages to person or property in any manner or form resulting from the issuance of this Certificate of Compliance. St. Louis County cannot and does not guarantee the successful operation of the system.

This Certificate of Compliance is valid for five years unless the system fails and becomes a public health hazard or nuisance.

By:   
JASON WALSH 218-725-5251  
Environmental Specialist

St. Louis County Environmental Services Department  
Government Services Center  
320 W 2nd St., Suite 301  
Duluth, MN 55802

Form:11420317P





**SSTS Final Drawing**  
**Subsurface Sewage Treatment System**  
St. Louis County, Minnesota

Site Address: 4821 Datka Road

Parcel ID: 365-0021-00130

Designer: James Balogh

Drawing Date: 12/19/17

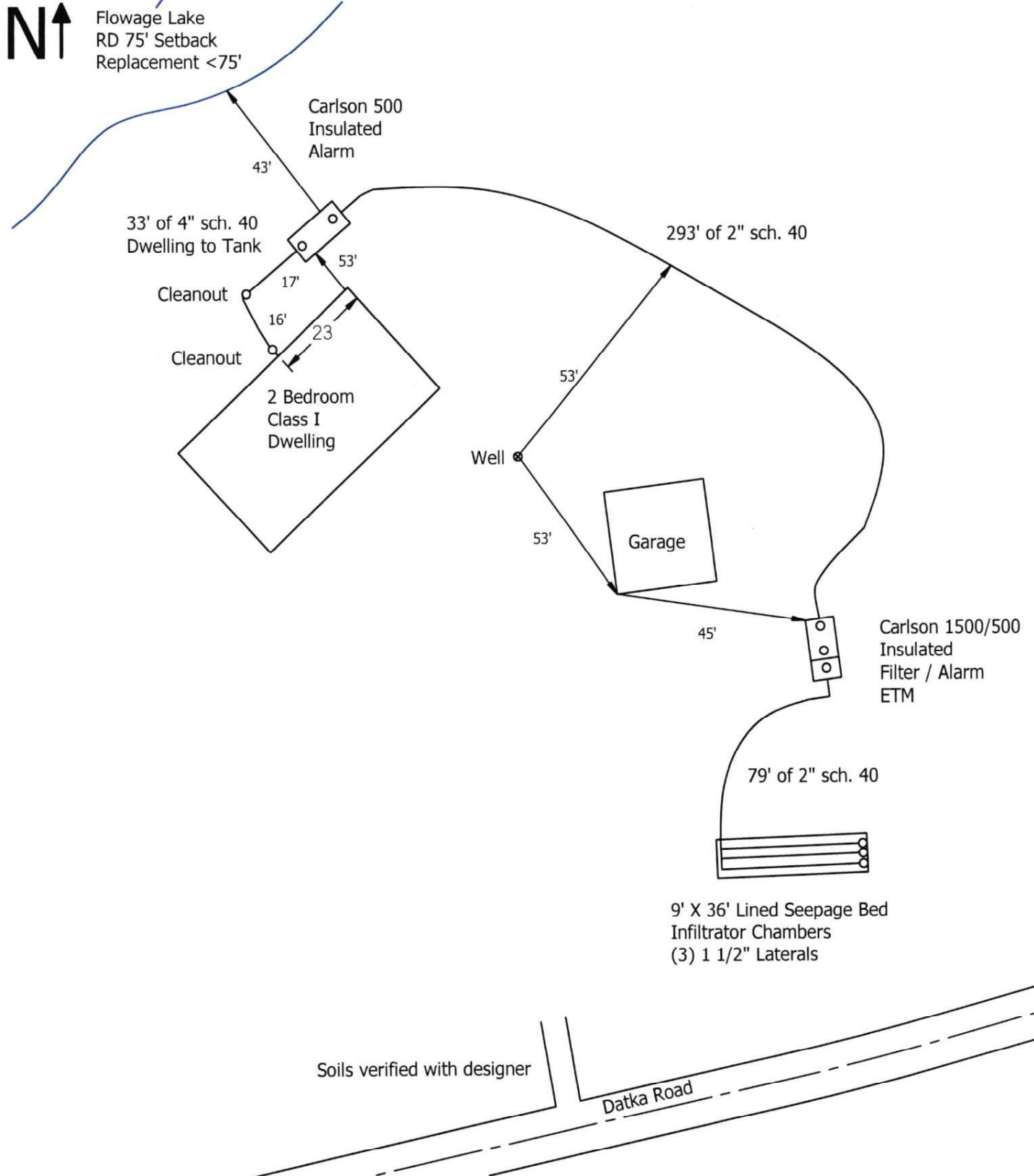
Sand: Elmquist Pit

Installer: Haugen Construction

Final Inspection Date: 12/19/17 Tank/Bed  
5/25/18 Tank (Grinder)

Rock: Chambers

By ES Staff Inspector: *[Signature]*



Not to scale



**Individual Sewage Treatment System  
Permit to Construct**

**Site:** PETER GOLDSCHMIDT  
**Address:** 4821 DATKA RD  
DULUTH MN 55803

GOLDSCHMIDT PETER  
3221 EWING ST  
DULUTH MN 55803

**Permit Number:** 32090  
**Date of Permit:** 12/04/2017  
**Permit expires on:** 12/04/2019  
**Parcel Code:** 365 - 0021 - 00130  
**Township:** FREDENBERG (5215)  
**Designer:** Spectrum Research, Inc.

**Legal Description:**  
LOTS 13 AND 14

Sewage Treatment System plans for the following system meet the minimum standards of St. Louis County Ordinance No: 61. All sewage treatment system construction must be done in accordance with St. Louis County Ordinance No: 61.

The system was sized for a Single Family Dwelling with 2 Bedrooms.

The permit was granted for:

A Replacement Standard System

ONE 500 Gallon Septic Tank(s) and ONE 1,500 Gallon Additional Tank(s)

ONE 500 Gallon Pump Chamber(s)

System consists of 36 Feet of 9 Foot wide Seepagebed with a total of 12 Inches of Rock

**Comments:** System designed for a 2 bedroom, class I dwelling; 300 gpd max flows, 201 gpd average flows.  
Infiltrator chambered lined seepage bed.

**IF YOU ENCOUNTER ANY UNFORSEEN PROBLEM SUCH AS HIGH WATER TABLE, LEDGE ROCK, CHANGE IN SOIL CONDITIONS, OR CHANGES TO THE SYSTEM OR ITS LOCATION, YOU MUST OBTAIN APPROVAL FROM THE DEPARTMENT BEFORE CONTINUING WITH THE CONSTRUCTION OF THE SYSTEM.**

**FINAL INSPECTION:** A final inspection must be made prior to backfilling and must be scheduled a minimum of 48 hours in advance, excluding weekends and holidays. Office hours are 8 a.m. to 4:30 p.m.

**DISCLAIMER:** St. Louis County issues sewage treatment system permits as part of its discretionary activities on behalf of the public. St. Louis County disavows and assumes no liability for damages to person or property in any manner or form resulting from the issuance of this permit or subsequent authorization to use the system. St. Louis County cannot and does not guarantee successful operation of the system.

**\*\*THIS PERMIT IS NOT TRANSFERABLE\*\***

**By:**   
JASON WALSH 218-725-5251  
Environmental Specialist

St. Louis County Environmental Services Department  
Government Services Center  
320 W 2nd St., Suite 301  
Duluth, MN 55802



# SSTS Design Summary

Env. Svcs. Onsite Wastewater Div., St. Louis County, Minnesota

To be completed by SSTS licensed designer for review & approval by SLC EHS

SSTS Designer: James C. Balogh, PSS, Ph.D., Spectrum Research, Inc.  
(2215)

Design Date: 11/21/2017

Site Address: 4821 Datka Rd., Duluth, MN 55803

Twnshp: Fredenberg

Dwelling: ☒ Residential ☐ Seasonal/Recreational Other (identify):

Commercial System: ☐ Describe business type:

FOG: Estimated BOD: TSS:

Design Flow Dwelling

Classification (As per 7080.1860): ☒ Class I ☐ Class II ☐ Class III ☐ Class IV ☐:

Total Finished Floor Area Sq Ft (if Class. II, III, IV): 1285 Total Bedrooms (include all dwellings): 2

Nbr. of people using the SSTS: 2 Max Flow (gals/day): 300 Average Flow (gals/day): 201

Linear Loading Rate (gpd/ft): 10 Soil Loading Rate (gpd/ft<sup>2</sup>): 1.0

Water Meter (Y or N): No Buried Sewer Line Pressure Test Required (Y or N): No

Inches to Redox. or Restrictive layer: >74 Predominate Soil Type: Sand (Rollins)

SSTS Flow Description: 500 gallon grinder tank with pump pumping sewage to a 1500 gallon septic tank w/  
attached 500 gallon pump chamber with a single pump dosing a seepage bed (end fed; chamber system). See Plan Sheet 1 & 2  
for construction specifications. See Sheet 3 for setbacks. Infiltrator chambers in seepage bed.

MPCA SYSTEM TYPE: ☒ Type I ☐ Type II ☐ Type III ☐ Type IV ☐ Type V

## TANK DESCRIPTION

(ex: Septic Tank, Holding Tank, Pump Tank, Septic/Pump Combo, or other)

Tank Size Gallons  
(ex: 1000/500)

Tank(s)  
(New or Existing)

Tank Material  
(Precast, plastic,  
Fiberglass, etc)

Alarm  
(Yes or  
No)

Grinder Pump	500	<input checked="" type="checkbox"/> New <input type="checkbox"/> Exist	Precast Concret	Yes
Septic - Pump Combination	1500 / 500	<input checked="" type="checkbox"/> New <input type="checkbox"/> Exist	Precast Concret	Yes
		<input type="checkbox"/> New <input type="checkbox"/> Exist		
		<input type="checkbox"/> New <input type="checkbox"/> Exist		
Sand/Rock Bedded (Y or N): Y	Insulated (Y or N): Y			

## DISTRIBUTION TO DRAINFIELD

☐ Gravity ☐ Drop Box ☐ Distribution Box

☒ Pressure Pump model and size: Liberty 293

Gallons/minute: 32 with Ft of Head: 23+5 Pump to field line diameter (inches): 2

Manifold diameter (inches): 2 Manifold location: Center Feed End feed: X

Number of laterals: 3 Diameter of laterals: 1.5 Lateral flush ports (Y or N): Y

Orifice size (inches): 3/16 Spacing (inches): 36 Orifice Shields (Y or N): N

Dose Volume to network (gal): 60 Drainback (gal): 14

Event Counter (Y or N): N Elapsed Time Meter: (Y or N): Y

Time Dose Panel (Y or N): N Specify type: SJE Rhombus Demand Dose Panel w/elapsed time meter

**SSTS Design Summary Continued**

Site Address: 4821 Datka Rd., Duluth, MN 55803

**DRAINFIELD INFORMATION****In Ground:**Seepagebed: ☒ ☐ Rock ☐ Gravelless ☒ Chambered ☐ Poly. AggregateTrench: ☐ ☐ Rock ☐ Gravelless ☐ Chambered ☐ Poly. Aggregate

Trench Width (ft): Total Trench Length (ft): Number of Trenches:

Bed Dimensions (ft): 9 Width by 36 Length Total Treatment Area (sq ft): 324

Depth of Rock (inches): 12 Depth of Cover (inches): 12

**At Grade:** Rock Cell Size (ft): Width by Length Downhill berm width (ft):**Mound:**

Number of Rock Beds: Bed Size (ft): W by L Total Dimension (ft): W by L

Uphill Fill Depth (in) : Downhill Fill Depth (in) :

Uphill Berm Width (ft): Downhill Berm Width (ft): Adjusted Sand Volume (cubic yards):

**Registered Pretreatment Filter System:**Filter Class: ☐ Intermittent/Single Pass ☐ Recirculating ☐ Subsurface Flow ☐ OtherMedia Type: ☐ Sand ☐ Peat ☐ Gravel ☐ Textile/Synthetic ☐ Constructed Wetlands

No. of cells: Filter Dims (ft): W by L Media Depth (in): Manufacturer:

**Aerobic Treatment System:**Type: ☐ Suspended Growth ☐ Fixed Film ☐ Sequencing Batch ☐ Other:

Gallons/day: Number of Units: Manufacturer:

Disinfection (Y or N): If yes, chemical or UV:

Designer's comments to EHS:

End feed pressure with 2" manifold - 6 feet long. Grinder pump shall be a Liberty ProVore PRG101A-2 (12 full amps, 115 volts), capable of pumping 16 gpm with 28+5 feet of head. Dose to septic tank shall be 30 gal. + 35 gal. for drainback for a total of 65 gal

SLC EHS Use Only	Permit #	Due By:
Design Review By:		Date Reviewed:
If denied, why: <input type="checkbox"/> Incomplete Design <input type="checkbox"/> Design Not Approved <input type="checkbox"/> Request more information		
Return the application &/or design to: <input type="checkbox"/> Applicant <input type="checkbox"/> Designer		
Denial/ Return explanation:		
Approved (issue permit): <input type="checkbox"/> Yes		An Operating Permit is required: <input type="checkbox"/> Yes
EHS comments &/or instructions to include on permit:		





# SSTS Construction Permit Application

## Subsurface Sewage Treatment System

St. Louis County, MN

Find your Parcel ID#(s) on your Property Tax Statement in the upper right corner (Property ID).  
Or at [www.stlouiscountymn.gov](http://www.stlouiscountymn.gov) and click on County Land Explorer

Parcel ID #(s): **365 - 0021 - 00130**

#: - -

#: - -

Parcel ID #(s): - -

#: - -

#: - -

☐ Check here to request a 911 address number and sign for this site. See [www.stlouiscountymn.gov/landproperty](http://www.stlouiscountymn.gov/landproperty) for addressing information.

**Applicant Name** (property owner)

Peter and Anne Goldschmidt

**Applicant Name** (if other than owner)

**Site Address**

**4821 Datka Rd.**

**City**

**Duluth**

**MN**

**Zip**

**55803**

Acreage: ~2.65

Lot Size: See Plan Sheet 3

Township

Name: Fredenberg

Sec

13

Twn

52

Rge

15

Legal Description or Plat Name/Block #/Lot #: **Fredenberg Twp, MN, Lots 13 and 14 in Rearrangement of Bay Park (SW¼ of Section 13 in T. 52N, R.15W)**

### CONTACT INFORMATION:

Send the Permit by: ☒ Mail; or by ☐ Email address:

Other:

Name (if different than above):

Primary Phone:

**218-393-7453**

Secondary Phone:

Mailing Address (if different than above)

3221 Ewing St.

City

Duluth

ST

**MN**

Zip

**55803**

### PERMIT APPLICATION IS FOR:

☐ New SSTS ☒ Replacing the Existing SSTS. Why: Old system does not meet code & building permit ☐ Point of Sale Requirement

☐ Holding Tank ☐ Component Addition or Replacement ☐ Greywater without Pressure ☐ Greywater with Pressure

☐ Privy (Outhouse) ☐ Privy & Greywater without Pressure ☐ SSTS Variance ☐ Commercial SSTS

### SITE INFORMATION: (Check all that apply)

☐ Yes ☒ No Has this parcel been divided recently? Or in the process of being divided? When:

☒ Yes ☐ No Is this project within 300 ft of a stream/river or 1,000 ft of a lake? **Lake/River/Stream Name: Fredenberg Lake (69039400)**

☐ Yes ☒ No Is the property connected to a CIC (Common Interest Community)? If yes, include the Associated PIN on this Application.

☐ Yes ☒ No Is this serving multiple dwellings sharing a SSTS component? If yes, explain:

☐ Yes ☒ No Is this leased property? If yes, you must obtain & attach the Lessor's written authorization for this project.

Leased From: ☐ MN Power ☐ SLC Land & Minerals Dept. ☐ MN DNR ☐ US Forest Service ☐ Other

**COMPLETE PAGE 2 NEXT: (Be sure to sign and date, then submit this form with the permit fee and design paperwork).**

Office Use Only

Fees are payable to St. Louis County Auditor

Permit # **32090**

Amt Paid

**520**

Date RIO

**12/4/17**

Paid by

**Tim Anderson Construction**

Rev Code

Cash

Check #:

**8008**

Recd By

☐ Mail

☒ IP



# SSTS Construction Permit Application

## Subsurface Sewage Treatment System

### St. Louis County, MN

Page 2

**SSTS DESIGNER:** (Permits for privies or graywater systems do not require the services of a licensed designer).

Licensed Business or Certified Individual Name: Spectrum Research, Inc.

Lic. # 2215

Cert. # 5885

Designer's comments to Environmental Health Staff regarding this permit application:

**Water Source** ☐ Proposed Well ☒ Existing Wells ☐ Hand Carried ☐ Surface/Lake Water ☐ Municipal

**Well Type** ☐ Sandpoint ☒ Drilled ☐ Dug Well Depth Ft: Cased Depth Ft: Unique Well #:

The number of people who will be using this system: 2

Building Type and Water Uses Check all that apply	# of Bdrms	Seasonal Use Only	PLBG	Bsmt PLBG	Garb Disp	Clothes Wshr	Dish Wshr	Water Condr	Furnace w/Hum	Bathtub > 40 gal	GSP
<input checked="" type="checkbox"/> Single Family	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Multi-Family		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Cabin or RV		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Garage with <input type="checkbox"/> Bedroom <input type="checkbox"/> Sink <input type="checkbox"/> Shower <input type="checkbox"/> Toilet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Guest House		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Bunk House		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sauna		<input type="checkbox"/>	<input type="checkbox"/>								

Bdrms = bedrooms PLBG = plumbing Bsmt PLBG = basement plumbing Garb Disp = garbage disposal Wshr = washing machine  
Condr = water conditioner Furn w/Hum = self-cleaning humidifier in furnace GSP = sewage grinder pump OWD=onsite wastewater division

Other information to be considered for this application: EZ-Flow used in rockbed. Depth of well casing is undocumented. Disposal in kitchen sink. Grinder pump in 500 gal. tank outside residence pumps sewage to septic tank.

**APPLICANT SIGNATURE:**

**FEE: \$520.00**

**DATE:**

11/28/17

**APPLICANT AGREEMENT:** By submitting this application, 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.

#### Duluth Office:

Environmental Services OWD  
Government Services Center  
320 W 2nd Street, Suite 301  
Duluth, MN 55802

218-725-5200  
Onsite Wastewater Dept. Toll Free 1-800-450-9278  
[www.stlouiscountymn.gov/septic](http://www.stlouiscountymn.gov/septic)

#### Virginia Office:

Environmental Services OWD  
Northland Office Center  
307 First Street S, Suite 115  
Virginia, MN 55792

218-749-0625

PLAN SHEET 1

Prepared by: Spectrum Research, Inc. (#2215)  
Peter and Anne Goldschmidt Residence

4915 E. Superior St., Suite 100  
Duluth, MN 55804

spectrumsoils@aol.com  
218-525-5322

This is not a survey or engineering drawing. All property lines and setbacks shall be verified by property owner prior to installation. Contours are approximate.

SSTS Site Assessment and Pressurized Infiltrator Chamber Seepage Bed System Plan  
For Peter and Anne Goldschmidt Lakeshore Residence

PLAN SHEET 1

Location: 4821 Duika Rd., Duluth, Minnesota, St. Louis County, Fredenberg Twp., Lots 13 and 14 in Rearrangement of Bay Park (Section 13 in T. 52N, R.15W)

Site evaluation and soil descriptions conducted on 10/24-25/2017. System design completed on 11/8/2017. Design and evaluation conducted by James C. Balogh, Ph.D., P.E., SSTS Adv. Designer 1 (#5885), Spectrum Research, Inc., (#2215). On-site wastewater treatment system is for a replacement system for a 2 bedroom residence (Class 1 residences (1257 ft<sup>2</sup> / 2 bedrooms = 629 & 3 water using appliances). All construction and materials shall conform to these plans and specifications and shall comply with St. Louis County, Minnesota, Ordinance #61, and applicable State and local codes. Required permits shall be obtained prior to construction. ANY CHANGE TO ANY PORTION OF THE DESIGN WITHOUT THE WRITTEN PERMISSION OF SPECTRUM RESEARCH, INC. VOIDS THE ENTIRE DESIGN

Pressurized Standard Infiltrator Chamber Seepage Bed Drainfield

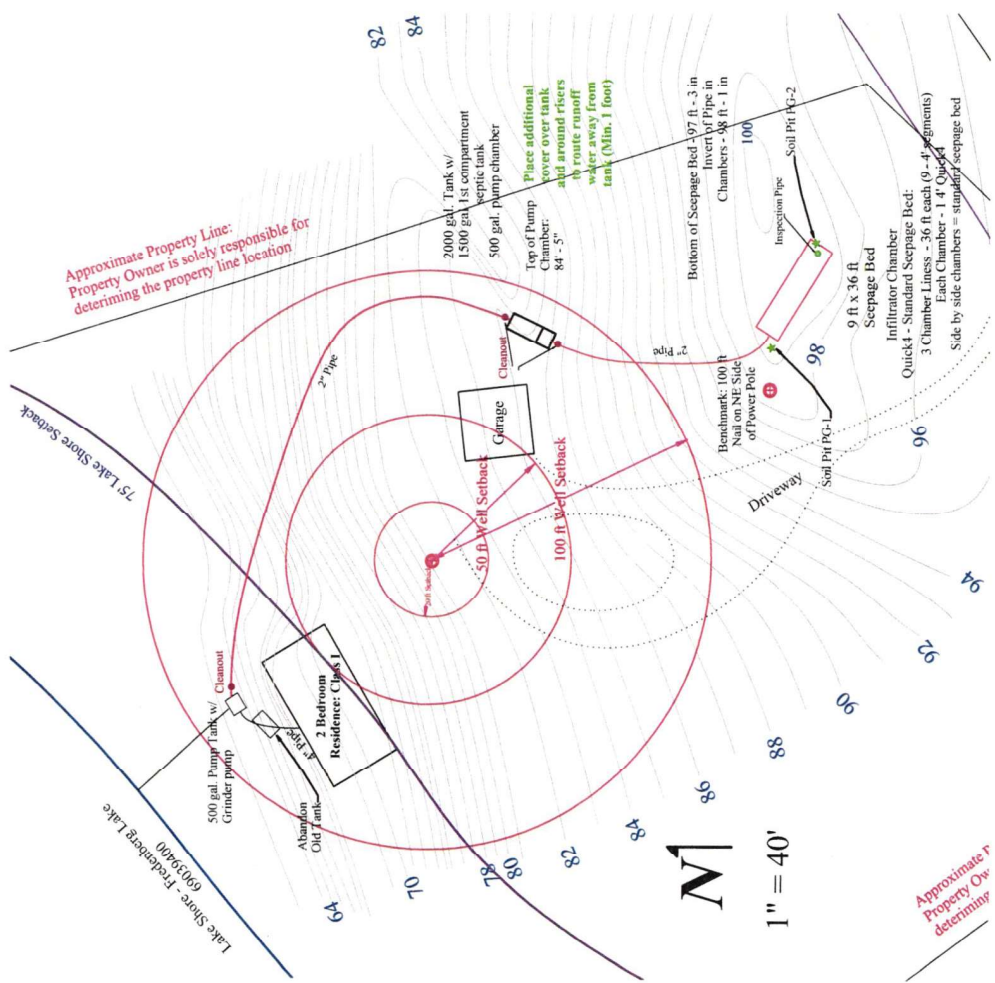
Pressurized Infiltrator Seepage Bed with 1.5" Pipe: System treatment and dispersal capacity is 300 gallons per day peak flow and 200 gallons per day average flow (See In Ground Worksheet). 9 ft x 36 ft seepage bed - subdivided into 3 infiltrator chambers of 36 ft each (27 segments). Three parallel Quick4 Standard Infiltrator Chambers shall be installed in the 36 ft seepage bed. Effluent shall be pumped to the infiltrator chamber seepage bed system from the septic tank pump chamber (See Plan Sheet 2 and Pressure Distribution Worksheet). Bottom of seepage bed shall be level at an elevation of 97 ft - 3 in. The seepage bed material and construction shall meet St. Louis County Ordinance 61 and MPCA Registered Product specifications for Infiltrator Chambers. See Plan Sheet 2 for construction details. The seepage bed system shall conform to the design on Plan Sheet 1 and Plan Sheet 2. System shall be setback at least 10 feet from property lines. Property lines are only approximations. Proceed with construction as follows:

- Stake component locations: Septic tank, dosing tank, seepage bed, location of distribution pipes in drainfield, and replacement area (not required for this system).
- Installer and property owner shall confirm location of property lines and system setbacks from property lines, structures, on-site well, and neighbor's wells.
- Field verify all component relative elevations. Owner shall field verify the location of all property lines. Acceptability of deviation from specified elevation differences shall be confirmed with designer.
- Install components per details on Plan Sheet 1, Plan Sheet 2, Plan Sheet 3, and attached specifications.
- 4 inch sewer pipe to septic tank from the residence shall be installed where sewer line is less than 24 inches below grade. Laterals pipe in chamber seepage bed shall be 1.5 in. Force main shall be 2 in.
- Manifold between laterals in the seepage bed shall be 2 in and insulated.
- Unless otherwise specified all piping shall
  - Be schedule 40 PVC.
  - Have watertight joints solvent welded in accordance with manufacturer's specifications.
  - Have a minimum 1/8" inch per foot slope or maximum 1/2" inch per foot slope for the building sewer line.
  - Be bedded in clean sand, hand tamped about the pipe, and backfilled with rock-free material compacted to grade.
  - Installed and bedded without sags and to prevent sags in the future.
- Prevent erosion during construction using approved erosion control measures.
- Cover infiltrator chambers with 12 inches of sand - sandy loam fill. Seepage bed cover shall be mounded slightly to allow for settling.
- Additional fill area on the downslope side of the bed is required on top of bed as shown on Plan Sheet 2.
- Drainfield area (replacement area) shall not be disturbed by construction equipment prior to construction.
- Soil, or seal and much areas disturbed during construction.

Grinder Pump  
500 gallon grinder pump tank. Elevation of top of grinder pump tank is 61 ft - 6 in. Pump off elevation in grinder pump tank shall be at 59.13 feet (55 ft - 1.6 in). Maintenance covers shall be located at grade. Maintenance covers shall be surrounded by sufficient fill to direct any runoff water away from the tank. Tank cover, tank sides, and insides of seepage bed shall be insulated with 2 inches of Styrofoam. Styrofoam over top of tank shall extend down over the sides of tank to the base on all sides. 2 in. of Styrofoam shall be attached to the bottom of the maintenance opening lids and inspection openings. Tank shall have an inlet baffle. Sufficient fill shall be placed around risers to redirect any run-off water away from the risers. See Plan Sheet 2, Pressure Distribution Worksheet, and Tank Worksheet for construction specifications.

Septic Tank:  
2000 gallon tank. 1500 gallon concrete septic tank chamber with an effluent screen draining into attached pump chamber. Tank must include inlet and outlet baffles, inspection pipes, minimum 20 inches maintenance covers. Maintenance covers shall be located at grade. Tank cover, tank sides, and insides of maintenance opening and inspection pipes shall be insulated with 2 inches of Styrofoam. See Grinder Pump Tank for tank insulation specifications (see Plan Sheet 2). See Tank Worksheet for construction specifications.

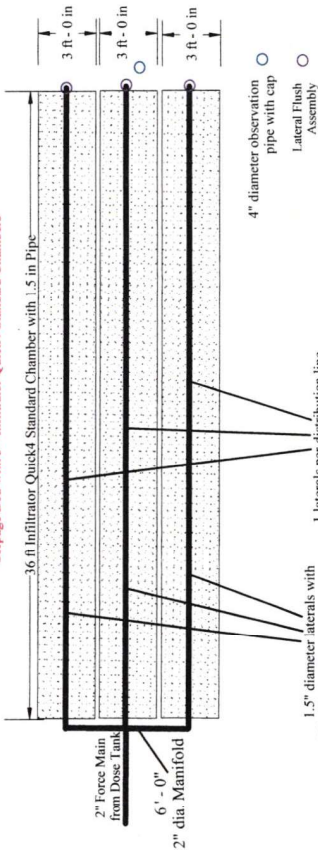
Dosing Chamber:  
500 gallon dosing chamber attached to septic tank. Elevation of top of dosing tank is 84 ft - 6 in. Pump off elevation in dosing tank shall be at 81.05 feet (81 ft - 0.6 in). Maintenance covers shall be located at grade. Tank cover, tank sides, and insides of maintenance opening and inspection pipes shall be insulated with 2 inches of Styrofoam. See Grinder Pump Tank for tank insulation specifications (see Plan Sheet 2). See Tank Worksheet for construction specifications. See Grinder Pump Tank for tank insulation specifications.





Pressurized Infiltrator Chambers in Seepage Bed

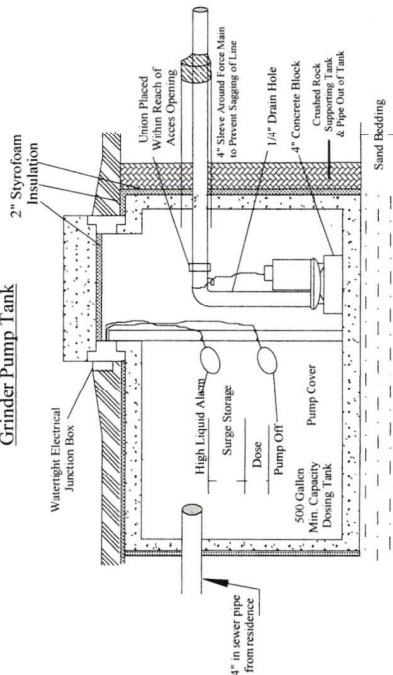
Seepage Bed with 3 - Infiltrator Quick4 Standard Chambers



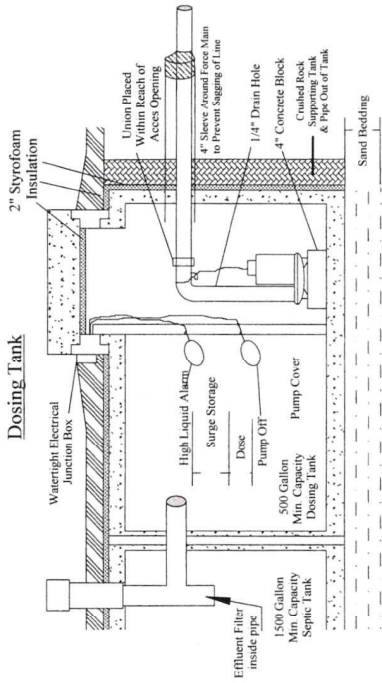
PLAN SHEET 2

Prepared by: Spectrum Research, Inc. (#2215)  
Peter and Anne Goldschmidt Residence  
Details Not Drawn to Scale  
4915 E. Superior St., Suite 100  
Duluth, MN 55804  
spectrumsoils@aol.com 218-525-5322

Grinder Pump Tank



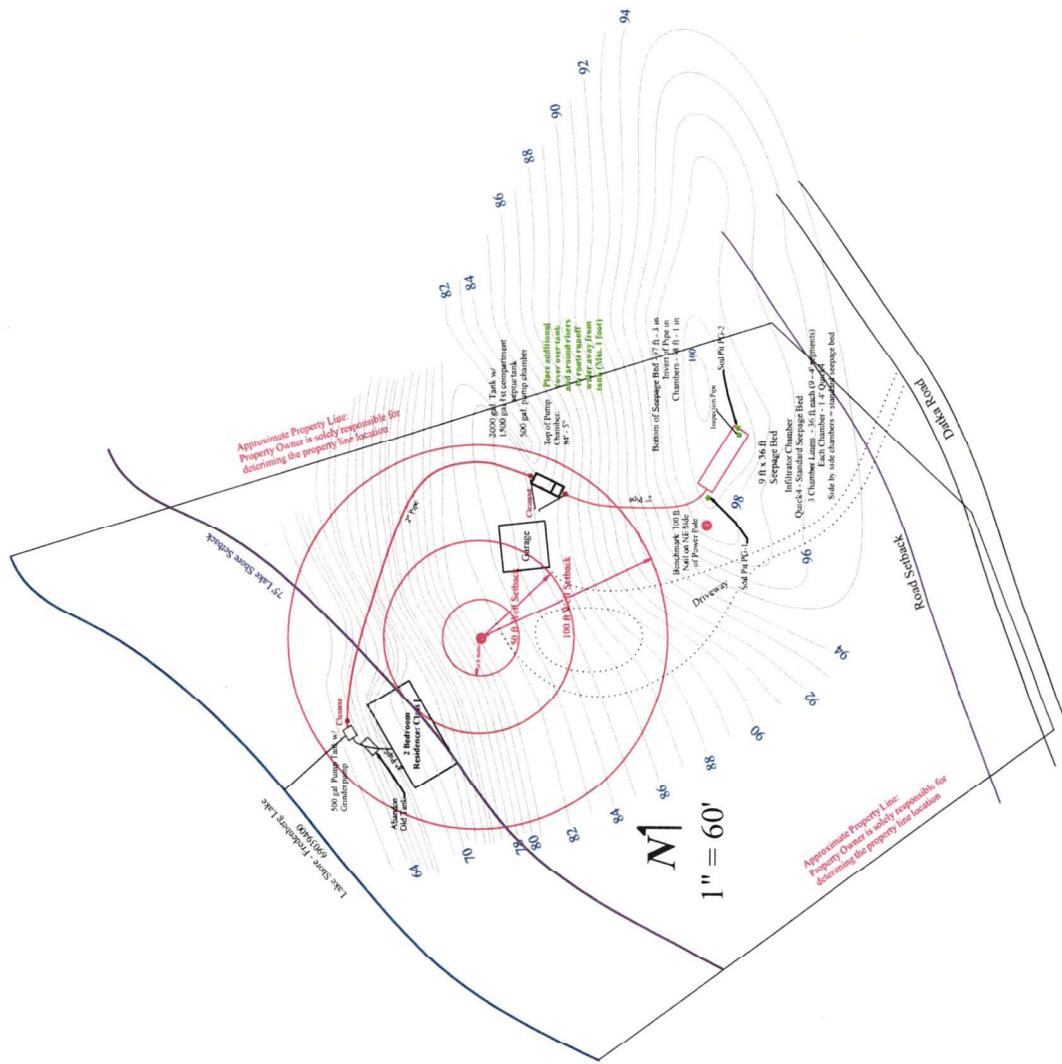
Dosing Tank



NOTES

1. Install force main to area below point of connection with manifold and cap below grade with sufficient depth to avoid damage to the force main during soil preparation. Install with 1/8 inch per foot minimum slope to dosing tank for drain back. **Network invert elevation is 98.08 ft (98 ft - 1 in).**
2. **For the drainfield seepage bed:**
  - a. Drainfield shall have a width of 9 feet to accommodate three parallel infiltrator chambers (total of 27 - 4 ft segments). The elevation of the bottom of the seepage bed is 97 feet - 3 in. Traffic in drainfield area, other than backhoe, is prohibited. Seepage bed is excavated and infiltrator chambers with pressure distribution piping is installed after the fill area has been prepared (See Plan Sheet 1). Seepage bed cover shall be mounded slightly for settling.
  - b. **A 12 inch layer of mound sand is placed under the infiltrator bed.**
  - c. Install Standard Infiltrator Chambers in seepage bed and backfill using attached MPCA Infiltrator specifications following the Pressure Distribution Worksheet.
  - d. 3 drain field distribution pipes in infiltrator chambers shall be constructed 3 ft. centers and shall be connected by an end distribution manifold.
  - e. Uncover buried force main and extend above distribution network elevation (98 ft - 1 in). Construct infiltrator chamber distribution network as shown on Plan Sheet 1 and Plan Sheet 2 and as specified by infiltrator manual specifications.
  - f. Place sandy loam-loamy sand cap and topsoil with minimal vehicle traffic working from the downhill side of drainfield. Backfilling shall be done carefully, making sure that the grade infiltrator chambers are not affected and remain level. Complete final grade and finish per Plan Sheet 1.
  - g. Additional fill area on the downslope side of the bed is required on top of bed to meet the 12 inch cover requirement with mounding.
3. Septic and surge storage-dosing tanks shall:
  - a. Be constructed of durable materials and able to withstand in situ earth and hydrostatic pressures, full or empty.
  - b. Be set level on a 4-inch bed of compacted gravel-free sand.
  - c. Be watertight, and have watertight joints and connections.
  - d. Be ballasted as necessary to prevent flotation.
  - e. Have ground surface graded away from access risers.
  - f. Have effluent screen with alarm (Polylok PL-122 Effluent filter with a Polylok filter alarm or approved equal) installed on outlet pipe of septic tank (See Pressure Distribution Worksheet or Tank Worksheet).
  - g. Have an alarm installed as part of demand dose panel.
  - h. Have 2 in. of Styrofoam installed on top and sides of tank and beneath maintenance opening lids and inspection pipe lids. Styrofoam over top of tank shall extend down over side of tank to the tank base. Pre-foamed tanks from Carlson Concrete may be used.
  - i. All maintenance openings shall have risers brought up to grade with securely attached and insulated lids.
4. **Grinder pump** shall be a submersible grinder pump capable of discharging 16 gpm for a total dynamic head of 28 feet (and additional 5 feet of head) [Liberty ProVore 101A-2 (12.0 full amps, 115 volts) or approved equal]. Add drainback hole near the pump outlet and down stream from the quick release. See specifications on Pressure Distribution Design Worksheet. **Pump-on float shall be set to discharge 30 gallons plus 35 gallons of drain back for a total of 65 gallons per dose.**
5. **Control panel for grinder pump** with alarm shall be an SJE Rhombus demand dose panel (demand dose, not a time dose panel with alarm and elapsed time meter) or approved equal, available from Carlson Concrete, mounted on a wood or plastic post or metal pole, near the grinder pump tank access. Bottom of dose panel shall be at least 3 feet above grade.
6. **Dosing pump for seepage bed** shall be a submersible effluent pump capable of discharging 32 gpm for a total dynamic head of 23 feet (and additional 5 feet of head) [Liberty 293 (10.4 full amps, 115 volts) or approved equal]. Add drainback hole near the pump outlet and downstream from the quick release. See specifications on Pressure Distribution Design Worksheet. **Pump-on float shall be set to discharge 60 gallons plus 14 gallons of drain back for a total of 74 gallons per dose.**
7. **Control panel for seepage bed dosing tank** with alarm shall be an SJE Rhombus demand dose panel (demand dose, not a time dose panel with alarm and elapsed time meter) or approved equal, available from Carlson Concrete, mounted on a wood or plastic post or metal pole, near the surge-storage dosing tank access. Bottom of dose panel shall be at least 3 feet above grade.

This is not a survey or engineering drawing. All property lines and setbacks shall be verified by property owner prior to installation. Contours are approximate.





# Soil and Site Evaluation Report

Page 1 of 3

Prepared by: Spectrum Research, Inc. (#2215), James C. Balogh, Ph.D., PSS (#5885)

County: St. Louis

Parcel I.D. 365-0021-00130

Reviewed by: Jason Walsh, SLC Dept. Enviro. Services

Date: 10/25/2017

Date of Soil Evaluations: October 24, 2017

Property Owner: Peter and Anne Goldschmidt

Property Location: 4821 Datka Rd., Duluth, MN 55802

Legal Description: Fredenberg Twp, MN, Lots 13 and 14 in Rearrangement of Bay Park (SE¼ Section 13 in T. 52N, R.15W)

Nearest Road: Datka Rd.

System Designer: Spectrum Research, Inc. System Installer: Haugan Construction

☐ New Construction ☒ Use: Residential/Number of bedrooms: 2 (Class I Residence)

☒ Replacement ☐ Public or commercial Describe:

Code derived design flow rate 300 gal/d Average design flow rate 201 gal/d

Parent Material: Loamy mantle over glacial outwash Evidence of Cut/Fill: None

Landscape feature: Summit – glacial outwash

Observed depth to bedrock: >6 feet

Flood Plain elevation Not applicable Flooding Potential: Low

Run-on/off Potential Low

Mapped USDA NRCS Mapping Unit: F124F – Rollins – Pequawaywan complex, pitted, 0 to 45 percent slope

Observed: USDA NRCS Mapping Unit: F124F – Rollins – Pequawaywan complex, pitted, 0 to 45 percent slope

General Comments: Lakeshore residential lot (~2.65 acres) in Fredenberg Township. Soil report is for construction of a replacement treatment system for a 2 bedroom residence (Class I residence (1285 ft<sup>2</sup> / 2 bedrooms = 643 & 3 water using appliances). Soil on the proposed replacement area is well drained. Excavator dug soil pits were used for describing soil features in the field. **1 ft of mound sand shall be placed between the bottom of the seepage bed and the native course sand in the BC horizon in PG-1 and C1 – C2 horizons in PG- 2 (24 – 36 inches). Soil application rate is 1.0 gpd ft<sup>-2</sup>.**

USDA NRCS mapping unit interpretations were downloaded from the USDA NRCS Web Soil Survey for Duluth Part of St. Louis County. Model series descriptions were downloaded from the USDA NRCS OSD Soil Descriptions web site.

The periodically saturated soil layer, contour loading rate, and soil loading rate in the general area of each soil pit are:

Soil Pit	Slope (%)	Depth to limiting layer (in)	Contour Loading Rate (gal. ft <sup>-1</sup> d <sup>-1</sup> )	Limiting Soil Application Rate (gpd ft <sup>-2</sup> )
PG-1 (Primary treatment area)	2	>74	10	1.0
PG-2 (Primary treatment area)	2	>74	10	1.0

**\*Base design for a limiting layer >74 inches below grade and contour loading rate of 10.0 in the primary treatment area. Mound sand placed under the seepage bed (24 – 36 inches) has a soil application rate of 1.0.**

# Soil and Site Evaluation Report

## Soil Profile Morphology: Replacement Treatment Area

Soil Profile ID: PG-1 Excavation Method: ☒ Backhoe Pit ☐ Hand Dug ☐ Hand or Auger Boring  
 Date of Description: 10/24/2017 Time of Description: 9:45 am

Slope: 2 % Aspect: SW Vegetation: Balsam fir, paper birch, aspen, bracken fern, lowbush honeysuckle  
 Slope Shape: Linear Linear Comments: See designer site map for soil pit location: Located on the northwest side of the proposed replacement area.

Depth to Limiting Factor: >74 in  
 Ground Surface Elevation: ~1414 ft\*  
 Landscape position: Nearly level, summit (esker)

Location:

Mapped NRCS Soil Series: Rollins  
 Observed NRCS Soil Series: Rollins variant

Well locations: See site map Well head protection zone: >500 ft

Contour Loading Rate: 10.0 gallon per lineal foot Soil type: ☒ Upland ☐ Transition-Upland Soil ☐ Transition-Hydric ☐ Wetland-Hydric

Horizon	Depth (in)	Matrix Color (Munsell)	Redox Features	Texture	Structure	Consistence	Boundary	Coarse Fragments	Roots	Soil Application Rate (gpd ft <sup>-2</sup> )	
										Eff#1*	Eff#2*
A	0-10	7.YR 2.5/2	-	Sandy loam	Moderate, fine granular	Friable	Clear, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel	Common, fine; Common, medium; Very few, coarse	0.6	
Bw	10-23	5YR 4/4	-	Coarse sandy loam	Moderate, fine subangular blocky	Friable	Gradual, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel; 10% cobble	Few, fine; Very few, medium	0.6	
BC	23 - 37	7.5YR 4/4	-	Loamy coarse sand (24 - 36' replaced with mound sand under seepage bed)	Weak, fine subangular blocky	Very friable	Gradual, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel; 10% cobble	Few, fine	1.0	
C1	37 - 53	7.5YR 3/4	-	Coarse sand	Single grain	Loose	Gradual, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel; 20% cobble	Very few, fine	1.0	
C2	53-74	10YR 3/4	-	Coarse sand	Single grain	Loose	-	5% fine gravel; 5% medium gravel; 15% coarse gravel; 15% cobble	-	1.0	

Other Comments: Contour loading rate is 10.0 gallons per foot per day because of soil texture, structure, and consistence in the A, Bw, BC, and C horizons, depth to redoximorphic features (not observed), and topography. \*Effluent #1 = 30<BOD<220 mg/L 30 and 30<TSS<150 mg/L Effluent #2 = BOD<30 mg/L and TSS<30 mg/L (Pre-treatment)

## Soil and Site Evaluation Report

### Soil Profile Morphology: Primary Treatment Area

Soil Profile ID: PG-2 Excavation Method: ☒ Backhoe Pit ☐ Hand Dug ☐ Hand or Auger Boring  
 Date of Description: 10/24/2017 Time of Description: 10:15 am

Slope: 2 % Aspect: SW Vegetation: Balsam fir, paper birch, aspen, bracken fern, lowbush honeysuckle

Slope Shape: Linear Linear Comments: See designer site map for soil pit location: Located on the northwest side of infiltrator bed of the proposed replacement area.

Depth to Limiting Factor: >74 in  
 Ground Surface Elevation: ~1414 ft\*  
 Landscape position: Nearly level, summit (esker)

Location:

Mapped NRCS Soil Series: Rollins  
 Observed NRCS Soil Series: Rollins variant

Well locations: See site map Well head protection zone: >500 ft  
 Contour Loading Rate: 10.0 gallon per lineal foot Soil type: ☒ Upland ☐ Transition-Upland Soil ☐ Transition-Hydric ☐ Wetland-Hydric

Horizon	Depth (in)	Matrix Color (Munsell)	Redox Features	Texture	Structure	Consistence	Boundary	Coarse Fragments	Roots	Soil Application Rate (gpd ft <sup>-2</sup> )	
										Eff#1*	Eff#2*
A	0-6	7.YR 3/2	-	Coarse sandy loam	Moderate, fine granular	Friable	Clear, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel	Common, fine; Common, medium; Very few, coarse	0.6	
Bw	6-13	7.5YR 4/6	-	Coarse sandy loam	Moderate, medium subangular blocky	Friable	Gradual, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel; 10% cobble	Few, fine; Very few, medium	0.6	
BC	13 - 18	7.5YR 4/4	-	Coarse sand	Single grain	Very friable	Gradual, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel; 10% cobble	Few, fine	1.0	
C1	18 - 34	7.5YR 4/4	-	Coarse sand (24 - 34' replaced with mound sand under seepage bed)	Single grain	Loose	Gradual, wavy	5% fine gravel; 5% medium gravel; 10% coarse gravel; 20% cobble	Very few, fine	1.0	
C2	34 - 39	7.5YR 3/4	See other comments: Lamellae are not redoximorphic	Coarse sand (34 - 36' replaced with mound sand under seepage bed)	Massive	Very friable	Gradual, wavy	5% fine gravel; 5% medium gravel; 5% coarse gravel	-	1.0	
C3	39-74	10YR 3/4	-	Coarse sand	Single grain	Loose	-	5% fine gravel; 10% medium gravel; 15% coarse gravel; 15% cobble	-	1.0	

Other Comments: Contour loading rate is 10.0 gallons per foot per day because of soil texture, structure, and consistence in the A, Bw, BC, and C horizons. depth to redoximorphic features (not observed), and topography. **Few, fine distinct, 7.5YR 4/4 lamellae in C2 horizon.** \* Effluent #1 = 30<BOD<220 mg/L 30 and 30<TSS<150 mg/L Effluent #2 = BOD<30 mg/L and TSS<30 mg/L (Pre-treatment)

# **Spectrum Research, Inc.**

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4915 East Superior Street, Suite 100  
Duluth, Minnesota 55804-2452  
(218) 525-5322 • Fax (218) 525-6472  
E-Mail: [spectrumsoils@aol.com](mailto:spectrumsoils@aol.com)  
[www.spectrumsoils.com](http://www.spectrumsoils.com)

## **Septic System Site Assessment Report & In Ground Pressurized Infiltrator Chamber Seepage Bed System Design**

### ***Submitted to***

**Curtis Haugan, Haugan Construction  
Peter and Anne Goldschmidt, Property Owner  
4821 Datka Rd., Duluth, Minnesota  
Fredenberg Twp, Section 13: T.52N - R.15W**

Date of Site Evaluation: October 24 & 25, 2017

Date of Soil Evaluation: October 24, 2017

Design: November 1 – 8 & 21, 2017

Work performed under the  
direct supervision of:

Dr. James C. Balogh, PSS, SSTS Advanced Designer #5885  
SPECTRUM RESEARCH, INC. (#2215)  
4915 East Superior Street, Suite 100  
Duluth, Minnesota 55804-2448  
218-525-5322  
218-525-6472 (Fax)

Original Copies of  
Work Submitted to:

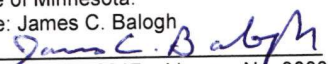
Mr. Curtis Haugan  
Haugan Construction  
4408 Thomas Lake Rd.  
Two Harbors, MN 55616

Materials Included:

Site Assessment Map and Site Design (Plan Sheets 1 – 3)  
System Design Summary Sheet  
Soils Worksheet and Profile Descriptions  
USDA Soil Survey Information  
Design Worksheets: In-ground Worksheet, Diagram, and Calculations;  
Pressure Worksheet; and Tank Worksheet

I hereby certify that this plan, document, or report was prepared by me or under  
my direct supervision and that I am a duly Licensed Soil Scientist under the laws  
of the state of Minnesota.

Print Name: James C. Balogh

Signature:   
Date: November 21, 2017 License No. 30001

Report No. 2017100185-1

Environmental Assessment • Soil • Water • Research Contracting



## In Ground Worksheet - Summary

Applicant Name: Peter & Anne Goldschmidt

Site Address: 4821 Datka Rd.  
Fredenberg Twp, MN, Section 27,  
T. 55N, R. 12W

System Designer: James C. Balogh Ph.D., PSS (SSTS Designer #5885) Date: Oct. 28, 2017

Type of system: Rock Trench \_\_\_\_\_ Chambered System X Bed X  
Graveless \_\_\_\_\_ Other Infiltrator System Chamber Inground Seepage Bed

Purpose of system: Treatment and dispersal X Dispersal and polishing only \_\_\_\_\_

Assigned soil loading rate: (most restrictive within 24" of system) 1.0 gallons / ft<sup>2</sup> / day  
**(1 ft mound sand over native course sand)**

Describe how materials are to be brought into site: (directions): Materials are brought on site using a dump truck via driveway off Daka Rd. Material is off loaded east of the driveway and south of the proposed seepage bed. Site preparation follows site preparation procedures detailed in St. Louis County Ordinance 61. Construction vehicles do not drive over or disturb the drainfield area.

Width of system seepage bed: 9 feet Total length of Bed 36 feet  
Manufacturer (if applicable): Infiltrator System, Inc. Quick4 Standard (MPCA Registered Distribution Product)

Type of distribution: Gravity from residence to a 500 gal. tank w/ a grinder pump, sewage is pumped to a 2000 gal tank with 1500 gal septic tank and attached 500 gal. pump chamber. Effluent pumped to 9' x 36' Infiltrator chambers in a seepage bed with end feed manifold to 3 - 1.5" pipes suspended in chambers (3 distribution lines). Infiltrator chambers are 4' long (total of 27 segments).

Location of inspection pipes: At the end of infiltrator chamber seepage bed, one through maintenance cover and one over inlet and outlet baffles in septic tank and pump chamber

Water meter Y / N Time dose control panel Y / N

Elapsed time meter Y / N Event Counter Y / N

Dose volume (if pressure distribution) 60 gallons per dose for chamber seepage bed system  
Drain back volume (if pressure distribution) 14 gallons per dose for chamber seepage bed system  
Total dose = 74 gallons per dose

Cleanout locations: (1) **Through the maintenance cover in the septic tank;**  
(2) **Lateral flush valves or sweep 90° at the end of each lateral**

Comments: Manifold shall be insulated.

# IN GROUND CALCULATIONS (Spreadsheet)

Name of Applicant: Peter and Anne Goldschmidt



## 1. SITE CONDITIONS

Evaluate the site and soils report for the following:

- > Surface water movement
- > Measure Elevations and distances on the site so that slope, contours and available areas can be determined.
- > Description of several soil profiles where the system will be located.
- > Determine the limiting conditions such as bedrock, high groundwater level, soil permeability, and setbacks.

(Note: shaded boxes to be filled in by designer)

Slope =  %

Occupancy: One or two family dwelling # of bedrooms =

Public facility (I.e. non-residential). Daily wastewater flow  GPD  
(provide particulars on separate sheet)

Wastewater: Typical residential BOD5 Y/N =   
Or other: BOD5=  mg/L

Suitable area: Cross slope distance =  Feet  
Width =  Feet

Soil limiting factor=  Depth to limiting factor =  Inches

In-situ soil application rate used  gal/sf/day

1 ft mound sand beneath the bottom of bed.  
Bottom of bed replaces soil over native  
coarse soil

## 2. DESIGN WASTEWATER FLOW (DWF)

One or two-family dwelling:

DWF = gal/day/bedroom (generally 150) x # of bedrooms

DWF =  gal/day/bedroom x  # of bedrooms

Class I Flow

DWF =  gal/day

Public Facilities

DWF = Sum of each wastewater flow per source per day x 1.5

DWF =  gal/day x 1.5

DWF =  gal/day



### 3. WIDTH AND LENGTH OF THE DISTRIBUTION CELL

1. Determine the design loading rate (DLR) for the site

Select the effluent application rate for the most restrictive soil horizon in contact with the distribution cell that matches the soil conditions. The effluent application rate selected is the design loading rate (DLR) for the site.

$$\text{DLR} = \boxed{1} \text{ gpd/sf}$$

2. Determine the distribution cell area.

Calculate the distribution cell area by dividing the daily design wastewater flow (DWF) by the design loading rate (DLR).

$$\text{Distribution cell area} = \text{DWF/DLR}$$

$$\text{Distribution cell area} = \boxed{300} \text{ gpd divided by } \boxed{1} \text{ gpd/sf}$$

$$\text{Distribution cell area} = \boxed{300} \text{ sf}$$

3. Select a width (A) for the distribution cell. (Usually 3 feet)

$$A = \boxed{9} \text{ ft} \quad \text{Seepage Bed with Infiltrator Chambers}$$

4. Determine the distribution cell length.

Calculate the distribution cell length (B) by dividing the required distribution area by the distribution cell width (A).

$$B = \text{Distribution cell area divided by A}$$

$$B = \boxed{300} \text{ sf divided by } \boxed{9} \text{ ft}$$

$$B = \boxed{33.33333} \text{ ft}$$

Infiltrator Chambers are 4' long:

Bed length is 36 ft

## PRESSURE DISTRIBUTION DESIGN

### Peter and Anne Goldschmidt Residence: Grinder Pump



System Designer James C. Balogh (SSTS Adv. Designer #5885) 11/2/2017

Design for a pump tank with grinder pump that pumps to a septic tank and pump tank. Pressure calculations for seepage bed is separate from this worksheet. This portion of the distribution network consists of 1) the force main, 2) the pump or siphon, 3) the pump or siphon chamber; (4) receiving septic tank..

Use the following criteria in the design:

Aggregate area width	<u>NA</u> ft (See Mound Worksheet)
Aggregate area length	<u>NA</u> ft (See Mound Worksheet)
Elevation difference from the off-float to invert of existing tank	<u>24.6</u> ft (Grinder Pump off Elev. = 59.83 ft; Invert of 1500 gal. Tank Elev. = 83.73 ft)
Force main length	<u>201.5</u> ft
(Pump out of sewage tank to 1500 gal. septic/pump tank) = $[3.5' + 198'] = 201.5'$	

Sewage tank pump off elev. =  $62.5'$  (sewage dosing tank elevation at grade) –  $1.0'$  (soil cover) –  $1.2'$  (cover to outlet invert) –  $2.25'$  (invert to top of pump) =  $59.13'$

1500 gal. septic tank invert elev. =  $79.83'$  (elevation of bottom of septic tank) +  $3.9'$  (bottom of septic tank to inlet invert) =  $83.73'$

#### A. Design the distribution network.

##### 1. Evaluate the configuration of the network based on the aggregate area.

3 – Infiltrator Quick4 Standard chambers in  $9' \times 36'$  (27 segments) seepage bed on residential site with 2% slope (average). 1.5" lateral pipes in chambers and bed runs on contour. See Plan Sheet 1 and Plan Sheet 2. Grinder pump at residence pumps up to the sewage/pump tank. Final pump tank pressurizes seepage bed. See Plan Sheet 1 and Plan Sheet 2.



**2. Determine the lateral length.**

Not applicable.

**3. Select the perforation size and spacing.**

**a. Perforation spacing**

Not applicable

**b. Perforation size**

Not applicable

**4. Determine the lateral diameter.**

Not applicable.

**5. Determine the number of perforations per lateral and number of perforations.**

Not applicable.

**6. Determine the lateral discharge rate (LDR)**

Not applicable.

**7. Determine the number of laterals.**

Not applicable

**8. Calculate the manifold size.**

Not applicable.

**9. Determine network discharge rate (NDR)**

NDR = Selected by designer

**NDR = 10 gpm**

Discharge rate for pump selection = [NDR + (# drain back perf. x rate per perf.)] x 1.1

Discharge rate for pump selection = [10 gpm + (1 x 3.73 gpm)] x 1.1 = **16 gpm**

**(1/4" orifice for drain back: discharge rate per orifice= 3.73 gpm per orifice** based on  $11.79(\text{perf. dia.})^2(\text{distal head} + \text{static head})^{1/2} = 11.79(0.25'')^2(2.5' + 24.6')^{1/2} = 3.73 \text{ gpm}$ , where static head = network invert – pump off elevation = 24.6'; distal head = 2.5'.)

**10. Determine the Total Dynamic Head.**

**a. System head = Friction loss in network distribution system**

System head = 1.31 x distal pressure

**System head = 1.31 x 1.0 feet = 1.3 feet**

**b. Elevation head**

Elevation head (Static head) = Septic tank inlet invert elevation – Sewage tank pump off elevation

**Elevation head = 83.73 feet – 59.13 feet = 24.6 feet**

**c. Friction loss**

**Friction loss =  $0.002082 (L) \times (100/C)^{1.85} \times [(pump\ gpm)^{1.85} / d^{4.8655}] \times 1.1$**

L = pipe length + pipe in tank + fitting equivalent length = 198.0 + 3.5 + 15 = 216.5'

Fitting equivalent length = (1-90° = 9', quick disconnect=2', 1-45°=4', =0-Y-elbow=0') = 15'

C = 145

pump gpm = Q = 16 gpm

d = diameter of the force main = 2"

Friction loss =  $0.002082(216.5) \times (100/145)^{1.85} \times [(16\ gpm)^{1.85} / (2'')^{4.8655}] \times 1.1 = \mathbf{1.44\ feet}$

or

Friction loss =  $10.42[Q/(C \times d^{2.63})]^{1.85} \times L \times 1.1 = \mathbf{1.44\ feet}$

**d. Total dynamic head**

Total dynamic head = system head + elevation head + friction loss

**Total dynamic head = 1.3 feet + 24.6 feet + 1.44 feet = 27.34 = 28 feet**

## 11. Pump summary

A pump shall be selected to deliver at least 16 gallons per minute with at least 28 feet of total dynamic head (Must have at least 5 feet of additional head capacity).

### B. Design the Force Main, Pressurization Unit, Dose Chambers and Controls.

#### 1. Calculate the system performance curve.

Not applicable.

#### 2. Determine the force main diameter.

Force Main Diameter = 2 inches

#### 3. Select the pressurization unit.

The dosing pump shall be a submersible effluent pump capable of discharging 16 gpm with at least a total dynamic head of 28 feet (Must have at least 5 feet of additional head capacity).

Grinder pump shall be a **Liberty Pro Vore PRG101A-2 Sewage Grinder Pump** (12.0 full load amps, 115 voltage), or approved equal. **See attached sheet.**

#### 4. Determine the dose volume.

System dose volume = network dose + force main flow back

Network dose = 10% x peak daily flow

Network dose =  $0.10 \times 300 \text{ gallons/dose} = 30 = \mathbf{30 \text{ gal/dose}}$

Force Main Flow Back = length x void volume

Force Main Flow Back =  $201.5 \text{ feet/dose} \times 0.1714 \text{ gal/feet} = 34.5 = \mathbf{35 \text{ gal/dose}}$

System Dose Volume =  $30 + 35 = \mathbf{65 \text{ gallons per dose}}$

**5. Size the dose chamber.**

**Dose chamber size = 500 gallons**

**6. Select the controls and alarm.**

Control box with alarm shall be an SJE Rhombus PS Demand Dose Control Panel with **pre-installed elapsed time meter or event counter**, and, **alarm** or approved equal.

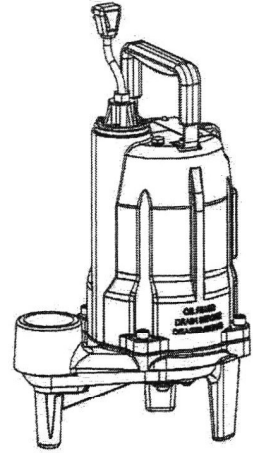
**7. Select effluent filter for septic tank/pump chamber.**

**Effluent filters shall be installed in the 1500 gallon septic tank.**

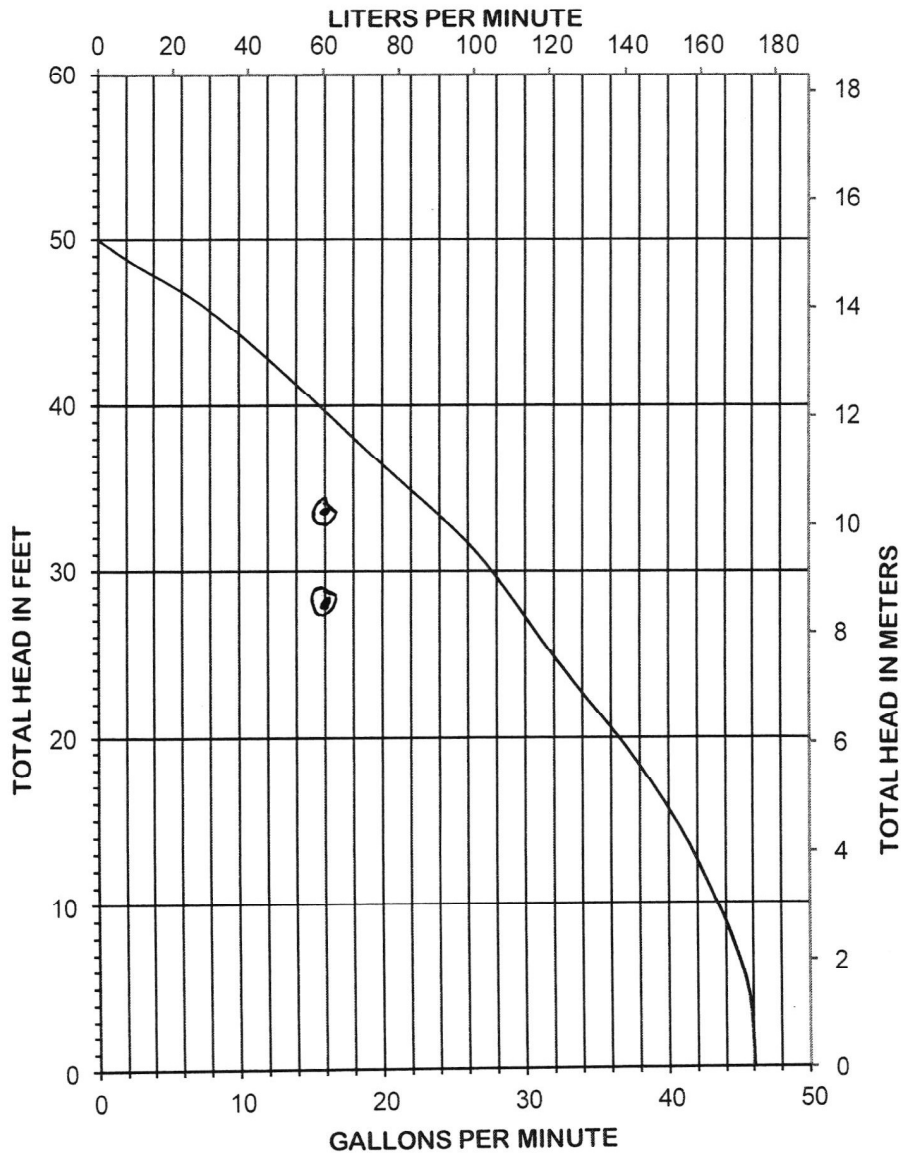


## Pump Specifications

PRG - SERIES 1HP Submersible Grinder Pump



# ProVore®



## ProVore® PRG100 - Series Electrical data

MODEL	HP	VOLTAGE	PHASE	SF	FULL LOAD AMPS	LOCKED ROTOR AMPS	THERMAL OVERLOAD TEMP	STATOR WINDING CLASS	CORD LENGTH FT	DISCHARGE	AUTOMATIC
PRG101A	1	115	1	1.0	12	47.5	105°C 221°F	B	10	2" NPT	WIDE ANGLE
PRG101A-2	1	115	1	1.0	12	47.5	105°C 221°F	B	25	2" NPT	WIDE ANGLE
PRG101M	1	115	1	1.0	12	47.5	105°C 221°F	B	10	2" NPT	NO
PRG101M-2	1	115	1	1.0	12	47.5	105°C 221°F	B	25	2" NPT	NO
PRG101AV	1	115	1	1.0	12	47.5	105°C 221°F	B	10	2" NPT	VERTICAL SWITCH
PRG101AV-2	1	115	1	1.0	12	47.5	105°C 221°F	B	25	2" NPT	VERTICAL SWITCH
PRG102A	1	230	1	1.0	6	23.7	105°C 221°F	B	10	2" NPT	WIDE ANGLE
PRG102A-2	1	230	1	1.0	6	23.7	105°C 221°F	B	25	2" NPT	WIDE ANGLE
PRG102M	1	230	1	1.0	6	23.7	105°C 221°F	B	10	2" NPT	NO
PRG102M-2	1	230	1	1.0	6	23.7	105°C 221°F	B	25	2" NPT	NO

## ProVore® PRG100 - Series Technical Data

IMPELLER	CAST IRON
PAINT	POWDER COAT
MAX LIQUID TEMP	60°C 140°F
MAX STATOR TEMP	105°C
THERMAL OVERLOAD	105°C 221°F
DISCHARGE SIZE	2" FNPT
POWER CORD TYPE	SJTW
MOTOR HOUSING	CLASS 25 CAST IRON
VOLUTE	CLASS 25 CAST IRON
SHAFT	303 SERIES S.S.
HARDWARE	STAINLESS
ORINGS	BUNA N
MECHANICAL SEAL	UNITIZED SILICON CARBIDE
MIN BEARING LIFE	50,000 HRS
CUTTER / CUTTER PLATE	V-SLICE® DESIGN, 440 STAINLESS STEEL ROCKWELL 58 C



## PRESSURE DISTRIBUTION DESIGN

### Peter and Anne Goldschmidt: Chamber Seepage Bed

System Designer James C. Balogh (SSTS Adv. Designer #5885) 11/1/2017

Design a pressure distribution network for a soil absorption unit. The distribution network consists of 1) the laterals and manifold, 2) the force main – end fed, 3) the pump or siphon, 4) the pump or siphon chamber.

Maximum daily flow is 300 gpd. Average daily flow is 200 gpd.

Use the following criteria in the design:

Aggregate area width	<u>9</u> ft (See In ground Worksheet)
Aggregate area length	<u>36</u> ft (See In ground Worksheet)
Elevation difference from the off-float to distribution network	<u>17.03</u> ft (Pump off Elev. = 81.05 ft; Network Elev. = 98.08 ft)
Force main length	<u>86.83</u> ft
(Pump out of tank to seepage bed, seepage bed to manifold = [3.5' + 82.5'] + [0.0 + 0.83'] = 86.83')	

Pump off elev. = 85.5' (dosing tank elevation at grade) – 1.0' (soil cover) – 1.2' (cover to invert)  
– 2.25' (invert to top of pump) = 81.05'

Network elev. = 97.25' (elevation of bottom of seepage bed) + 0.83' (bottom of seepage bed to  
invert of 1.5" pipe) = 98.08'

**A. Design the distribution network.**

**1. Evaluate the configuration of the network based on the aggregate area.**

3 – Infiltrator Quick4 Standard chambers in 9' x 36' (27 segments) seepage bed on residential site with 2% slope (average). 1.5" lateral pipes in chambers and bed runs on contour. See Plan Sheet 1 and Plan Sheet 2.

**2. Determine the lateral length.**

1 serial set of 3 parallel distribution pipes centrally located in seepage bed. Distribution lines connected with an end feed manifold. 1 lateral for each distribution line. See Plan Sheet 2.

Lateral length =  $[(\text{bed length} \div 1) - (\text{distance of distribution line from the end of bed}) - (\text{distance between serial distribution lines in center of rock bed} \div 2)] \div \# \text{ of serial distribution lines}$   
 $[(36' \div 1) - (1) - (0 \div 2)] \div 1 = \mathbf{36 \text{ feet}}$

**3. Select the perforation size and spacing.**

**a. Perforation spacing**

Perforation spacing = 3.0 feet

**b. Perforation size**

Perforation size = 3/16 inch

**4. Determine the lateral diameter.**

**Lateral diameter = 2 inch.** Based on minimum diameter graph – Fig 4-2b in Section D (page 20) of St. Louis County Guidance Manual. See attached graph.

**5. Determine the number of perforations per lateral and number of perforations.**

# perforations/distribution line =  $36 \text{ ft} / 3.0 \text{ ft per perforation} + 1 = 13.0 = 13$

# perforations/lateral = #perforations per distribution line / laterals per dist. line

$13 \text{ perforations dist. line} / 1 \text{ laterals per dist. line} = \mathbf{13.0 \text{ perforations per lateral}}$



**6. Determine the lateral discharge rate (LDR)**

$$\text{LDR} = 0.66 \text{ gpm per orifice} \times 13 \text{ orifices per lateral} = \mathbf{8.58 \text{ gpm}}$$

(Given: Distal head = 2.5 feet, 3/16" orifice, and rate = 0.66 gpm per orifice)

**7. Determine the number of laterals.**

1 lateral per distribution line; 3 distribution lines: **3 laterals**

**8. Calculate the manifold size.**

(See attached Table 5 p. 18 of 28 from St. Louis County ISTS Guidance Manual – Section D)

**Manifold Size = 2"**

**9. Determine network discharge rate (NDR)**

$$\text{NDR} = \text{LDR} \times \# \text{ of distribution lines} \times \# \text{ of laterals per distribution line}$$

$$\text{NDR} = 8.58 \times 3 \times 1 = 25.74 = \mathbf{26 \text{ gpm}}$$

$$\text{Discharge rate for pump selection} = [\text{NDR} + (\# \text{ drain back perf.} \times \text{rate per perf.})] \times 1.1$$

$$\text{Discharge rate for pump selection} = [25.74 \text{ gpm} + (1 \times 3.26 \text{ gpm})] \times 1.1 = \mathbf{32 \text{ gpm}}$$

(1/4" orifice for drain back: discharge rate per orifice = 3.26 gpm per orifice based on  $11.79(\text{perf. dia.})^2(\text{distal head} + \text{static head})^{1/2} = 11.79(0.25")^2(2.5' + 17.03')^{1/2} = 3.26 \text{ gpm}$ , where static head = network invert – pump off elevation = 17.03'; distal head = 2.5'.)

**10. Determine the Total Dynamic Head.**

**a. System head = Friction loss in network distribution system**

$$\text{System head} = 1.31 \times \text{distal pressure}$$

$$\text{System head} = 1.31 \times 2.5 \text{ feet} = 3.275 = \mathbf{3.3 \text{ feet}}$$

**b. Elevation head**

$$\text{Elevation head (Static head)} = \text{Network elevation} - \text{Pump elevation}$$

$$\text{Elevation head} = 98.08 \text{ feet} - 81.05 \text{ feet} = \mathbf{17.03 \text{ feet}}$$

### c. Friction loss

$$\text{Friction loss} = 0.002082 (L) \times (100/C)^{1.85} \times [(\text{pump gpm})^{1.85} / d^{4.8655}] \times 1.1$$

L = pipe length + pipe in tank + fitting equivalent length = 83.13 + 3.5 + 11 = 97.83'

Fitting equivalent length = (1-90° = 9', 1-45° = 0', quick disconnect=2', 0-Tee=0') = 11'

C = 145

pump gpm = Q = 32 gpm

d = diameter of the force main = 2"

$$\text{Friction loss} = 0.002082(97.83) \times (100/145)^{1.85} \times [(32 \text{ gpm})^{1.85} / (2'')^{4.8655}] \times 1.1 = \mathbf{2.35 \text{ feet}}$$

or

$$\text{Friction loss} = 10.42[Q/(C \times d^{2.63})]^{1.85} \times L \times 1.1 = \mathbf{2.35 \text{ feet}}$$

### d. Total dynamic head

Total dynamic head = system head + elevation head + friction loss

$$\text{Total dynamic head} = 3.3 \text{ feet} + 17.03 \text{ feet} + 2.35 \text{ feet} = 22.68 = \mathbf{23 \text{ feet}}$$

## 11. Pump summary

A pump shall be selected to deliver at least 32 gallons per minute with at least 23 feet of total dynamic head (Must have at least 5 feet of additional head capacity).

## B. Design the Force Main, Pressurization Unit, Dose Chambers and Controls.

### 1. Calculate the system performance curve.

Use the following table to develop a system performance curve. Follow procedures (a) through (g) which is listed below the table. Orifice is synonymous to perforation.

Total Flow	Orifice Flow	Elevation Difference	Force Main	Network Head	Total Head
----- (gpm) -----			----- (ft) -----		
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Procedure:

- a. Select 5 flow rates above and below the calculated discharge rate.
- b. Calculate the orifice (perforation) flow rate for each of the flows. This is done by dividing the flow rate by the number of orifices in the network (60).
- c. The elevation head is the height that the effluent is lifted.
- d. The force main head is the head loss in the force main for the given flow rate. Table A-2 gives the friction loss. You need to select a force main diameter.
- e. The network head is calculated by  $H = 1.3 * (Q / (11.79 * d^2))^2$ . H is head in ft, Q is orifice flow rate in gpm, and d is orifice diameter in inches. The 1.3 is an adjustment factor for friction loss in laterals. For 3/16" diameter orifice the equation is  $H = 1.3 * (Q / 0.4145)^2$ .
- f. The total head is the sum of the elevation, force main and network heads.

## 2. Determine the force main diameter.

Force Main Diameter = 2 inches

## 3. Select the pressurization unit.

The dosing pump shall be a submersible effluent pump capable of discharging 32 gpm with at least a total dynamic head of 23 feet (Must have at least 5 feet of additional head capacity).

Dosing pump shall be a **Liberty 293** (Liberty 293, 10.4 full amps, 115 voltage) or approved equal. **See attached sheets.**

## 4. Determine the dose volume.

System dose volume = network dose + force main flow back

Network dose = 5 x lateral length x total no. of laterals x void volume of lateral

Network dose = 5/dose x 36.0 feet x 3 x 0.092 gal/feet = 49.68 gal/dose = 50 gal/dose

**or**

No. Pumping periods = ave. daily flow/network gallons per dose

No. Pumping periods =  $300 / 49.68 = 6.04$  pumping periods or **5 doses per day**  
(maximum on demand dose)

Network dose = 300 gallons per day / 5 doses per day = 60.0 = **60 gallons per dose**

Force Main = length x void volume

Force Main Flow Back = 86.83 feet/dose x 0.1714 gal/feet = 14.9 = **14 gal per dose**

(Force main flow back is rounded down to prevent more effluent than desired from being discharged to seepage bed)

System Dose Volume = 60 + 41 = **74 gallons per dose**

**5. Size the dose chamber.**

**Dose chamber size = 500 gallons (100% of design flow)**

**6. Select the controls and alarm.**

Control box with alarm shall be an SJE Rhombus EZ Series Demand Dose Panel with **pre-installed event counter** and **alarm** or approved equal.

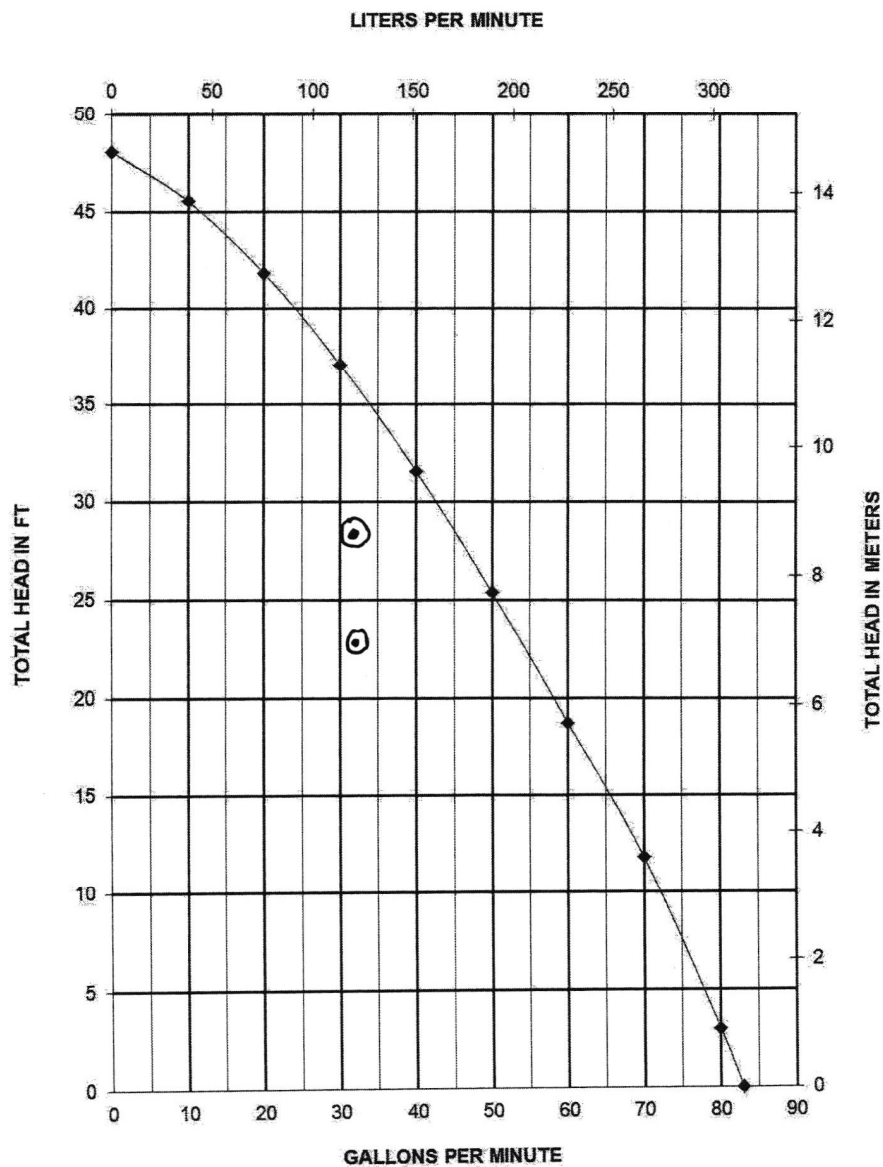
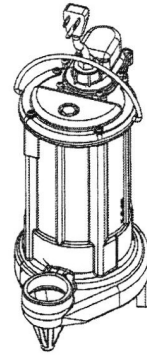
**7. Select effluent filter for septic tank/pump chamber.**

Effluent filter shall be a **Polylok PL-122 Effluent filter with Polylok filter alarm** or approved equal and shall be installed on outlet pipe of septic tank. These effluent screens can be replaced through the 6" cleanout opening over the outlet baffle.



## Pump Specifications

### 290 Series 3/4 hp Submersible Effluent Pump



## 290-Series Electrical Data

MODEL	HP	VOLTAGE	PHASE	FULL LOAD AMPS	LOCKED ROTOR AMPS	THERMAL OVERLOAD TEMP	STATOR WINDING CLASS	CORD LENGTH FT	DISCHARGE	AUTOMATIC
290	3/4	115	1	10.4	24	120°C/ 248°F	B	10	1 1/2	NO MANUAL
291	3/4	115	1	10.4	24	120°C/ 248°F	B	10	1 1/2	YES INTEGRAL FLOAT
293	3/4	115	1	10.4	24	120°C/ 248°F	B	10	1 1/2	YES PIGGY BACK FLOAT
297	3/4	115	1	10.4	24	120°C/ 248°F	B	10	1 1/2	YES INTEGRAL VERTICLE FLOAT
290HV	3/4	208-230	1	5.3	13	105°C/ 221°F	B	10	1 1/2	NO MANUAL
291HV	3/4	208-230	1	5.3	13	105°C/ 221°F	B	10	1 1/2	YES INTEGRAL FLOAT
293HV	3/4	208-230	1	5.3	13	105°C/ 221°F	B	10	1 1/2	YES PIGGY BACK FLOAT
297HV	3/4	208-230	1	5.3	13	105°C/ 221°F	B	10	1 1/2	YES INTEGRAL VERTICLE FLOAT

## 290-Series Cord Length Options\*

Model	10'	25'(-2)	35'(-3)	50'(-5)
290	Standard	Optional	Optional	Optional
291	Standard	Optional	Optional	Optional
293	Standard	Optional	Optional	N/A
297	Standard	Optional	N/A	N/A
10' cord length standard on all models. For optional lengths, add "-2, -3 or -5" suffix to model number. Example: for model 290 with 35' cord. Order 290-3				

**WARNING:** \*Always use a replacement power cord assembly of the same length and type as originally installed on the Liberty product. Using a cord of improper gauge or length may lead to exceeding the electrical rating of the cord and could result in death, injury, fire or other significant failure.

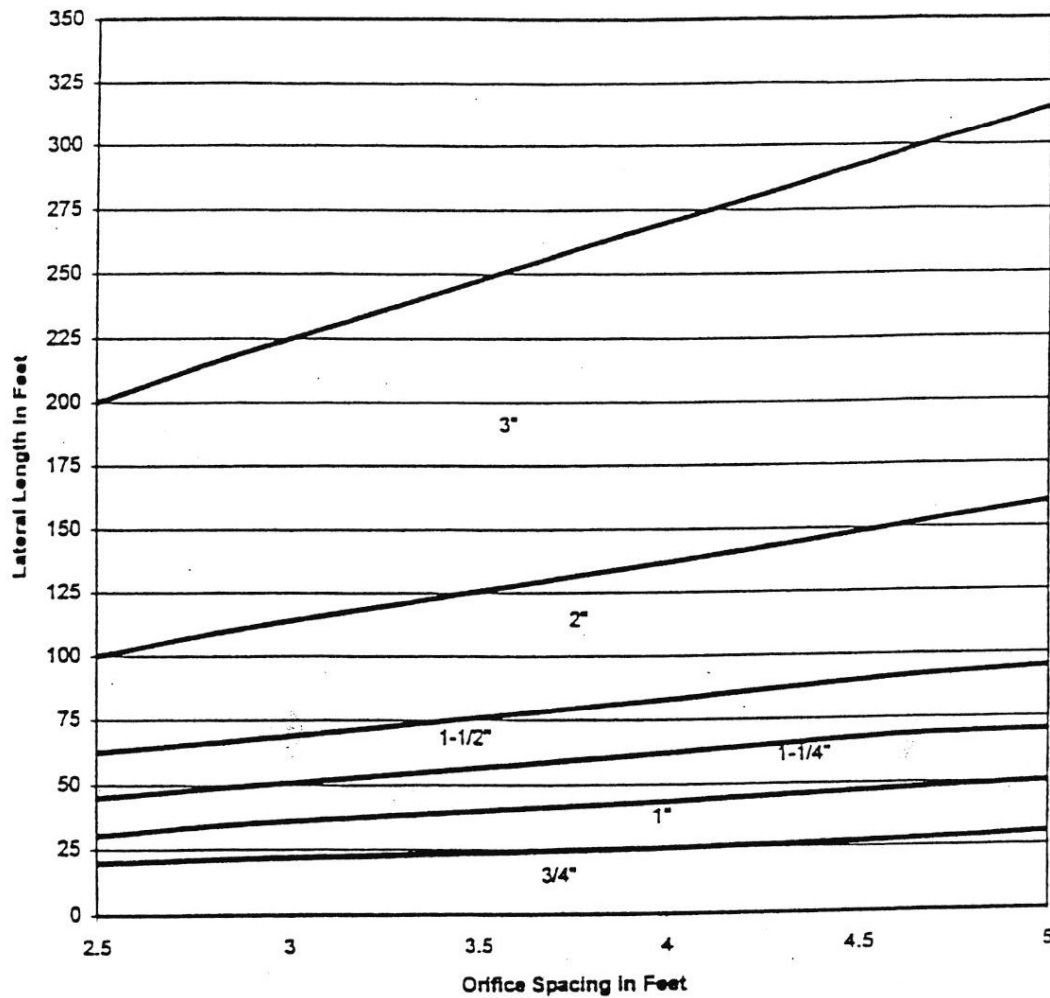


Fig. A -2b. Minimum lateral diameter based on orifice spacing for 3/16 in. diameter orifices (Wisc. Dept. Of Commerce, 1999b).

Table 5 Maximum Manifold Length Based on Individual Lateral Flow Rates and Lateral Spacing														
Individual Lateral Discharge Rate					1-1/4" Diameter Manifold					1-1/2" Diameter Manifold				
End Manifold	Center Manifold				Lateral Spacing					Lateral Spacing				
		1.5	2	2.5	3	3.5	4			1.5	2	2.5	3	4
10	5	4.5	6	7.5	9	10.5	8			7.5	8	10	12	14
20	10	3	4	5	6	7	8			4.5	6	7.5	6	7
30	15	3	4							3	4	5	6	7
40	20									3	4	5	6	
50	25									3	4			
60	30									3				
Individual Lateral Discharge Rate					2" Diameter Manifold					3" Diameter Manifold				
End Manifold	Center Manifold				Lateral Spacing					Lateral Spacing				
		1.5	2	2.5	3	3.5	4			1.5	2	2.5	3	4
10	5	12	14	15	18	21	20			22.5	28	32.5	36	38.5
20	10	7.5	8	10	12	14	12			15	18	20	24	24.5
30	15	6	6	7.5	9	10.5	12			12	14	15	18	21
40	20	4.5	6	7.5	6	7	8			9	12	12.5	15	17.5
50	25	4.5	4	5	6	7	8			7.5	10	12.5	12	14
60	30	3	4	5	6	7	8			7.5	8	10	12	12
70	35	3	4	5	6	7	8			6	8	10	9	10.5
80	40	3	4	5	6	7				6	8	7.5	9	10.5
90	45	3	4	5	6					4.5	6	7.5	9	10.5
100	50	3	4	5						4.5	6	7.5	9	10.5
110	55	3	4							4.5	6	7.5	6	7
120	60	3								4.5	6	5	6	7
130	65	3								4.5	6	5	6	7
140	70									4.5	6	5	6	7
150	75									4.5	6	5	6	7
160	80									4.5	4	5	6	7
170	85									4.5	4	5	6	7
180	90									3	4	5	6	7
190	95									3	4	5	6	7
200	100									3	4	5	6	7





## Tank Worksheet

Applicant Name: Peter and Anne Goldschmidt Site Address: 4821 Datka Rd., Duluth, MN  
System Designer: James C. Balogh Ph.D., PSS (SSTS Adv. Designer #5885) Date: Nov. 12, 2017

What type of use are these tanks servicing? 2 bedroom residence, 2 residents, 2 bathrooms, laundry, disposal,  
no large tub, grinder pump

Feed into septic tanks: Gravity X Pressure \_\_\_\_\_ Both \_\_\_\_\_

What is the design flow for the treatment system? 300 gallons per day (code flow)

Describe flow train (order) of tanks: A 500 gal. grinder pump tank w/ grinder pump pumping sewage to a 1500 gal. septic tank with attached 500 gallon pump chamber (e.g. lift station) with a sewer line from the residence feeding into the grinder pump tank. The sewage flows into the grinder pump tank by gravity. Sewage is pumped to the 1500 septic chamber and effluent drains out of the outlet of the septic tank through an effluent screen into the 500 gallon pump chamber. The 500 gallon pump chamber is a dosing and surge storage tank used to pump the effluent to a pressurized chamber seepage bed system. There shall be an alarm in the grinder pump tank and the pump chamber for the seepage bed. The 1500 gal. septic tank shall have an effluent screen and a screen alarm. Tank construction must conform to St. Louis County Ordinance 61.

Garbage disposal Y / N Bath > 75 gallons Y / N Grinder pump Y / N

### Septic tanks for project

Proposed number of septic tanks 1 Depth of cover 36 inches Septic tank alarm Y / N

Anchoring requirements Y / N If yes, specify \_\_\_\_\_

#### Septic Tank #1

Size of septic tank 1<sup>st</sup> compartment 1500 gals. 2<sup>nd</sup> compartment \_\_\_\_\_ gals (See Pump Tank or Chamber).

Proposed tank material Concrete Existing \_\_\_\_\_ or new tank X

Seam locations on tank Between lid and tank

Elevation of seams above seasonal high water table minimum 12 inches (min. code depth is 12 in.)

Risers cast into lid? Y / N If no method of attachment? **Plastic risers must be properly sealed. Risers must come up to grade with a securely attached lid.**

Filter supplied ? Y / N Method of tank bedding: Leveled sand.

Is tank to be insulated ? Y / N

If yes, how 2 in. of Styrofoam over top of tank and extending down over the sides of tank to the tank base on all sides (see Plan Sheet 2). 2 in. of Styrofoam shall be attached to the bottom of the maintenance opening lids and inspection openings. Pre-foamed tanks may be used if acquired from Carlson Concrete.

Type and size of vault \_\_\_\_\_ Manufacturer Carlson Concrete

## Pump vaults

### Grinder Pump Tank: Dosing sewage to the 1500 septic tank

Size of tank : 500 gallons

Tank construction material Concrete New X or existing       

Are risers cast into lid? Yes If no, method of attachment       

Is riser lid insulated.? Y/N Are there anchoring requirements for this tank? Y/N

Method of tank bedding? Leveled sand

Time dose control panel Y/N Event counter Y/N Elapsed time meter Y/N

Risers cast into lid? Y/N If no method of attachment? **Plastic risers must be properly sealed.**  
**Risers must come up to grade with a securely attached lid.**

Is tank to be insulated ? Y/N

If yes, how 2 in. of Styrofoam over top of tank and extending down over the sides of tank to the tank base on all sides (see Plan Sheet 2). 2 in. of Styrofoam shall be attached to the bottom of the maintenance opening lids and inspection openings. Pre-foamed tanks may be used if acquired from Carlson Concrete.

Type and size of vault        Manufacturer Carlson Concrete

### Effluent Pump tank or chambers

Size of tank : 500 gallons

Tank construction material Concrete New X or existing       

Are risers cast into lid? Yes If no, method of attachment       

Is riser lid insulated.? Y/N Are there anchoring requirements for this tank? Y/N

Method of tank bedding? Leveled sand

Time dose control panel Y/N Event counter Y/N Elapsed time meter Y/N

Risers cast into lid? Y/N If no method of attachment? **Plastic risers must be properly sealed.**  
**Risers must come up to grade with a securely attached lid.**

Is tank to be insulated ? Y/N

If yes, how 2 in. of Styrofoam over top of tank and extending down over the sides of tank to the tank base on all sides (see Plan Sheet 2). 2 in. of Styrofoam shall be attached to the bottom of the maintenance opening lids and inspection openings. Pre-foamed tanks may be used if acquired from Carlson Concrete.

Type and size of vault        Manufacturer Carlson Concrete

## Recirculation tanks

Size of tank _____ gallons	New _____	or existing _____
Tank construction material _____		
Are risers cast into lid? _____ If no, method of attachment _____		
Is riser lid insulated.? Y/ N		
Are there anchoring requirements for this tank? Y / N		
Method of tank bedding? _____		
_____		
Time dose control panel Y / <u>N</u> Event counter <u>Y</u> / N    Elapsed time meter Y / <u>N</u>		

### General:

- Tank installation access: Grinder pump tank is located to the NNW of the residence. Tank is accessible from the driveway. Installation truck shall not cross the proposed new drain field. The septic/pump tank for the seepage bed is located off the SE corner of the garage. This tank is accessible from the driveway.
- Drainage details: Excess drainage from the site should flow away from the both concrete tank. Both parts of the site are considered well drained. **Sufficient fill shall be placed around risers to redirect any runoff water away from the risers.**
- Pumping access route: Tanks are accessible from the driveway. Pump truck hose can reach the septic/pump tank from the driveway.
- General Comments: Tanks must be watertight and meet all specifications of the St. Louis County Ordinance #61. Install the drainback hole near the pump outlet and down stream from the quick release. **Plastic risers must be properly sealed to avoid leakage. Risers must be brought up to the surface and lids properly attached. Risers must be high enough above grade to divert runoff away from tank.**



## Septic System Management Plan for Below 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 **Peter and Anne Goldschmidt**

---

Property Address **4821 Datka Rd., Duluth, MN 55803** Property ID **375-0021-00130**

---

System Designer **Spectrum Research, Inc.** Phone **218-525-5322**

---

System Installer **Haugan Construction Sewers & Excavating LLC** Phone **218-834-9240**

---

Service Provider/Maintainer \_\_\_\_\_ Phone \_\_\_\_\_

---

Permitting Authority **St. Louis County** Phone **218-725-5200**

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Permit # \_\_\_\_\_ Date Inspected \_\_\_\_\_

---

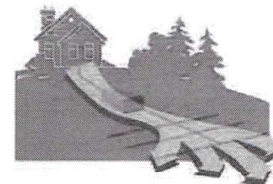
Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-builts 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.

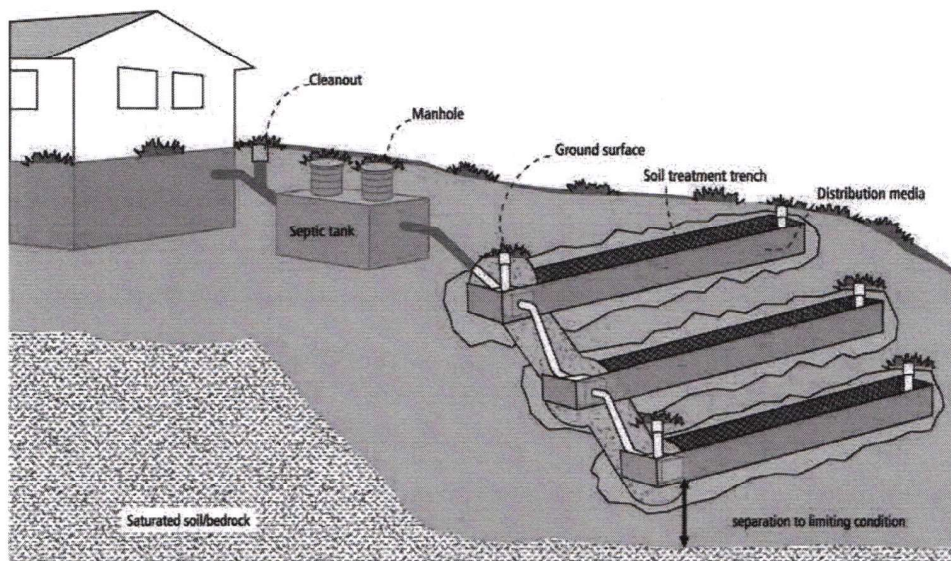
For a copy of the *Septic System Owner's Guide*, call 1-800-876-8636 or go to <http://shop.extension.umn.edu/>

**<http://septic.umn.edu>**





## Your Septic System



Septic System Specifics	
System Type: <input checked="" type="radio"/> I <input type="radio"/> II <input type="radio"/> III <input type="radio"/> IV* <input type="radio"/> V* <i>(Based on MN Rules Chapter 7080.2200 – 2400)</i>	<input type="checkbox"/> System is subject to operating permit* <input type="checkbox"/> System uses UV disinfection unit* Type of advanced treatment unit _____ *Additional Management Plan required

Dwelling Type	Well Construction
Number of bedrooms: <u>2</u> (Class I) System capacity/ design flow (gpd): <u>300</u> Anticipated average daily flow (gpd): <u>201</u> Comments _____ Business? <input type="checkbox"/> What type? _____	Well depth (ft): <u>Unknown</u> <input checked="" type="checkbox"/> Cased well Casing depth: <u>Unknown</u> <input type="checkbox"/> Other (specify): _____ Distance from septic (ft): _____ Is the well on the design drawing? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N

Septic Tank	
<input checked="" type="checkbox"/> One tank Tank volume: <u>2000</u> (2 comp) gallons Does tank have two compartments? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Two tanks Tank volume: _____ gallons <input type="checkbox"/> Tank is constructed of <u>Concrete</u> <input type="checkbox"/> Effluent Screen type: <u>Polylok 122</u>	<input checked="" type="checkbox"/> Pump Tank (if one) <u>500</u> gallons <input checked="" type="checkbox"/> Effluent Pump make/model: <u>Liberty 293</u> Pump capacity <u>32</u> GPM TDH <u>28 + 5</u> Feet of head <input type="checkbox"/> Alarm location <u>Control box</u>

Soil Treatment Area (STA)	
Trenches: <u>Bed - 9' x 36'</u> total lineal feet Number of trenches: _____ at _____ feet each STA size (width x length): <u>9</u> ft x <u>36</u> ft Location of additional STA: <u>Infiltrator Chambers</u>	<input type="checkbox"/> Gravity distribution <input checked="" type="checkbox"/> Pressure distribution <input type="checkbox"/> Inspection ports <input type="checkbox"/> Cleanouts <input type="checkbox"/> Additional STA not available



## Homeowner Management Tasks

These operation and maintenance activities are your responsibility. Use the chart on page 6 to track your activities.

Identify the service intervals recommended by your system designer and your local government. The tank assessment for your system will be the **shortest interval of these three intervals**. Your pumper/maintainer will determine if your tank needs to be pumped.

System Designer: check every \_\_\_\_\_ months

Local Government: check every \_\_\_\_\_ months

State Requirement: check every 36 months

My tank needs to be checked  
every 36 months

### Seasonally or several times per year

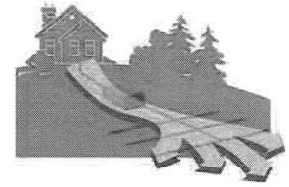
- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Surfacing sewage.* Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. *Untreated sewage may make humans and animals sick.*
- *Alarms.* Alarms signal when there is a problem; contact your maintainer any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. 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.

### Annually

- *Water usage rate.* A water meter 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.
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your pumper/maintainer.

### During each visit by a pumper/maintainer

- Ask if your pumper/maintainer is licensed in Minnesota.
- Make sure that your pumper/maintainer services the tank through the manhole. (NOT through a 4" or 6" diameter inspection port.)
- 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. Professionals should refer to the O/M Manual for detailed checklists for tanks, pumps, alarms and other components. Call 800-322-8642 for more details.*

- Written record provided to homeowner after each visit.

### 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 drainfield.)
- *Inspection pipes.* Replace damaged 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 operating properly.
- *Event counter or run time.* Check to see if there is an event counter or run time log for the pump. If there is one, calculate the water usage rate and compare to the anticipated average daily flow listed on Page 2.

### Soil Treatment Area

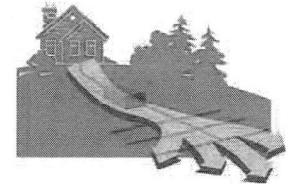
- *Inspection pipes.* Check to make sure they are properly capped. Replace caps that are damaged.
- *Surfacing of effluent.* Check for surfaced effluent or other signs of problems.
- *Gravity trenches and beds.* Check the number of gravity trenches with ponded effluent. Identify the percentage of the system in use. Determine if action is needed.
- *Pressure trenches and beds - Lateral flushing.* Check lateral distribution; if cleanouts exist, flush and clean as needed.

**All other components – inspect as listed here:**

---

500 gal. Grinder pump tank with a Liberty ProVore PRG101A-2 sewage ejector pump

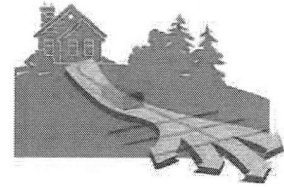
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### Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	<ul style="list-style-type: none"> <li>• Uses additional water.</li> <li>• Adds solids to the tank.</li> <li>• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.</li> </ul>	<ul style="list-style-type: none"> <li>• Use of a garbage disposal is not recommended.</li> <li>• Minimize garbage disposal use. Compost instead.</li> <li>• To prevent solids from exiting the tank, have your tank pumped more frequently.</li> <li>• Add an effluent screen to your tank.</li> </ul>
Washing machine	<ul style="list-style-type: none"> <li>• Washing several loads on one day uses a lot of water and may overload your system.</li> <li>• Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.</li> </ul>	<ul style="list-style-type: none"> <li>• Choose a front-loader or water-saving top-loader, these units use less water than older models.</li> <li>• Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents.</li> <li>• Install a lint filter after the washer and an effluent screen to your tank</li> <li>• Wash only full loads.</li> <li>• Limit use of bleach-based detergents.</li> <li>• Think even – spread your laundry loads throughout the week.</li> </ul>
2 <sup>nd</sup> floor laundry	<ul style="list-style-type: none"> <li>• The rapid speed of water entering the tank may reduce performance.</li> </ul>	<ul style="list-style-type: none"> <li>• Install an effluent screen in the septic tank to prevent the release of excessive solids to the soil treatment area.</li> <li>• Be sure that you have adequate tank capacity.</li> </ul>
Dishwasher	<ul style="list-style-type: none"> <li>• Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area.</li> <li>• New models promote “no scraping”. They have a garbage disposal inside.</li> </ul>	<ul style="list-style-type: none"> <li>• Use gel detergents. Powdered detergents may add solids to the tank.</li> <li>• Use detergents that are low or no-phosphorus.</li> <li>• Wash only full loads.</li> <li>• Scrape your dishes anyways to keep undigested solids out of your septic system.</li> </ul>
Grinder pump (in home)	<ul style="list-style-type: none"> <li>• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.</li> </ul>	<ul style="list-style-type: none"> <li>• Expand septic tank capacity by a factor of 1.5.</li> <li>• Include pump monitoring in your maintenance schedule to ensure that it is working properly.</li> <li>• Add an effluent screen.</li> </ul>
Large bathtub (whirlpool)	<ul style="list-style-type: none"> <li>• Large volume of water may overload your system.</li> <li>• Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time.</li> <li>• Use oils, soaps, and cleaners in the bath or shower sparingly.</li> </ul>
Clean Water Uses	Impacts on System	Management Tips
High-efficiency furnace	<ul style="list-style-type: none"> <li>• Drip may result in frozen pipes during cold weather.</li> </ul>	<ul style="list-style-type: none"> <li>• Re-route water into a sump pump or directly out of the house. Do not route furnace recharge to your septic system.</li> </ul>
Water softener Iron filter Reverse osmosis	<ul style="list-style-type: none"> <li>• Salt in recharge water may affect system performance.</li> <li>• Recharge water may hydraulically overload the system.</li> </ul>	<ul style="list-style-type: none"> <li>• These sources produce water that is not sewage and should not go into your septic system.</li> <li>• Reroute water from these sources to another outlet, such as a dry well, daintile or old drainfield.</li> </ul>
Surface drainage Footing drains	<ul style="list-style-type: none"> <li>• Water from these sources will likely overload the system.</li> </ul>	<ul style="list-style-type: none"> <li>• When replacing, consider using a demand-based recharge vs. a time-based recharge.</li> <li>• Check valves to ensure proper operation; have unit serviced per manufacturer directions</li> </ul>





**Maintenance Log**

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

Activity	Date accomplished									
<b>Check frequently:</b>										
Leaks: check for plumbing leaks										
Soil treatment area check for surfacing										
Lint filter: check, clean if needed										
Effluent screen: if owner-maintained										
<b>Check annually:</b>										
Water usage rate (monitor frequency ____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

Notes: 500 gal. Grinder pump tank with a Liberty ProVore PRG101A-2 sewage ejector pump

Mitigation/corrective action plan:

*"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:

Date

11/8/12

Management Plan Prepared By: **Spectrum Research, Inc**

Certification # **2215**

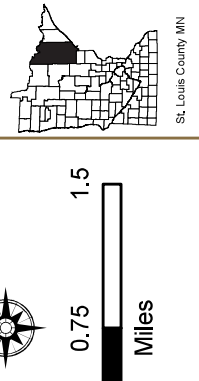
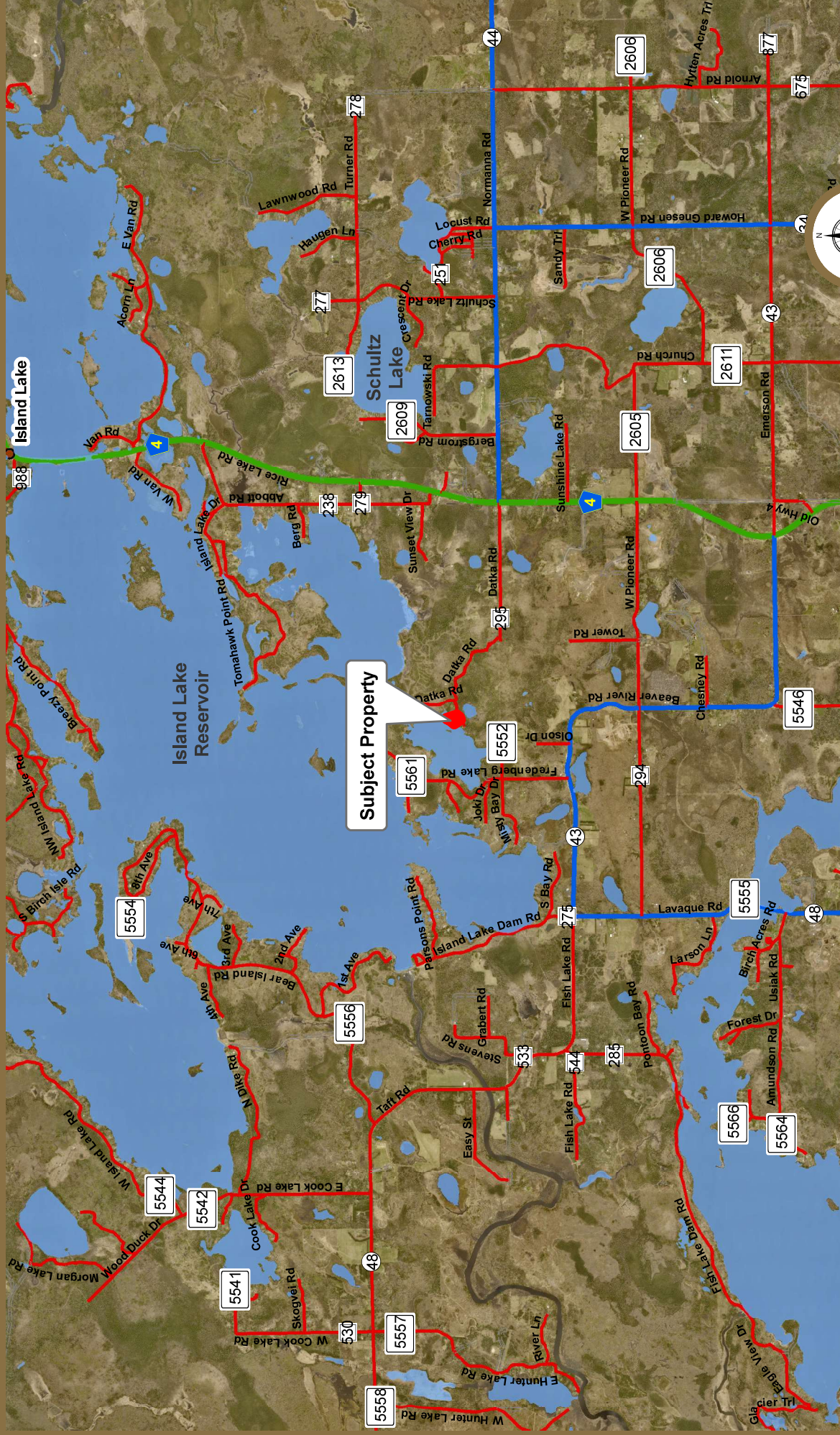
Permitting Authority: **St. Louis County**





# St. Louis County

## March BOA Meeting



### Peter & Anne Goldschmidt

#### Location Map

365-0021-00130

Prepared By: **Planning & Zoning Department**  
(218) 725-5000  
[www.stlouiscountymn.gov](http://www.stlouiscountymn.gov)

Source: St. Louis County

Map Created: 2/15/2024

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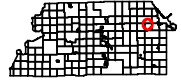
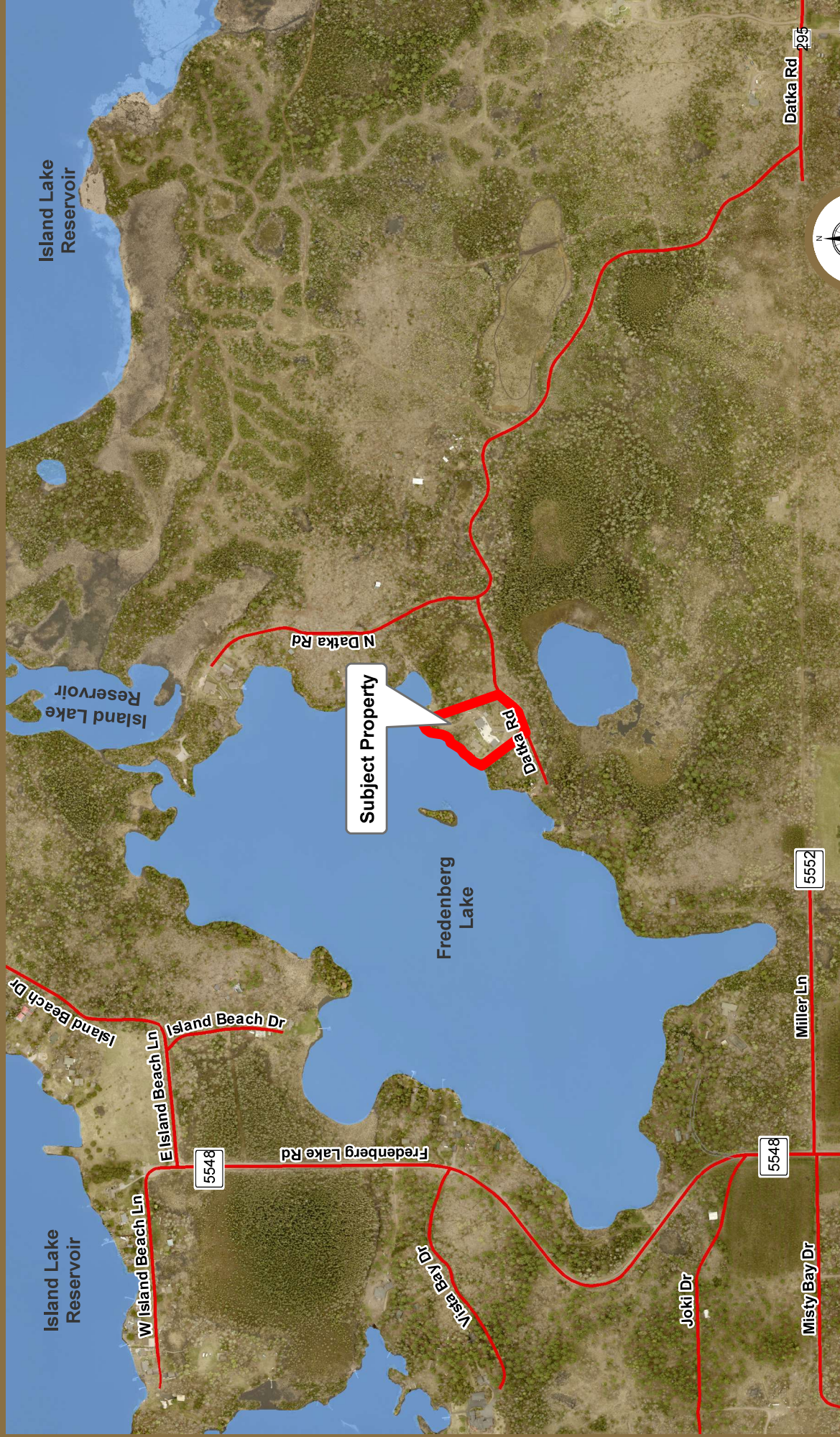
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# St. Louis County

March BOA Meeting



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(218) 725-5000  
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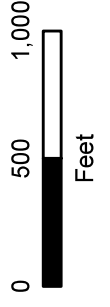
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**Peter & Anne Goldschmidt**  
Location Map  
365-0021-00130



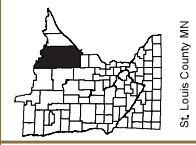
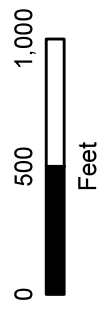
St. Louis County MN



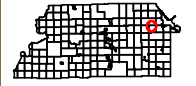


# St. Louis County

March BOA Meeting



**Peter & Anne Goldschmidt**  
Zoning Map  
365-0021-00130



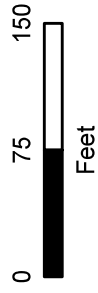
Prepared By: **Planning & Zoning Department**  
(216) 725-5000  
[www.stlouiscountymn.gov](http://www.stlouiscountymn.gov)  
Source: St. Louis County  
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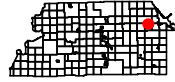
# St. Louis County

March BOA Meeting



## Peter & Anne Goldschmidt

Site / Elevation Map  
365-0021-00130



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Department  
(218) 725-5000  
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# St. Louis County

March BOA Meeting



Fredenberg  
Lake

Dakota Rd

Prepared By: Planning & Zoning

Department

(218) 725-5000

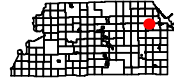
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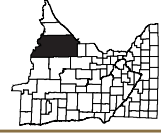
## Peter & Anne Goldschmidt

### Site Map

365-0021-00130




0 75 150  
Feet

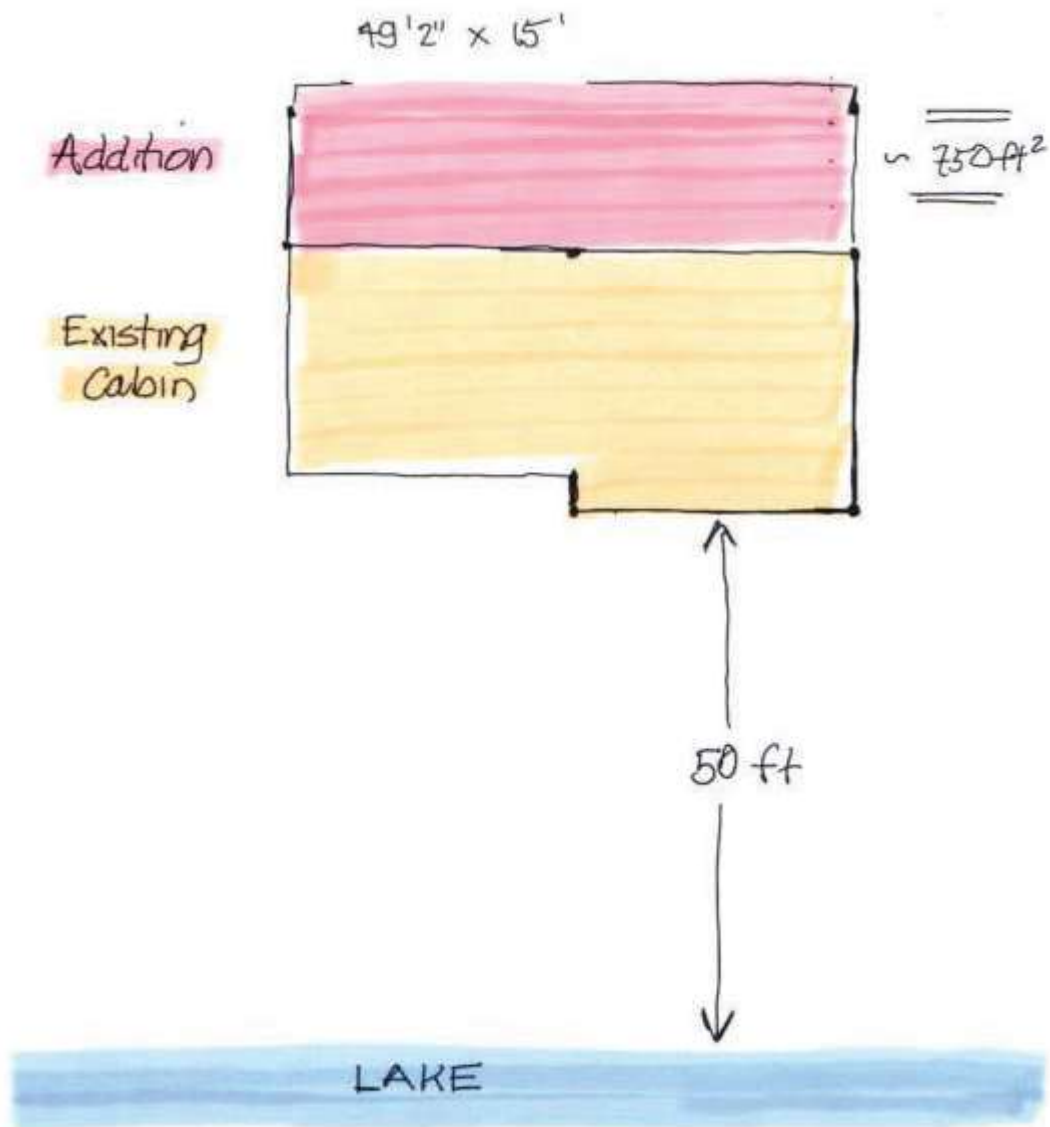



St. Louis County MN



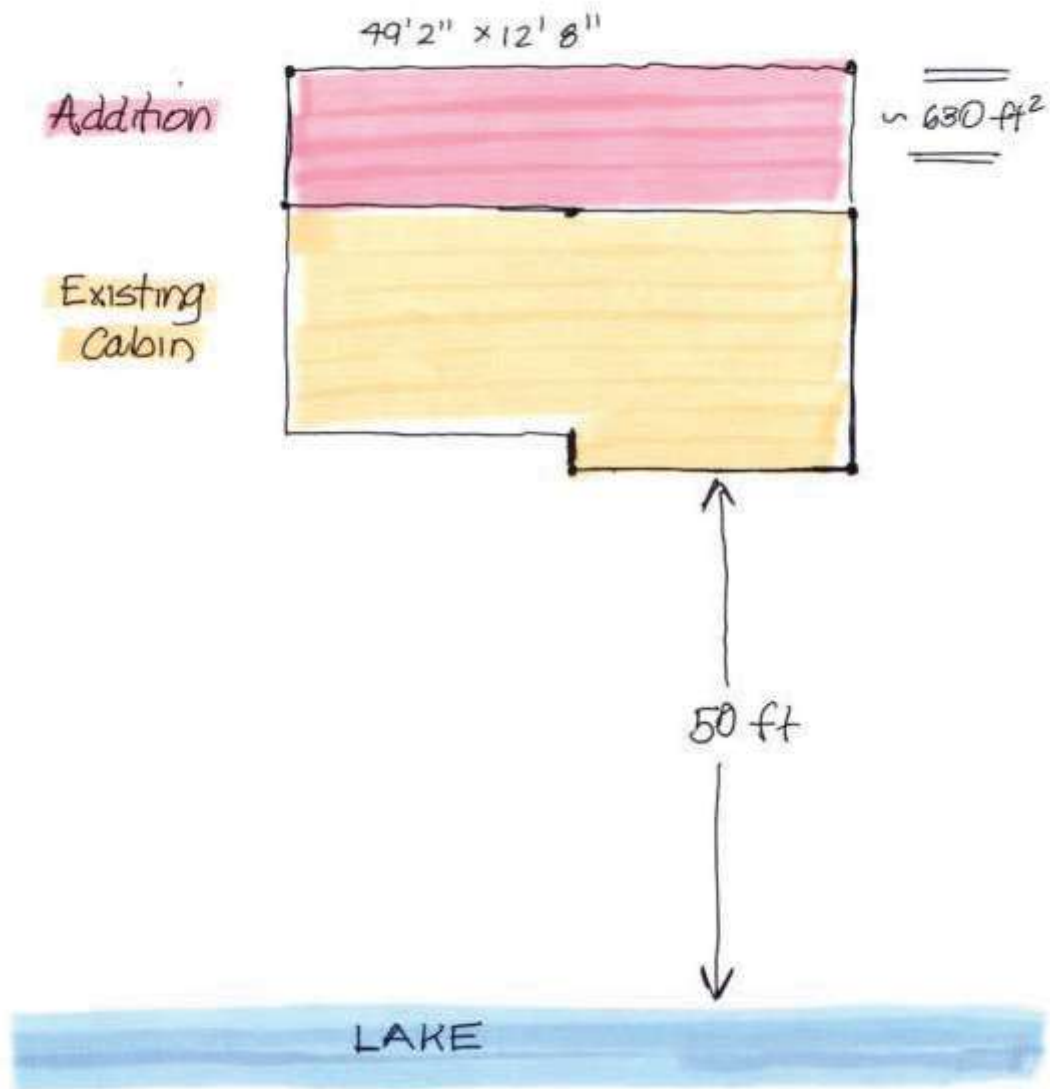
1 SQ = 4 ft 

This is the  
addition we want  
to add



1 SQ = 4 ft 

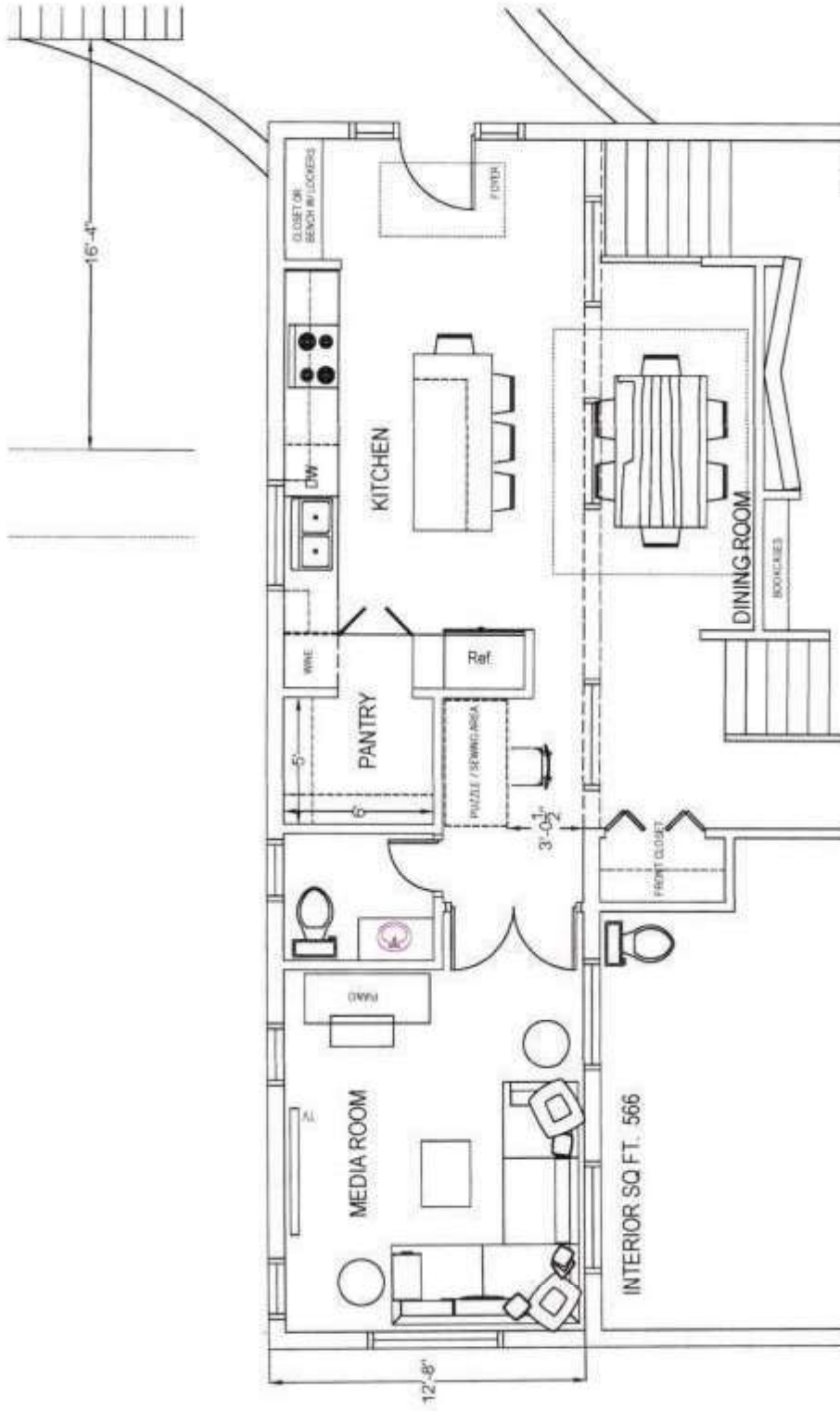
Alternate with less  
square footage



Rd

Arial view





Date: 1 January 2024  
Page: 1/1

Scale: 3/16" = 1'-0"

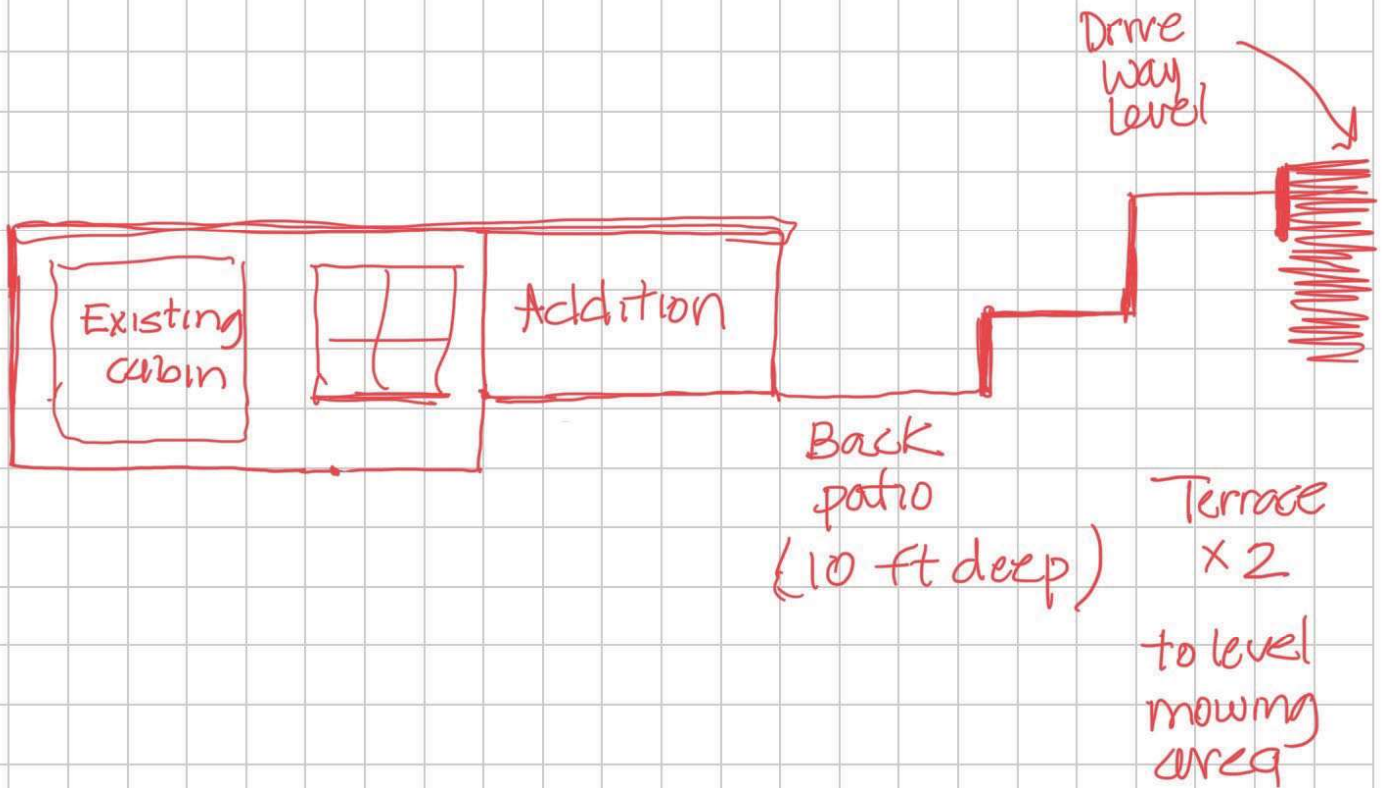
# Concept Plan Goldschmidt Cabin #8

4821 Datka Road Duluth, Minnesota



1 SQ = 3 feet

SIDE VIEW from South



GOLDSCHMIDT CABIN