A STRUCTURAL ENGINEERING REPORT ON THE PROPOSED NEW SEPTIC SYSTEM ADDITION TO THE FARRAR'S SPIRIT LAKE PROPERTY.

Located in Aitkin County at
41329 300th. Lane
Aitkin, MN.. 56431

Prepared for
Mr. Jeff Brummer
Brummer Septic LLC.
Site Evaluations, Designs, Inspections
Brainerd, MN.

Prepared By

STUART ANDERSON PROFESSIONAL ENGINEERING SERVICE INC.

35840 Co. Rd. 238 Deer River, MN. Tel. 218/ 246-2396
Ref. Project C1945 Date: October 18, 2019

CONTENTS

I hereby certify that this report and related calculations were prepared by me and that I am a duly Licensed Engineer under the laws of the State of Minnesota-

Stuart C. Anderson P.E.
Stuart C. Anderson
Reg. No. 6721 Date 10/18/2019

A STRUCTURAL REPORT ON THE NEW SEPTIC SYSTEM ADDITION TO THE FARRAR'S SPIRIT LAKE PROPERTY IN RURAL AITKIN CO.

SUMMARY AND CONCLUSIONS:

A new septic system is being installed on the Farrar Property. As requested by Mr. Jeff Brummer of Brummer Septic Co., the property owner's Septic System installation contractor, we have reviewed the correspondence and telephone information submitted to us for the proposed septic system addition. The Loran Farrar property is on Spirit Lake in Aitkin County, located at 41329 300th. Lane, Aitkin, MN.

Mr. Brummer informed us that the proposed new pressure bed type 19 ft. by 31 ft. septic drain field will be located between the existing pole building at the north west corner of the Farrar property, and the westerly property line. **See the attached site plans of Appendix A, page A1 and A2.** The rock absorption bed of the new drain field will be only fifteen feet from the pole building structure, less than the 20 foot code clearance requirement.

The basic layout and design of the existing pole building, as well as the proposed new septic system design were performed by others. Our review is in regard to, *and limited to*, the effect of the existing pole building foundation structure onto the proposed new nearby septic field, and also regarding the effects of the adjacent new septic field onto the existing pole building's pole foundations. The new septic tanks are well beyond the ten foot limit from the pole building or other structures.

It is our understanding the owners require a certified engineering evaluation of the closeness of the structure to the septic field, in view of the code restrictions that require a clearance distance of 10 feet from any septic system tank and 20 feet from the drain field's rock bed. The zoning officer may have questions regarding the permit application concerning potential effects of the adjacent septic field on the nearby pole building foundation; and vice versa.

The existing pole building is founded on a series embedded poles, embedded five feet or more in depth in the soil, and placed eight to ten feet on center around the perimeter of the building; supporting the building roof. The floor of the building is a concrete slab on grade.

Our engineering evaluation (see the report body below) concludes that there is no adverse structural problem between the two adjacent facilities, beyond that, if not already present, we suggest that gutters may be installed on the pole building to divert rainwater from the adjacent new sand beds of the proposed septic system. **Based on these facts, we conclude the Plan as presented by Mr. Brummer is acceptable from a Structural Engineer's evaluation.**

PROBLEM ANALYSIS AND CALCULATIONS:

No calculations were performed to determine strength, load capacity or bearing values of the building structure. The rock bed is only 15 feet from the pole building, see Appendix A, page A1 & A2. Because of the fifteen foot minimum absorption bed clearance, this foundation loading will still be well outside the zone of influence that may impose any significant force onto the drain field. We see no adverse structural effect that the new septic field flowage can exert onto the distant pole building pole bases from the well-draining absorption bed and those well draining residual soils (see Appendix A, pages A3 & A4).

However, one caution we note is with the pole building eave line adjacent and parallel to the east edge of the drain field, we suggest that gutters may be installed on that segment of the pole building west eave line opposite the new pressure bed. The purpose is to divert rain water away from the new drain field pressure bed construction, to reduce the potential to drain into it or cause erosion of it.

A STRUCTURAL REPORT ON THE NEW SEPTIC SYSTEM ADDITION TO THE FARRAR'S SPIRIT LAKE PROPERTY IN RURAL AITKIN CO.

REVIEW AND RECOMMENDATIONS:

We reviewed the new septic system drain field, as described by Mr. Brummer, which is closer than the code required minimum twenty foot clearance from the absorption rock bed of the pressure bed system. We performed a Structural Engineering Review of the proposed adjacent location effects, regarding the existing structure's influence on the proposed waste disposal system (or vice versa) in regard to the information given given to us.

In conclusion, it is our Professional Opinion that the new septic system's drain field absorption bed may be located as defined on the attached site plans of Appendix A, to be only fifteen feet clear of the existing pole building wall and supporting poles, without significant adverse structural effects. Those subsurface septic tanks, as shown on the Appendix A plot plans are well beyond the ten foot clearance limit to the pole building or other structures.

We understand that current code clearance requirements are 10 feet to a septic containment tank and 20 feet to the drain field. The basic reason for limiting the distance criteria between a building structure and a septic system tank and drain field is to prevent contamination of habitable spaces such as subsurface basements, and to reduce the risk to structural foundations from erosion or a wash out in the event of a failure of the tank or development of a "piping" channel in the soil from the drain field. Another purpose for the distance is to prevent the construction work from undermining and disturbing nearby foundations. The soil and installation layout described to us, plus the depth and location of the adjacent footings should not be subject to these types of adverse action.

The conclusions of this report represent our professional opinions. They are based on the limitations of observable items regarding the materials and procedures to be used in the construction. Our conclusions are also based on our research, experience, assumptions and judgment regarding comparable material and conditions of the construction.

The civil, structural and foundation engineering services performed for this project have been conducted in a manner consistent with that level of skill and care ordinarily exercised by other members of the profession currently practicing in this area under similar budgetary and time constraints. No other warrantee, express or implied, is made.

This report represents our completion of this project, based on our understanding of the scope of services requested. It is presented for the exclusive use of Brummer Septic Co., the owner's contractor, and Mr. Loran Farrar, the property owner.

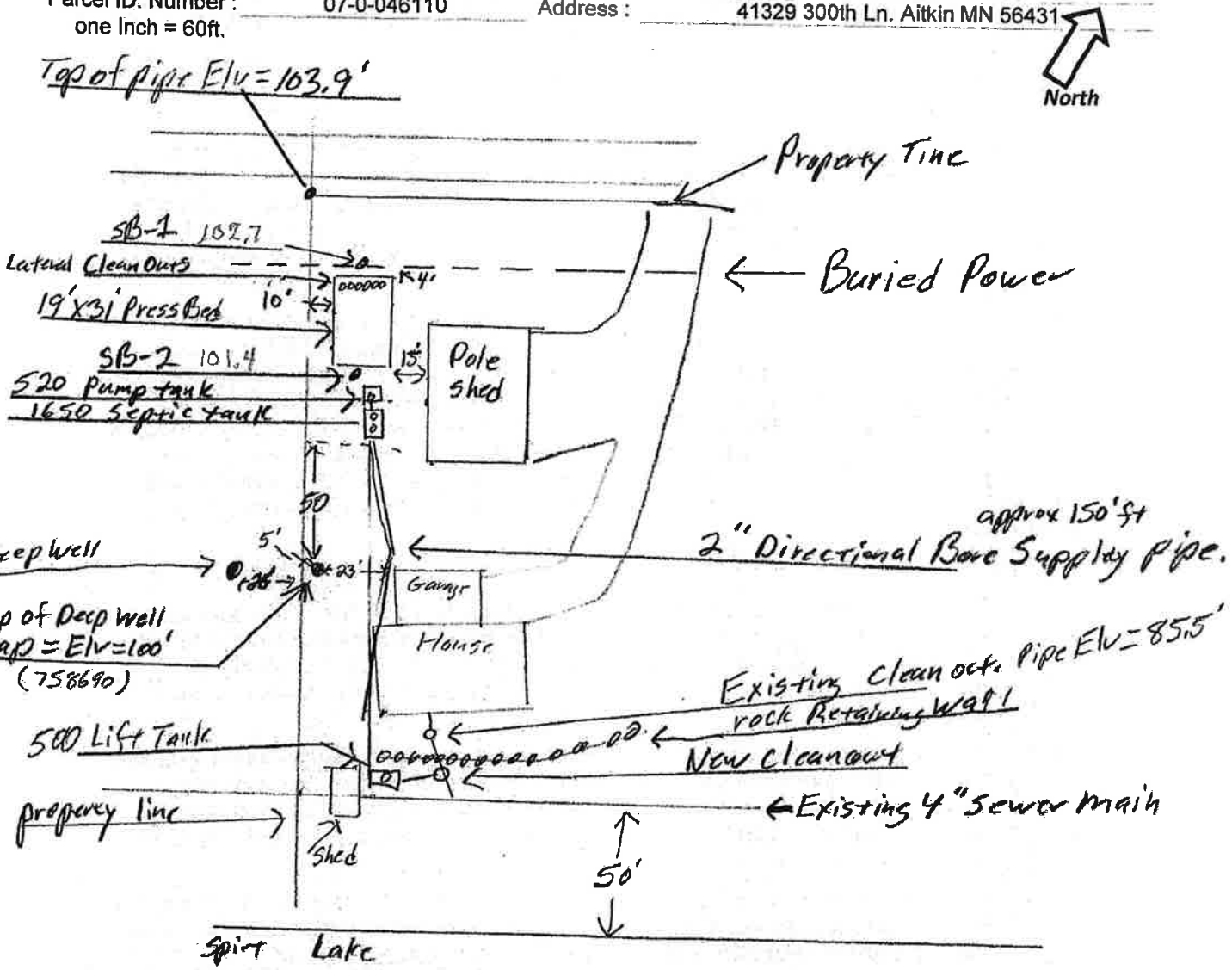
END OF REPORT

{ Design Drawing }

Property Owner: ~~xxxxxxx~~ Loren Farrar Date: 10/8/19 Designer's Initials : JB

Parcel ID. Number : 07-0-046110 Address : 41329 300th Ln. Aitkin MN 56431

one Inch = 60ft.



Grade at Walk-out Elv.= 89.3'

Grade below retaining wall Elv. = 86.1'

Lake Elv. On 10/8/2019 Elv.= 80.6' shore Elv. = 83.6' Existing 4" sewer Main pipe approx. Elv.= 82.5'

	Surface/ SHWT	*Top of Well Cap= Bench Mark 100'*			Existing Grade	
Soil Bore 1	102.7'/70"	Bench Mark	100'		Grade at Bed	North End Elv.= 103'
Soil Bore 2	101.4'/61"	Ground Elv. BM	98.9'			South End Elv.= 102'
Soil Bore 3		Ground Elv. Tank	101.4'	Septic	Bottom of Rock	Elv.= 100'
Grade at NW corner of House garage			99'		Grade at 500 Lift tank Elv.= 85.5'	

Please show all that apply (Existing)

Wells within 100ft. Of Drain field.

Water lines within 10 ft. of Drain field.

Drain field Areas:

Please Draw to Scale with North to Top or Left Side of Page:

Disturbed/Compacted Areas	Access Route for Tank Maintenance
Component Location	Property Lines
OHW ordinary high water	Structures
Lot Easements	Setbacks

APPENDIX A PAGE A1

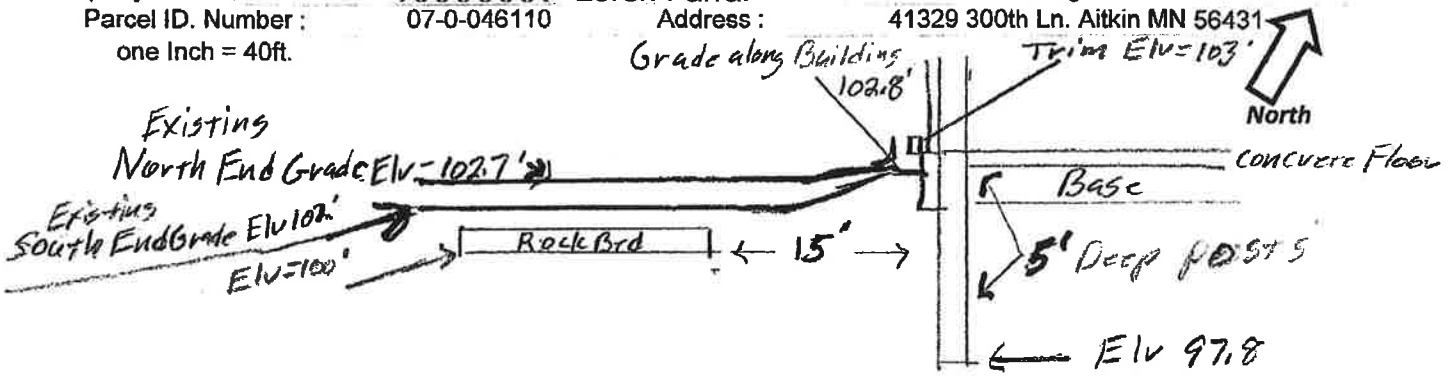
Shed setback Drawings

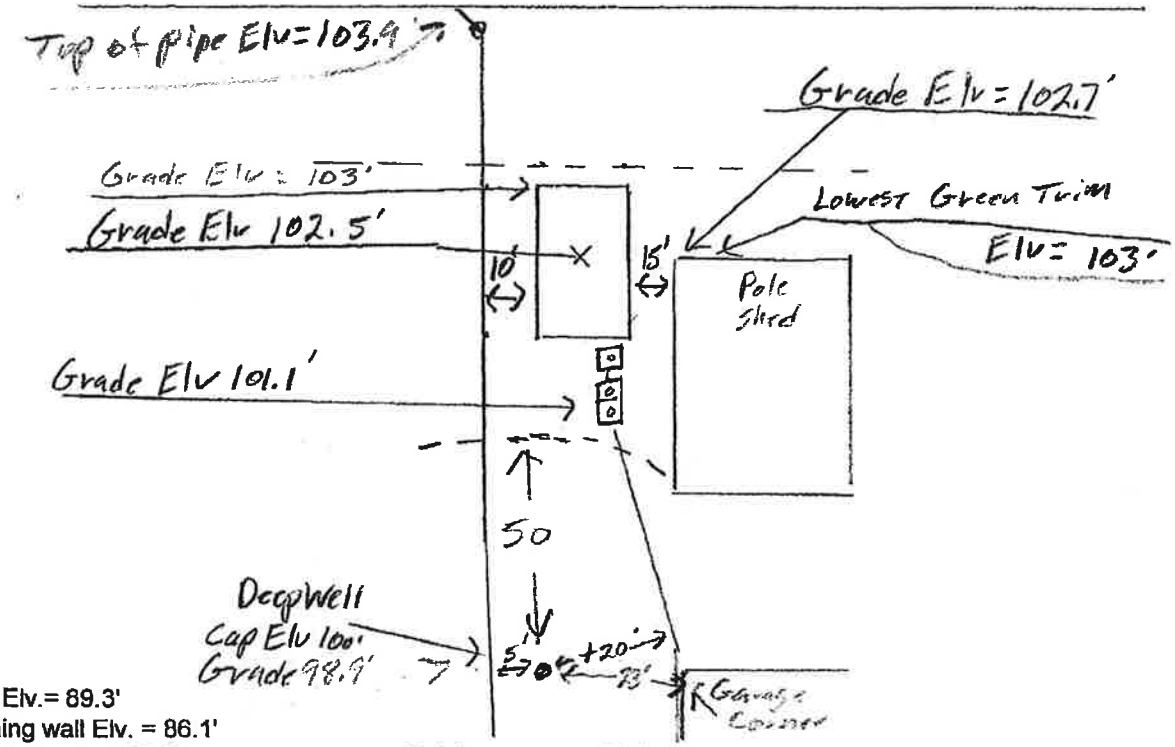
{ Design Drawing }

Property Owner: ~~XXXXXXX~~ Loren Farrar Date: 10/8/19 Designer's Initials : JB

Parcel ID. Number : 07-0-046110 Address : 41329 300th Ln. Aitkin MN 56431

one Inch = 40ft.





Grade at Walk-out Elv.= 89.3'

Grade below retaining wall Elv. = 86.1'

Lake Elv. On 10/8/2019 Elv.= 80.6' shore Elv. = 83.6' Existing 4" sewer Main pipe approx. Elv.= 82.5'

	Surface/ SHWT	Top of Well Cap= Bench Mark 100'			Existing Grade	
Soil Bore 1	102.7'/70"	Bench Mark	100'		Grade at Bed	North End Elv.= 103'
Soil Bore 2	101.4'/61"	Ground Elv. BM	98.9'			South End Elv.= 102'
Soil Bore 3		Ground Elv. Tank	101.4'	Septic	Bottom of Rock Elv.= 100'	
Grade at NW corner of House garage			99'		Grade at 500 Lift tank Elv.= 85.5'	

Please show all that apply (Existing)

Wells within 100ft. Of Drain field.

Water lines within 10 ft. of Drain field.

Drain field Areas:

Please Draw to Scale with North to Top or Left Side of Page:

	Disturbed/Compacted Areas	Access Route for Tank Maintenance
	Component Location	Property Lines
	OHW ordinary high water	Structures
	Lot Easements	Setbacks

APPENDIX A PAGE A2

Soil Observation Log

www.SepticResource.com vers 12.4

Owner Information

Property Owner / project: ~~Loran Farrar~~ Loren Farrar Date 10/8/2019

Property Address / PID: 41329 300th Ln. Aitkin MN 56431

Soil Survey Information

☐ refer to attached soil survey

Parent matl's: ☑ Till ☐ Outwash ☐ Lacustrine ☐ Alluvium ☐ Organic ☐ Bedrock

landscape position: ☐ Summit ☐ Shoulder ☑ Side slope ☐ Toe slope

soil survey map units: 504B slope 1 % direction- SE

Soil Log #1

☑ Boring ☐ Pit Elevation 102.7' Depth to SHWT 70"

Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 8	Topsoil Sandy Loam	<35	10YR3/2		Loose	Loose	Granular
8 - 70	Med Sand	<35	10YR5/4		Loose	Loose	Granular
70 - 74	Clay Loam	<35	10YR5/3	7.5YR5/6	Friable	Weak	Blocky
74 - 80	Med Sand	<35	10YR6/4		Loose	Loose	Granular
		<35					

Comments:

APPENDIX A PAGE A3

41329 300th Ln. Aitkin MN 56431				Soil Log #2			
	☑ Boring	☐ Pit	Elevation 101.4'		Depth to SHWT 61"		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 8	Topsoil Sandy Loam	<35	10YR3/2		Loose	Loose	Granular
8 - 13	Loam	<35	10YR5/3		Loose	Loose	Granular
13 - 61	Med Sand	<35	10YR5/4	10YR4/4 (1/4" to 1/2") lamellae layers	Loose	Loose	Granular
61 - 65	silt Loam	<35	10YR5/3	7.5YR5/4	Friable	Weak	Blocky
65 - 70	Med Sand	<35	10YR5/4		Loose	Loose	Granular

41329 300th Ln. Aitkin MN 56431				Soil Log #3			
	☐ Boring	☐ Pit	Elevation ______		Depth to SHWT ______		
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive
		<35 35 - 50 >50			loose friable firm rigid	loose weak moderate strong	single grain granular blocky prismatic platy massive

I hereby certify this work was completed in accordance with MN 7080 and any local req's.

Designer Signature

Brummer Septic LLC.
Company

L-1347
License #

APPENDIX A PAGE A4