

**A STRUCTURAL ENGINEERING REPORT ON THE PROPOSED GARAGE
BLDG. ADDITION AT THE PETER YOUNG ESQUAGAMAH LAKE PROPERTY**

Located in Aitkin County
AT
40145 502ND. Lane
Palisade, MN. 56469

Prepared for
Mr. & Mrs. Peter Young
1512 126th. Ave.
Blaine, MN. 55449

Prepared By

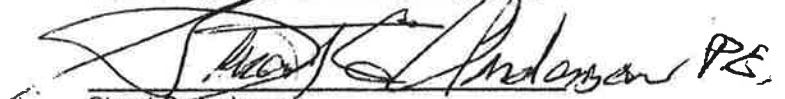
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Ref. Project C1606 Date: April 6, 2016

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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
Reg. No. 6721

Date 4/06/2016

A STRUCTURAL REPORT ON THE PROPOSED GARAGE BLDG. ADDITION TO THE PETER YOUNG ESQUAGAMAH LAKE PROPERTY

SUMMARY AND CONCLUSIONS:

As requested by Mr. Peter Young, the Residence Owner, we have reviewed the information he submitted to us in regard to the proposed new garage building on their Aitkin Co. Lake property. The Young property is located at 40145 502nd. Lane, Palisade, MN. 56469, in rural Aitkin Co. on Esquagamah Lake.

The description of the site places a new proposed garage foundation to be located with sixteen feet of foundation and fourteen feet of eave line clearance from the existing rock bed of the sanitary drain field on his property (See the attached Site Plan of Appendix A, page A1). The basic garage design and construction and design of the existing septic field were performed by others. Our review is in regard to, and limited to, the effect of the sanitary system drain field onto the proposed new garage building foundations; and also regarding the proposed garage foundation load and construction effects onto the adjacent sanitary septic field components.

The Garage will be located **less than 20 feet from the sanitary drain field rock bed at the closest point.** It is clear from the attached Site Plan that the garage will be beyond the required ten foot limit to the septic tanks.

It is our understanding the owners are applying for a variance on the code restrictions that require a distance of 10 feet from the Septic tank and 20 feet to the drain field's rock bed from any structure. The zoning officer may have questions regarding the variance application concerning potential effects of the drain field on the nearby foundation support, and vice versa.

It is our professional opinion that the discharge flow through a properly working septic field, sized for the moderate loading of this lake shore residence as noted above, should have no significant effect in reducing the bearing capacity of the proposed nearby shallow depth garage building foundations. **Based on these facts, we conclude the plan presented by Mr. Young is acceptable from a Structural Engineer's evaluation.**

OBSERVATIONS:

Our observations were limited to the data submitted to us. The new garage building is to be located adjacent to the septic system drain field. This will fit the garage into that space with only a sixteen foot foundation clearance and fourteen foot eave line clearance to the septic system rock bed.

We were advised that the new garage building structure will be a conventional slab on grade founded structure, with wood framed perimeter walls and conventional wood framed roof truss construction. We were also advised that due to the property limits, other facility locations, convenience, access and topography of the land; the desired location of the new garage building is restricted to that limited area as noted above.

PROBLEM ANALYSIS AND CALCULATIONS:

No calculations were performed to determine strength, load capacity or bearing values of the garage structure components. This report, as noted above, is in regard to, and limited to the effect of the sanitary system drain field onto the proposed new garage building foundations and vice-versa.

In general, a wood framed stick built (stud wall) superstructure building will distribute the roof loading at the eave line in a uniform manner to the building wall and the thickened slab edge of the garage building. The edge strip footing loading for this garage building would probably add a load of about 900 or 1,000 lb. per lineal foot to the thickened slab edge footing, which would result in what would be considered a relatively light soil bearing pressure. If a small area of the garage footing edge were subject to an unlikely piping action by a malfunction of the septic drain system, the lightly loaded foundation slab's thickened and reinforced edge should bridge over such an unlikely, but possible, "piping" type of erosion gap without affecting the structural integrity of the foundation/slab.

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Even if the residual soil is not truly a "non frost susceptible" soil, the typical wood framed building founded on a shallow slab foundation is quite flexible, and would not be seriously adversely affected by some frost action. This is evidenced by the tens of thousands of similar structures that successfully serve as garages in northern Minnesota.

Another potential problem could be an adverse effect of the structural excavation work for the garage building foundation on the nearby septic system drain lines. The construction excavation for the shallow depth footings will require a foundation depth of only a foot or two at that adjacent south side area. This will not jeopardize the existing rock bed by undermining, so the new garage building construction should have no detrimental effect onto the existing drain field. However, construction equipment shall be kept off of the rock bed area.

A non structural problem that was considered is the close location and the effect of rain water impinging on the drain field rock bed. The sixteen foot foundation and fourteen foot eave line clearance should mitigate this problem, plus the eave line gutter slope direction can be used to direct the roof drainage away from the septic field.

REVIEW AND RECOMMENDATIONS:

We reviewed the proposed garage building location regarding its influence on the existing waste disposal system (or vice versa) as given to us by Mr. Youngr. We paid special attention to the proposed garage building location in regard to the septic system drain field. The garage building is to be located sixteen feet from the drain field system rock bed.

We conclude, the garage building and it's foundation addition may be located as described to us, without significant adverse structural effects. Following construction, closeness of the drain lines of a properly functioning septic system in normal soils for this type of structure should have no significant detrimental effect on the foundation support for the reported building installation in accordance with the information received.

We understand that current code clearance requirements are 10 feet to a septic containment tank and 20 feet to the drain field. The apparent reasons for the distance criteria between a building and a septic system tank and drain field are to prevent contamination of habitable spaces below grade (basements) and to reduce the risk to structural foundation damage 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 from undermining and disturbing functional portions of the drain system. The installation layout described should not be subject to these types of action. However, due to the close confines of the construction area, care shall be exercised during construction to not damage the near by existing drain field. Keep heavy equipment off of it.

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 Mr. & Mrs. Peter Young, the home owner.

END OF REPORT