

LIFE SAVER INVESTMENT CORP.

**Report of Final
Geotechnical Exploration
Proposed Two-Story Townhome Development
1385 West Daughtery Road
Lakeland, Polk County, Florida**

File No. 05-51-9119



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Site Preparation Recommendations

The existing natural surficial soils should be prepared prior to placement of engineered fill and foundation construction on the soils, in accordance with the following site preparation recommendations. The recommended procedures should be covered in the project specifications, and completed prior to construction of the foundation system.

1. The building area, plus a margin of five feet beyond the perimeter of the foundation system, should be cleared and grubbed of any vegetation, stumps, tree root systems, and sod. Organic topsoil should be excavated and removed. Strippings, debris, and organic soils should be disposed in accordance with the owner's instructions. Any hole larger than three feet in diameter resulting from the removal of any object should be ramped to allow compaction of the bottom and sides with mechanical equipment prior to filling.
2. After completion of the clearing and grubbing operations, including organic topsoil removal, the exposed soils within the construction area plus the margin, should be thoroughly moisture-conditioned with an ample supply of water. The moisture-conditioned soil surface should then be compacted using either a heavy, rubber-tired traffic roller, or three cubic yard capacity front-end loader with full bucket of soil, to a depth of 24 inches below existing grade or to a depth of 24 inches below the finished floor slab subgrade elevation, whichever is greater, to a minimum of 98 percent of the Standard Proctor (ASTM D 698) Maximum Dry Density. This density level should be measured by a qualified soils technician using procedures described by ASTM D 2937 or approved equal, prior to commencement of subsequent procedures. In the event that initial rolling results in unstable, yielding or pumping conditions, the soils engineer shall be contacted to determine the cause of the problem and to make recommendations for remediation. As a minimum, soft, yielding, excessively wet, or otherwise unsuitable material shall be cut out and replaced with compacted clean granular fill. In the event that applied water does not penetrate sufficiently deep into natural soils to act as a lubricant in the compaction process, it will be necessary to disc or otherwise break up the soils before and during application of water.
3. After steps 1 and 2 are completed, fill necessary to raise the grade to finished floor subgrade, or any interim-working grade, should then be placed in one-foot thick layers, moisture conditioned, and compacted to a minimum of 98 percent of the Standard Proctor Maximum Dry Density. All fill should consist of clean granular fill, which is free of roots and debris.
4. Continuous wall footing trenches and individual footing pits should be excavated to footing line and bottom grade. Foundation soils should be saturated with water and compacted with suitable mechanical equipment to achieve the specified level of density to the required depth. Foundation bottom grade should be tested to confirm that a minimum density of 98 percent of the Standard Proctor Maximum Dry Density exists to a depth of 12 inches below footing bottom. If necessary, the bottom of the footing excavation shall be over-excavated, refilled, and recompacted with mechanical equipment to achieve the necessary minimum field density to the required depth.
5. Foundation backfill on sides of formed footings, if any, and building slab subgrade fill should consist of clean granular fill, free of roots and debris, which is placed in 12-inch lifts and compacted to 98 percent of the Standard Proctor Maximum Dry Density.

GROUNDWATER CONDITIONS

The groundwater level readings were measured in the borehole upon completion of testing, and at the completion of the day's fieldwork, where possible. The measured borehole groundwater levels are plotted adjacent to the final logs. These water level readings may differ from the actual stable groundwater table due to variations in the permeability of soil layers. The degree of accuracy of the reported water levels is also related to the time allowed for the borehole water level to come to equilibrium. Consequently, if a water table is not indicated, it does not necessarily mean that groundwater does not exist within the vertical reach of the borehole. Finally, it must be noted that fluctuations in the groundwater level may occur due to variations in rainfall and other environmental or physical factors at the time measurements are made.

Unconfined (Surficial) Aquifer Conditions

The measured (borehole) unconfined ground water table level ranged from 4.0 to 5.5 feet below land surface at the time of the field exploration.

EVALUATION AND RECOMMENDATIONS

Proposed Development

Based on information provided by Emiliano Antunez, it is our understanding that the proposed two-story townhome development will be constructed with wood and unit masonry walls. The structure will be supported by perimeter load bearing foundations and will include an interior slab-on-grade ground floor to support partitions and live loads. The wall loads are not anticipated to exceed 4 kips per linear foot and are expected to be transmitted to the foundation soils by reinforced unit masonry stem walls. Interior columns supporting up to 12 kips were considered in our analysis. Moreover, final floor grade placed 12 inches above existing grade was considered in our analysis.

This study and the following recommendations are for the proposed two-story townhome construction at the location of the borings performed for this study. It is our opinion that these soils at the tested locations, will be capable of supporting the anticipated loads on a conventionally designed shallow foundation system after a program of site preparation.

The proposed preparation consists of densifying the subgrade surfaces of both the floor slab-on-grade and the foundations. The purpose of the densification is to compress loose surficial soils, as well as subgrade soils disturbed by other site preparation procedures, thereby creating a more uniform and less yielding soil mass. The above-created conditions will promote uniform settlement of the structure, thereby, reducing the incidence and magnitude of differential settlement. Reduction of differential settlement in light masonry structures is beneficial because the brittle nature of the masonry makes it sensitive to such movement. Reduction of differential settlement corresponds directly to reduction of the number and severity of cracks in the masonry surfaces.

The following report subsection describes earthwork procedures, which were found to be successful in achieving the required soil improvement, at similar sites. That section also includes target specifications for in-place soil densities. It has been our experience that the described procedures can be accomplished using conventional earthwork equipment and techniques.



6. Ardaman & Associates, Inc., Bartow office, should be engaged by the owner prior to site preparation to provide field observation of site preparation steps, compaction operations on natural and fill soils, and conduct field in-place density testing to confirm that the specified requirements are met.

Foundation Recommendations

Following preparation of the subgrade soils, as described previously in this report, the shallow foundations may be proportioned for a maximum net allowable soil bearing pressure of 2500 pounds per square foot, to support the design dead load plus sustained live load. (The above stated allowable soil bearing pressure may be increased by one-third (1/3) when considering cases involving short duration transient load situations, such as that case when wind loads are considered on the structure.)

A minimum soil cover of 18 inches, as measured from the bottom of the foundation system to lowest adjacent finished grade should be provided. Isolated spread footings should be proportioned to be at least 2.5 feet wide. Similarly, a minimum lateral dimension of 24 inches should be provided, when proportioning the continuous strip bearing wall foundation elements. The foundations should be designed for equal dead load distribution, in accordance with Standard Building Code requirements.

Predicted Performance of Shallow Spread Footings

Selection of the recommended soil bearing pressure was based primarily on considerations of limiting the expected settlement to tolerable values. Considerations of overstress and general shear of the soils below the footings were found to not have a significant influence on the recommended soil bearing pressure. Based on the expected magnitude of the foundation loads, we estimate that the continuous wall footings' maximum settlement will be on the order of 0.25 inches. Similarly, the estimated maximum settlement of isolated individual pad foundations is 0.25 inches. We also anticipate that 90 to 100 percent of the settlement will be distortional in nature. That is, it will be the result of rearrangement of the soil particles, which constitute the granular component of the soil and elastic compression of the soil particles, which comprise the cohesive component of the soil in response to the applied load. This distortional settlement would occur almost immediately following placement of dead load on the foundations. Furthermore, it is our judgment that the settlement would occur incrementally as the dead weight loads are applied due to the predominantly granular nature of the foundation soils. Further distortional settlement of foundations due to the addition of sustained live loads during the useful life of the structure would also occur shortly following the application of those loads. Foundation settlement, which may be due to the application of transient live loads such as wind, is expected to be negligible. The expected weight of the structure and site fills are not expected to transmit any significant additional stress to any underlying cohesive soils. Consequently, we judge that the magnitude of long-term (consolidation-related) settlement of the foundation elements will be negligible.