VANN ENGINEERING INC
GEOTECHNICAL ENGINEERING ▪ ENVIRONMENTAL CONSULTING ▪ CONSTRUCTION TESTING & OBSERVATION

September 28, 2018 Project 24215

Mr. Scott L. Tonn
Tonn Investments, LLC
4350 East Camelback Road
Suite A-100
Phoenix, Arizona 85018

RE: EXECUTIVE SUMMARY LETTER FOR THE UPDATED GEOTECHNICAL INVESTIGATION REPORT AND BOULDER STABILITY EVALUATION
PROPOSED TONN RESIDENCE
APN 172-47-063
5429 EAST SOLANO DRIVE
PARADISE VALLEY, ARIZONA 85253

Mr. Tonn:

At the request of the Town of Paradise Valley, this firm is submitting an Executive Summary Letter in regard to the Updated Geotechnical Investigation Report dated 09/28/18, and the Boulder Stability Evaluation dated 09/27/18 prepared by this firm, which have been submitted for the above listed project.

Two main components, as a portion of the PV Hillside Safety Plan, were included in the study which include a full seismic refraction hillside geotechnical study and a boulder stability evaluation. Excerpts from each of these studies are presented below. The subject site did not warrant a slope stability analysis report.

Geotechnical Investigation

The site is situated on hillside terrain on the northside of Camelback Mountain. Currently the site is occupied by a residential structure, a swimming pool, and an asphalt driveway which are to be demolished. Interpretation of Maricopa Aerial Photography shows the existing structure was built circa 1964.

This firm considers the existing spread fill, used to build the existing pad, to be uncontrolled and uncompacted (undocumented). In lieu of spread fill removal and replacement, this firm has generated specific recommendations for foundations and slabs bearing on existing spread fill. Deeper occurrences of spread fill may exist at locations on the site not explored by the seismic surveys.

It is necessary that all surface-level foundations and isolated exterior foundations bearing on existing fill be embedded a minimum of 3.5 feet. The base of the zone of subexcavation (subexcavation cut surface below foundations) shall not require moisture processing and compaction. Shallower footings may be possible and subexcavation may be terminated upon contact with Layer 2 rock, to be verified by this firm, with a minimum foundation embedment of 1.5 feet.

In order to minimize the adverse effects of differential settlement, it is recommended that all of the foundations bear on the same or very similar stratum, i.e. situations should be avoided where a portion of the footings are bearing on Layer 2 (rock) or stronger and a portion is bearing on existing fill. If the downslope footings for the structure are to bear on existing fill, it is recommended to place some degree of recompacted soil beneath the upslope footings as well, i.e. minimum of 12.0 inches, such that the resultant bearing condition is somewhat equivalent across the site. A Transition Lot Overexcavation diagram has been provided in Section IV of the Geotechnical Report to aid in construction efforts associated with the aforementioned. The controlling overexcavation depth shall be governed by the Spread Foundations and Site Preparation section of the report.

A 5-inch thick floor slab for the building should incorporate No. 4 reinforcing steel at 24 inches on center, each way (OCEW), chaired, tied 100 percent, and tied to the footing steel, or wire mesh equivalent. The final design for reinforcement should be completed by a registered structural engineer.

4.0 inches of aggregate base course (ABC) floor fill should immediately underlie 5.0-inch thick (full) interior grade floor slabs. The aggregate base material should conform to the requirements of local practice.

In no case should long-term ponding be allowed near structures. In areas where sidewalks or paving do not immediately adjoin structures, protective slopes should be provided with an outfall of at least 2 percent for at least 10 feet from perimeter walls. For planting distances less than 5.0 and 10.0 feet for flowers/shrubs and trees respectively, the adjoining foundation embedment depths will need to increase per the table in Section 5.13 in the Updated Geotechnical Report.

Boulder Stability Analysis

The following table summarizes the results of the 3 boulder simulations. An “X” indicates that the boulder did not meet both design criteria and will require stabilization.

Boulder ID	In Situ	Seismic Shaking		Base Erosion	Stabilization Required	Required BMPs
	(Sliding)	(Sliding)	(Toppling)	(Sliding)		
B-1	-	-	-	X	**yes**	**2**
B-2	X	X	-	X	**yes**	**2,8**
B-3	-	-	-	X	**yes**	**2**
B-4	-	-	X	X	**yes**	**2,7**
B-5	-	-	-	-	**no**	**-**

The voids between the boulders B-1, B-2, B-3, and B-4, and the underlying slope/pedestal should be filled with 4000 psi non-shrink grout (ASTM C1107). Any smaller boulders wedged between the subject boulders and the underlying rock mass should be encompassed within the grout as well (BMP-2). Furthermore, on the downhill side of boulder B-2, the top soil should be removed so that the grout makes clean contact with the underlying rock (BMP-8). The grout should be formed on the downhill side of the boulder to create a buttress. A pinning technique (BMP-7) is recommended for boulder B-4 to resist the potential for toppling. Refer to the Boulder Mitigation Protocol (BMP) detail sheets in Section II of the Boulder Stability Evaluation Report.

The location of each boulder to be stabilized must be confirmed by this firm prior to grouting and coring.

Furthermore, any smaller boulders or rock fragments (without a dimension greater than 3.0 feet) which sit atop other boulders should be removed, as depicted in the figure below. The stability of such boulders/rock fragments was not directly evaluated in this study; however, it is the opinion of this firm that such scenario presents a high potential for movement.

All exposed concrete may be finished with faux rock, natural rock veneer, or equivalent textured paint. If the faux rock is mixed into the concrete design, the minimum compressive strength of the mix must still meet the requirements set forth herein.

It is important to note that several boulders are present upslope from the property boundary that are believed by this firm to warrant a stability analysis. However, per the Town of Paradise Valley Hillside Code, this study is limited to only the boulders on the subject property. Our study has addressed applicable boulders within an area as defined by the Town of Paradise Valley. Other boulders exist upslope that may pose conditions of instability, thereby affecting the subject property.

The reports and the recommendations are predicated on two reports serving in congress; 1) the Updated Geotechnical Investigation Report dated 09/28/18 and 2) the Boulder Stability Evaluation dated 09/27/18. This report is, therefore, a portion of the overall study of the site. Because of the uniqueness of each report, the contents are constrained to separate submittals. Notwithstanding, all reports will work together. Each report is identified by the Project Number 24215.

Neither Vann Engineering, Inc. nor their agents or employees shall be jointly, severally or individually liable to the client or owner in excess of the compensation to be paid for our work, by any reason of any act or omission, including breach of contract or negligence not amounting to willful or intentional wrong.

Respectfully submitted,

VANN ENGINEERING, INC.

Jeffry D. Vann, MS PE D.GE F.ASCE
Principal Engineer

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