



May 13, 2016

MEL File No.: 2549

**Ms. Charmian Maybury**  
**Architectural Design**  
**Advance Design Consultants, Inc.**  
998 Park Avenue  
San Jose, CA 95126

**Subject: Addendum Report / Concrete Piers for PV System**  
**VA Psychosocial Rehabilitation and Recovery Center (PRRC)**  
**150 Muir Road**  
**Martinez, CA**  
**Project No. 612-503**

**Reference: Geotechnical Engineering Investigation**  
**By MatriScope, MEL File No.: 2549, November 20, 2015**

**Dear Ms. Maybury:**

MatriScope Engineering Laboratories, Inc. (MatriScope) understands that new photovoltaic (PV) system will be installed on the existing asphalt concrete (AC) pavement area, southeast of the proposed Psychosocial Rehabilitation and Recovery Center (PRRC). Concrete piers are required to support the proposed PV system. As requested, we visited the site, reviewed the above referenced geotechnical report, and prepared this addendum report to provide our recommendations for structural concrete pier design.

### **Cast-on-Place Drilled Concrete Piers**

#### Vertical Resistance of Piers

Drilled piers should be at least 18 inches in diameter and extend at least 8 feet below the ground surface. Actual embedment, dimension and reinforcements of piers should be determined by the structural engineer depending on the anticipated loads. Vertical support for the piers will be derived from friction between the sides of the piers and the surrounding soil.

An allowable skin friction of 400 pounds per square foot per foot of pier embedment may be used for structural design. Friction in the upper 12 inches should be neglected due to possible desiccation and disturbance of the soil surrounding the piers. The allowable pressures apply to dead plus live loads may be increased by 1/3 for short-term loading due to wind or seismic forces. The total settlement of piers designed in accordance with the above recommendations is estimated to be less than one inch.

Two-thirds of the indicated allowable downward friction capacity may be used to resist transient uplift loads. The weight of the pier may be added to the design of uplift value.

### Lateral Resistance of Piers

Resistance to lateral loads (including those due to wind or seismic forces) is a function of the stiffness of the surrounding soils, the stiffness of the pier material, the allowable deflection at the top of the pier and the allowable moment capacity of the pier cross section. We recommend the following soil parameters may be used for structural analysis/design using the computer program LPILE.

**Table 1**  
**LPILE Parameters**

Soil Type	Layer Thickness (in.)	Unit Weight (pci)	Angle of Friction (degree)	p-y Modulus, k (pci)
Dense Sand	240	0.0723	36	225

It is essential that pier drilling be monitored by a representative from MatriScope to verify compliance with our recommendations and the project specifications.

If you have questions regarding this report, please contact our office.

**Respectfully Submitted,**  
**MatriScope Engineering Laboratories, Inc.**



**Ying-Chi Liao, C.E., G.E.**  
**Senior Engineering Manager**

