

**GEOTECHNICAL ENGINEERING EXPLORATION
SEISMIC RETROFIT OF KAHOLO BRIDGE
HAWAII BELT ROAD, PROJECT NO. BR-19-2(072)
DISTRICT OF HAMAKUA, ISLAND OF HAWAII
W.O. 8063-00 JULY 12, 2024**

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The subsurface conditions encountered below the surface AC pavement consists of fill comprised of loose to medium dense gravel and sand and stiff to hard clayey silt extending to depths of about 1 to 5 feet below the existing ground surface. The fills were underlain by medium stiff to very stiff residual soils, saprolite, and medium dense weathered basalt. The residual soils, saprolite and weathered basalt extended to a depth of about 28 feet below the existing ground surface at the Hilo side abutment, and the saprolite extended to depths of about 36 to 43 feet below the existing ground surface at the Honokaa side abutment. Below the residual soils, saprolite and weathered basalt, as well as highly to moderately weathered basalt rock, were encountered to depths of about 49 to 63 feet below the existing ground surface. The basalt rock graded to moderately to slightly weathered and medium hard to hard down to the maximum depth explored of about 102.5 feet below the existing ground surface. We did not encounter groundwater at the time of our field exploration.

Based on the seismic evaluation of the bridge structure by the project structural engineer, we understand that appreciable lateral deflections of the bridge structure would occur during a seismic event. The lateral deflection of the bridge structure in the longitudinal direction would be reduced by the passive pressure resistance of the shallow bridge foundations and the stiffness of the abutment fills. A group of battered micropiles would be installed to provide resistance to the transverse lateral load and reduce the amount of transverse lateral deflection of the bridge structure.

In general, a 7.625-inch diameter cased micropile system with a minimum grout bulb diameter of 7.625 inches should be used for the battered micropiles to provide lateral load resistance in the transverse direction during a seismic event. The uplift and lateral supporting capacities of the micropile would be derived primarily from skin friction between the micropile bonded zone and the surrounding saprolite soils and highly to moderately weathered soft to medium hard basalt formation. The bonded zone of the micropile should be embedded a minimum of 30 and 45 feet with micropile embedment lengths of 40 and 55 feet for the Hilo and Honokaa abutments, respectively. The text of this report should be referred to for detailed discussion and specific design recommendations.

END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS