SECTION 2. SITE CHARACTERIZATION

2.1 Regional Geology

The Island of Oahu was built by the extrusion of basaltic lavas from the Waianae and Koolau shield volcanoes. The older Waianae Volcano is estimated to be middle to late Pliocene in age and forms the bulk of the western third of the island. The younger Koolau Volcano is estimated to be late Pliocene to early Pleistocene (Ice Age) in age and forms the majority of the eastern two-thirds of the island. Waianae Volcano became extinct while Koolau Volcano was still active, and its eastern flank was partially buried below Koolau lavas banking against its eastern flank. These banked or ponded lavas formed a broad plateau referred to as the Schofield Plateau.

The Schofield Plateau was formed when lavas from the Koolau Volcano ponded against the already eroded slopes of the Waianae Volcano in the late Pleistocene Epoch. The dips of the lava beds are generally near horizontal (between 3 to 5 degrees from horizontal). The lava flows on the plateau have undergone in-situ weathering extending to depths of 50 to 100 feet and are characterized by the red colors of the soil.

As the main shield building on the Island of Oahu drew to a close during the Pleistocene Epoch, sea levels fluctuated in response to continental glaciation. As the sea levels fluctuated, fringing coral/algal reefs began to grow on the seaward margins of the island. After a long period of volcanic activity, during which erosion incised deep valleys into the Koolau shield, volcanic activity returned with a series of lava flows followed by cinder and tuff cone formations. These series are referred to as the Honolulu Volcanic Series. Subsequently, a thick sedimentary wedge, known as the Honolulu Coastal Plain, started to accumulate along the southern shores of Oahu. The Honolulu Coastal Plain is composed of intercalated coral/algal reef deposits, terrigenous and marine sediments and volcanics of the Honolulu Volcanic Series.

In general, the project sites are located on the southerly side of the Koolau Volcano and Schofield Plateau. The geologic units include lava flows, tuff, and tuff cone deposits of the Honolulu Volcanic Series and Quaternary alluvium.

2.2 Existing Site Conditions

The project sites are along Interstate Routes H-1 and H-201 and along Kamehameha Highway at various locations on the Island of Oahu, Hawaii. The project locations and general vicinity are shown on the Project Location Map, Plate 1. The approximate locations of each site are shown on the Site Plans, Plates 2.1 through 2.6. The following provides a brief description of the existing conditions at each destination sign site.

2.2.1 Sign H1EBR-253 Site

This site is generally located east of the main gates of Joint Base Pearl Harbor-Hickam along the eastbound direction of Nimitz Highway between O'Malley Boulevard and Valkenburgh Street. Based on the drawings provided, we understand that the existing two-post sign structure will be replaced with another two-post sign structure about 10 feet west from the existing sign structure.

2.2.2 Sign H1WB-421 Site

The site is located along the westbound direction of Interstate Route H-1 between Gulick Avenue and Kalihi Street overpasses. Based on the drawings provided, we understand that the existing two-post sign structure will be replaced with a one-post, cantilever sign structure about 10 feet east from the existing sign structure.

2.2.3 Sign H1EB-305 Site

The site is located along the eastbound direction of Interstate Route H-1 near Vineyard Boulevard Exit 20B. Based on the drawings provided, we understand that the existing one-post, double cantilever sign structure will be replaced with another one-post, double cantilever sign structure about 10 feet southeast from the existing sign structure.

2.2.4 Sign 78WB-853 Site

The site is generally located along the westbound direction of Moanalua Freeway between Ala Kapuna Street overpass and Interstate Route H3 Exit 1D. Based on the drawings provided, we understand that the existing two-post sign structure will

be replaced with another two-post sign structure about 10 feet west from the existing sign structure.

2.2.5 Sign H2NBR-722 Site

The site is generally located near the fork along the westbound direction of Kamehameha Highway by Sam's Club in Pearl City. Based on the drawings provided, we understand that the existing two-post sign structure will be replaced with another two-post sign structure about 10 feet west from the existing sign structure.

2.2.6 Sign H1EB-104 Site

The site is located at about 0.5 miles west of the Fort Weaver Road exit along Interstate Route H-1 in the eastbound direction. Based on the drawings provided, we understand that the existing one-post cantilever sign structure will be replaced with another one-post cantilever sign structure about 10 feet east from the existing sign structure.

2.3 Subsurface Conditions

Our field exploration consisted of drilling and sampling nine borings, designated as Boring Nos. 1 through 9, extending to depths of about 26.5 to 45.6 feet below the existing ground surface. The approximate boring locations are shown on the Site Plans, Plates 2.1 through 2.6. The subsurface conditions at each sign location are presented in the following subsections.

2.3.1 Sign H1EBR-253 Site

The subsurface condition near the existing Sign H1EBR-253 structure was explored by drilling and sampling two borings, designated as Boring Nos. 1 and 2, on Nimitz Highway extending to a depth of about 31 feet below the existing pavement surface.

Our field exploration indicates that the project site is generally covered with about 4-inch thick asphaltic concrete pavement underlain by surficial fills and volcanic tuff formation extending to the maximum depth explored of about 31 feet below the pavement surface. In general, our borings encountered surficial fills consisting of

silty gravel and sandy silt extending to depths of about 4 and 4.5 feet below the pavement surface. The surficial fill was generally underlain by medium hard to soft volcanic tuff formation extending to the maximum depth explored of about 31 feet below the pavement surface. It should be noted that within Boring No. 1, weathered volcanic tuff consisting of very stiff sandy silt was encountered within the volcanic tuff formation between depths of about 9 and 11 feet below the pavement surface. Groundwater was encountered in the borings at about 11 and 11.5 feet below the pavement surface at the time of our field exploration.

2.3.2 Sign H1WB-421 Site

The subsurface condition near the existing Sign H1WB-421 structure was explored by drilling and sampling one boring, designated as Boring No. 6, on Interstate Route H-1 Freeway extending to a depth of about 26.5 feet below the existing pavement surface.

Our field exploration indicates that the project site is generally covered with about 12-inch thick asphaltic concrete pavement underlain by surficial fills, residual soil and saprolite with basalt formation at a greater depth. In general, our boring encountered surficial fills consisting of medium dense to dense sandy gravel, and very stiff clayey silt extending to a depth of about 4 feet below the pavement surface. The surficial fill was generally underlain by residual soil consisting of stiff to very stiff silty clay extending to a depth of about 9.5 feet below the pavement surface. Beneath the residual soil, saprolite consisting of dense to very dense silty sand was encountered between the depths of about 9.5 and 11.5 feet below the pavement surface. Underlying the saprolite, our boring encountered hard basalt formation extending to the maximum depth explored of about 26.5 feet below the pavement surface. Groundwater was encountered in the boring at about 9.6 feet below the pavement surface at the time of our field exploration.

2.3.3 Sign H1EB-305 Site

The subsurface condition near the existing Sign H1EB-305 structure was explored by drilling and sampling one boring, designated as Boring No. 3, on Interstate

Route H-1 Freeway extending to a depth of about 38 feet below the existing pavement surface.

Our field exploration indicates that the project site is generally covered with about 7-inch thick asphaltic concrete pavement underlain by surficial fills and alluvial deposits extending to the maximum depth explored of about 38 feet below the pavement surface. In general, our boring encountered surficial fills consisting of dense to medium dense sands and gravels, and stiff to very stiff silty clay extending to a depth of about 6 feet below the pavement surface. The surficial fill was generally underlain by alluvial deposits consisting of medium stiff to very stiff silty clay and clayey silt extending to the maximum depth explored of about 38 feet below the pavement surface. It should be noted that a loose silty gravel layer was encountered within the alluvial deposits between depths of about 15 and 20 feet below the pavement surface. Groundwater was encountered in the boring at about 15 feet below the pavement surface at the time of our field exploration.

2.3.4 Sign 78WB-853 Site

The subsurface condition near the existing Sign 78WB-853 structure was explored by drilling and sampling two borings, designated as Boring Nos. 4 and 5, on Moanalua Freeway extending to depths of about 31.5 feet below the existing pavement surface.

Our field exploration indicates that the project site is generally covered with asphaltic concrete pavement of about 6 to 12 inches thickness underlain by fills, residual soils, weathered clinker and saprolite with basalt formation at greater depths. In general, our borings encountered fills consisting of dense to loose sandy gravel and gravelly sand extending to depths of about 11 and 2.5 feet below the pavement surface for Boring Nos. 4 and 5, respectively. The fill was generally underlain by residual soils, weathered clinker and saprolite consisting of very stiff to hard silty clay and clayey silt extending to depths of about 19.5 and 24.5 feet below the pavement surface. Underlying the residual soils, weathered clinker and saprolite, our borings encountered hard basalt formation extending to the maximum

depths explored of about 31.5 feet below the pavement surface. We did not encounter groundwater in the drilled borings at the time of our field exploration.

2.3.5 Sign H2NBR-722 Site

The subsurface condition near the existing Sign H2NBR-722 structure was explored by drilling and sampling two borings, designated as Boring Nos. 7 and 8, on Kamehameha Highway extending to depths of about 30.1 and 45.6 feet below the existing pavement surface.

Our field exploration indicates that the project site is generally covered with about 8 to 9 inches thick asphaltic concrete pavement underlain by surficial fills and alluvium extending to the maximum depth explored of about 45.6 feet below the pavement surface. In general, our borings encountered surficial fills consisting of gravelly sand and silty gravel extending to depths of about 2 to 3 feet below the pavement surface. The surficial fill was generally underlain by alluvium consisted of hard sandy silt with some gravel to medium dense silty sand and sandy gravel with cobbles and boulders extending to the maximum depth explored of about 45.6 feet below the pavement surface. Dense cobbles and boulders were encountered at various depths of about 25 to 45.6 feet below the pavement surface. Groundwater was encountered in the borings at about 22.7 and 23.3 feet below the pavement surface at the time of our field exploration.

2.3.6 Sign H1EB-104 Site

The subsurface condition near the existing Sign H1EB-104 structure was explored by drilling and sampling one boring, designated as Boring No. 9, on Interstate Route H-1 Freeway extending to a depth of about 31 feet below the existing pavement surface.

Our field exploration indicates that the project site is generally covered with about 3-inch thick asphaltic concrete pavement underlain by surficial fills, residual soil and saprolite with basalt formation at a greater depth. In general, our boring encountered surficial fills consisting of medium dense sandy gravel and clayey sand extending to a depth of about 3 feet below the pavement surface. The surficial

fill was generally underlain by residual soil consisting of medium stiff sandy silt extending to a depth of about 4.5 feet below the pavement surface. Beneath the residual soil, saprolite consisting of very dense silty sand with some gravel was encountered between the depths of about 4.5 and 12.5 feet below the pavement surface. Underlying the saprolite, hard basalt formation was encountered extending to the maximum depth explored of about 31 feet below the pavement surface. We did not encounter groundwater in the drilled boring at the time of our field exploration.

It should be noted that groundwater levels encountered in the drilled borings are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

Detailed descriptions of the materials encountered from our field exploration are presented on the Logs of Borings in Appendix A. Results of the laboratory tests performed on selected soil samples are presented in Appendix B. Photographs of core samples are presented in Appendix C.

END OF SITE CHARACTERIZATION