

**GEOTECHNICAL ENGINEERING EXPLORATION  
PALI HIGHWAY RESURFACING  
VINEYARD BOULEVARD TO WAOKANAKA STREET  
HONOLULU, OAHU, HAWAII  
FEDERAL AID PROJECT NO. NH-061-1(036)  
W.O. 6782-00(B) JULY 7, 2020**

<b>SUMMARY OF FINDINGS AND RECOMMENDATIONS</b>
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In general, the type and severity of the distresses exhibited in the pavement areas would determine whether rehabilitation or reconstruction of the existing pavements should be performed. Existing pavements showing minor distresses and severity are generally rehabilitated with cold planing and an AC overlay. Reconstruction of the existing pavements is usually performed for those areas where the observed distresses are likely caused by failures in the underlying base, subbase, and/or subgrade materials.

Based on our evaluation, it is our opinion that pavement areas with minor distresses may be rehabilitated with an AC overlay consisting of cold planing 5 inches of the existing AC surface and replacing with 2 inches of Mix IV PMA over 3 inches of Mix IV AC overlay. Due to the poor bonding of the existing multiple AC overlays, a contingency fund should be allocated in the construction budget for extending the cold planing thickness to the underlying intact asphaltic concrete.

It is our opinion that existing pavements, identified and delineated with moderate to severe distresses, should be reconstructed with a new pavement section designed based on a 10-year pavement life in accordance with the guidelines provided in the pavement design manual prepared by HDOT. We believe that the majority of pavement distresses may be attributed to the softening of the clayey subsurface soils anticipated at the pavement subgrade level resulting from moisture infiltration. Ideally, the distressed pavements should be completely removed (including the clayey subsurface soils) and should be replaced with select granular fill materials. However, complete removal and replacement would significantly increase the construction time required and may not be feasible nor practical due to the high traffic volumes of the highway. Therefore, we recommend replacing the existing weakened pavements with a new pavement structural section consisting of 2 inches of Mix IV PMA on 3 inches of Mix IV AC over 5 to 9 inches of ACB. The recommended new pavement sections have taken into consideration the contribution from the remaining existing pavement sections as well as constructability issues due to the limited time frame within a single work shift.

It should be noted that the existing AC and underlying base/subbase are relatively thin for the pavements from about Vineyard Boulevard to about Sta. 54+00 (or MP 0.75). Therefore, excavation for the pavement reconstruction may expose the clayey soils at the pavement subgrade level as encountered in our field exploration. If soft clayey soils are exposed at the pavement subgrade level, we recommend providing a stabilization layer in lieu of proof-rolling the soft subgrade, which may induce pumping condition. The

stabilization layer should consist of 6 inches of aggregate base course over a layer of reinforcing geogrid (such as Tensar TriAx Grid, TX 7 or equivalent) underlain by a layer of permeable separator (such as Mirafi 170N or equivalent).

We recommend allocating a contingency fund for additional distressed areas requiring reconstruction that may develop between the time construction plans are prepared and the actual commencement of the project construction.

The existing AC surface course over the existing bridge deck spanning over traversing gullies along the highway alignment should be cold planed down to the top of the bridge deck and overlaid with 1.5 inches of Mix V PMA.

One of the primary distress mechanisms in pavement structures is pumping due to the saturation of the base, subbase, and/or subgrade soils. Therefore, the pavement surface should be sloped, and drainage gradients should be maintained to carry surface water off the pavement to appropriate drainage structures.

The text of this report should be referred to for detailed discussions and specific design recommendations.

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END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS