

**GEOTECHNICAL ENGINEERING EXPLORATION**  
**FREEWAY MANAGEMENT SYSTEM**  
**PHASE 3, UNITS 1 AND 2, IM-0300(152)**  
**INTERSTATE ROUTES H-1 AND H-2 FREEWAYS**  
**DISTRICTS OF HONOLULU AND EWA, OAHU, HAWAII**


**W.O. 6891-30(A)    FEBRUARY 5, 2021**

Prepared for

**AUSTIN, TSUTSUMI & ASSOCIATES, INC.**



THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION.

  
SIGNATURE                      4-30-22  
EXPIRATION DATE  
OF THE LICENSE



**GEOLABS, INC.**  
Geotechnical Engineering and Drilling Services  
94-0429 Koaki Street, Suite 200 • Waipahu, HI 96797

Hawaii • California



## **GEOLABS, INC.**

*Geotechnical Engineering and Drilling Services*

February 5, 2021  
W.O. 6891-30(A)

**Mr. Neal Kasamoto**  
**Austin, Tsutsumi & Associates, Inc.**  
501 Sumner Street, Suite 521  
Honolulu, HI 96817

**Dear Mr. Kasamoto:**

Geolabs, Inc. is pleased to submit our report entitled "Geotechnical Engineering Exploration, Freeway Management System, Phase 3, Units 1 and 2, IM-0300(152), Interstate Routes H-1 and H-2 Freeways" prepared for the design of the proposed project.

Our work for the project was performed in general accordance with the scope of services outlined in our fee proposal dated May 17, 2018.

Please note that the soil and rock samples recovered during our field exploration (remaining after testing) will be stored for a period of two months from the date of this report. The samples will be discarded after that date unless arrangements are made for a longer sample storage period. Please contact our office for alternative sample storage requirements, if appropriate.

Detailed discussion and specific design recommendations are contained in the body of this report. If there is any point that is not clear, please contact our office.

Very truly yours,  
**GEOLABS, INC.**

**Gerald Y. Seki, P.E.**  
Vice President

GS:JS:AT:cj

**GEOTECHNICAL ENGINEERING EXPLORATION**  
**FREEWAY MANAGEMENT SYSTEM**  
**PHASE 3, UNITS 1 AND 2, IM-0300(152)**  
**INTERSTATE ROUTES H-1 AND H-2 FREEWAYS**  
**DISTRICTS OF HONOLULU AND EWA, OAHU, HAWAII**  
**W.O. 6891-30(A)    FEBRUARY 5, 2021**

**TABLE OF CONTENTS**

	Page
<b>SUMMARY OF FINDINGS AND RECOMMENDATIONS.....</b>	<b>iii</b>
<b>1. GENERAL .....</b>	<b>1</b>
1.1 Introduction.....	1
1.2 Project Considerations.....	1
1.3 Purpose and Scope .....	2
<b>2. SITE CHARACTERIZATION.....</b>	<b>4</b>
2.1 Regional Geology .....	4
2.2 Existing Site Conditions .....	4
2.2.1 Waikele CCTV Site .....	5
2.2.2 H-1/Kamehameha CCTV Site .....	5
2.2.3 H-2 North CCTV Site.....	5
2.2.4 H-2 South CCTV Site .....	5
2.2.5 Ko Olina CCTV Site .....	5
2.3 Subsurface Conditions.....	5
2.3.1 Waikele CCTV Site .....	6
2.3.2 H-1/Kamehameha CCTV Site .....	6
2.3.3 H-2 North CCTV Site.....	6
2.3.4 H-2 South CCTV Site .....	6
2.3.5 Ko Olina CCTV Site .....	7
<b>3. DISCUSSION AND RECOMMENDATIONS .....</b>	<b>8</b>
3.1 Drilled Shaft Foundations.....	8
3.1.1 Uplift Load Resistance .....	9
3.1.2 Lateral Load Resistance .....	10
3.1.3 Torsional Resistance.....	11
3.1.4 Foundation Settlement.....	11
3.1.5 Drilled Shaft Construction Considerations.....	12
3.2 Design Review .....	12
3.3 Construction Observation .....	13
<b>4. LIMITATIONS.....</b>	<b>14</b>
<b>CLOSURE.....</b>	<b>16</b>

**PLATES**

Project Location Map.....	Plate 1
Site Plans.....	Plates 2.1 thru 2.5

**APPENDIX A**

Field Exploration.....	Pages A-1 and A-2
Soil Log Legend .....	Plate A-0.1
Soil Classification Log Key.....	Plate A-0.2
Rock Log Legend .....	Plate A-0.3
Logs of Borings .....	Plates A-1 thru A-5

**APPENDIX B**

Laboratory Tests.....	Page B-1
Laboratory Test Data.....	Plates B-1 thru B-9

**APPENDIX C**

Photographs of Core Samples.....	Plates C-1 and C-2
----------------------------------	--------------------