HAMILTON
& Associates

1641 Border Avenue • Torrance, CA 90501 T 310.618.2190 888.618.2190 F 310.618.2191 W hamilton-associates.net

June 24, 2021
17-2338-3

Mr. Paul Ahir
40 Avenida Corona
Rancho Palos Verdes, CA 90275

Subject: Second Updated Geotechnical and
Engineering Geology Investigation
Remedial Slope Repair and Proposed Swimming Pool
40 Avenida Corona
Rancho Palos Verdes, California

References Geologic Investigation Report
Slope Failure
Dated March 17, 1995
By Keith W. Ehlert

Geotechnical Engineering Investigation Report
Proposed Slope Stabilization
Dated April 4, 1995
By Coastline Geotechnical Consultants, Inc.

Preliminary Geotechnical and Geologic Engineering Report
Remedial Slope Repair
Dated October 24, 2017
By Hamilton & Associates, Inc.

Update Preliminary Geotechnical and Geologic Engineering Report
Remedial Slope Repairs
Dated February 19, 2019
By Hamilton & Associates, Inc.

Gentlemen:

We are pleased to present the results of a limited geotechnical field investigation pertaining to the slope repair and a proposed swimming pool in the back yard of 40

Avenida Corona, City of Rancho Palos Verdes, California. This is the second update of prior reports concerning a proposed remedial slope repair at the site, as well as a report on a field investigation for a geotechnical engineering and geological analysis of proposed construction of a "backyard" swimming pool.

Proposed Pool Location Investigation

Hamilton and Associates, inc. (HAI) carried out a field investigation that included two (2) hand dug test pits located in the area where, in sum, this firm deduced as best suited for pool placement. The potential site is underlain by very firm to hard bedrock that is away from steeper slopes that locally have been subject to rockfall-style failure (see References). The referenced reports detail the history of geotechnical engineering and geologic exploration and analysis. Much of the information contained herein is drawn from these previous technical studies.

Field Investigation

On May 12, 2021, this firm hand dug two (2) test pits which supplement the four as shown on Plate A-1. (enclosed). Test Pit TP-1 was excavated where this firm believed that from geotechnical and geological standpoints was the area best suited for pool placement (Plate A-1). Test Pit TP-2 was located to provide information regarding depth of fill on the existing pad. Both pits refused hand tools at about one and one-half to two-feet owing to the presence of hard diabasic bedrock within the Miocene-aged Altamira Shale Member of the Monterey Formation (see attached Logs of Test Pits). The rock, where observed, consists of brown to reddish brown diabase, which is an extruded igneous rock common to the lower Monterey Formation (of which the Altamira Shale is part). For reference, it is generally similar to basaltic rock.

Bedrock

Exposed bedrock is generally fine-grained, massive, and locally rich with grayish phenocrysts. It is very hard where fresh, but weathers into clays over time. In many places the diabase, owing to the presence of calcic feldspars, has been altered to clays that form dense but locally erosible materials. This results in material that can be friable by hand.

Bedding plane partings are absent on and near-site, but joint patterns locally are well to moderately developed; some are open near the slope failure discussed in the listed reference reports, including those by HAI. The most recognizable joint patterns are those described in HAI (2017 and 2019). Weathering of feldspars and ferromagnesians (dark minerals) occurs along the joints at the surface to depths of a few feet to perhaps 10 to 15 feet. The rock away from the joints is very hard and in many places is difficult to rip

with standard excavating equipment, and yields blocky spoil. But where weathered it is rippable and breaks down into soil-like spoil.

Fill

Where encountered in exploration excavations by this firm and others, fill soils on the building pad are on the order of 1.5 to 4.5 feet thick, and are silt clay with some scattered gravel.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings summarized in this report, and provided the recommendations of this report are followed, and the designs, grading and construction are property and adequately executed, it is our finding that construction of the swimming pool within the building site will not be subject to geotechnical hazards from landslides, slippage, or settlement, within the standard limits of geotechnical practice. Further, it is our finding that the proposed swimming pool and anticipated site grading will not adversely affect the stability of the adjacent properties, with the same provisos listed above.

Current Site Conditions

Based on this firm's observations on May 12, 2021, the site conditions are generally consistent with those reported by HAI in the 2019 update The "slide area" as reported in 2019 has not increased significantly in areal limits. Also, spalling of individual clasts from the slide is occurring, but major movement has not taken place. There is apparent minor widening of previously discussed surficial cracks near the slide mass (HAI, 2019).

Based on observations of the current site conditions, it is concluded that the prior recommendation as presented in the reference documents remain valid except to Building Code changes discussed later. Of importance, incidental and irrigation water should be directed away from slide area in particular and away from the backyard and side yard slopes in general.

Footing and piles design recommendations for the site are provide in the prior reports.

The use of nails/tiebacks with chain link and gunite are still the recommended products tor stabilizing the bedrock surface remaining after the 1995 rock fall area. The possible arrangement of repairs, with and without a retaining wall at the toe, is shown on Plates A-3 and A-4. The use of the Tecco System for similar project has been approved for use by the City of Los Angeles.

The preliminary design is for bolts to be installed is 10 feet on center, angled 30 degrees from the horizontal, and 20 feet long. For design purposes, the following may be used for the basalt bedrock:

Cohesion = 270 psf
Angle of friction = 38°
Wet density = 130 pcf

The gunite is installed to reduce the infiltration of water and erosion of the bedrock.

Typically, the gunite is a sand and cement mix, with additives, which is about 2½-inches thick. Welded wire netting, 3" by 3", is attached to the rock bolts before guniting. Weep holes, spaced 6-feet on-center, are recommended.

Seismic Design Parameters

The site-specific seismic design parameters below were determined as a part of this study in accordance with the 2019 California Building Code, which is based on the 2018 International Building Code (IBC). Additionally, seismic design parameters were determined using the Applied Technology Council (ATC) website. The 2019 CBC seismic design parameters that apply to the site are as follows:

Latitude: 33.7402 Longitude: 118.3224

CBC Seismic Parameters	Value or Classification
Site Classification (per ASCE/SEI 7-10 Table 20.3-1	C
Mapped Spectral Response at 0.2 Sec Acceleration, Ss	1.548
Mapped Spectral Response at 1.0 Sec Acceleration, S1	0.564
Maximum Considered Earthquake Spectral Acceleration, SMS	1.858
Maximum Considered Earthquake Spectral Acceleration, SM1	0.809
5-Percent Damped Design Spectral Acceleration, SDS	1.238
5-Percent Damped Design Spectral Acceleration, SD1	0.540
Site Seismic Design Category (per 1613.35)	D

The structural consultant should review the above parameters and the 2019 CBC to evaluate the seismic design. Final selection of design coefficients should be made by the structural consultant based on the local laws and ordinances, expected building response, and the desired level of conservatism.

4.6 Retaining Walls

Walls retaining drained earth may be designed for the following:

Surface Slope of Retained Material Horizontal to Vertical	Static Equivalent Fluid Pressure Pounds per Cubic Foot	Seismic Loading Pounds per Foot Of Wall Width*
Level	35	19 H^2
2 to 1	48	31 H^2
1½ to 1	65	35 H^2

*(H = Wall Height for walls over 6 feet high) Per the report produced by Agusti and Sitar (2013), the above seismic values were calculated in general accordance. For cohesionless soils, the point of application of the seismic loading is located 1/3H above the base of the wall. For soils with cohesion, the point of application of the seismic loading varies between 0.37H to 0.40H above the base of the wall.

Backfill should consist of clean sand and gravel. While all backfill should be compacted to the required degree, extra care shall be taken working close to walls to prevent excessive pressure.

A proper drainage system should be utilized to prevent hydrostatic pressure behind the retaining wall. It is therefore recommended that either weep holes or a drainage pipe be installed. A four-inch perforated pipe (holes down) surrounded by at least 12 inches of ¾ inch gravel enveloped in a drainage fabric, such as Mirafi 140N or equivalent, should be placed at the base of the footing at the wall. If weep holes are chosen, these openings should be four feet on center, and situated at the base of the wall with a gravel and drainage fabric back drain.

Swimming Pool

Based on this firm's subsurface exploration it is anticipated that the pool can be founded in "non-weathered" bedrock as recommended in the previous HAI reports (HAI, 2107 and 2019). The geotechnical requirements for pool placement design, and construction contained in this and previous HAI reports should adhere to the recommendation contained in this and previous HAI (2017, 2019) geotechnical reports

In essence the pool site best suited for construction of a swimming pool is shown on Plate A-1. That is in the backyard of the residence away from the slope that has been subject to rockslides, near the east-facing slope and an existing planter, just south of the HAI Test Pit TP-1. Based on this and previous HAI investigations, bedrock adequate for foundation is about 1.5 to 3 feet below present ground surface.

Actual depths must be confirmed during construction by representatives of this firm.

This firm concludes that remedial repairs as presented in the attached October 24, 2017 HAI report are geotechnically feasible provided that the recommendations and design guidelines presented in the report and this update are incorporated into the project plans and design and implemented during construction.

Closure

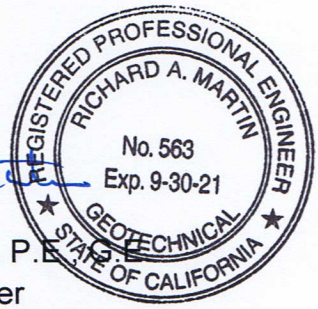
This document was made in accordance with generally accepted geotechnical engineering and engineering geologic procedures and practices being provided at this time in this area. In the opinion of the undersigned, the accompanying report has been substantiated by mathematical data in conformity with generally accepted engineering principles and presents fairly the information requested. No other warranty, either express or implied, is made as to the professional advice included in this report.

We thank you for the opportunity of working with you on this project. We look forward to assisting you further.

If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
HAMILTON & ASSOCIATES, INC.

Michael Mills, C.E.G.
Engineering Geologist



Richard Martin, M.S., P.E., G.E.
Geotechnical Engineer

Distribution:

(4) Addressee w/CD
(1) SRB Consulting Engineers

TEST PIT LOCATION PLAN

Bulk of Slide Debris Area

Rough Slide Scarp and Debris

B'

B

TP-1

TP-2

TP-3

TP-4

Tmd

Qrf

Af

Proposed Pool Location

Heavy Vegetation and Roots

LANDSLIDE AREA

N07°26'53"E 232.12'

N83°57'20"W 124.00'

N07°01'24"W 247.57'

N87°43'43"E 63.00'

POR. PARCEL 16 RECORD OF SURVEY R.S. 64/8-11

1 STORY HOUSE

PARCEL 1 (P.T.R.)

PARCEL 2 (P.T.R.) EASEMENT PARCEL

LEGEND

TP-4

Approximate Location of Test Pit (2019)

TP-2

Approximate Location of Test Pit (2021)

A — A'

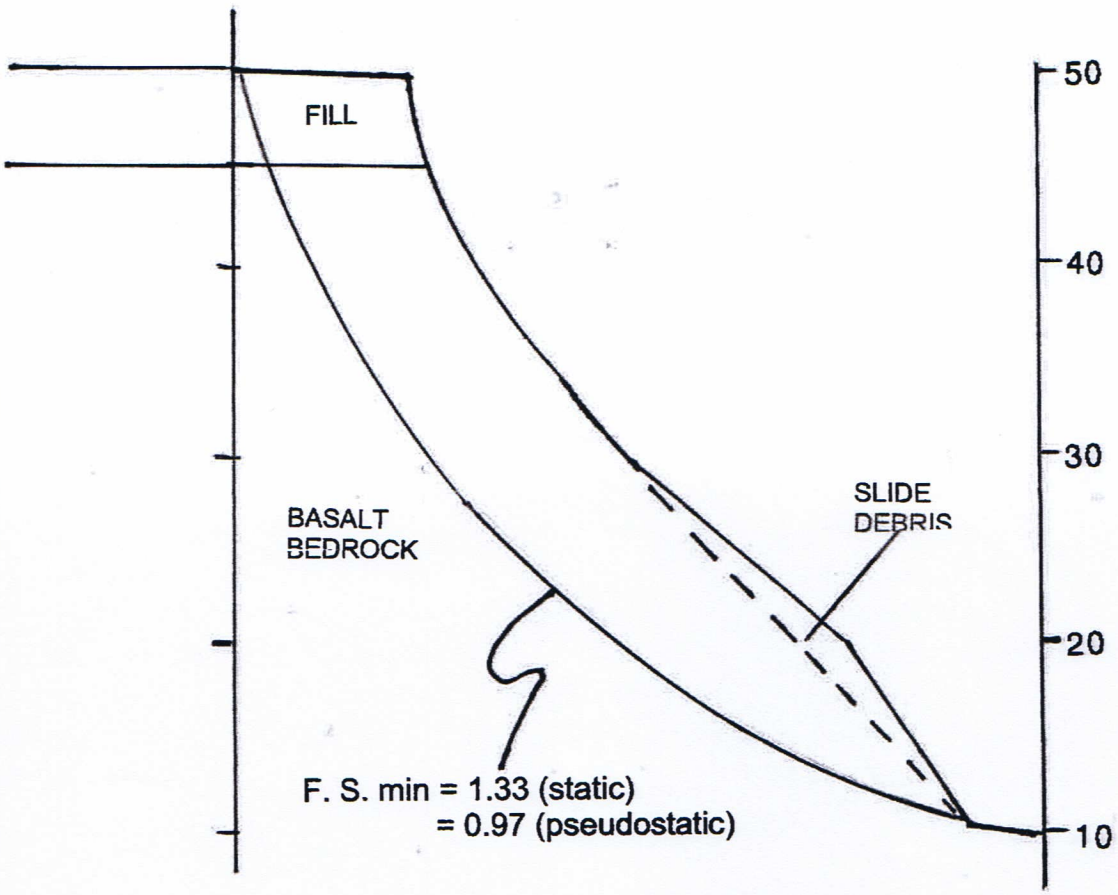
Cross-Section

Af - Artificial Fill
Tmb - Tertiary Diabase Rock
Qrf - Rockfail

Site plan based on plan prepared by Surveying & Drafting Services, Inc., dated September 28, 2017

Update Geotechnical Report 40 Avenida Corona Rancho Palos Verdes, California		
SCALE: 1" = 20'		Drawn By
Date: June 2021		Revised
Hamilton & Associates, Inc.		
PROJECT NO: 17-2338-3		**PLATE A-1**

SECTION B-B' - SLOPE STABILITY ANALYSIS



SCALE
1" = 10'

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Plate A-2

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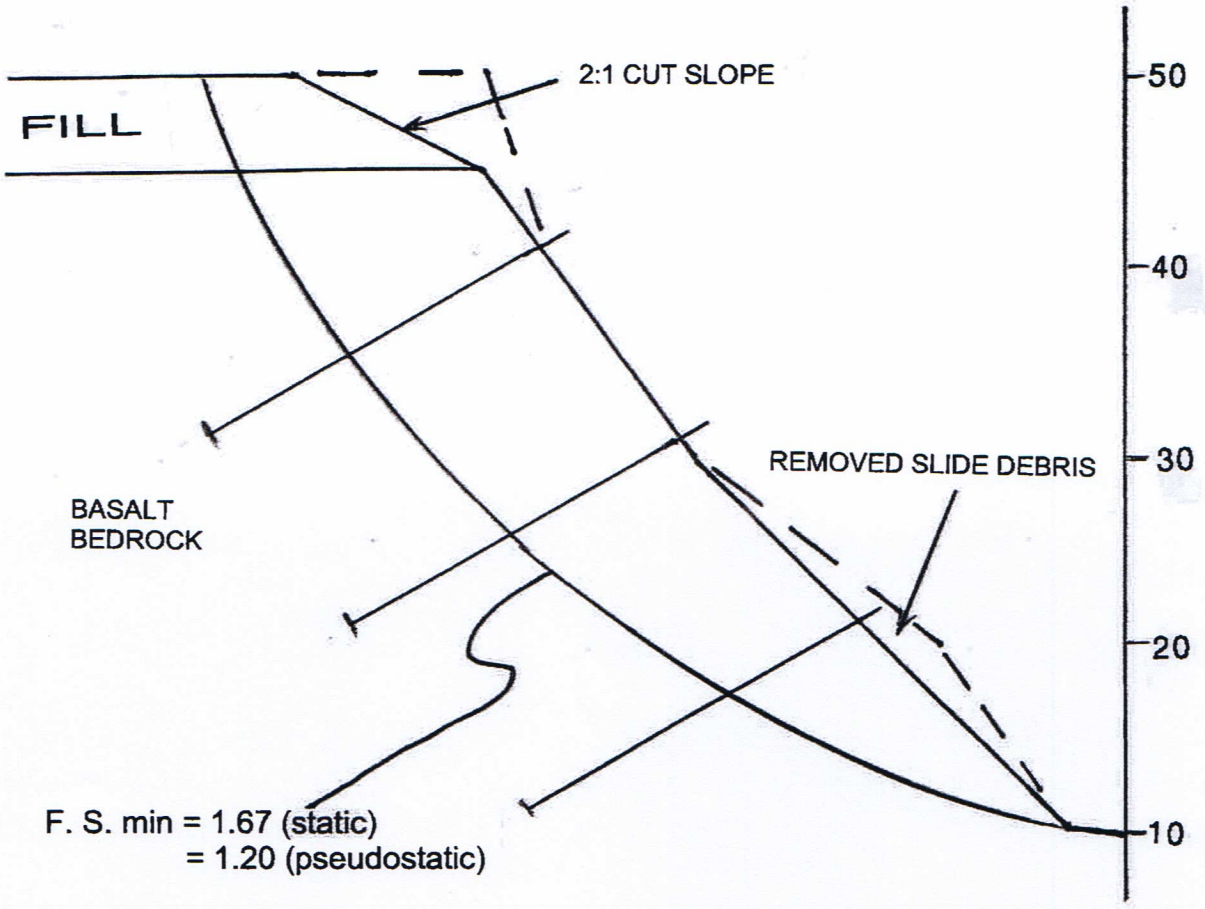
SECTION B-B' - SLOPE STABILITY ANALYSIS

TIEBACK/ROCK BOLT STABILIZATION



SCALE
1" = 10'

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Plate A-3

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SECTION B-B' - COMBINED RETAINING WALL & ROCK BOLTS

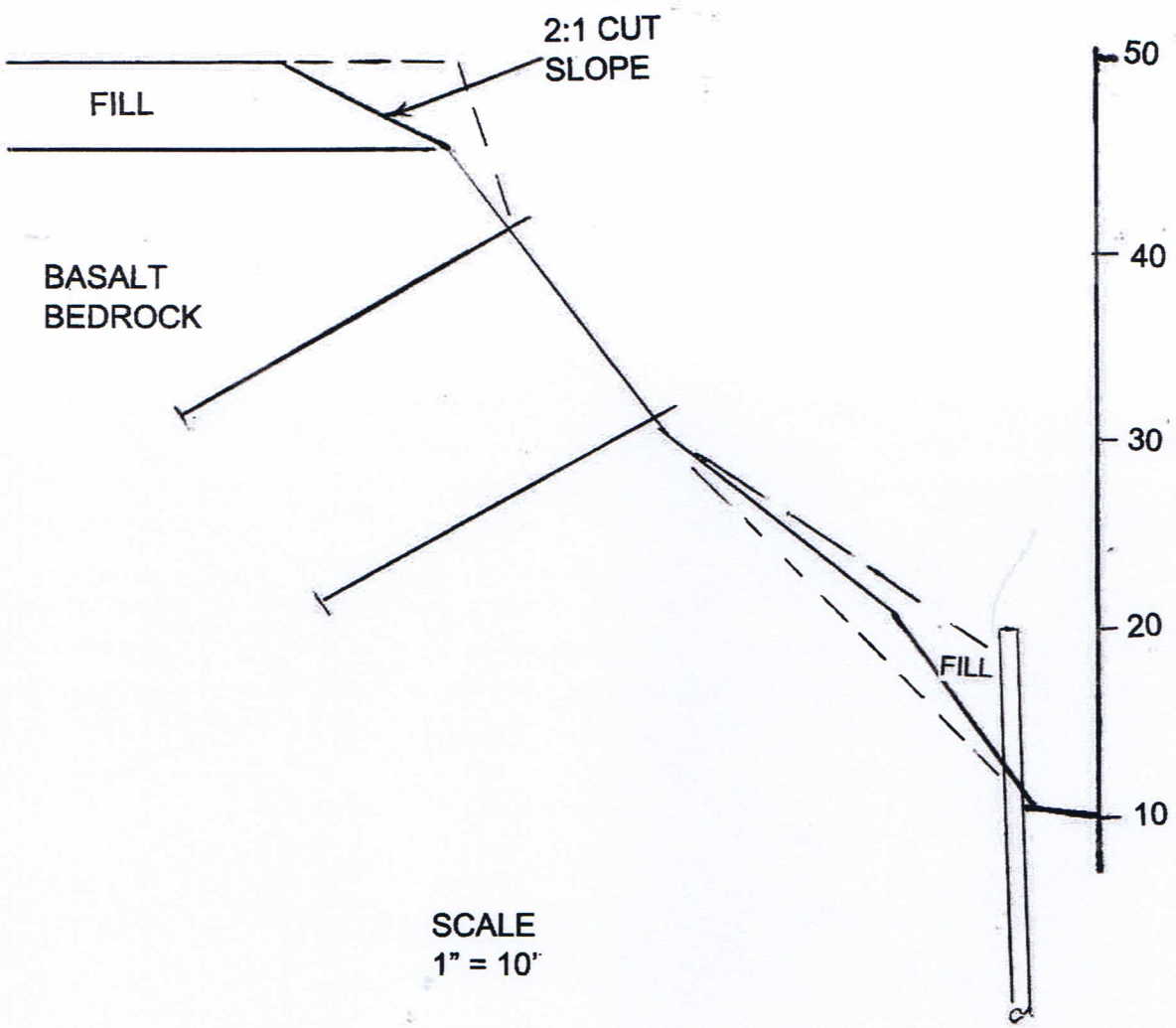

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Figure A-4

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SUMMARY OF TEST PIT NO. 1

DATE: 05/12/21

Drive Energy (Kip-Ft.)	Dry Density (Pcf)	Moisture (% Dry Wt.)	Samples U	Samples B	Depth (Ft.)	Description	Color	Consistency
						FILL: Grevelly Silty Sand - sand fraction is very fine grained, dry, abundant roots, common small root tubules	Reddish Brown	Soft to locally Stiff
					2	**BEDROCK:** Diabase, fine grained, many very small light colored phenocrysts, occasional larger grains, weathered and anthropically disturbed near surface, fresher with depth, in places feldspors are weathered to clay, fractured, refusal at 1.5' with hand tools	Dark Yellow Brown	Very Hard
						End of Boring at 1.5' No Caving No Groundwater		
					5			
					10			

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Plate B-1

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SUMMARY OF BORING NO. 2

DATE: 05/12/21

Drive Energy (Kip-Ft.)	Dry Density (Pcf)	Moisture (% Dry Wt.)	Samples U B	Depth (Ft.)	Description	Color	Consistency
					FILL: Silty Sand, dry, few roots	Reddish Brown	Moderately Stiff
					FILL: gravely silty sand, fine grained sand fraction, common rock fragments, slightly moist	Reddish Brown	Soft to Stiff
	112.1	10.1		2	**BEDROCK:** Diabase, gravely fine grained, many very small light colored grains, occasional larger grains, weathered and anthropically disturbed near surface, fresher with depth, in places feldspors are weathered to clay, fractured, refusal at 1.5' with hand tools	Dark Yellowish Brown	Very Hard
					End of Boring at 2.5' No Caving No Groundwater		
				5			
				10			

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Project No. 17-2338-3

Plate B-2

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