

August 10, 2021
Project #2109

Denise Enea
738 Loma Court
Redwood City, CA 94062

Subject: **ENGINEERING GEOLOGIC CONSULTATIONS**
 APN 051-022-180
 738 Loma Court
 San Mateo County, California

Dear Ms. Enea,

At your request, I have prepared this letter regarding your property, APN 051-022-180, located at 738 Loma Court in San Mateo County, California. I understand that landslide mitigations were completed on your property during 2017 and 2018. Landslide mitigations were also completed on the adjacent property located at 634 Palomar Drive. A proposed new home is now planned at 634 Palomar Drive which will include installation of a leachfield system that could potentially adversely impact your property and your landslide repair.

I understand that you are concerned about the impact of the proposed new leachfield on your landslide repair. Consequently, these Engineering Geologic Consultations are intended to identify existing site conditions, to document the site history, and to assess the potential impact of the proposed new leachfield on your landslide repair.

This letter is based upon email communications and phone communications with you, review of geologic maps, literature, and historic air photos, review of existing reports for your property, review of pertinent nearby reports, site reconnaissance, consultation with the Cotton Shires and Associates, Inc., San Mateo County's Reviewing Geologist, drafting, and letter preparation.

Site Conditions

The subject property is located along the northeast flank of the northwest-trending Santa Cruz Mountain Range. The irregularly-shaped property is located in hillside terrain, inclined moderately towards the northeast. A bowl-shaped drainage swale is located to the northeast of the existing residence. The adjacent property to the east is located on a broad northeast-trending ridgeline. The properties are vegetated with grass, brush, and scattered oak trees, as shown on Photo 1 below.



Photo 1: Aerial view from April 2018 of the subject property to the left and 634 Palomar Drive to the right. The landslide repair is visible on the subject property and an active landslide is apparent on 634 Palomar Drive.

An existing home and detached garage are located on the upper southwest half of 738 Loma Court. A landslide repair is located within the drainage swale below the residence (see Photo 1 above and Photo 4 below). The landslide repair occurred on a separate parcel on Los Cerros Road that has since been combined with 738 Loma Court. The adjacent property at 634 Palomar Drive is undeveloped. An active landslide on the property (see Photo 1 above and Photo 4 below) has since been repaired.

Geology

Regional geologic mapping by Brabb, Graymer, and Jones (1998) indicates that the subject property and site vicinity are underlain by Cretaceous to Jurassic age (66 to 201 million years old) sandstone, as shown on Figure 1, Regional Geologic Map. The bedrock is composed of sandstone with interbedded siltstone and shale. Beds strike towards the northwest and dip moderately towards the southwest.

Brabb and Pampeyan (1972) map the property within relatively undisturbed bedrock terrain. Landslides are not identified in the site vicinity. The County of San Mateo (1976) also does not map landslides in the site vicinity.

Air Photo Review

Several GoogleEarth air photos dating from 1948 to present and the following stereographic pairs of black & white aerial photographs were examined to observe site conditions and to aid in identifying site history and landsliding:

<u>Date</u>	<u>Photo Identification</u>	<u>Type</u>	<u>Scale</u>
6-9-56	DDB-3R 45 & 46	B&W	1:20,000
5-11-65	SM 2-31 & 32	B&W	1:12,000



Photo 2: 1965 air photo showing the subject property.



Photo 3: 2007 air photo showing the subject property. Note the graded pad and lawn area on 634 Palomar Drive.

The subject property is clearly visible in the photos reviewed, as shown on Photos 2, 3, and 4, above and below. The existing residence was constructed sometime prior to the 1948 photos. A home was also constructed on the parcel below on Los Cerros Road sometime prior to 1948 (see Photo 2 above). That home was removed sometime between 1965 and 1991. Grading to construct a building pad on the upper southwest portion of 634 Palomar Drive occurred sometime between 1991 and 2002. A lawn had been installed on the pad by 2007, as shown on Photo 3 above.

A landslide repair was underway on the lower portion of 738 Loma Court during September of 2017, as shown on Photo 4 below. An active landslide was apparent on the lower portion of 634 Palomar Drive at the same time. The landslide repair appears complete on 738 Loma Court by November of 2017. A landslide repair at 634 Palomar Drive appears to have been completed by September of 2019.

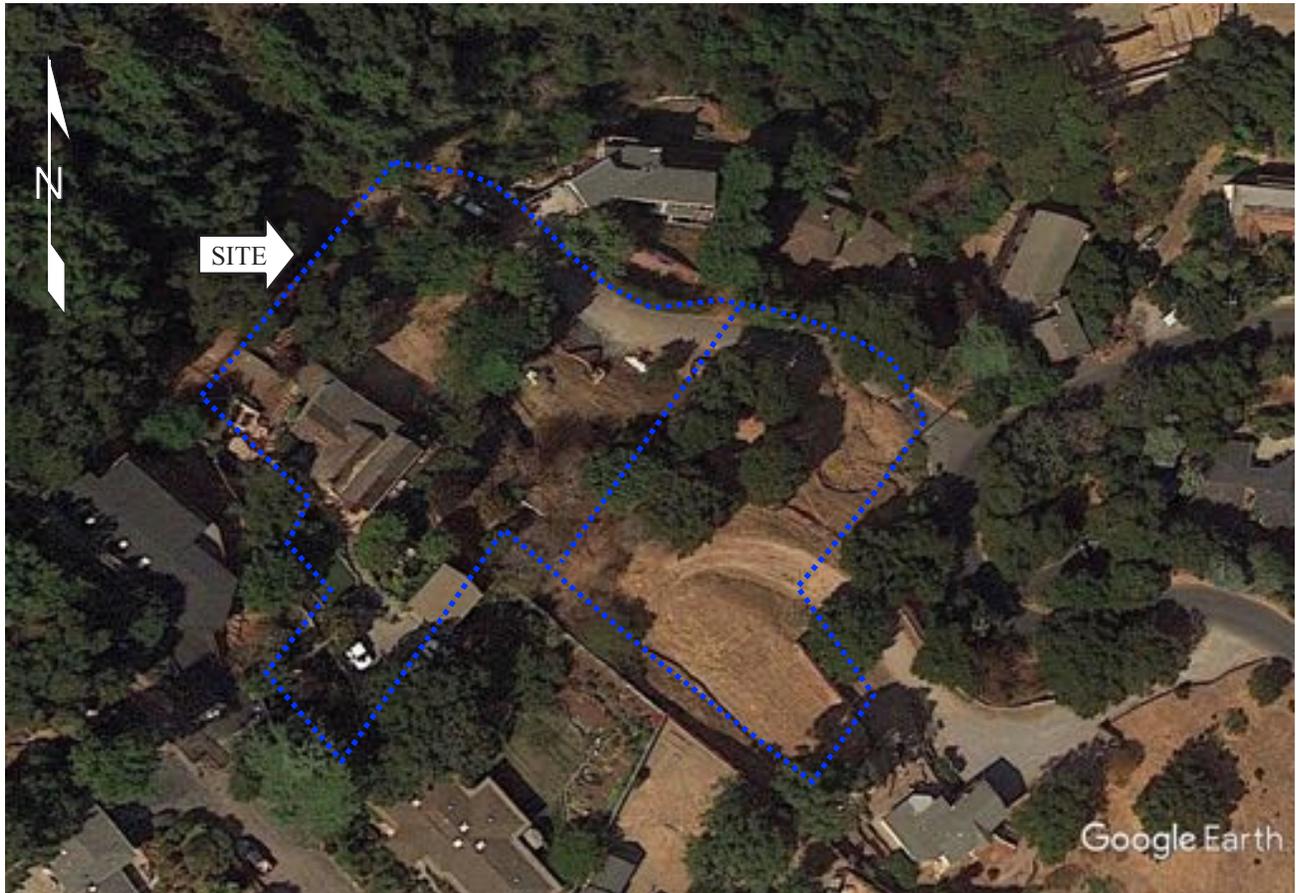


Photo 4: 2017 air photo showing the subject property. Equipment is onsite for the landslide repair on the lower portion of 738 Loma Court.

Site Reconnaissance

A site reconnaissance was completed of the subject property and adjacent property at 634 Palomar Drive on July 17, 2021. The natural ground in the site vicinity slopes moderately towards the northeast. Bedrock is not exposed as natural outcrops on the properties or site vicinity. Landslide repairs are apparent within a broad swale on the lower portion of 738 Loma Court and at the base of a broad ridge on 634 Palomar Drive, as shown on Photos 5, 6, 7, and 8 below.

A series of subdrains are located within the landslide repair at 634 Palomar Drive, as shown on Photo 6 below. Subdrains are also installed within the landslide repair at 738 Loma Court. These subdrains outlet at the base of the slope, as shown on Photo 7 below. Water was actively flowing out of this outlet at the time of my site reconnaissance.



Photo 5: View towards the south across Palomar Drive. A landslide repair is apparent at the bottom of 738 Loma Court (to the right of the truck) and at the base of 634 Palomar Drive (to the left of the truck).



Photo 6: View of landslide repair and sub drain clean outs at the base of 634 Palomar Drive.



Photo 7: View of landslide repair at the base of 738 Loma Court. Water is actively seeping out of the sub drain outlet.



Photo 8: View towards the west of the access road on 634 Palomar Drive. Subdrain clean outs associated with the landslide repair are visible below and to the right of the access road.



Photo 9: View towards the southeast of the building pad on 634 Palomar Drive.

An access road and level building pad have been graded onto the upper portion of 634 Palomar Drive, as shown on Photos 8 and 9 above. Artificial fill appears to form the outer margins of the access road and building pad.

Previous Investigations

Jo Crosby & Associates (1971) and Fowler and Associates (1985) completed Geotechnical Investigations of recurrent landsliding on the property on Los Cerros Road, located below the subject property. Landsliding occurred during the 1950's, 1971, and during the 1980's when the house on Los Cerros Road was destroyed.

Balance Hydrologics, Inc. (2014) completed a report characterizing a perennial spring source associated with the landslide on Los Cerros Road below 738 Loma Court. The spring was considered to be groundwater emanating from the bedrock and not shallow perched water. The spring water was also thought to contribute to the recurrent slope instability observed on the property on Los Cerros Road.

Michellucci & Associates (2015) completed Geotechnical Investigations associated with the existing residence at 738 Loma Court. The existing residence was found to be up to 6 inches out of level. Underpinning and leveling of the residence was subsequently accomplished.

Earth Investigations Consultants (2017) completed a Geotechnical Investigation for mitigation of the landslide on Los Cerros Road below 738 Loma Court. Recommendations for repair of the landslide were presented.

GeoForensics, Inc. (2017) completed a Geotechnical Investigation and observations for the landslide repair at 738 Loma Court. The limits of landsliding were identified on the property, as approximately shown on Figure 2, Site Landslide Map. The landslide headscarp was located within 10 feet of the existing residence. Water was actively seeping out of the headscarp. A landslide repair was completed that involved removing landslide debris and rebuilding the slope with compacted and drained engineered fill.

Proposed Leachfield at 634 Palomar Drive

I understand that a new home is planned at the base of the property at 634 Palomar Drive. The home will be constructed into the hillslope in the area of the previous landslide repair. A leachfield for the new home is proposed on the graded pad on the upper portion of the property. Effluent from the home will be pumped upslope to the leachfield system and dispersed into the pad.

The County's Reviewing Geologists, Cotton Shires and Associates, Inc. (2021) has completed a Geotechnical Peer Review letter regarding the proposed wastewater treatment system at 634 Palomar Drive. Geosphere Consultants, Inc. completed geologic and geotechnical investigations for the proposed project. The Geosphere reports were not available for my review.

Cotton Shires and Associates, Inc. has requested additional analysis by Geosphere of the potential impact of the proposed wastewater treatment system, potentially including slope stability analysis, additional subsurface testing, percolation testing, and a 100-foot setback from identified landslides.

GeoForensics, Inc. (2020) prepared comments regarding the proposed leachfield at 634 Palomar Drive. A minimum 50-foot-setback of the proposed leachfield from the landslide repair work on 738 Loma Court was recommended. A maximum height of 20 feet above Los Cerros Road was also recommended for the proposed leachfield to limit infiltration of effluent into the adjacent landslide repair system at 738 Loma Court.

Kilik General Engineering (2017) prepared a letter regarding the potential impact of the proposed leachfield on 634 Palomar Drive to the existing landslide repair at 738 Loma Court. Several subdrains were installed as part of the landslide repair to collect and control extensive groundwater seeps encountered during the excavation and reconstruction of the hillslope. Kilik warned against adding or altering groundwater conditions above or adjacent to the landslide repair at 738 Loma Court.

Recommendations

Based upon my review of referenced documents, review of published maps and air photos, and site reconnaissance, I am in agreement with Cotton Shires and Associates, Inc. (2021), GeoForensics, Inc. (2020) and Kilik General Engineering (2017) that the potential for effluent from the proposed leachfield at 634 Palomar Drive to adversely impact the landslide repair at 738 Loma Court should be closely evaluated and avoided.

Balance Hydrologics, Inc. (2014) indicates that a natural perennial spring is located on 738 Loma Court and that the spring contributed to the recurring landsliding on the lower portion of the property. Kilik General Engineering also notes the prevalent groundwater during the landslide repair and the required drainage installations. This spring was actively flowing, during my site visit in July, out of subdrains installed as part of the landslide repair.

In my opinion, the risk of degradation of this water from the adjacent proposed leachfield system should be carefully assessed. Effluent from the proposed leachfield should not be allowed to contaminate the natural spring water on 738 Loma Court or allowed to contribute to the drainage system of the landslide repair at 738 Loma Court. Setback requirements presented by the Cotton Shires and Associates, Inc. should be adhered to and setback recommendations by GeoForensics, Inc. should be considered.



LIMITATIONS

This Engineering Geologic Consultation letter has been prepared for the exclusive use of the addressee, and project architects and engineers. The opinions, comments, and conclusions presented in this report were based upon information derived from office studies and one site visit. My work has been conducted in general conformance with the standard of care in the field of engineering geology currently in practice in the San Francisco Bay Area. I make no other warranty either expressed or implied.

Thank you for the opportunity to prepare this letter. Please call if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Steven F. Connelly".



Steven F. Connelly
Certified Engineering Geologist 1607

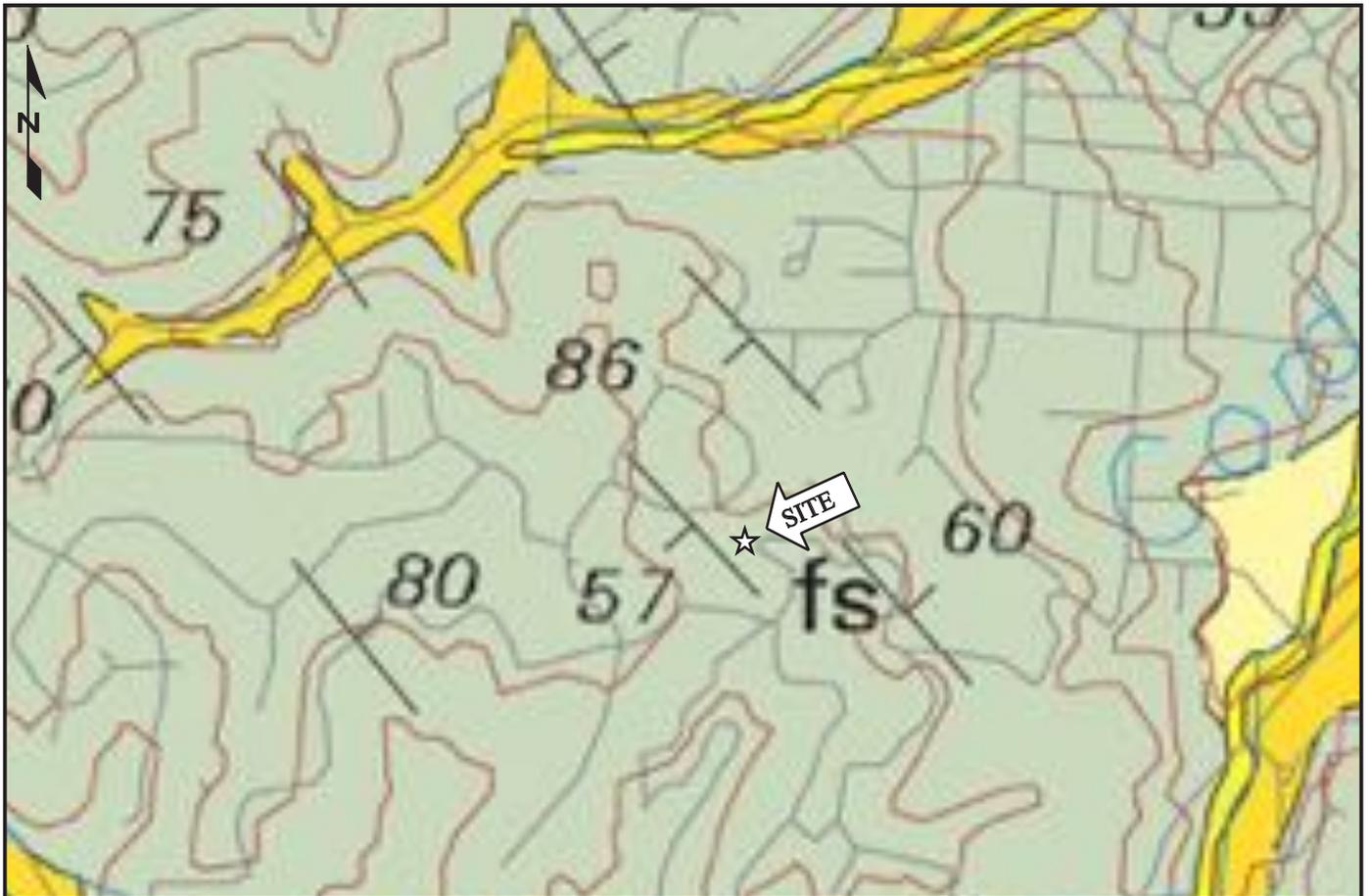
Copies: 4 - Ms. Enea

Attachments

- Figure 1 - Regional Geologic Map
- Figure 2 - Site Landslide Map

References

- Balance Hydrologics, Inc., April 16, 2014, Spring source and protection reconnaissance, APN 051-022-310.
- Brabb, E.E., Graymer, R.W., and Jones, D.L., 1998, Geology of the Palo Alto 30 X 60 Minute Quadrangle, California: A digital database, Open-File Report 98-348, Map Scale 1:100,000.
- Brabb, Earl E. and Pampeyan, Earl H., 1972, Preliminary Map of Landslide Deposits in San Mateo County, California, U.S. Geological Survey Map MF-344, Map Scale 1:62,500.
- Cotton Shires and Associates, Inc., June 14, 2021, Geotechnical Peer Review, Onsite Wastewater Treatment System (OTWS), PLN2020-00251, 634 Palomar Drive.
- County of San Mateo, 1976, Geotechnical Hazard Synthesis Map, prepared by Leighton and Associates, the San Mateo County Planning Department, and the U.S. Geological Survey, Map Scale 1:24,000.
- Fowler and Associates, July 5, 1985, Geotechnical Investigation Duggan Residence, Los Cerros Drive, Palomar Park, San Mateo County, California.
- GeoForensics, Inc., June 10, 2017, Geotechnical Investigation for Slope Repair, Enea Property, 738 Loma Court, Redwood City, California.
- GeoForensics, Inc., October 9, 2017, Observations of Slide Repair, Enea Property, 738 Loma Court, Redwood City, California.
- GeoForensics, Inc., March 16, 2020, Comments on Proposed Leachfield, Enea Property, 738 Loma Court, Redwood City, California.
- Jo Crosby & Associates, June 3, 1971, Preliminary Landslide Investigation, Los Cerros Road, Redwood City, California.
- Kilik General Engineering, November 4, 2017, Landslide Area, 0 Los Cerros, APN 051-022-310.
- Michelucci & Associates, Inc., January 12, 2015, Preliminary Geotechnical Evaluation, Property at 738 Loma Court, Redwood City, California.
- Michelucci & Associates, Inc., June 25, 2015, Geotechnical Consultation, Proposed "Stitch Pier" Retaining Wall, Property at 738 Loma Court, Redwood City, California.



EXPLANATION

	Geologic Contact, dashed where approximate, dotted where concealed		Stream channel deposits
	Fault Trace, dashed where approximate, dotted where concealed, queried where uncertain		Alluvial fan deposits
	Thrust or Reverse Fault		Whiskey Hill Formation
	Strike and Dip of Bedding		Sheared rock
	Strike and Dip of Foliation		Sandstone
			Serpentinite

Source: Brabb, Graymer, and Jones, 1998

Regional Geologic Map		APN 051-022-180		
STEVEN F. CONNELLY, C.E.G.		738 Loma Court		
		San Mateo County, California		
Project #	Scale	Date	Figure	
2109	1 Inch = 1000 Feet	8/10/21	1	

