
Appendix 1-J
Preliminary Geotechnical Assessment – Burns & McDonnell



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Preliminary Geotechnical Narrative

Project: SoCalGas Ventura Compressor Modernization – Site Alternatives Assessment

Site: Avocado

Date: 7/28/2025

Preliminary Geotechnical Narrative

Note the contents of this Preliminary Geotechnical Narrative specifically excludes design considerations and impacts associated with the environmental contaminants, active/decommissioned nearby oil and gas wells, wildfires, and dam inundation risks.

General Site Conditions

The Avocado site is located approximately 3000-feet west of the existing Ventura Compressor Station property on the existing transmission pipeline corridor. The high-elevation plot is approximately 30-acres in area and extends over an existing ridgeline approximately 1000-ft due south of the fork of Devil's Canyon Rd and Taylor Ranch Rd. The site is steeply sloped and extends down the northern and eastern facing foothills that generally frame the west side of Devil's Canyon and the Ventura River in Ventura County, CA. The site is bound by agricultural avocado groves to the south and east. Active oil and gas fields lie to the north. Based on historical aerial imagery (post 1994 via Google Earth), the site has remained undeveloped (greenfield), with the neighboring avocado groves established sometime between 2009 and 2011. A northern-facing aerial image of the proposed site is presented in Figure 1.

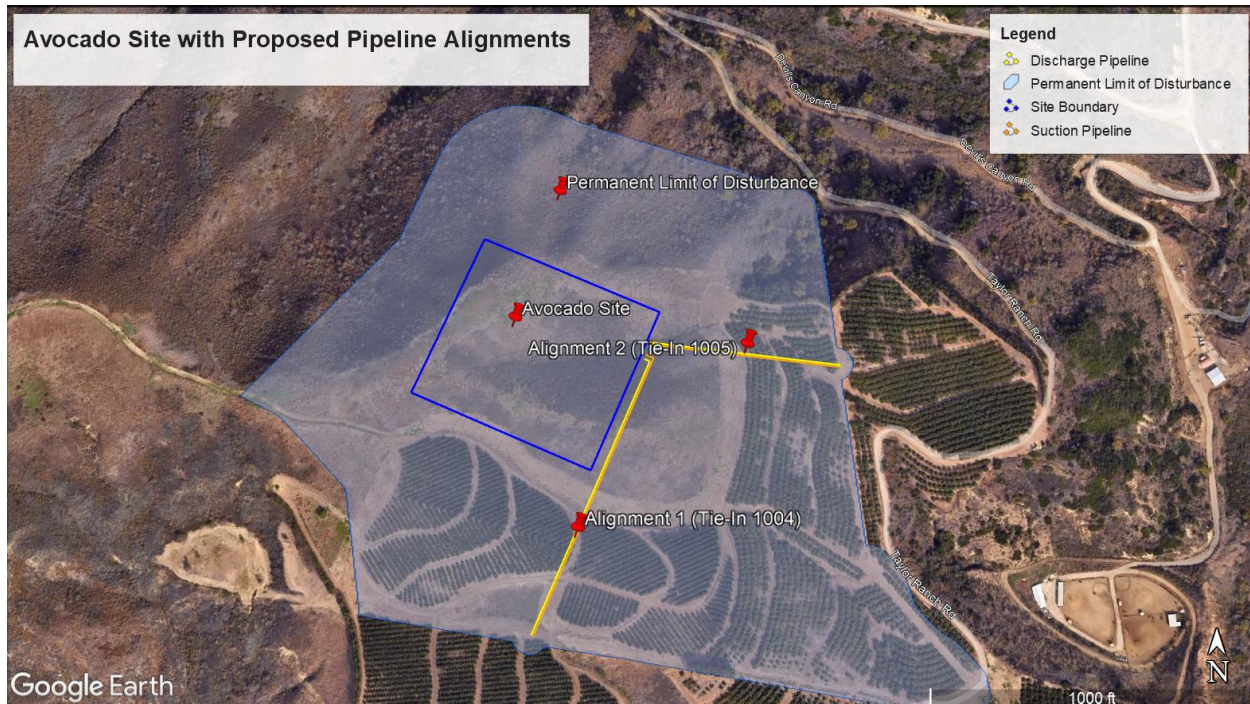


Figure 1: Northern facing view of Avocado site and proposed pipelines (Google Earth, 2025)

General Pipeline Alignment 1 Conditions

Proposed Alignment 1 (Tie-In 1004) encompasses two pipelines: one for suction and one for discharge. The two pipelines are each 0.18 miles in length and extend from the eastern edge of the Avocado site boundary as shown on Figure 1. The proposed pipeline alignment extends through existing avocado groves and is steeply sloped (5-40%) with approximately 110-ft of total elevation change along its length.

General Pipeline Alignment 2 Conditions

Proposed Alignment 2 (Tie-In 1005) also encompasses two pipelines: one for suction and one for discharge. The two pipelines are each 0.12 miles in length and extend from the eastern edge of the Avocado site as shown on Figure 1. The proposed pipeline alignment extends through existing avocado groves. Alignment 2 is steeply sloped (20-55%) with approximately 125-ft of total elevation change along its length.

General Subsurface Conditions

Based on publicly available information, identified soil types at the Avocado Site generally consist of unconsolidated clay, sand, gravel, and cobble soils with some boulder-sized material (Undivided Pleistocene stream terrace deposits [Qpt]) underlain by sedimentary bedrock consisting of claystone, siltstone, sandstone, and shale (associated with Pleistocene Santa Barbra [Qsb], and Pico [Tp] Formations). Both bedrock formations within the site boundary have been identified by the California Geological Survey (CGS) to be generally to highly susceptible to landsliding. Holocene and Pleistocene landslide deposits [Qls] (including numerous active

slides) composed of weathered broken up rocks were also identified near or within the limits of permanent disturbance for the site. These active slide deposits were identified by the California Geological Survey as extremely susceptible to renewed landsliding.

Groundwater levels at the site are unknown.

Subsurface Conditions Along Proposed Pipeline Alignments

Geological information about the surficial soils relevant to the design of both proposed pipeline routes can be found on the 2003 map “Geologic Map of the Ventura 7.5’ Quadrangle Ventura County, California: A Digital database” by the United States Geological Survey (USGS) and the California Department of Conservation (CDC). Both alignments run through Undivided Pleistocene stream terrace deposits [Qpt], characterized by the presence of unconsolidated clays, sands, gravels, cobbles, and some boulder-sized materials. Additionally, both alignments run near mapped Holocene and Pleistocene landslide deposits susceptible to renewed sliding [Qls].

Bedrock composition along the alignments can be found on the “California Geological Survey 150th Anniversary Geologic Map of California 2010” by Jennings (1977) and Gutierrez et al (2010). Weak sedimentary bedrock, composed of moderately consolidated sandstone, siltstone, shale, and conglomerate from the Pliocene epoch, lies beneath the alignments. Depth to bedrock is anticipated to be shallow, within 1- to 3-ft of the ground surface, from mile 0.0 to 0.13 along Alignment 1 (Figure 2). From approximately mile 0.13 to mile 0.17 along Alignment 1, the depth to bedrock is greater than 6-ft below the ground surface. Bedrock from approximately mile 0.17 to 0.18 along Alignment 1 is within 1- to 3- ft of the ground surface. Depth to bedrock is anticipated to be at least 6-ft below grade for the full length of Alignment 2 (Figure 2). Alignment 2 runs near the mapped boundary of the Pliocene undivided Pico Formation [Tp], composed of claystone, siltstone, and sandstone. The Pico Formation is noted as susceptible to landsliding.

Groundwater levels along the pipeline alignments are unknown.

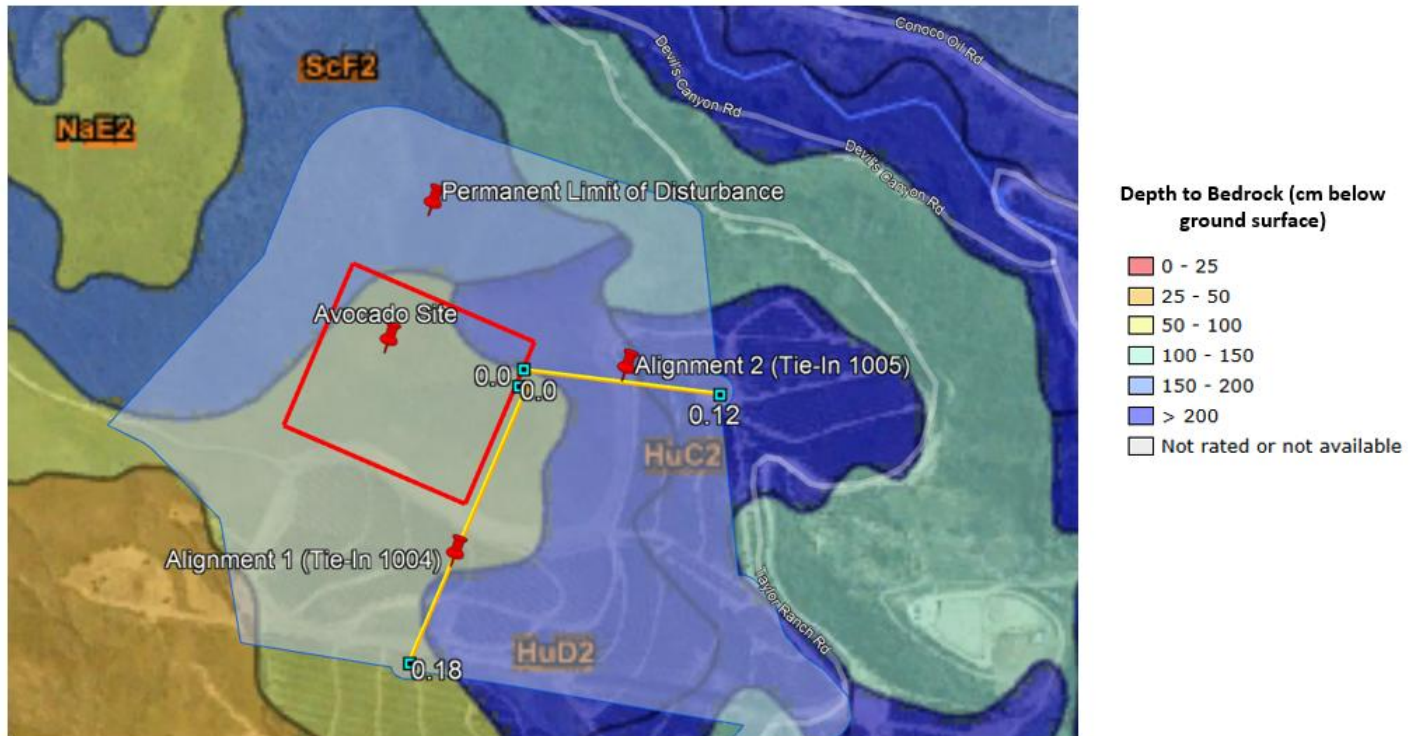


Figure 2: Mapped Depth to Bedrock (United States Department of Agriculture National Resources Conservation Service (USDA NRCS), 2025)

Preliminary Geotechnical Narrative (cont'd)



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Anticipated GeoHazards

A cursory review of geological hazards from publicly available data pertinent to the Avocado Site and Alignments 1 and 2 is summarized in Table 1.

Table 1: Avocado Site and Pipeline GeoHazards Summary

Geohazard	Details	Relative Hazard Level	Source
Active Fault Rupture	No known active faults were identified to intersect the site or pipelines.	Low	California Geological Survey (CGS)
Strong Ground Shaking	Mapped $PGA_M = 1.066$, Ground Motion Hazard Analysis required per Section 11.4.8 of ASCE 7.	High	American Society of Civil Engineers (ASCE) 7 Hazard Tool
Landslide	Limit of disturbance boundary intersects a known recent or active shallow debris slide as mapped in 2015 by the California Geological Survey (0-10 ft thickness). Other landslides in the vicinity range from 0-50 ft in thickness (Figure 3). Geologic units within the site and along the alignments are reported as generally to extremely susceptible to landsliding. The pipeline alignments do not intersect any known recent or active landslide deposits. However, several mapped surficial soil slides are recorded in close proximity (Figure 3). California Department of Conservation (CDC) and California Geological Survey (CGS) Earthquake Zones of Required Investigation Map = Alignments and site span mapped zones of landslide potential (Figure 4).	High	California Geological Survey (CGS) Landslide Inventory California Department of Conservation (CDC) and California Geological Survey (CGS)

Table 1 (cont.): Avocado Site and Pipeline GeoHazards Summary

Geohazard	Details	Relative Hazard Level	Source
Liquefaction	California Department of Conservation (CDC) and California Geological Survey (CGS) Earthquake Zones of Required Investigation Map = Site and alignments do not span zones of mapped liquefaction (Figure 4). California Geological Survey (CGS) Seismic Hazard Mapping Program: Liquefaction Zones Map = Site and alignments fall outside Mapped Zones of Liquefaction. Investigative borings have not been performed nearby; site specific investigation may be required. City of Ventura in conjunction with CDC and CGS = Site and alignments fall outside Mapped Zones of Liquefaction.	Low	California Geological Survey (CGS) and California Department of Conservation (CDC) California Geological Survey (CGS) City of Ventura, California Department of Conservation (CDC), and California Geological Survey (CGS)
Flooding	Site and alignments in FEMA Zone 'X' Designation – Area of Minimal Flood Hazard.	Low	Federal Emergency Management Agency (FEMA) National Flood Hazard Maps
Tsunamis	Site and alignments outside mapped hazard area.	Low	California Geological Survey (CGS)/National Oceanic and Atmospheric Administration (NOAA) Tsunami Hazard Area Map

Table 1 (cont.): Avocado Site and Pipeline GeoHazards Summary

Geohazard	Details	Relative Hazard Level	Source
Shrink/Swell Potential	Soils prone to moisture induced volumetric changes identified at the site and along alignments.	Moderate	United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Maps
Corrosion	Soils identified as potentially degradative to exposed buried concrete or steel elements identified at the site and along alignments.	Low to High	

Potential Site and Pipeline Impacts

Publicly available information suggests that the site and pipelines are likely to be situated on stream terrace deposits and/or landslide deposits underlain by weak sedimentary bedrock. Both surficial soils and lower rock units have landslide potential. Surficial soils were also identified to have the potential for seasonal shrink-swell and corrosivity to buried steel and concrete.

Potential impacts to the proposed compressor station site and pipelines are as follows:

- An ASCE 7-required Ground Motion Hazard Analysis (GMHA) will be required during the future site and pipeline-specific geotechnical investigations. At minimum, design foundation and retaining/slope systems will need to consider the effects of strong ground shaking, and vet the likelihood of the geohazards described in Table 1.
- The project site and pipelines are in a steeply sloped area identified to have high landslide potential (>15%) (see presented California Geological Survey Landslide Susceptibility Map in Figure 3 below). Additionally, sections of the proposed pipeline alignments and site are located within earthquake-induced landslide zones (Figure 4). The presence of shallow sedimentary bedrock at the site does not remediate known landslide risks identified. The site's limit of disturbance also intersects a mapped debris slide occurrence. This slope failure was reported to occur at relatively shallow depths (within the upper 10-ft feet); however, it is unknown if the slope has since stabilized. It is important to note that any grading activities at the site could exacerbate the known landslide risks already present. The pipelines and site may be negatively impacted by slope failures, leading to equipment damage or blocked roads. This risk should be thoroughly evaluated by SoCalGas with respect to long-term site and pipeline performance.

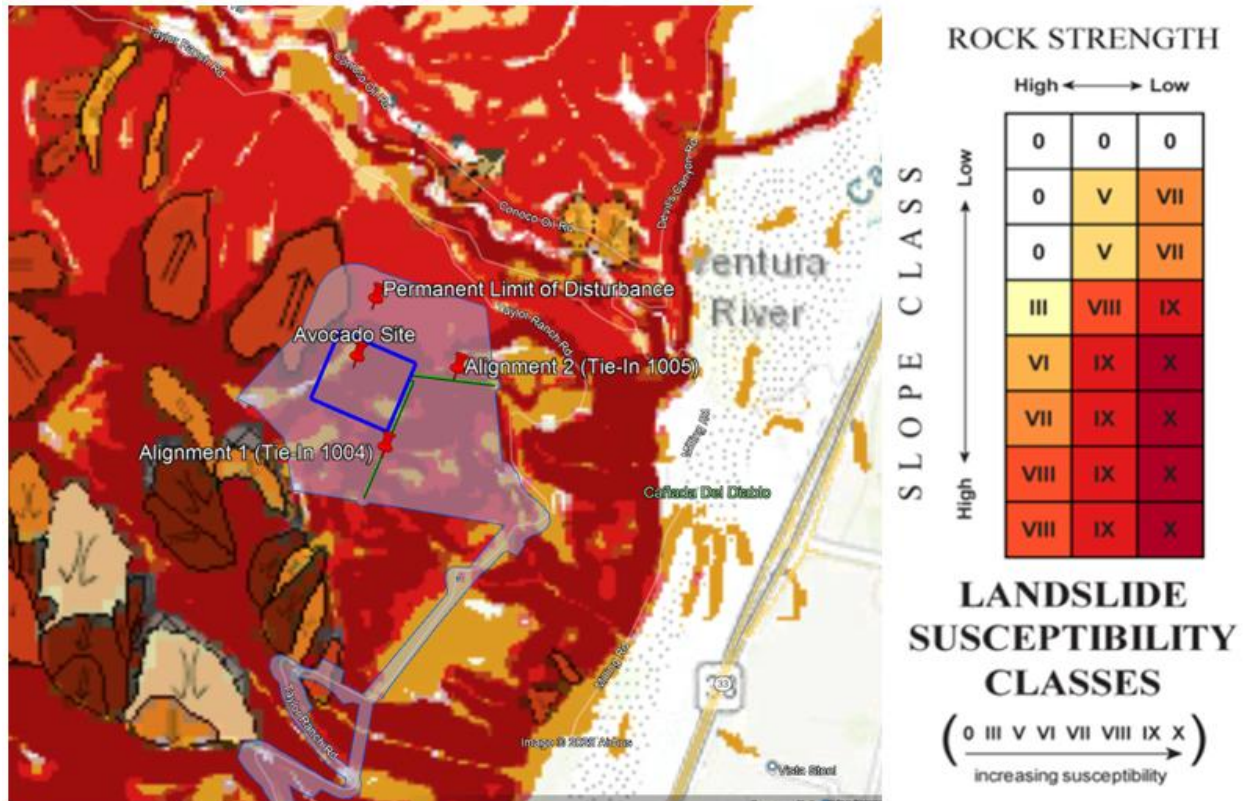


Figure 3: CGS Landslide Susceptibility Class Map per Wilson & Keefer (1985) and Ponti et al (2008)

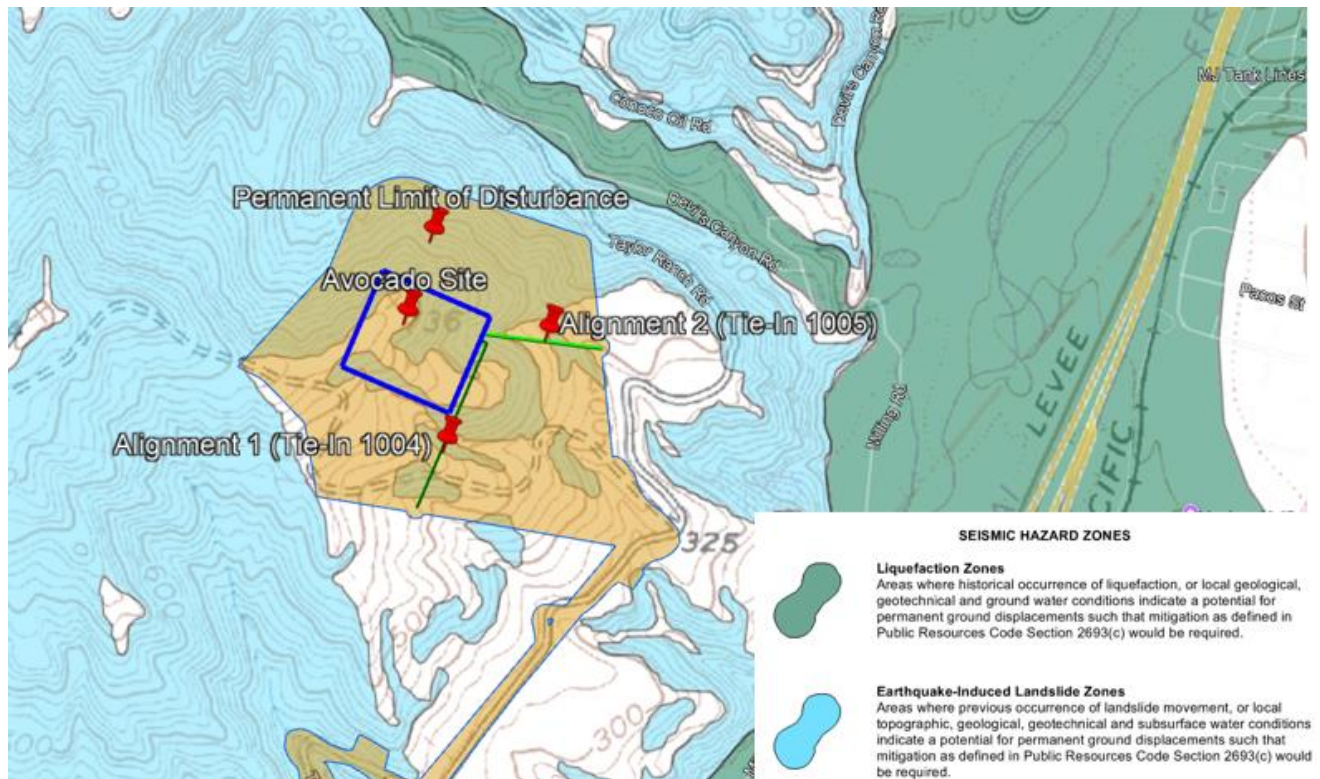


Figure 4: Earthquake Zone of Required Investigation (California Geological Survey, 2003)

- Given the high landslide potential of the area, the geotechnical risks need to be further identified and/or evaluated through the performance of site and alignment-specific geotechnical investigations which should include, but not be limited to:
 - o Static and seismic global stability of the existing slopes along the proposed pipeline alignments and project site.
 - o Drainage and erosion potential of the area relative to proposed earthwork activities required to achieve temporary and final grades.
- Review of preliminary grading options for the Avocado site indicates significant cuts/fills will be required to effectively level the site.
 - o Shallow sedimentary bedrock is expected within the upper 6-ft of cut areas. Future site-specific geotechnical investigations should evaluate the suitability of in-situ soil and rock to be used as fill material. If found inappropriate, importing engineered fill may be required.
 - o Given the existing slopes, robust temporary or permanent excavation support systems will likely be required.

- Potentially compressive and unsuitable materials in surficial soils may be present. For shallow foundations, depending on the severity of the compressibility/shrink-swell potential, additional mitigation measures may be required, such as over-excavation and replacement. If deep foundations are required, increased embedment depths may be needed.
- Roadway access to the pipeline alignments and project site is limited. Existing roadway subgrades may also be generally unsuitable for traffic loads associated with construction and operation. New or expanded roadways may be necessary. Additional over-excavation and backfill with low volume change material, chemical treatment, or other means may be necessary to improve existing roadways or to meet state and local jurisdiction access requirements. Modification/remediation of adjacent roadway slopes to improve global stability may also be required.
- Concrete and steel foundations could be affected by corrosion, which may lead to an increase in thickness to account for sacrificial steel or the consideration of special coatings. Corrosion potential may impact the overall foundation design and require site-specific investigation.