

ARON R. TAYLOR, M.S., P.G., C.E.G.
Vice President
Principal Engineering Geologist



PROFESSION

Engineering Geologist

REGISTRATIONS

Professional Geologist

– State of California

Certified Engineering Geologist

– State of California

Qualified SWPPP Developer (QSD)

– CASQA Cert. #00496

Qualified SWPPP Practitioner (QSP)

– CASQA Cert. #00496

EDUCATION

M.S. Geological Sciences, 2006

California State University, Fullerton.

*Thesis: “Geomorphology and
Geochronology of the San Juan
Creek Terraces: Implications for
Quaternary Uplift of the Santa Ana
Mountain Foothills”*

B.S. Geological Sciences, 2001,

Summa Cum Laude – California
State University, Fullerton.

*Thesis: “Evaluation of the Long-
Term Segmentation of the Wasatch
Fault Footwall Using (U-Th)/He
Thermochronometry”*

PROFESSIONAL EXPERIENCE

GMU Geotechnical, Inc.

(2001-Present)

Principal Engineering Geologist and
Vice President, Rancho Santa
Margarita, California

AFFILIATIONS

Building Industry Association

Geological Society of America

South Coast Geological Society

California Geotechnical Engineers
Association

SUMMARY OF EXPERIENCE & QUALIFICATIONS

Mr. Taylor has 15 years of experience on a wide variety of geotechnical projects. His experience includes work with residential and master-planned community developers, commercial developers, public agencies, and water districts. He has worked successfully as project manager and engineering geologist on a diverse range of projects, as outlined below. His specific engineering geological experience includes large-scale grading jobs, geologic mapping, subsurface exploration, foundation investigations, landslide evaluations, liquefaction studies, groundwater investigations, seismic hazard analyses, seismic refraction and rippability studies, fault investigations, and debris flow analyses. Mr. Taylor is also proficient in the use of AutoCAD and GIS for geotechnical applications. Selected projects representative of Mr. Taylor’s experience are subdivided into the following categories:

- Master-Planned Communities
- Major Roadways
- Bridges
- Commercial, Industrial, and Retail Projects
- Water Infrastructure Projects
- Residential and Custom Lot Projects
- Landslide/Slope Stability Investigations & Repairs
- Groundwater Studies
- Fault Investigations
- Miscellaneous Utility Projects
- Seismic Hazard Analyses
- Seismic Refraction and Rippability Studies

PROJECT EXPERIENCE

MASTER-PLANNED COMMUNITIES:

- Esencia, Rancho Mission Viejo – Rancho Mission Viejo, Orange County, CA (2006-Present): 860-acre master-planned community within Rancho Mission Viejo. Provided the geotechnical studies from original EIR and entitlement through final design and construction. Major grading included approximately 35 million cubic yards of earthwork, with cuts and fills greater than 100 feet deep. Geotechnical studies addressed remedial grading, slope stabilization, landslide mitigation, liquefaction remediation, settlement monitoring, infiltration basins, and localized shallow groundwater.
- Sendero, Rancho Mission Viejo – Rancho Mission Viejo, Orange County, CA (2005-2013): Geotechnical investigation, design, and construction services for 550-acre master-planned community. Studies addressed numerous geotechnical issues including large-scale 160-foot-deep ancient landslides, liquefaction hazards, time-delayed settlement, shallow groundwater, debris flows, existing infrastructure, and scour protection for the adjacent San Juan Creek.
- The Ranch Plan – Rancho Mission Viejo, Orange County, CA (2001-Present): Project covers 23,000 acres of southeastern Orange County and is characterized by complex geologic terrain that includes the Cristianitos fault, the Mission Viejo fault, and numerous Quaternary to Jurassic geologic formations. Completed geologic investigations for the Ranch Plan Environmental Impact Report (EIR) and entitlement. Studies included long-term groundwater monitoring studies, geologic mapping, subsurface exploration, fault trenching, and seismic refraction studies. Geotechnical studies are on-going for long-term planning, design, and construction of the sequenced 14,000-unit development.
- Ladera Ranch – Orange County, CA (2001-2004): Geologic mapping, grading observation, and final reporting for a portion of the 8,000-unit master-planned community. Major hillside grading operations for the community involved approximately 100 million cubic yards of earthwork, with cuts and fills in excess of 100 feet deep. Field mapping and grading observations focused on complex geologic structure, extensive remedial grading, and remediation of large-scale ancient landslides.
- Talega, Village 5 – San Clemente, Orange County, CA (2003-2006): Geotechnical investigation, design, and construction services for master planned community. Geologic mapping during grading included complex geologic structure, including the Cristianitos Fault zone and numerous ancient landslides.
- Crystal Cove – Newport Beach, Orange County, CA (2003-2006): Geotechnical investigation and geologic mapping during hillside grading for residential development. Geologic structure included the Pelican Hills fault zone and numerous large-scale ancient landslides.
- Newport Banning Ranch – Newport Beach, Orange County, CA (2007-Present): Geotechnical studies and design consultation for 400-acre master-planned development. The development plan includes open space preserves, parks, residential neighborhoods, and a

resort hotel. GMU provided the geotechnical studies to support the EIR and entitlement process with the City of Newport Beach and other affected agencies (County of Orange, California Coastal Commission, etc.). Studies addressed active traces of the Newport-Inglewood fault zone, bluff stability, bluff retreat, and groundwater.

MAJOR ROADWAYS:

- Los Patrones Parkway – Rancho Mission Viejo, Orange County, CA: Provided geotechnical investigation and design services for new 5-mile long roadway. Construction is in progress with approximately 4 million cubic yards of earthwork. Geotechnical design addressed stability of large cut slopes, settlement of deep canyon fills over alluvium, liquefaction and lateral spreading, and shallow groundwater.
- Cow Camp Road – Rancho Mission Viejo, Orange County, CA: Geotechnical investigation, design, and construction services for 6-lane arterial roadway spanning a distance of 4 miles between Antonio Parkway and Ortega Highway on the north side of San Juan Creek. Recently completed the construction of Phase 1, which included a 1,420-foot long bridge over Chiquita Canyon. Served as project manager for all geotechnical inspections, registered special inspections, and materials testing during construction. Roadway extension and three additional bridges are currently being designed.
- Ortega Highway (SR 74) Widening – San Juan Capistrano and Orange County, CA: Geotechnical and materials investigation for widening of 2-lane highway to 4 lanes. Project spanned from within the City of San Juan Capistrano to about ½-mile east of the intersection with Antonio Parkway. Design effort required preparation of Geotechnical Design Reports, Materials Reports, and Foundation Reports. These required coordination and review with Caltrans and the County of Orange. Also served as project manager and field geologist for geotechnical and materials testing services during construction of County portion of project, including extensive inspection and testing on jet grouting and soil cement revetments around the San Juan Creek bridge.
- Antonio Parkway Widening – Orange County, CA: Geotechnical and pavement investigation for widening of 4-lane arterial roadway to 6 lanes. Project spanned from the southern portion of Ladera Ranch to about ½-mile south of intersection with Ortega Highway. Also served as project manager and field geologist for geotechnical observation and testing services related to roadway grading.
- La Pata Gap Closure Project – Orange County, CA: Geotechnical investigation and design services to support Project Report, environmental document, and final design PS&E for 3.5 miles of roadway widening and extension between San Juan Capistrano and San Clemente.
- Laguna Canyon Road Widening – Orange County, CA: Subsurface investigation and preparation of Geotechnical Design Report for proposed road and shoulder widening between El Toro Road and SR-73.

- Lincoln Avenue Widening – Anaheim and Orange, CA: Geotechnical investigation for proposed roadway widening, retaining walls, and bridge widening over Santa Ana River.
- La Pata Avenue Extension – City of San Clemente, Orange County, CA: Geologic mapping and grading observation during grading of the roadway extension within Talega.

BRIDGES:

- Cow Camp Road Bridges – Rancho Mission Viejo, Orange County, CA (2005-Current): A total of four major 6-lane bridges spanning approximately 1,000 to 1,700 feet over Chiquita Canyon, Gobernadora Canyon, and San Juan Creek. Geologic conditions are characterized by up to 80 feet of saturated alluvial soils with high liquefaction potential. Geotechnical studies for roadway and bridge foundation design addressed liquefaction issues such as seismic settlement, lateral spreading, flow failures, downdrag on columns, decreased lateral and vertical capacity, and potential ground improvement/liquefaction remediation. Prepared Type Selection Memos, Preliminary Foundation Reports, and Final Foundation Reports to support project design. Served as project manager and field geologist during construction of first bridge, which included CIDH foundations up to 10 feet in diameter and 120 feet deep.
- Antonio Parkway Bridge Widening – Orange County, CA (2006-2010): Geotechnical investigation and design services for bridge widening over San Juan Creek. Geotechnical studies addressed liquefaction potential, updated seismic design, foundation design, and revetment design. Prepared Preliminary Foundation Report and Final Foundation Report. Also served as project manager and field geologist during construction, which included compaction grouting, soil cement revetments, construction dewatering, driven pile foundations, and CIDH foundations.
- San Juan Creek Bridge, Ortega Highway (SR74) - Orange County, CA (2005-2009): Geotechnical investigation and design services for construction of a new 3-lane bridge adjacent to the existing 2-lane bridge. Geotechnical studies addressed liquefaction potential, foundation design, scour protection, and new abutment grading. Also served as project manager and field geologist for geotechnical and materials testing services during construction of bridge, including extensive inspection and testing of jet grouting and soil cement revetments around the bridge.
- La Pata Utility Crossing Bridge – San Clemente, Orange County, CA (2011-2013): Performed geotechnical investigation and design services for utility access and crossing over Avenida La Pata. Prepared Preliminary and Final Foundation Reports for bridge design.
- Grandeza Drive Bridge – Rancho Mission Viejo, Orange County, CA (2014-Current): Preliminary geotechnical investigation and planning studies for proposed 4-lane bridge that spans Gobernadora Canyon for a distance of about 1,500 feet. Prepared geotechnical report to support Project Report and Advanced Planning Study.

- Lincoln Avenue Bridge Widening – Anaheim and Orange, CA (2009): Geotechnical investigation for proposed bridge widening over the Santa Ana River.
- Antonio Wildlife Crossing Bridge – Ladera Ranch, Orange County, CA (2008) – Geotechnical observation of foundation construction, including excavation of large-diameter shafts for bent construction.

COMMERCIAL, INDUSTRIAL, AND RETAIL PROJECTS:

- 650/670 Newport Center Drive – Newport Beach, Orange County, CA (2009-2014): Geotechnical investigation, design, and construction services for a twenty-story office building and eight-level parking garage with four subterranean levels. Geotechnical studies addressed complex foundation design, dewatering, and adverse bedding surcharges and building surcharges on basement walls and temporary shoring walls.
- Westar Goleta Mixed Use Project – Goleta, CA (2007-Present): Geotechnical studies, fault investigation, and percolation testing for 23-acre mixed use site with apartments and retail buildings. Geotechnical studies supported original EIR and entitlement through final design and construction.
- Koll Co. Calabasas Office Park II – Calabasas, Los Angeles County, CA (2008-2009): Geotechnical investigation and reporting for a three-story office building and four-story parking garage with subterranean level. Geotechnical studies addressed slope stability, foundation design, and consolidation of up to 70 feet of existing artificial fill.
- Capistrano Mixed Use Site (Plaza Banderas) – San Juan Capistrano, CA (2009): Geotechnical investigation and design services for proposed hotel and retail site.
- Koll Co. Railroad Industrial Complex – City of Industry, Los Angeles County, CA (2008 - 2009): Geotechnical investigation and reporting for three industrial buildings. Geotechnical studies addressed liquefaction hazards, settlement, and foundation design.
- Koll Co. San Juan – San Juan Capistrano, Orange County, CA (2008): Geotechnical investigation and reporting for 10 single- and two-story commercial office buildings on an undeveloped hillside site. Project involves significant rough grading and construction of numerous retaining walls, including MSE walls, soil nail walls, and conventional walls. Geotechnical studies addressed slope stability, foundation design, and significant grading operation.
- Crean Lutheran South High School – Irvine, CA (2009): Provided geotechnical investigation and design services for 15-acre high school with 2-story administrative building, 3-story classroom building, performing arts building, gymnasium, parking structure, and track and field area.

- CR&R Materials Reclamation Facility – Orange County, CA (2007-2008): Geotechnical investigation for a potential MRF Site on 14 acres of undeveloped property. Geotechnical studies addressed complex landslides and geologic conditions, slope stability, and numerous grading configurations.

WATER INFRASTRUCTURE PROJECTS:

- Chiquita Zone I/A Reservoirs - Santa Margarita Water District, Orange County, CA: Provided investigation, design, and construction services for three steel tank reservoirs. Project also included significant hillside grading, 3,200 feet of new access road, and 11,000 feet of new pipelines.
- Tesoro Zone II/B Reservoirs - Santa Margarita Water District, Orange County, CA: Provided investigation, design, and construction services for two steel tank reservoirs. Project also included significant hillside grading, 4,000 feet of new access road, and 7,500 feet of new pipelines.
- San Juan Creek Revetment – Rancho Mission Viejo, Orange County, CA: Geotechnical investigation and studies to support design of proposed revetment (i.e., scour protection system) along San Juan Creek near Ortega Highway and Antonio Parkway. Studies included subsurface investigation, materials testing, revetment stability analyses, groundwater evaluation, and assistance with design of jet grouting and soil cement components of the revetment.
- Gobernadora Multi-Purpose Basin – Santa Margarita Water District, Orange County, CA: Geotechnical investigation, design, and construction services for flood control and water quality basins in Gobernadora Canyon, south of Coto de Caza. Investigation included extensive liquefaction analyses and groundwater studies.
- Shadow Rock Detention Basin and Lift Station – Trabuco Canyon Water District, Rancho Santa Margarita, CA: Provided value engineering and construction support services for stormwater detention basin designed to capture urban runoff and re-use as non-domestic water.
- Sendero Lift Station and Pressure Reducing Stations – Santa Margarita Water District, Orange County, CA: Geotechnical design and construction services for three pressure reducing stations and one lift station to support new master-planned community of Sendero.
- Esencia Lift Station - Santa Margarita Water District, Orange County, CA: Geotechnical design and construction services for sewer lift station to support new master-planned community of Esencia.
- Trabuco Creek Channel Levee Improvement Project – Orange County Flood Control District/Materials Laboratory: Provided geotechnical investigation and design services for

proposed sheet pile walls within channel levees. Sheet pile walls will be approximately 30 feet deep and will provide additional scour protection for concrete-lined levees.

- Rose Canyon and Lang Wells Groundwater Treatment Facility – Trabuco Canyon Water District, CA: Provided geotechnical investigation, design, and construction services for groundwater treatment facility in Trabuco Canyon. Managed construction services including materials testing and special inspection for concrete, grout, mortar, rebar, welding, etc.
- South County Pipeline Protection Project – Santa Margarita Water District, Orange County, CA: Geotechnical services to support design and construction of scour protection for the South County Pipeline (48-inch water main) crossing at San Juan Creek. Protection included sheet piles and rip rap. Vibration monitoring was utilized by GMU due to pile driving near existing 48-inch water main.
- Stormwater Testing for SWPPP Compliance – Ladera Ranch, Orange County, CA: Sampled stormwater runoff at locations in and around Ladera Ranch during rain events. Analyzed water samples for chemical parameters related to water quality.
- San Juan Creek Forcemain Replacement – Santa Margarita Water District, Orange County, CA: Geotechnical investigation for jack and bore replacement of damaged sewer forcemain that crosses San Juan Creek.
- Domestic and Non-Domestic Reservoirs – Santa Margarita Water District, Orange County, CA: Geotechnical investigation for five proposed reservoir sites within Rancho Mission Viejo.

RESIDENTIAL AND CUSTOM LOT PROJECTS:

- St. Michael's Abbey – Silverado Canyon, Orange County California: Provided geotechnical investigation for EIR and entitlement through rough grade design and construction (in progress 2015). Project includes a monastery, high school, chapel, sports fields, roadways, water quality basins, and other site improvements. Geotechnical studies addressed settlement, debris flows, slope stability, liquefaction, infiltration basins for water quality, percolation for septic systems, and pavement design.
- Via Terracaleta – Coto de Caza, Orange County, CA: Geotechnical investigation for a 7-lot custom home development on about 15 acres of partially developed land.
- Newport Beach Country Club – Newport Beach, Orange County, CA: Geotechnical investigation and design services for future grading and construction of residential development at the Newport Beach Country Club.
- Westar Goleta Mixed Use Project – Goleta, CA: Geotechnical studies, fault investigation, and percolation testing for 23-acre mixed use site with apartments and retail buildings.

Geotechnical studies supported original EIR and entitlement through final design and construction.

- Capriotti Residence – Coto de Caza, Orange County, CA: Geotechnical investigation, design, and construction services for grading and construction of a large custom home on a 14-acre property. Improvements include the main residence, pool house, guest house, ponds, pool, 17-foot-high MSE walls, etc.
- McFadden Residence – Coto de Caza, Orange County, CA: Geotechnical investigation and design services for proposed grading and construction of several retaining walls, slopes, and a large residential addition.

LANDSLIDE/SLOPE STABILITY INVESTIGATIONS AND SLOPE REPAIRS:

- Various Landslide Investigations – Orange County, CA: Investigation, analysis, and remediation of dozens of landslides related to development of several master-planned communities.
- Dove Canyon Debris Flows – Rancho Santa Margarita, CA: Provided mapping, investigation, and analysis of numerous damaging debris flows resulting from heavy rain event in December, 2010. Quantified remaining debris flow hazard for use in design of debris posts, debris basins, and drainage improvements.
- Hillcrest Drive Landslide, Los Angeles, CA: Geotechnical investigation of landslide and design of slope repair behind residences. Also managed preparation of survey work, grading plans, erosion control plans, and landscape plans.
- Sunset Crossing Landslide, Diamond Bar, CA: Geotechnical investigation of landslide and design of slope repair behind five residences. Repair included tie-backs, removal and replacement of landslide debris, and installation of geogrid within new engineered fill. Also served as field geologist during repair grading and tie-back installation.
- Canyon Wren Street Distress and Slope Movement, Aliso Viejo, CA: Geotechnical investigation of street distress and potential slope movement. Study included subsurface exploration and installation of three slope inclinometers.
- Woodview Road Landslide Repair – City of Chino Hills, CA: Geotechnical investigation of two landslides that destroyed half of the roadway.
- Debris Flow Analysis, Talega Village 5 – San Clemente, CA: Calculations and analysis of debris flow hazards affecting residential development. Also assisted with design of detention facilities to mitigate debris flow hazard.

- Debris Flow Analysis, Sendero – Rancho Mission Viejo, CA: Calculations and analysis of debris flow hazards affecting residential development. Also assisted with design of detention facilities to mitigate debris flow hazard.
- Mission Gorge Quarry Slope Stability Evaluation – Superior Ready Mix, San Diego, CA: Geologic mapping and structural geologic analysis of multiple intersecting joint sets within a quarry slope comprised of Santiago Peak Volcanics.

GROUNDWATER STUDIES:

- The Ranch Plan Groundwater Studies – Rancho Mission Viejo, Orange County, CA: Long-term groundwater studies to support EIR for The Ranch Plan, a long-range development plan for the 23,000-acre property in southeastern Orange County. Groundwater studies included the installation and monitoring of over 60 monitoring wells. Water level and water chemistry monitoring was performed using manual measurements, pneumatic piezometers, and data loggers.
- Dewatering Study for 650/670 Newport Center Drive – Newport Beach, Orange County, CA (2010): Dewatering study included four observation wells and a pumping well to evaluate bedrock seepage at proposed eight-level parking garage with four subterranean levels.
- Groundwater Study for Trabuco Canyon Water District – Trabuco Canyon, Orange County, CA: Drilled and installed two monitoring wells to depth of 200 feet in order to evaluate shallow unconfined aquifer and deep bedrock aquifer. Also provided studies for TCWD Groundwater Treatment Facility.
- Gabino Canyon Groundwater Study – Rancho Mission Viejo, Orange County, CA: Performed a seismic refraction study and geologic mapping to evaluate depth to groundwater and depth to bedrock for use in determining optimum locations and depths for groundwater production wells. Sited shallow and deep wells for agricultural groundwater production. 500-foot deep production well yielded artesian conditions.
- Mission Viejo Golf Course Groundwater Studies – Mission Viejo, Orange County, CA: Drilled and installed four monitoring wells to evaluate shallow groundwater and impacts to a proposed lake facility.
- Groundwater Study for San Juan Creek Revetment – Rancho Mission Viejo, Orange County, CA: Excavated numerous borings and test pits to observe groundwater levels adjacent to San Juan Creek. Groundwater data was utilized for design of revetment system which included jet grouting and soil cement.
- Koll Co. La Costa Meadows Groundwater Study – San Marcos, San Diego County, CA: Geologic oversight for drilling and installation of eight monitoring wells to evaluate artesian conditions and fracture flow within volcanic bedrock materials. Groundwater distress was related to upward migration of groundwater through floor slabs of commercial buildings.

FAULT INVESTIGATIONS:

- Newport Banning Ranch – Newport Beach, Orange County, CA (2007-Present): Geotechnical analyses and design consultation for master-planned residential development near the Newport-Inglewood fault zone. Extensive fault trenching program addressed multiple traces of the Newport-Inglewood fault zone.
- North Ellwood Fault Investigation – Westar, Goleta, CA: Geologic investigation of a potentially active fault that was mapped through a proposed development. Investigation included air photo analysis, geophysical survey, and fault trenching to determine location and inactivity of postulated fault.
- Mission Viejo Fault – Rancho Mission Viejo, CA: Investigated Mission Viejo fault in two locations for EIR studies.
- Whittier Fault – Yorba Linda, CA: Participated in fault trenching within the Alquist-Priolo zone for the Whittier Fault.

MISCELLANEOUS UTILITY PROJECTS:

- KMEP Jet Fuel Line Relocation, PA-1 – Kinder Morgan Energy Partners, Orange County, CA: Geotechnical investigation for relocation of existing jet fuel line within Planning Area 1 of Rancho Mission Viejo.
- KMEP Jet Fuel Line Relocation, Ortega Highway – Kinder Morgan Energy Partners, Orange County, CA: Geotechnical services for jack-and-bore relocation of existing jet fuel line below Ortega Highway.
- Cellular Sites at Tree of Life and Color Spot Nurseries – RMV Telecom, Orange County, CA: Geotechnical investigation for two proposed cellular sites.

SEISMIC HAZARD ANALYSES:

- Probabilistic (PSHA) and Deterministic (DSHA) Seismic Hazard Analyses – Seismic hazard analyses performed for a wide variety of projects, including residential and commercial developments, roadways and bridges, reservoirs, slope deformation analyses, etc. Seismic hazard analyses are focused on generating Peak Ground Acceleration (PGA), CBC and site-specific response spectra curves, and deaggregated analyses for use in liquefaction calculations.
- CALTRANS-Based Seismic Hazard Analyses – Seismic hazard analyses performed according to Caltrans Seismic Design Criteria for use in bridge design.

SEISMIC REFRACTION AND RIPPABILITY STUDIES:

- Rancho Mission Viejo Rippability Studies – Rancho Mission Viejo, Orange County, CA: Performed three separate refraction and rippability studies in Planning Areas 3, 4, and 5 to evaluate Tertiary and Cretaceous sedimentary bedrock of the San Onofre Breccia, Silverado, and Williams Formations.
- Gabino Canyon Refraction Study – Rancho Mission Viejo, Orange County, CA: Performed refraction study to evaluate depth to groundwater and depth to bedrock for use in determining optimum locations and depths for groundwater production wells.
- Murrieta Hills Rippability Study – Pulte Homes, Murrieta, CA: Seismic refraction and rippability study to evaluate granitic rock in area of proposed housing development.
- Alessandro Rippability Study – Riverside, CA: Seismic refraction and rippability study to evaluate granitic rock in area of proposed commercial development.
- Elephant Hill Rippability Study – Centex Homes, Pomona, CA: Seismic refraction and rippability study to evaluate volcanic rock in area of proposed housing development.
- Palomar Pointe Rippability Study – Western Realco, San Diego County, CA: Seismic refraction and rippability study to evaluate volcanic rock in area of proposed development.

PUBLICATIONS:

- Armstrong, P. A., Taylor, A. R., and Ehlers, T. A., 2004, Is the Wasatch fault footwall (Utah, United States) segmented over million-year time scales?: *Geology*, v. 32, No. 5, p. 385-388; doi: 1130/G2042.1.
- Taylor, A. R., Armstrong, P. A., and Farley, K. A., 2001, Evaluation of the long-term segmentation of the Wasatch fault footwall using (U-Th)/He thermochronometry: *EOS Trans. AGU*, 82(47), Fall Meeting Suppl.
- Taylor, A. R., Armstrong, P. A., and Knott, J. R., 2006, Geomorphology and geochronology of the San Juan Creek Terraces: Implications for uplift of the Santa Ana Mountain foothills, Orange County, California: *Geology of the Orange County Region, Southern California*; South Coast Geological Society Annual Field Trip Guide No. 33.