

SDAG OSW led by STEPHEN JACOBS - 10am Saturday December 10, 2022

**OUTCROP OF UNMAPPED LUSARDI FORMATION,
CALAVERA NATURE PRESERVE, CARLSBAD, CALIFORNIA**

An outcrop with unmapped probable Lusardi Formation occurs in a stream cut along the south side of the Miocene dacite volcanic dome of Cerro de la Calavera within the Calavera Nature Preserve, Carlsbad, California. The Lusardi Formation in San Diego County and the correlative Trabuco Formation in Orange County have been generally interpreted as having been deposited in stream channels and on alluvial fans on the west side of a string of volcanoes and granitic mountains in coastal southern California, probably 90 to 75 million years ago.

The Lusardi Formation is considered the basal member of the Rosario Group of middle to late Cretaceous age. It has been recognized as a post-batholithic highly distinctive boulder conglomerate in west-central San Diego County, California. In the Carlsbad area, the northern-most mapped extent of this conglomerate by Tan (1996) lies about a quarter of a mile south of the subject outcrop. The outcrop contains abundant highly weathered and decomposed rounded boulders and cobbles ("ghosts") in a massive sandstone matrix overlain by bedded sandstone of the Eocene Santiago Formation containing some only slightly weathered rounded boulders and cobbles just above the conjectured base of this formation. To my knowledge, this is the only outcrop in the Carlsbad area that provides a stratigraphic context whereby exposed is a formation that overlies the Lusardi. Typically, the landscape in the Carlsbad area, and perhaps in other regions in San Diego County, where the Lusardi Formation is mapped contains clusters of isolated rounded boulders and cobbles on the ground without any known significant outcrops.



2nd choice parking

Meeting Location (1st choice parking)

Google Earth

33°09'16.36" N 117°17'15.48" W elev 65 ft eye alt 8208 ft

1985

1816 ft

El Camino Real

Cannon Rd

Gasgoy Dr

Gateshead Rd

Edinburgh Dr

Gage Dr

Gage Dr

CALAVERA HILLS VILLAGE

College Blvd

Richfield Dr

Glen Ave

Glen Ave

Cannon Rd

Don Lorenzo Dr

Don Rodolfo Dr

Don Juan Dr

Carlos Dr

Rancho Carlsbad Owners' Association

Rancho Carlsbad Golf Course

Image Landsat / Copernicus

Agua Hedionda Creek

The Old Rancho Wedding Estate

Sage Creek High School

Lake Calavera Trail Head - Cannon Road

Ultra Capturing

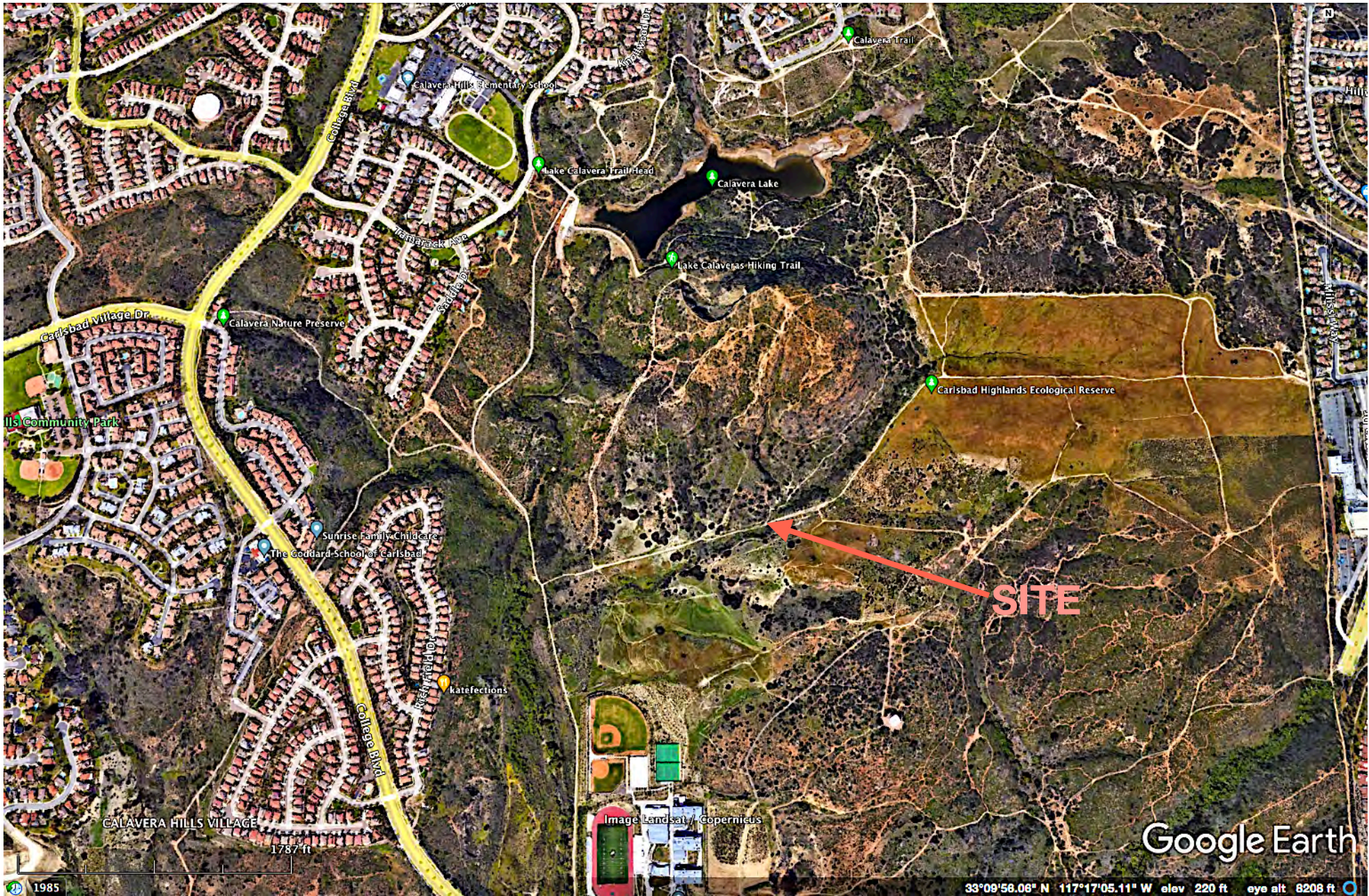
Glen Ridge Apartments

Carlsbad Fire Station 3

Casa Aldea Carlsbad

katefections

Creek side park



TERTIARY

Miocene

- Tso** San Onofre Breccia; greenish red, poorly-to moderately-bedded, well-indurated, breccia with Catalina Schist clasts. Resistant to landsliding.
- Tda** Dacite stock; small bodies of igneous rock of dacitic and basaltic composition.
- Tsa** / **Tt** Santiago Formation; light-colored, poorly-bedded, poorly-indurated, fine- to medium-grained sandstone interbedded with landslide-prone siltstone and claystone. Local coarse-grained sandstone and conglomerate. Renamed from Scripps Formation in the Encinitas (Tan, 1986) and Rancho Santa Fe (Tan, 1987) quadrangles. It interfingers with Torrey Sandstone.

Middle Eocene

- Tf** Friars Formation (La Jolla Group); poorly-bedded, poorly-indurated, landslide-prone claystone, fine- to medium-grained sandstone and some conglomerate.
- Td** Del Mar Formation (La Jolla Group); poorly-bedded, poorly-indurated, landslide-prone sandy claystone interbedded with medium- to coarse-grained sandstone. A similar greenish colored claystone also occurs locally in the Santiago Formation.

LATE-CRETACEOUS

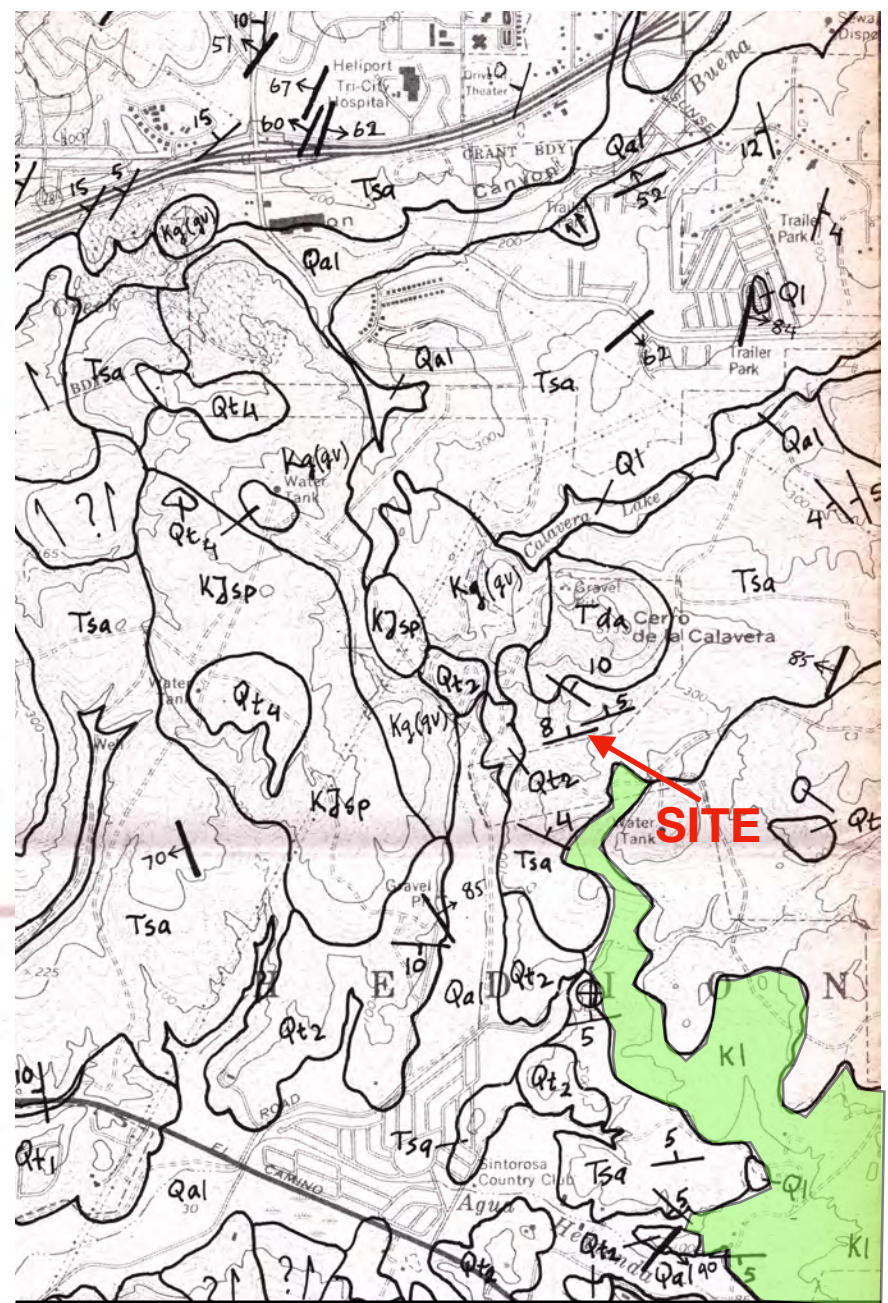
- Kp** Point Loma Formation (Rosario Group); well-bedded, well-indurated siltstone and fine-grained sandstone.
- Kl** Lusardi Formation (Rosario Group); poorly-bedded, moderately-indurated cobble and boulder conglomerate with thin lenses of medium-grained sandstone. Possibly correlative with the Trabuco Formation in the Santa Ana Mountains.

MID-CRETACEOUS

- Kg** Undivided granitic rocks of the Southern California batholith, includes: fine- to medium-grained granodiorite, tonalite and gabbro. Subscripts indicate the map symbols used by Larsen (1948).
- Kg (e)** Escondido Creek Leucogranodiorite (Larsen, 1948); light-colored, fine-grained granodiorite and tonalite, with locally abundant inclusions.
- Kg (wm)** Woodson Mountain Granodiorite (Larsen, 1948); medium- to coarse-grained granodiorite. It weathers into distinctive boulders of disintegration.
- Kg (b)** Bonsall Tonalite (Larsen, 1948); medium-grained tonalite, characterized by abundant inclusions.
- Kg (gv)** Green Valley Tonalite (Larsen, 1948); medium-grained tonalite (similar to Bonsall Tonalite, but it lacks the abundant inclusions).
- Kg (sm)** San Marcos Gabbro (Larsen, 1948); medium-grained gabbro and norite.

EARLY-CRETACEOUS

- KJsp** Undifferentiated Santiago Peak Volcanics, mildly metamorphosed volcanic, volcaniclastic and interbedded sedimentary rocks. Volcanic rocks range from basalt to rhyolite, but are predominantly andesite. It also contains some rock types listed under KJm (mentioned below).
- KJm** Metavolcanic and metasedimentary rocks, with fine-grained granodioritic and other plutonic rocks. The map unit contains schist, quartzite, argillite,



Excerpt of Geologic Maps of the Oceanside, San Luis Rey, and San Marcos 7.5' Quadrangles: CDMG Open-File Report 96-02, by S.S. Tan (1996)

