

The Presidio Park Graben San Diego, California

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Presidio Park is located adjacent to and northeast of Old Town State Park in the southeast quadrant formed by Interstate 8 on the north and Interstate 5 to the west. Because of its unique location on the east side of the Rose Canyon fault and the fact that the area has escaped development by virtue of being designated a park; this area displays some unique and extremely interesting tectonic features. As a result of geologic mapping during a geologic study for a residential development in Old Town, a previously unrecognized graben, three north-south striking minor faults, and a probable fault manifested by an uphill-facing scarp and possible offset of the southern wall of Mission Valley were discovered in the park (Figure 1). The two northeast-striking graben-bounding faults are well-expressed on topographic maps and on aerial photographs (Figures 1 and 4). Vertical slip (throw) on the southernmost fault is nearly 100 feet.

The principal geologic units underlying Presidio Park are the Mission Valley and Lindavista formations. The Pomerado Conglomerate, San Diego Formation, and the Bay Point Formation are also represented but their outcrop areas are much smaller. The Mission Valley and Lindavista Formations are well-exposed in the park's steep slopes, road cuts, and trails. Much of the area that Kennedy (1975) mapped as Bay Point Formation is re-assigned to the Lindavista Formation based primarily on grain size and color. Bay Point sediments usually are much more poorly sorted and have a higher percentage of fines (silt and clay) than the Lindavista Formation that here consists primarily of moderately well-cemented, very

coarse reddish-brown sandstone and minor cobble conglomerate.

The fault defining the northern limits of the graben is well-exposed in a low cut made for a hiking trail in the east-central portion of the park (Location A, geologic map, Figure 1). At that location the fault juxtaposes the Lindavista and Mission Valley Formations and dips 80 degrees to the southeast. The presence of the fault to the southwest of this exposure is inferred from the prominent lineament visible on aerial photographs and the offset contact between the Lindavista and Mission Valley Formations. To the northeast, this fault continues at least as far as the roadcut leading to the parking area at the northeast corner of the park. Although the total displacement on the fault at this location cannot be determined with certainty, it appears to be dying out in the Mission Valley formation.

The southern fault that defines the graben is exposed at two localities; along a trail on the west side of the northwest trending ridge south of the previously described parking lot (Location B, Figure 1, and Figure 2,) and in the road cut leading to the parking lot described above. At this locality the fault juxtaposes red-brown sandstone of the Lindavista Formation with light-brown thinly-bedded sandstone of the Mission Valley Formation. Several additional faults that bound a secondary down-dropped block of Lindavista formation are also exposed in the road cut.

At the southwest end of the graben below Jackson Street the trace of the two primary faults appears to have been disrupted by a landslide before joining the Old Town branch of the Rose Canyon fault.

The Presidio Park Graben owes its existence to forces associated with movement along the adjacent Rose Canyon fault. The strain ellipse in Figure 3 shows the forces and structures that can result from wrenching deformation. The arrows at top and bottom of the diagram are the directions of the principal stress and line C-C' represents a right-lateral fault resulting from

wrenching. Dip-slip faults such as those bounding the Presidio Park Graben generally occur perpendicular to Line A-A'; the direction of extension.



Figure 2. The south graben fault juxtaposing Lindavista Formation on the left and Mission Valley formation on the right. (Location B, Geologic Map, Figure 1)

Two possible landslides have been mapped. The presence of landsliding near the northwest corner of the map is suggested by a pressure ridge and a possible closed drainage. The southern landslide is suggested by the presence of a prominent arcuate headscarp, topographic bench and anomalous low-gradient topography near the toe.

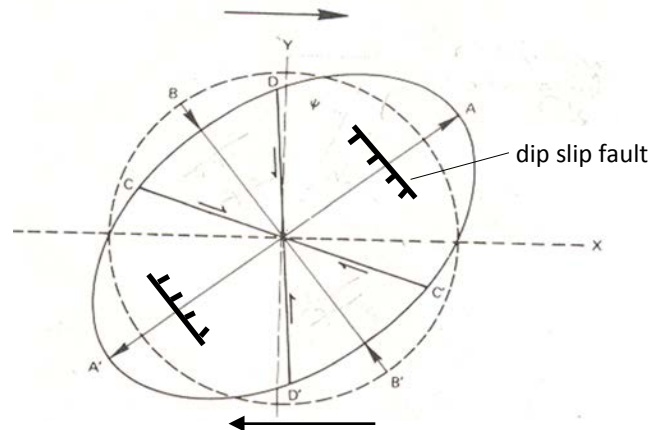


Figure 3. Strain ellipse showing forces and structures resulting from wrenching deformation.



Figure 4. San Diego County 1928 photographs of Presidio Park area. Black arrows point to northeast trending fault scarps bounding the Presidio Park Graben. Yellow arrow points to possible right-lateral offset of valley wall. Geologic map Figure 1 shows a pressure ridge and possible closed drainage south of the road below the yellow arrow that may be evidence of a landslide or an active fault.

