

**Figure 32. Photo. Monument Road Cave.**

#### **4.4.2 Data Analysis and Interpretation**

##### ***Ground Penetrating Radar***

Figure 33 is a plan view map, obtained from LBNM officials, that illustrates the approximate location of the GPR survey lines over Monument Road Cave. Exact coordinates of the starting and ending points of the three GPR lines are listed in table 9. Approximately 53.3 m (174.9 ft) of data were collected along each of three profiles at Monument Road Cave using the 200 and 400 MHz antennae. In general all profiles correlate well with each other and show many of the same characteristics. There is a distinct difference in the amplitudes evident in the three profiles for both the 200 and 400 MHz antennae. Although the same patterns are detected along the profile from line to line there is a decrease in the amplitude of the events from Line 3 to Line 1. It is unclear what may be causing this but it may be related to the material used to construct the road or road base. Figure 34 displays the GPR data.

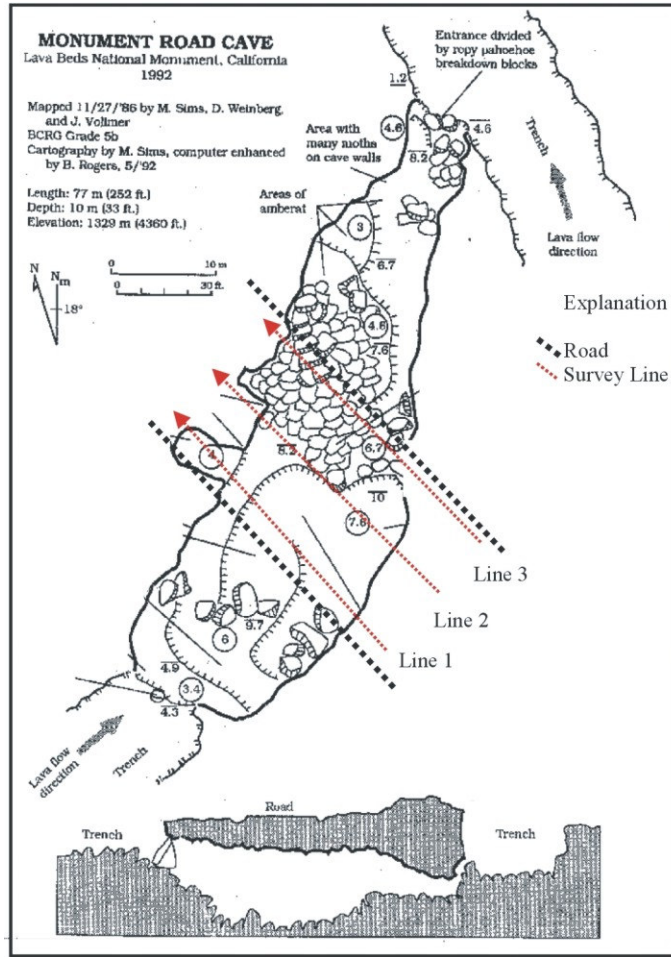
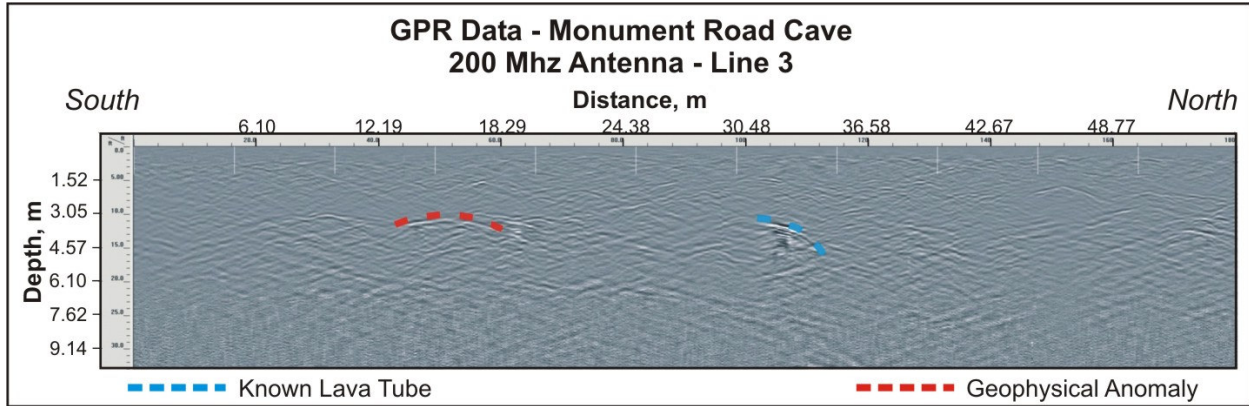


Figure 33. Map. GPR survey lines at Monument Road Cave. <sup>(17)</sup>

Table 9. GPR survey line coordinates over Monument Road Cave.

Line #	North End Point		South End Point	
	Easting (m)	Northing (m)	Easting (m)	Northing (m)
Line 1	619707.33	4625439.54	619722.25	4625386.67
Line 2	619711.69	4625439.04	619725.24	4625386.82
Line 3	619715.83	4625439.19	619728.64	4625386.73

All coordinates are listed in NAD 83/UTM Zone 10



**Figure 34. Profile. GPR data collected along Line 3 at Monument Road Cave.**

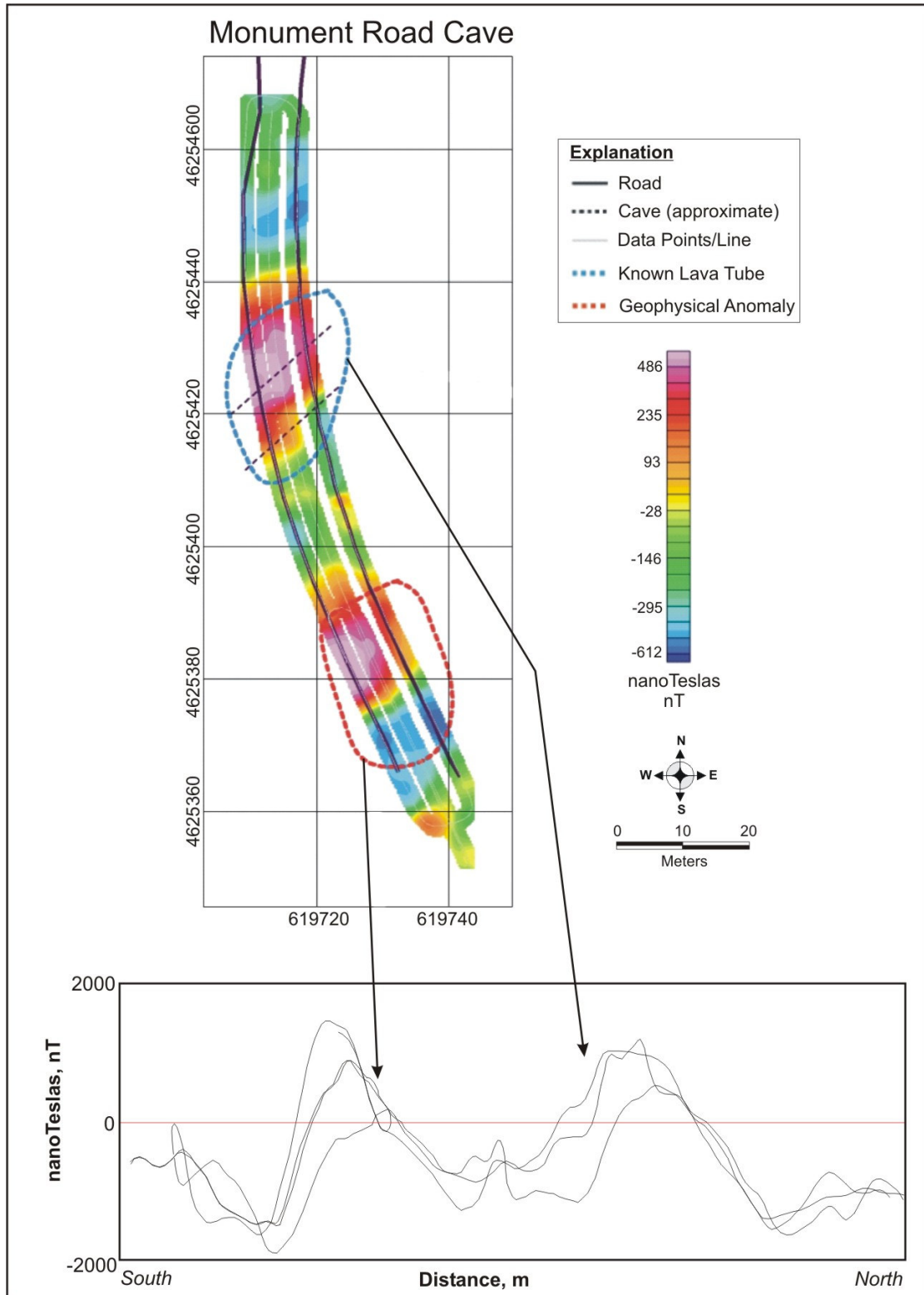
The GPR data collected at Monument Road Cave shows the same types of features as the data collected at the other three sites. Multiple diffractions are present with areas of concentrated high amplitude diffractions and other areas having low amplitude diffractions. From the data collected over Line 1, two anomalies were selected. An interpreted unknown lava tube is outlined in red at approximately 15.2 m (49.9 ft) along the profile. The second anomaly is outlined in blue, which is the approximate known location of the cave, at 32.6 m (107.0 ft) along the profile.

### *Magnetic Method*

The magnetic data showed a large positive anomaly coincident with the known cave location. Figure 35 displays the magnetic data in both plan and profile view. A second large anomaly, as indicated by the positive amplitude magnetic field, is located 45.7 m (150.0 ft) south of the known cave and may represent an unknown cave.

### *Electrical Resistivity*

Figure 36 displays the segment of the electrical resistivity survey line where it passes over Monument Road Cave <sup>(17)</sup> and table 10 gives the coordinates of the end points and center points of the survey line. Figure 37 shows the electrical resistivity profile collected over Monument Road Cave plotted from south to north. The data collected at Monument Road Cave has unique characteristics when compared to the data collected at the other sites. A highly resistive band of material occurs in the center of the section that encompasses five possible voids, including the known cave. A less resistive layer, approximately 1.2 m (3.9 ft) in depth, rests on top of this layer. The overall resistivities for this site appear lower than the resistivities obtained at the other sites, although, being generally over 600 ohm-m, they are still quite high. The lower resistivity strip near the surface may result from fill material deposited when the road was created, or possibly weathered material.



**Figure 35. Map. Plan and profile view of magnetic data collected over Monument Road Cave.**

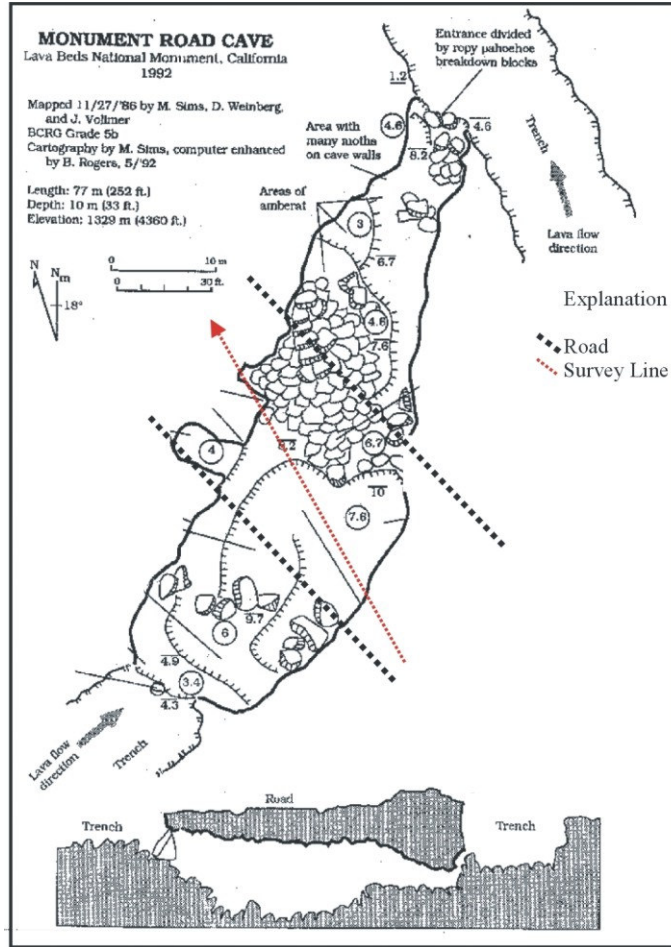


Figure 36. Map. Electrical resistivity survey line at Monument Road Cave. <sup>(17)</sup>

Table 10. Electrical resistivity line survey coordinates over Monument Road Cave.

ID	Easting (m)	Northing (m)
Point 1 (south end point)	619737.25	4625369.32
Point 2	619725.24	4625386.82
Point 3	619714.86	4625407.23
Point 4	619711.69	4625439.04
Point 5 (north end point)	619711.43	4625465.65
All coordinates are listed in NAD 83/UTM Zone 10		