

# PROJECT PROFILE

## EVALUATION OF CHANGED CONDITIONS AND EMBANKMENT REDESIGN

Improvements designed for the Payson-Sholow Road in central Arizona involved the construction of several embankments, the largest of which would have been 340 feet high. Foundation preparation for these embankments required excavation of colluvial soils in the toe areas to strengthen the foundation for the embankment and construction of an embankment buttress on the foundation. Initial stability analyses and designs prepared by others were based upon the assumption that the depth to bedrock in the embankment toe areas was about 10 feet. Consistent with this assumption, construction specifications were prepared requiring the removal of colluvial soils to the top of bedrock in the toe areas.



View of area prepared for roadway fill construction from the top of the mesa.

During initial construction, the toe excavation for one of the embankments reached a depth of more than fifty feet without encountering bedrock. Because of concerns about the possibility of failure of the upslope portion of this excavation, construction was halted, and D'Appolonia was retained by the Arizona Department of Transportation to evaluate subsurface conditions and to prepare designs to resolve the site condition difficulties.

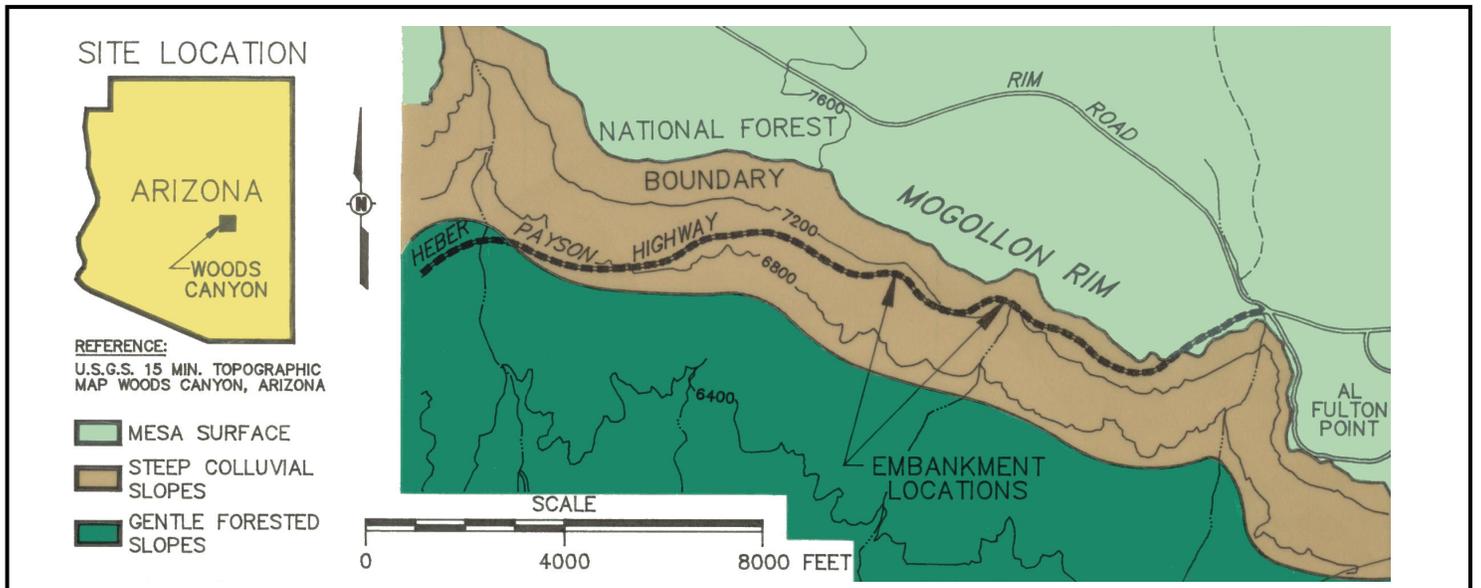
Our review revealed that the depth of the colluvial soils at the toe of the pro-

posed embankments exceeded 60 feet and that some of the "bedrock" was actually overconsolidated clay, the strength of which was very sensitive to water content. The equivalent effective angle of friction for these clays ranged from 9 to 23 degrees. Stability analyses indicated that the planned slope configuration would not have adequate factors of safety.

D'Appolonia evaluated various design alternatives for the proposed embankments including construction of cantilevered retaining walls, overexcavation

and replacement with rock fill, and use of flatter slopes.

The first two of these concepts were deemed economically unfeasible for the largest embankment. The latter approach was employed for several of the embankment fills, but for the largest embankment, a flatter slope would have involved construction on properties nearly 200 feet outside of the project right-of-way and placement of substantial quantities of additional fill. Accordingly, the decision was made to span this area with a 750-foot-long bridge.



Plan location of project area showing two embankment locations.