

## **Constructing a Decline Truck Entrance Tunnel Into Rock Reserves Located Beneath a College Campus**

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### **Abstract**

In the Kansas City metropolitan area, mineable Bethany Falls Limestone occurs 80 ft below river level under the 700 acre Park College Campus on the north bank of the Missouri River at Parkville. For 20 years prior to this project various firms passed over this opportunity to mine this property for construction aggregate because of uncertain costs, financial risk, and the difficulty of constructing an entry tunnel. This paper describes the drill and blast construction, rock bolting, and shotcrete lining of a 750 ft. long, 15% declining grade, truck tunnel through several Pennsylvanian limestones and shales. This tunnel was constructed from a portal above the 500 year flood level to limestone reserves located 80 ft. below the Missouri River level.. The construction involved precision pre-split blasting of a portal face, blasting within 125 ft. of a 150 year old stone house and within 175 ft. of a major highway and railroad. The wooded campus is located in an urban setting surrounded by large expensive homes. Critical to the success of this project was the necessity to tunnel safely in shale using drill and blast methods. Various drill patterns and techniques were utilized. This project was started in 1991, and substantially completed in 1993. The limestone aggregate mine is now fully operational.

Today's industry press is filled with articles on the benefits of mining underground from an established open pit quarry. The Kansas City area has been mining underground for most of this century. While many underground mines are started from an established face or an exposed bluff, a small company decided to try a different approach to breach the Kansas City market area.