

## Old Union Railroad Tunnel Rehabilitation Federal Railroad Administration

<b>Location:</b>	Baltimore, Maryland
<b>Date:</b>	2004 – 2005
<b>Structure:</b>	Two-Track Railroad Tunnel
<b>Length:</b>	Cut and Cover 960 feet Mined 2,450 feet
<b>Cross-Section:</b>	Width: 38.4 feet (11.7 meters) Height: (39.5 feet (12 meters)
<b>Geology:</b>	Backfill From Previous Construction Consisting of Material with Varying Densities (Loose Sand, Clay and Gravel) and Limited Stand-Up Time; on the Site, Natural Conditions Consist of Weathered Bedrock
<b>Cost:</b>	Approximately \$37.5 Million (Tunnel Structure Only)
<b>Client:</b>	Mueser Rutledge Consulting Engineers (MRCE)
<b>Owner:</b>	Federal Railroad Administration (FRA)

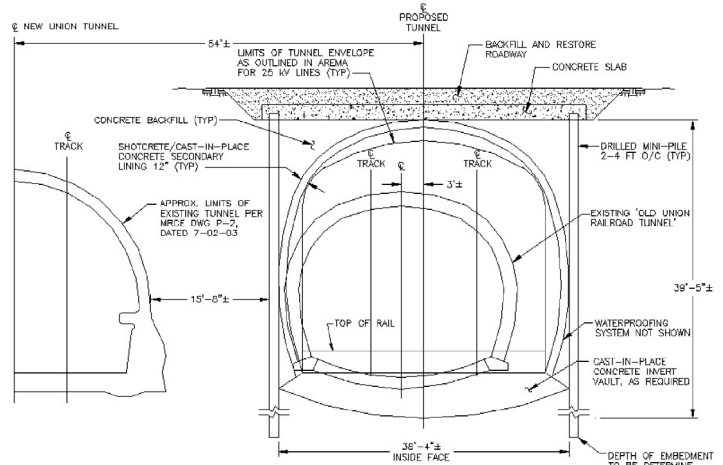


Figure 1. Typical cut-and-cover section (top-down construction) at the portals.

### Tunnel Reconstruction Feasibility Study:

Gall Zeidler Consultants (GZ) developed a feasibility study for the reconstruction of the existing Old Union Railroad Tunnel to allow for an increase of the tunnel clearance envelope. The study called for existing tunnel linings and portions of the surrounding ground to be removed.

GZ proposed a mined option for the reconstruction of the majority of the tunnel and a modified cut-and-cover construction method (top-down) for the portal areas. The proposal also called for a flexible membrane waterproofing system installed between initial shotcrete and final cast-in-place concrete linings. The waterproofing system consisted of a PVC membrane over a geotextile material.