Geohazards in Transportation

Liberty Vehicular Tunnels
Lynchburg, VA
Project Location:
Liberty University, Lynchburg, VA
Design Constraints:

- Eliminate the at-grade crossing
- Construct 2, 32-ft wide by 20.5 ft high by 130 ft long tunnels
- Construct a long-term, low maintenance transportation facility per NS design criteria
- Design for and satisfy railroad concerns
  - No freezing, grouting, cut-and-cover, SEM/NATM or jacking
  - No shut down in operation of yard or main-line
  - AREMA must control structural design
Subsurface Conditions:
Subsurface Conditions:
Construction Concept:

- Confine the embankment
- Avoid embankment “Blowout”
- Mitigate settlement
Construction Concept:

- Pull the box not push it
- Provide confinement
- Engage passive resistance
Construction Methods:

- HDD for spiling and tendon casing
- Auger boring for storm sewer
- Soil nail wall for temporary SOE
- Box jacking (pulling) for two tunnels
- Controlled excavation face with spiling installed at tunnel heading
Spiling:
Soil Nail Wall:
Tendon Casings:
Tendon Casings:
Base Slab:
Box Construction:
Box Construction:
Box Construction:
Box Construction:
Reaction Wall:
Reaction Wall:
Jacking System:
Jacking System:
Box Jacking:
Box Jacking:
Excavation:
Geohazards:
Jacking Forces:

![Graph showing Jacking Force vs Tunnel Distance (ft)](image)
Jacking Forces:
Jacking Forces:
Production Rate:

[Graph showing production rate over time with distances in feet for South and North]
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