

COLORADO Department of Transportation

Improvements For Public Safety and Infrastructure Resilience

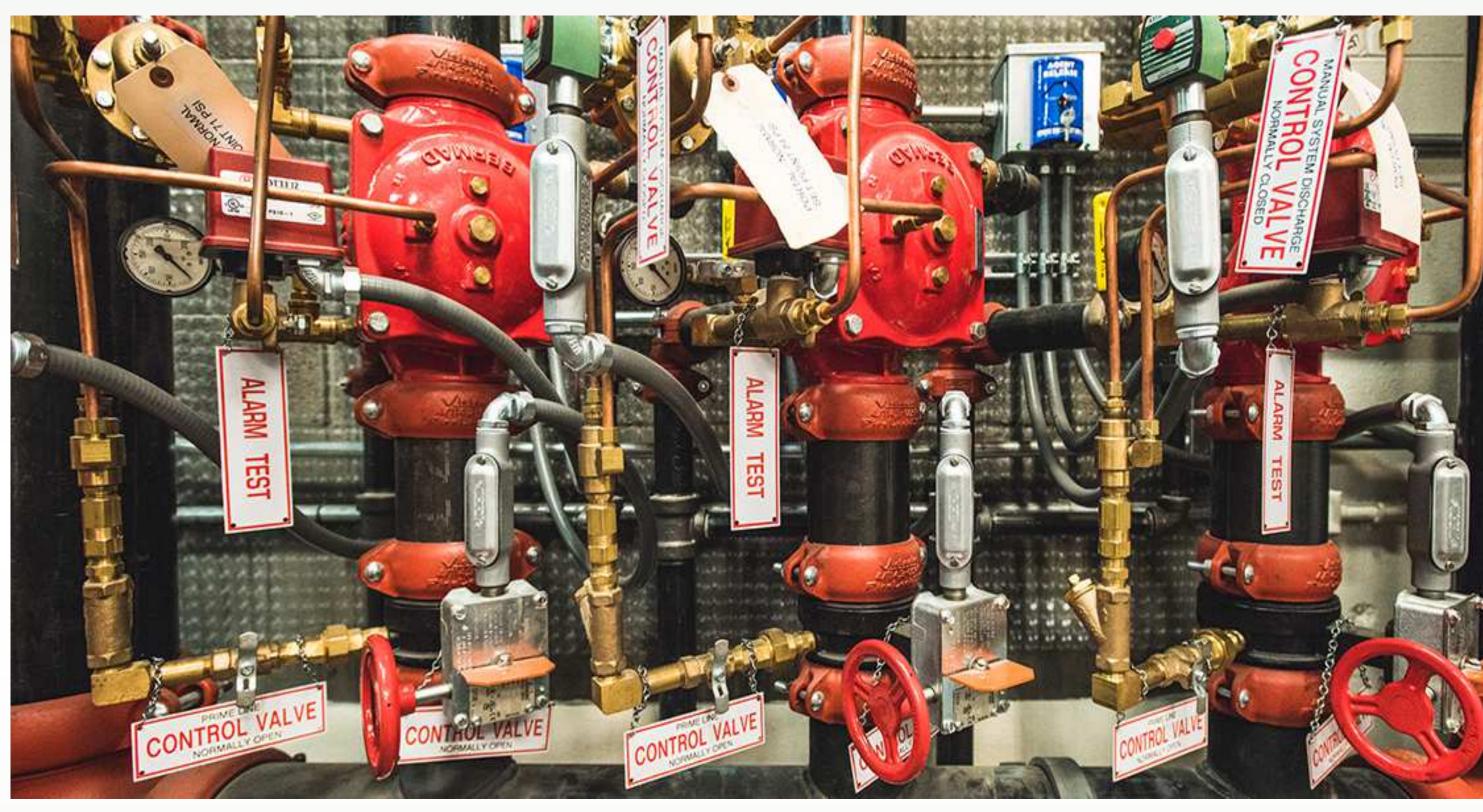
The I-70 Eisenhower-Johnson Memorial Tunnel (EJMT) Fixed Fire Suppression System (FFSS) will help protect the traveling public as well as the tunnel itself, which is a critical asset of the Colorado highway system.

Project Overview

- Location: I-70 Eisenhower Johnson Memorial Tunnels west of Denver, Colorado
- Owner: Colorado Department of Transportation (CDOT)
- Engineers: Rondinelli Life Safety / BCER Engineering teamed with ILF Consultants
- Construction Manager: Barnard Construction Company, Inc.
- Contract Type: Design-Build
- Status: Construction is complete

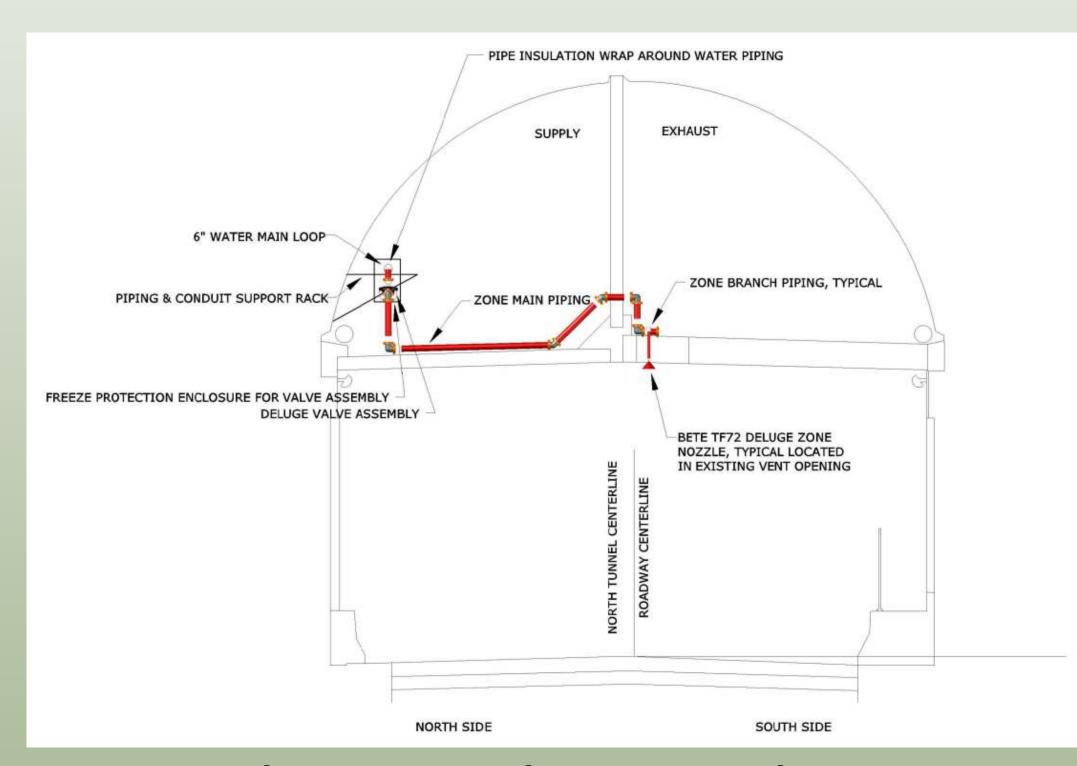


- Design, fabrication and construction of Fire Suppression System for nearly 18,000 lineal feet of tunnel
- Retrofit of existing water supply system
- Drainage system and underground storage tank
- Linear Heat Fire detection system
- Tunnel Operator interface system
- High altitude construction (11,150-ft elevation)
- Aggressive schedule
- Designed with Historical Preservation approval



Water-Only Deluge Fire Suppression System

- The combined volume of the FFSS and the standpipe system is 110,000 gallons over a one hour of operation
- A new fire pump provides the required pressure and flow to the FFSS deluge zones
- A boiler was incorporated within the system and a circulation pump located in the mechanical room to circulate hot water through the supply loop accounting for winter weather conditions and to prevent freezing
- The new 6 inch wet supply loop is located within the intake air plenums above the tunnel road way, the supply loop crosses the fan deck connecting both tunnels to create a complete 18,100 feet loop



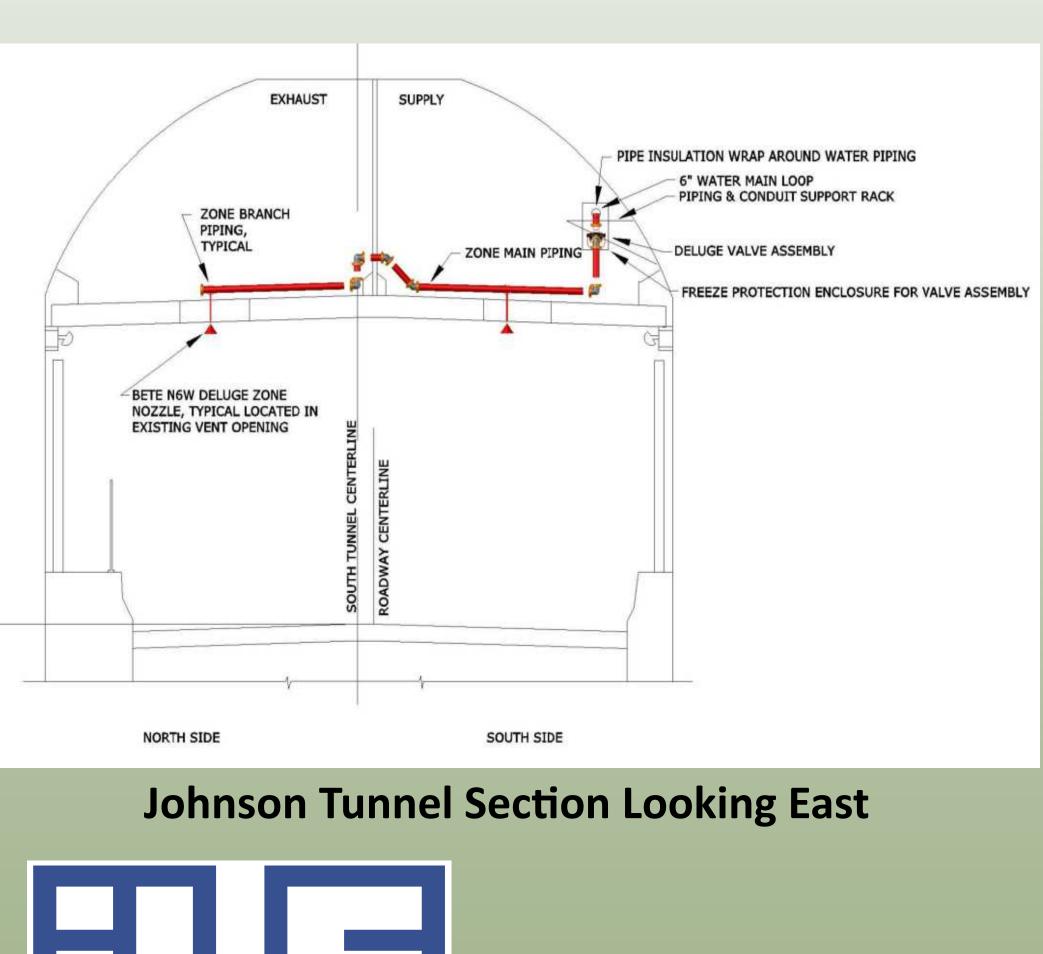
Eisenhower Tunnel Section Looking East

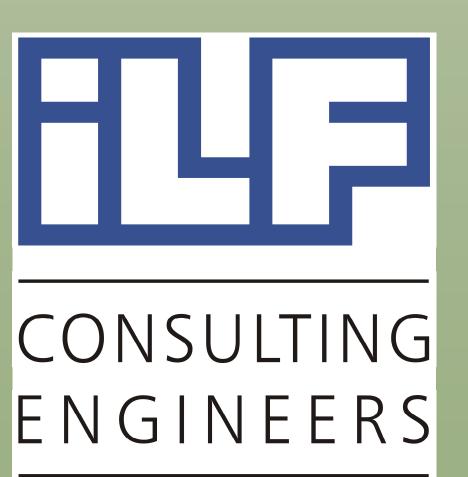


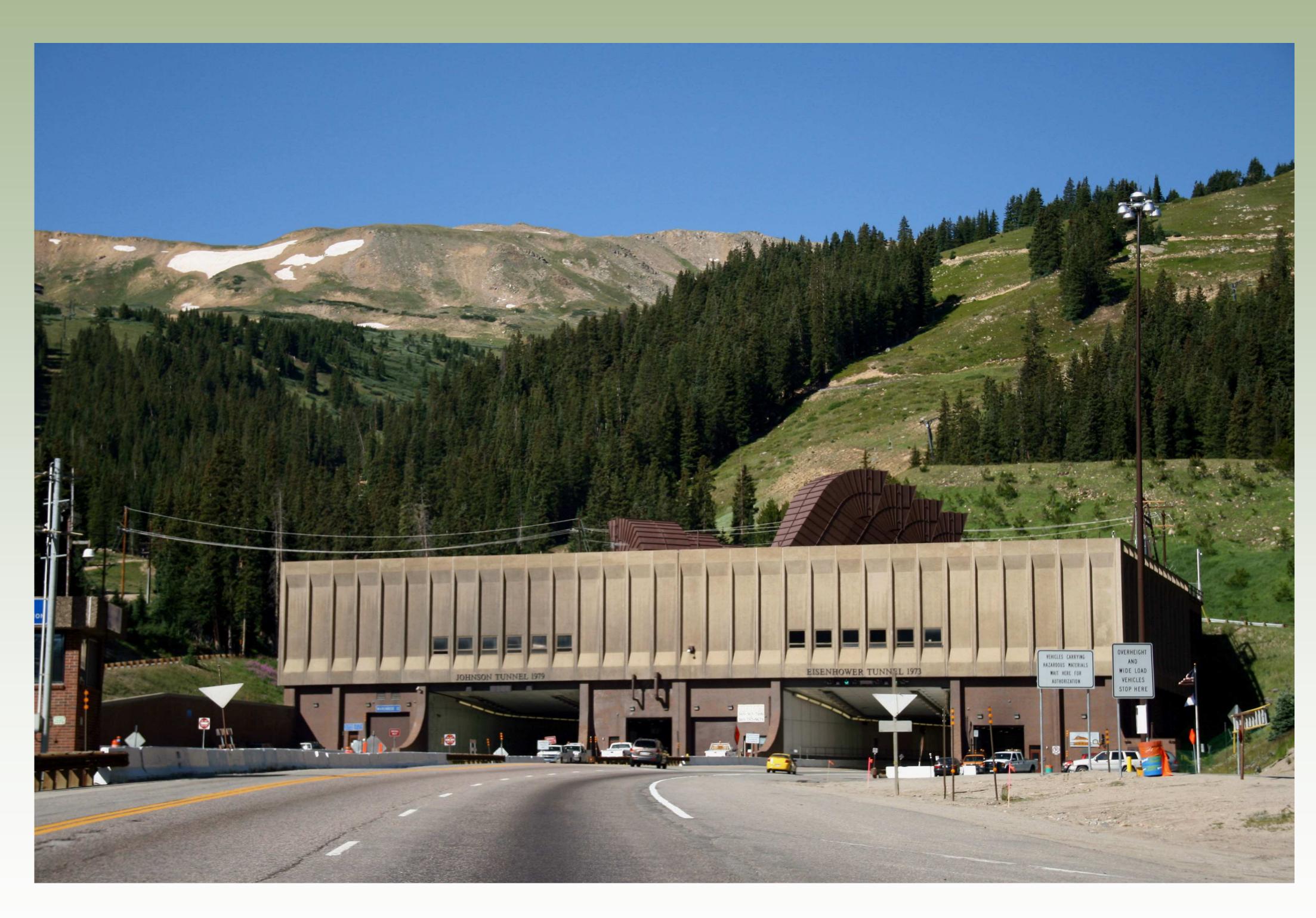


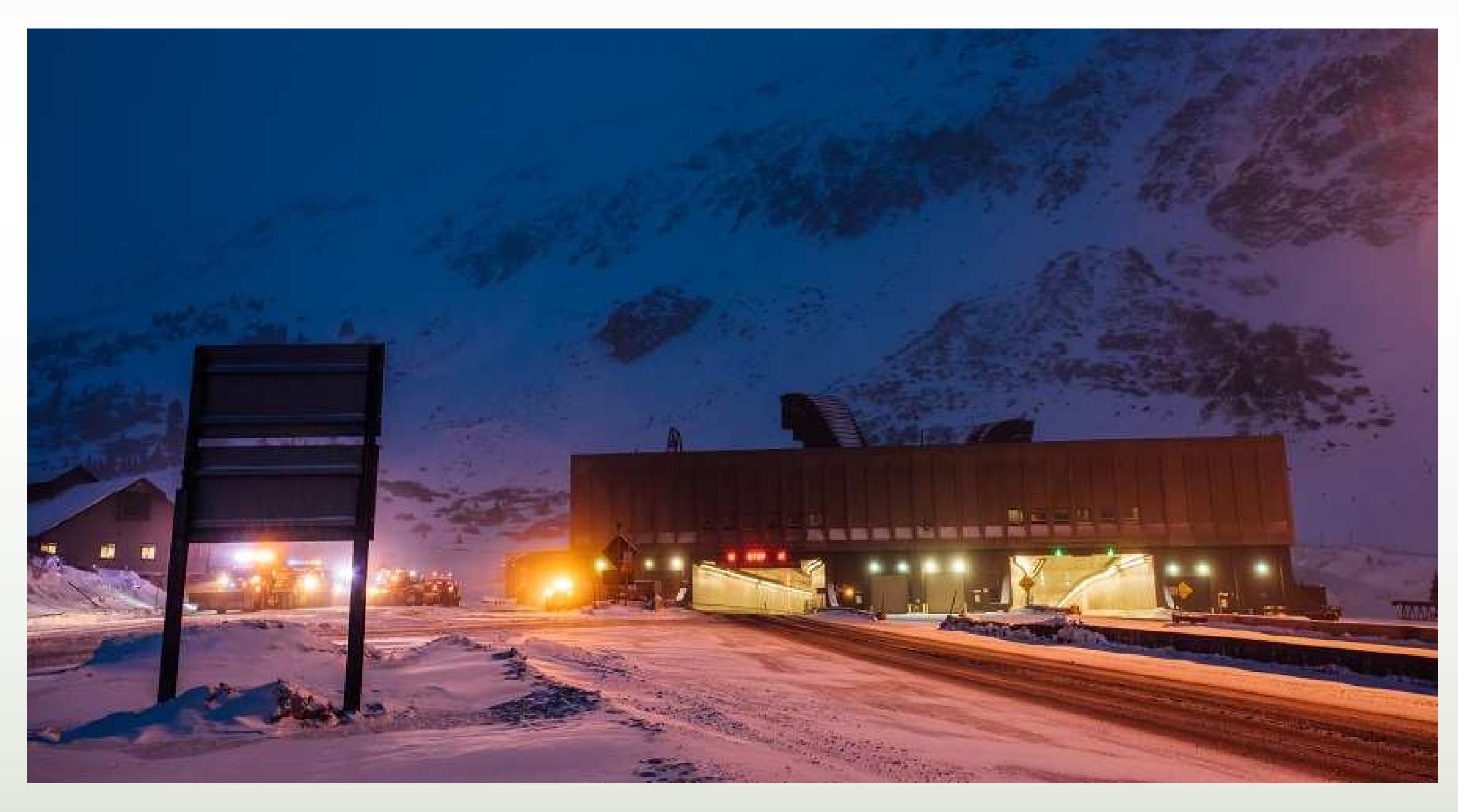
I-70 Eisenhower-Johnson Memorial Tunnel Fixed Fire Suppression System **A Project Case History**

Project Highlights











Fiber Optic Linear Heat Detection

- in advance of an automatic deluge event



Fire Alarm

The new fire alarm system monitors all related Fire Life Safety equipment, reports fire position in the roadway as detected from the linear heat detection system, activates the pre-positioning of closed circuit cameras, and triggers the deluge sprinkler zone to automatically release water in the roadway through the new graphical user interface (GUI)

- Linear heat detection panels are located in the east and west control rooms
- each quadrant of the tunnel
- ventilation plenums



Drainage System

- ity of the FFSS and existing standpipe system
- reach capacity







• The linear heat detection system is zoned to match the deluge zones in each tunnel, zones are approximately 100 ft long • Redundant fiber cable linkage to the twin panels ensure that full surveillance coverage is maintained

• Baseline settings for each zone within the tunnels were established during the initial set-up and commissioning period

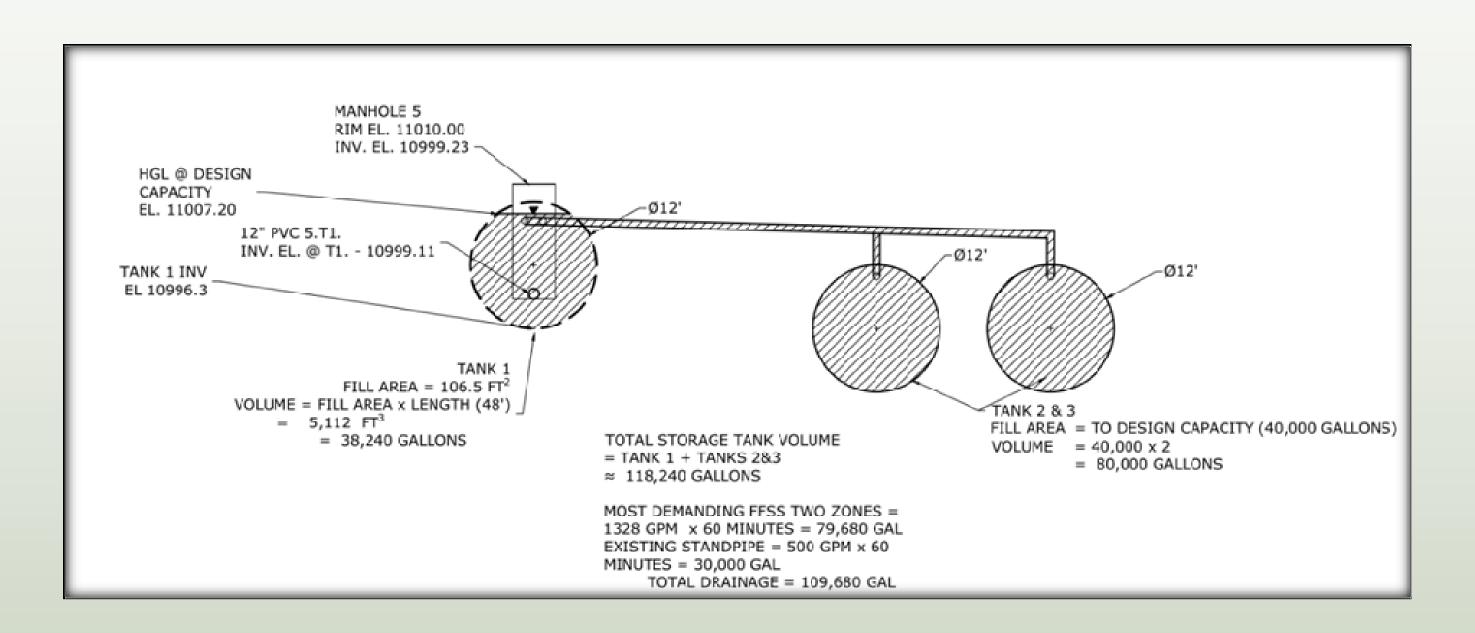
• Trigger temperatures for the camera positioning and the activation of a deluge zone are programmed to activate the cameras



• Fire Alarm Control Panels (FACPs) in the control rooms connect to the Fireworks Color Graphics Display Systems (GUI)

• Four remote control panels are located in the supply plenums to provide monitoring and control of the deluge equipment for

• Twenty-five FPCs house the deluge sprinkler release modules and sprinkler valve monitoring equipment located within



• The existing drainage systems within the tunnels are used to capture water via catch basins positioned every 150 ft

• Automatic valves control the flow of water during normal operation and during activation of the FFSS

• Inlets were added outside the east portal to capture the flow which may escape the in-tunnel drainage system

• The existing storage tank was utilized while providing two new storage tanks to support the required 110,000 gallon capac-

• Level sensor within storage tanks connected to the Fire Alarm Control Panel provide indication to an operator when tanks

