

Dam-Break Analysis Detention Dam for Jefferson at Broadmoor Colorado Springs, Colorado

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Anderson Consulting Engineers, Inc. (ACE) staff completed this project for Nolte and Associates, Inc. while they were previously affiliated with Lidstone & Anderson, Inc. The project involved an Incremental Damage Analysis (IDA) on a minor size Class I flood detention dam in a heavily urbanized area of Colorado Springs, Colorado. The primary flow path and subsequently the inundation zone downstream of the dam consisted of paved urban streets, residences, an elementary school, businesses, and a major road crossing. The detention pond was design for the 100-year event however; the Colorado Office of the State Engineer requires that a minor Class I dam must be able to safely pass an Inflow Design Flood (IDF) generated by 50 percent of the Probable Maximum Precipitation. Given the existing urbanization downstream of the structure an Incremental Damage Analysis was performed to justify a lower IDF.

The National Weather Service's BREACH model was utilized to predict the breach characteristics (size and time of formation) of the earthen Broadmoor Dam. The National Weather Service's DAMBRK model was used to predict the breach outflow hydrograph. Routing of the breach hydrograph downstream, utilized the U.S. Army Corp of Engineer's (USACOE) Flood Hydrograph Package (HEC-1). Inundation zone flow depths and velocities were determined using the USACOE HEC-2 model.

After delineating $\frac{3}{4}$ mile of inundation limits an evaluation was performed (IDA) on the structures included in the inundation zone using criteria promulgated by the Colorado Office of the State Engineer. The results of the IDA indicated that the Broadmoor Dam required IDF could be safely lowered from 50 percent of the PMP to the 100-year event. The Colorado Office of the State Engineer subsequently approved the analysis performed by Anderson Consulting Engineers, Inc.

