U.S. 40 - Berthoud Pass East

Context Sensitive Design
For Rural Roads

Michelle Li  CDOT - Region 1
Planning & Environmental Manager
U.S. 40 - Berthoud Pass East
Project Description

- Purpose & Need: “To construct a feasible improvement which will increase operation efficiency of US 40 on Berthoud Pass.”

- Primary Considerations: Environmental Mitigation and Recreational Area Access from the Highway

- Historic mountain pass over the Continental Divide (from Berthoud Falls to summit)

- Location: 50 miles west of Denver in Clear Creek County

- Length: 5 miles   - Total Cost: $70 million

Project History

- Named for Captain Edward L. Berthoud, who discovers it in 1861 while exploring a direct mail route through Colorado
- First built in 1874 as a narrow, private wagon road
- U.S. Forest Service and Colorado Highway Department agree to construct it as an improved automobile road in 1919
- Construction begins in 1920 and is completed in 1923
- Is further widened and paved in 1938, becoming an important access route for central Colorado
CSS Approach

What makes this a CSS project as opposed to the traditional format?

Project initiated with the following CSS objectives:
• Iterative and comprehensive public involvement process
• Roadway improvements to meet driver expectancy
• Address other safety and travel efficiency needs
• Protect and improve water quality and wetlands
• Improve visual quality by following USFS objectives
• Enhance access to recreation resources
• Compatibility with wildlife and USFS scenery management
• Avoidance of Arapaho National Forest impacts
Transportation Needs

- Improve safety and traffic flow
- Resolve roadway deficiencies involved with snow storage
- Vegetate eroded and unstable slopes
- Minimize surface icing and water quality problems
- Prevent wildlife/vehicle collisions by inclusion of three wildlife underpasses

28’ to 40’ Wide
Compatibility with Natural Environment

Environmental Issues Considered

• Water Quality and Erosion Control
• Slope Stability and Plant Establishment
• Wetlands
• Threatened and Endangered Species
• Avoidance of the Alpine Forest
• Visual Resources
• Cultural and Historic Impacts
• Social Impacts to the Local Community and Ski Industry
Compatibility with Human Environment

Community Needs
- Increased mobility of U.S. Highway
- Improved highway safety for drivers
- Enhanced access to mountain resort communities
- Aesthetic considerations

Major Issues
- Getting public buy-in on future benefits of improving Berthoud Pass during construction phase
- Traffic management during construction phase
Project Vision

Issues and Solutions

- Safety and mobility
- Water quality
- Wetlands
- Wildlife
- Visual resources
- Recreation/historic restoration
- Construction sequencing
- Financial constraints
Seamless Stakeholder Involvement Process

Stakeholders

• Iterative design/analysis process
• Value Engineering process
• USFS, CDOT and FHWA Interdisciplinary Team
  – Environmental Assessment
  – Design
  – Construction
• Partners for Access to the Woods (PAWS): non-profit group addressing ADA compliance and accessibility issues on public lands
Seamless Stakeholder Involvement Process

Level of Public Involvement

- Communication Methodologies: open houses, newsletters, small group meetings, agency contacts
- Role of the Stakeholders: consensus of preferred alternative, identification of mitigation measures, selection of aesthetic treatment
Transportation Successes

- Widened the roadway from two to three lanes
- Added a guardrail to reduce rate and severity of accidents
- Created shoulders for turn-offs and snow storage
- Increased design speed of switchbacks
- Built retaining walls to reduce risk of falling rocks
- Addressed a range of aesthetic and design challenges
Facility as a Community Asset

- Regional Context: Access to mountain recreation areas (Winter Park Ski Resort and Rocky Mountain National Park)
- Local Context: Access to homes and businesses
Challenges of Using a CSS Approach for this Project

Challenges

• Getting the public involved and accepting of “short-term pain for long-term gain”
• EA scheduled for only one year, but took three to complete
• Learning to conduct business in a new way
• Required an education process
• Financial and budget constraints
Challenges of Using a CSS Approach for this Project

Financial and Budget Constraints

- Strategic project for CDOT
- Rigid schedule and budget
- Phases 1 & 2 - Approximately $45 million total allocation
- Extremely tight schedule for NEPA process and design
Challenges of Using a CSS Approach for this Project

Design Challenges and Solutions

- Multi-disciplinary team blending CDOT, FHWA, and consultant staff
- Consideration of traffic clamming built into roadway alignment
- Tremendous geological challenges
  - Avalanche chutes
  - Landslides
  - Very high retaining walls
Accomplishments from Using a CSS Approach for this Project

Accomplishments

• Precedent-setting project for CDOT, resulting in other spin-off CSS projects
• Developed long-term partnership between CDOT and USFS
• Project outcome heralded as exceeding original expectations, while continuously “raising the bar” for future CDOT projects
• Recognized as exemplary by AASHTO, International Erosion Control Association, FHWA, and American Road & Transportation Builders Association
Significant Atypical Project-Specific Issues

- Topography: 11,000 ft. elevation at summit
- Design constraints: sharp curves and tight switchbacks, cutting through US Forest Service land
- Strategic CDOT project of statewide significance
- Little room for construction activity, short season (June through October)
- Traffic control in a year-round recreational area
- Visual aspects of the corridor
- Historical/archeological
- Ecosystem/native habitat
CSS Bottom Line

• How were our actions different?
• How was our attitude different?
• How was our decisionmaking different?
• How did our customers respond as partners?
• Was there buy-in from all?
Contact Information

For further information please contact:
Michelle Li – Colorado Dept. of Transportation
Region 1 - Planning & Environmental Manager
(303) 757-9112  michelle.li@dot.state.co.us

Daniel A. Lovato - U.S. Forest Service
Clear Creek District Ranger
(303) 567-3001  dalovato@fs.fed.us