Delivering & Developing a Context Sensitive Solution in a Mountain Environment
Putting the Buildability in Your Projects
2017 AASHTO SCOD/SCOE  Des Moines, IA
Buidability in your project

• I-70 Mountain Corridor: Background
• Creating a Vision & a Culture: Developing Consensus, Process and Toolkit
• Implementing the Vision: Design and Construction
• Best Practices
I-70 Mountain Corridor

PPSL Improvements
Narrow Canyons, Rock Cuts, and Tunnels, Curves
Sensitive Environment
• Studied for more than twenty years
• Collaborative Effort’s Consensus Recommendation (2008)
• Tier 1: Programmatic Environmental Impact Statement & Record of Decision (2011)
• Adaptive Management
Context Sensitive Solution Approach

- Establish core values for community, environment
- 6 step process for decision making
- Tools to navigate through the steps, including:
  - Design criteria, Aesthetic guidelines
  - Multi-agency agreements related to:
    - wildlife mobility,
    - historic resources and districts,
    - water quality and overall creek health
Eastbound Peak Period Shoulder Lane (Mountain Express Lane)

Description: A tolled peak period shoulder lane (PPSL) will be added (8 miles) from the US 40/I-70 interchange to east Idaho Springs, eastbound lanes only.

- PPSL open during greatest congestion during peak season: Saturdays, Sundays, and holidays
- Two general purpose lanes will be free and open to all travelers
- Shoulder will be Managed Lane
Purpose and Need

Purpose:
To relieve congestion on eastbound I-70 when traffic volumes are highest

Needs:
- Unreliable and long travel times
- Decreased access to recreation and local commerce
- Congested frontage roads
- Safety issues, increased crashes
- Longer emergency response times
Cross-sections

Existing Condition

- 12' GP Lane
- 10' Shoulder

Peak Period Operations

- 11' PPSL
- 11' GP Lane

Normal Operations

- 12' GP Lane
- 12' GP Lane

Major Project Elements

- Roadway Widening (1-3 ft.)
- Replaced two bridges
- Retaining walls
- Signage (ATM)
- Rockfall mitigation
- Improve Water Wheel Park
How to achieve Buildability

• Use tools in the toolkit and Every Day Count Initiatives:
  – Context Sensitive Solutions
  – Flexibility with Design Criteria
  – Aesthetic Guidelines
  – Innovative Contract Delivery
CSS: Concept  -->  Implementation

• Gain trust with Stakeholders and public by having an open and collaborative dialogue.

• Stakeholders and CDOT knew the rules
  – CSS process is used to aid in making decisions
  – Understanding of what CSS is not; an authority for making decisions
  – Avoid “Back Tracking”

• Established core values
Flexibility with Design Criteria

• Design Criteria variances allowed team:
  – Balance multiple core values and come to compromise that fits the context
  – How an “Interim Project” needs to minimize impacts

• Further refinements of the process included addressing peak and off peak tradeoffs

• Document variances in FHWA request and monitor via an MOU
Aesthetic Guidelines

- Focus on “Contextual Design” using the Corridor specific Aesthetic Guidelines

- Used for walls, plantings, rails, scaling, signage, color treatments, structures
Innovative Contracting

Construction Manager/ General Contractor (CM/GC)

– Blended Team (CDOT, Design Consultant and Contractor) allowed for:
  • Increased collaboration
  • Risk Allocation
  • Flexibility in field changes
  • Optimize phasing as a minimization measure
  • Constructability review
CM/GC Basics

• CM/GC is Construction Manager/General Contracting.
• A contracting method that involves a Contractor in both the design and construction phases of a project.
• The intent is to form a partnership with CDOT, the Design Consultant, and the Contractor.
SH 103 bridge replacement
Retaining Walls

- Eleven new retaining walls
- Rehab existing retaining walls
Retaining Walls
Context sensitive signage

- Signs: in median and on road side
- 19 new overhead signs
- 9 are Active Traffic Management signs
- Variable Speed Limit (VSL) signs will replace existing speed limit signs
Improvements for water wheel park and the greenway trail

- Redesign plaza area
- Improve creek access
- Reduced noise
- Install interpretive and retaining walls
- Install landscaped areas with native vegetation
Project benefits

- Improved conditions for pedestrians and cyclists
- Decreased noise near Lawson and Water Wheel Park
- Improved water quality
- Improved conditions at the Water Wheel Park
Project benefits

- Reduced travel times by 25-50% during peak periods
- Less traffic on local roads
- Better emergency service response times
- Fewer crashes and improved safety
Best Practices

• Significant stakeholder involvement
• Resource/staff commitment from multiple agencies and industry
• Established tools allows projects to move quickly through NEPA, final design, construction. No need to revisit past decisions if assumptions are still true.
• Allows for corridor to continue its momentum. (internally, externally)
The I-70 Corridor Successes

- Spend time setting up tools and commit to implementing the CSS process has rebuilt trust along the corridor with stakeholders
- Leverage Every Day Counts Initiatives
- Create culture of Adaptive management and continuous improvement
  - Measure effectiveness of improvements
  - Focus on maximizing benefits and compatibility of individual projects rather than “Building Out The Corridor”
Thank You

- Questions?

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Two possible outcomes of “bid”

1. **Owner gets acceptable Guaranteed Maximum Price (GMP)**
   - Proceed with construction

   Or

2. **Owner doesn’t get acceptable price**
   - Proceed with more design
   - ultimately convert to Design-Bid-Build
Project Delivery Phase Comparisons
Differences in Risk Allocation

Unit of Risk

Contractor Risk

DBB
CMGC
DB
CM/GC Process

• Owner hires designer and CM/GC contractor (after preliminary design)
  – CM/GC contractor hired with Best Value selection—the earlier the better
  – CDOT selection criteria has Experience, Project Approach, Price, and Approach to Price

• Team works on design
  – Contractor provides advice on Constructability, Schedule, Materials and Budget
  – Iterations address risk (Heavy involvement from owner specialty units)
  – Periodically owner asks CM/GC to price job
Benefits of CM/GC

- Fostering innovation
- Mitigating risk
- Improving design quality

- Improving cost control
- Optimizing construction schedules
Site Specific Project Challenges

• Highly compressed time table to deliver project
• Narrow project corridor with restricted access
• Large number of stakeholders taking advantage of local area
• Highly visible, dangerous work, along primary transportation corridor.
Twin Tunnels: Best Practices

- Stakeholder support for decision making process
- Active participation from contractor on multidisciplinary teams
- Co-location
- Dedicated agency staff and resources
- Conditions attached to environmental clearance for each phase
- Commitment Tracking