**STATE OF COLORADO**
DEPARTMENT OF TRANSPORTATION
REGION 1 I-70 MTN CORRIDOR PROGRAM
425A CORPORATE CIRLCE - GOLDEN, CO 80401
(720) 497-6900 (OFFICE), (720) 497-6901 (FAX)

# I-70 EB Peak Period Shoulder Lane Project

**Project Number: NHPP 0703-401**
**Project Code: 19474**

# Technical Team Meeting #9

## January 27, 2014

CDOT I-70 Mountain Corridor | HDR Engineering, Inc.

# AGENDA

1. INTRODUCTIONS AND OVERVIEW
   - Project Schedule
   - Other Project Efforts
2. RESPONSES TO TECHNICAL TEAM ISSUES
   - Define Interim
   - Local Roadway Network
3. OUTCOMES FROM ISSUES TASK FORCE MEETINGS
   - Idaho Springs Workshop 1/21/14
   - Rafting Meeting 1/9/14
   - Constructability Review 12/18/13
4. OUTREACH SUMMARY
5. FOLLOW UP
   - Pullout Locations
6. REVIEW PROPOSED SOLUTIONS
   - Initial Environmental Findings
   - Signing
   - SH 103
   - East Idaho Springs
   - Greenway
   - Noise
7. OUTSTANDING ISSUES
8. DEVELOP CRITERIA FOR:
   - ??
9. NEXT STEPS

## CORE VALUES

- SAFETY
- MOBILITY
- CONSTRUCTABILITY
- COMMUNITY
- ENVIRONMENT
- ENGINEERING CRITERIA AND AESTHETICS
- SUSTAINABILITY

**STEP 1**
Define Desired Outcomes and Actions

**STEP 2**
Endorse the Process

**STEP 3**
Establish Criteria

**STEP 4**
Develop Alternatives and Options

**STEP 5**
Evaluate, Select and Refine Alternatives and Options

**STEP 6**
Finalize Documentation and Evaluation Process

# PROJECT SCHEDULE

- **CONCEPT OF OPERATIONS REPORT**
  - FEBRUARY 2014
- **ENVIRONMENTAL ANALYSIS**
  - JANUARY 2014
- **OPEN TO TRAFFIC**
  - FALL 2015

# OTHER PROJECT EFFORTS

- Traffic and Revenue
- Twin Tunnels
- Westbound Tunnel Expansion
- AGS
- CCC Transportation Visioning
- Operational Pilot Projects

RESPONSES TO TECHNICAL TEAM ISSUES

# ➢ PARKING LOT

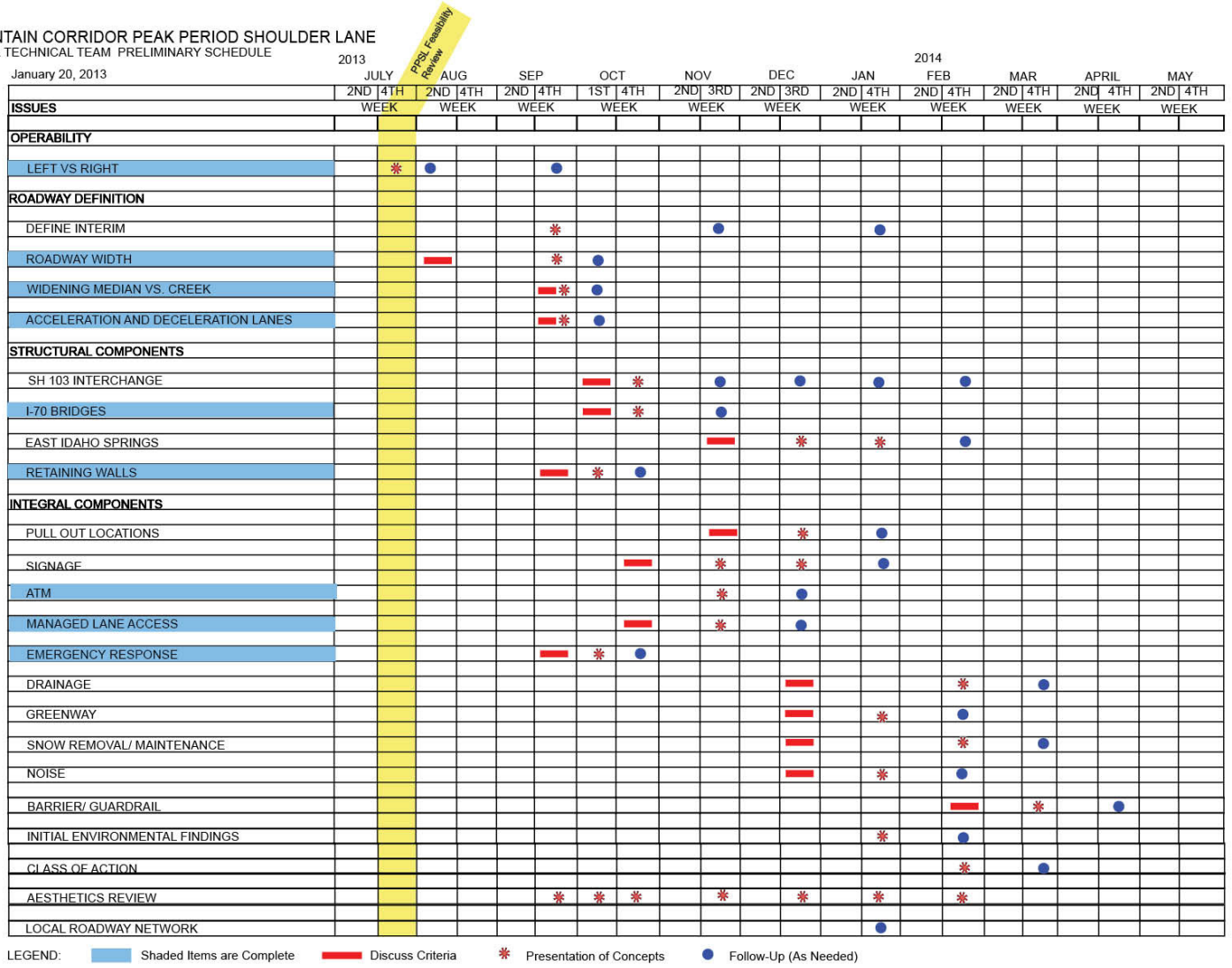
- **Define Interim**
- **Local Roadway Network**
- EA versus Cat Ex
- Snow removal
- Cooperative Agreements (revegetation, **greenway**, transportation, etc.)
- Enhancement opportunities along creek (revegetation etc.)

# CSS TRACKING SCHEDULE

## I-70 MOUNTAIN CORRIDOR PEAK PERIOD SHOULDER LANE

ISSUES FOR TECHNICAL TEAM PRELIMINARY SCHEDULE

January 20, 2013



# GLOSSARY OF TERMS

| | |
|---|---|
| **Acceleration Lane** | A lane adjacent to the primary travel lane that allows drivers to accelerate before merging into traffic on the main road |
| **Active Traffic Management** | A method of increasing peak capacity and smoothing traffic flows on busy major highways. Techniques include variable speed limits, hard-shoulder running, ramp-metering and may be controlled by overhead variable message signs . |
| **Auxiliary Lane** | Along a highway an auxiliary lane connects entrance and exit ramps, with the entrance ramp or acceleration lane from one interchange leading to the exit ramp or deceleration lane of the next. |
| **Breakdown Lane** | A strip of ground with a hard surface beside a major road where vehicles can stop in an emergency. |
| **Deceleration Lane** | A lane adjacent to the primary travel lane that allows drivers to pull off the main road and decelerate safely in order to turn or exit without slowing the traffic behind. |
| **Dynamic Toll** | A toll per vehicle that increases or decreases depending on the level of congestion in order to maintain the smooth flow of traffic. |
| **EOP** | Edge of pavement. |
| **General Purpose Lane** | A traffic lane that does not have any restrictions, such as time of day or type of vehicle that may use the lane. |
| **Interim Solution** | A capacity improvement on a roadway that will not be a permanent solution. |
| **Managed Lane** | In this case, the managed lane operates during a peak period and traffic utilizing that lane will be required to pay a toll. |
| **Median** | The central area between divided highway lanes with traffic traveling in opposite directions. |
| **Peak Period Shoulder Lane** | This is a lane of traffic that may function either as a shoulder and a managed lane or a shoulder and a general purpose lane, depending on left versus right. |
| **Rumble Strips** | A series of raised strips across a road or along its edge that make a loud noise when a vehicle drives over them in order to warn the driver to go slower or that he or she is too close to the edge of the road |
| **Traffic Management Operations** | A coordinated approach to road traffic management where ITS traffic data is utilized to provide traffic information across various platforms to allow for more effective incident management and more efficient management of traffic. This could include continual monitoring of video feed from the corridor. |

# CSS PROCESS

## Context Statement

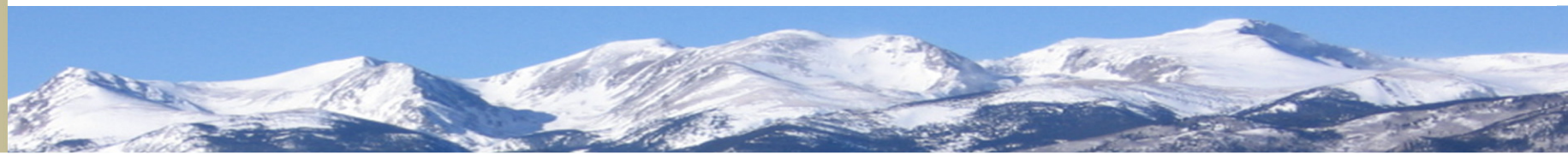
The I-70 mountain corridor is Colorado's only east-west interstate and the primary access route from Denver to the mountains of western Colorado.

The segment of the I-70 corridor that runs from Empire Junction to the Twin Tunnels at Idaho Springs has spectacular view sheds and is one of the most heavily populated areas of Clear Creek County. It also is one of the narrowest sections in the corridor, with the roadway located on the canyon floor adjacent to Clear Creek. This segment of interstate is an important link for the community, acting as a major arterial throughout the area and also providing multi-modal forms of transportation. Improvements to the interstate in this area directly impact established communities as well as unique environmental, historic and recreational resources.

This segment of the corridor experiences heavy flows of eastbound traffic causing severe congestion and traffic delays during peak periods, especially at the I-70/US 40 interchange at Empire Junction.

Short term operational strategies need to be explored until sufficient funding can be obtained to implement the corridor's ultimate vision.

| Core Values | Critical Issues | Evaluation Criteria |
|---|---|---|
| Safety | • Emergency Response<br>• Safety of Travelling Public<br>• Local and Tourist Driver Expectancy<br>• Incident Management | 1. Address Safety During PPSL Operations?<br>2. Maintain Safety During non-peak times? |
| Mobility | • Reliability<br>• Operations<br>• Maintenance<br>• Active Management<br>• Roadway Connectivity/Network | 3. Improves mobility and reliability during peak times for both I-70 and the local roadway network?<br>4. Minimize the effort required to maintain the option? |
| Constructability | • Fiscally Responsible Costs<br>• Limit Throw Away Work<br>• Adverse Impacts to Enviro/Community<br>• Minimize Infrastructure Improvements<br>• Keep to Operations Project<br>• Adaptability | 5. Enable the project team to achieve the goal of opening PPSL by July 1, 2015?<br>6. Create infrastructure investments that are reasonable to construct and provide the best value for their life cycle, function and purpose. |
| Community | • Recreation<br>• Historical and Cultural Resources<br>• Tourism and Economy<br>• Local Access<br>• Signing<br>• Livability<br>• Effects to low-income and minority populations | 7. Allow for a process to engage and communicate with all the local, regional and national users of the I-70 Mountain Corridor?<br>8. Create opportunities to "correct past damage"?<br>9. Provides access and protects opportunities for enhancements to tourist destinations, community facilities, interstate commerce and also limits disproportionate effects to the community? |
| Environment | • Clear Creek<br>• Wildlife Habitat and Movement<br>• Mining and Metals<br>• Water Quality<br>• Sediment<br>• Air Quality<br>• Noise<br>• Wetlands | 10. Incorporate sustainability by using locally available materials and environmentally-friendly processes?<br>11. Protect or create unique features for the area as a gateway?<br>12. Protect wildlife needs?<br>13. Protect Clear Creek?<br>14. Protect the defining historical elements of Clear Creek County? |
| Engineering Criteria & Aesthetic Guidelines | • Balance Design Using CSS Guidance<br>• Aesthetics Inspired By Surroundings<br>• Adherance to ROD<br>• Use of Most Recent Technology | 15. Meet CDOT and industry standards?<br>16. Achieve the mountain mineral belt aesthetic guidelines?<br>17. Meet the I-70 Mountain Corridor design criteria? |
| Sustainability | • Blends with Future Possibilities (AGS, Transit, Greenway, etc.)<br>• Definition of Interim<br>• Idaho Springs Visioning | 18. Preserve opportunities for the AGS and the ultimate preferred alternative?<br>19. Adaptable for future changes/projects (including Idaho Springs Visioning)? |



# ISSUES TASK FORCE MEETINGS

- Idaho Springs Workshop 1/21/14
- Rafting Meeting 1/9/14
- Constructability Review 12/18/13

OUTREACH SUMMARY

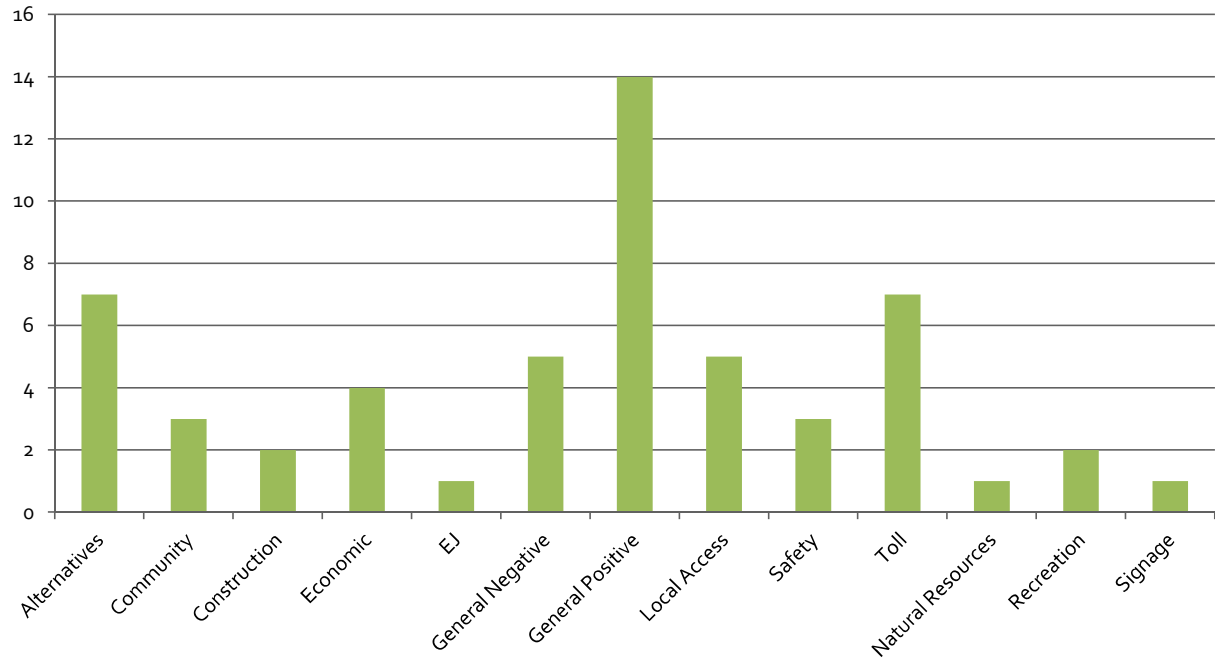
# Fast Facts

- Web Site Peak on December 16 – 130 Hits
- 37 Total Comments
- 24 Commenters
- 53 Comment Issues
  - General Positive: 14
  - Toll: 7
  - Alternatives: 7
- 40+ Individuals Participated in the Polls
  - Social Media and Email are best promotion tools
  - Safety is the most important issue: 14

OUTREACH SUMMARY

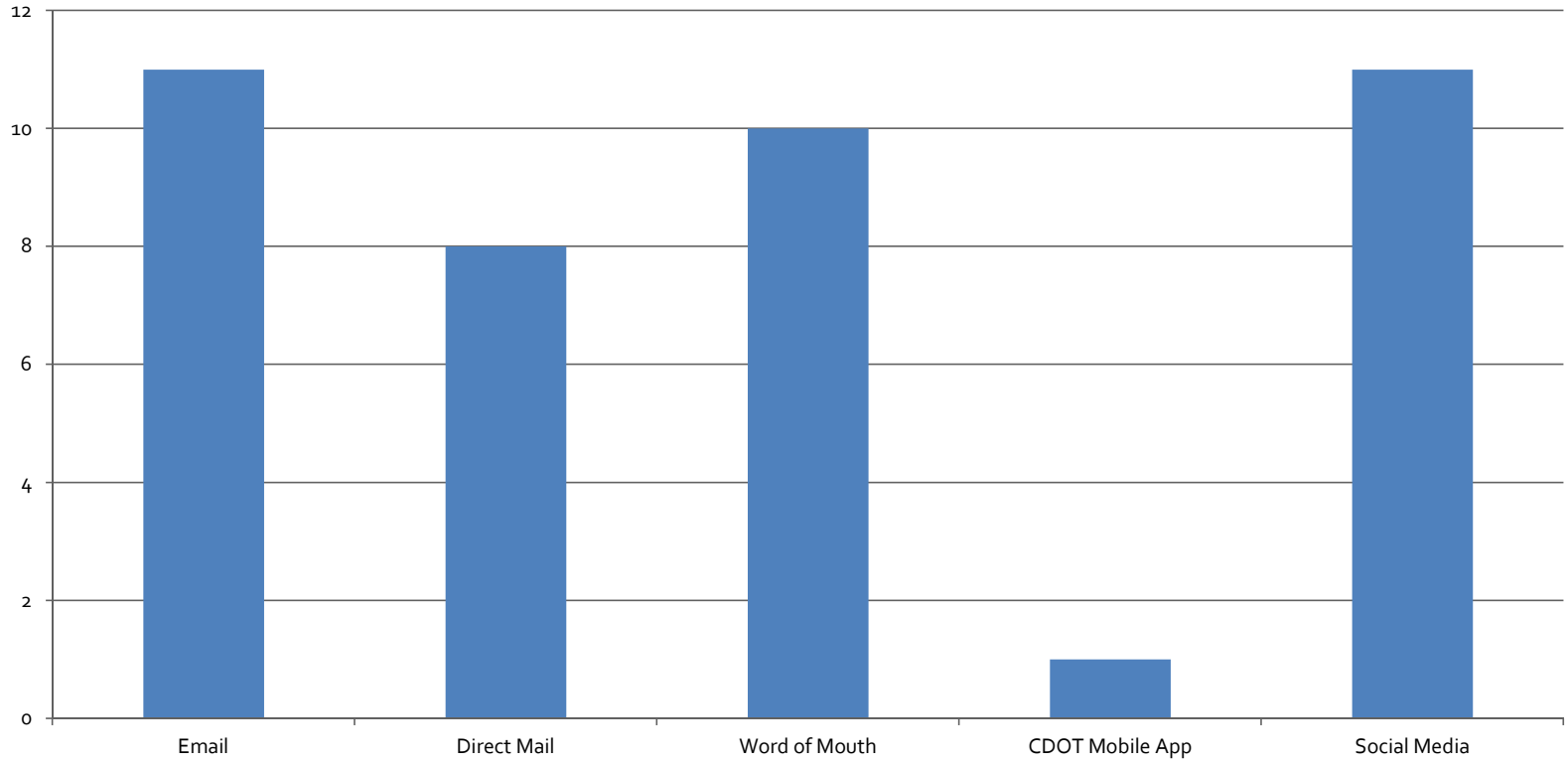
# Comment Issues

Polling Summaries



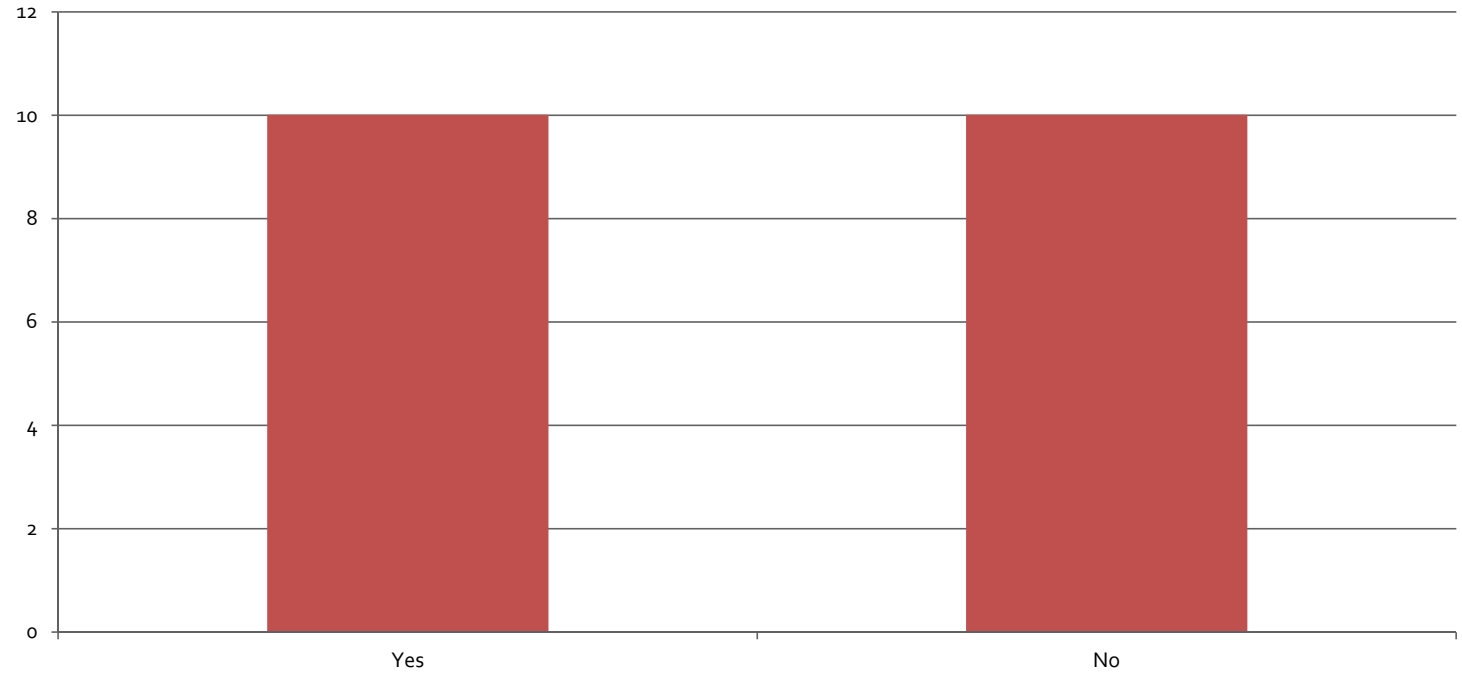

OUTREACH SUMMARY

# How Did you Hear About This?



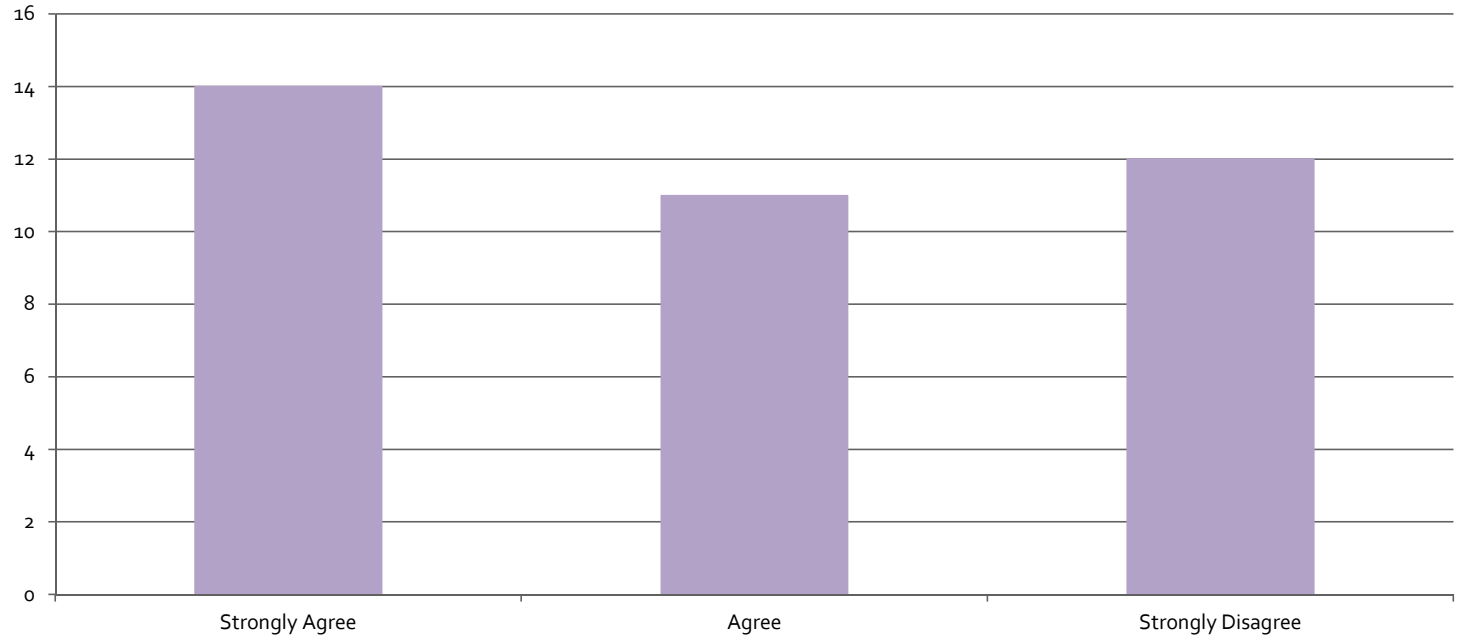

OUTREACH SUMMARY

## PPSL will provide a benefit for users who are willing to pay a toll to lessen congestion on the normal usage lanes. If this project goes forward do you see yourself using tolled lane?



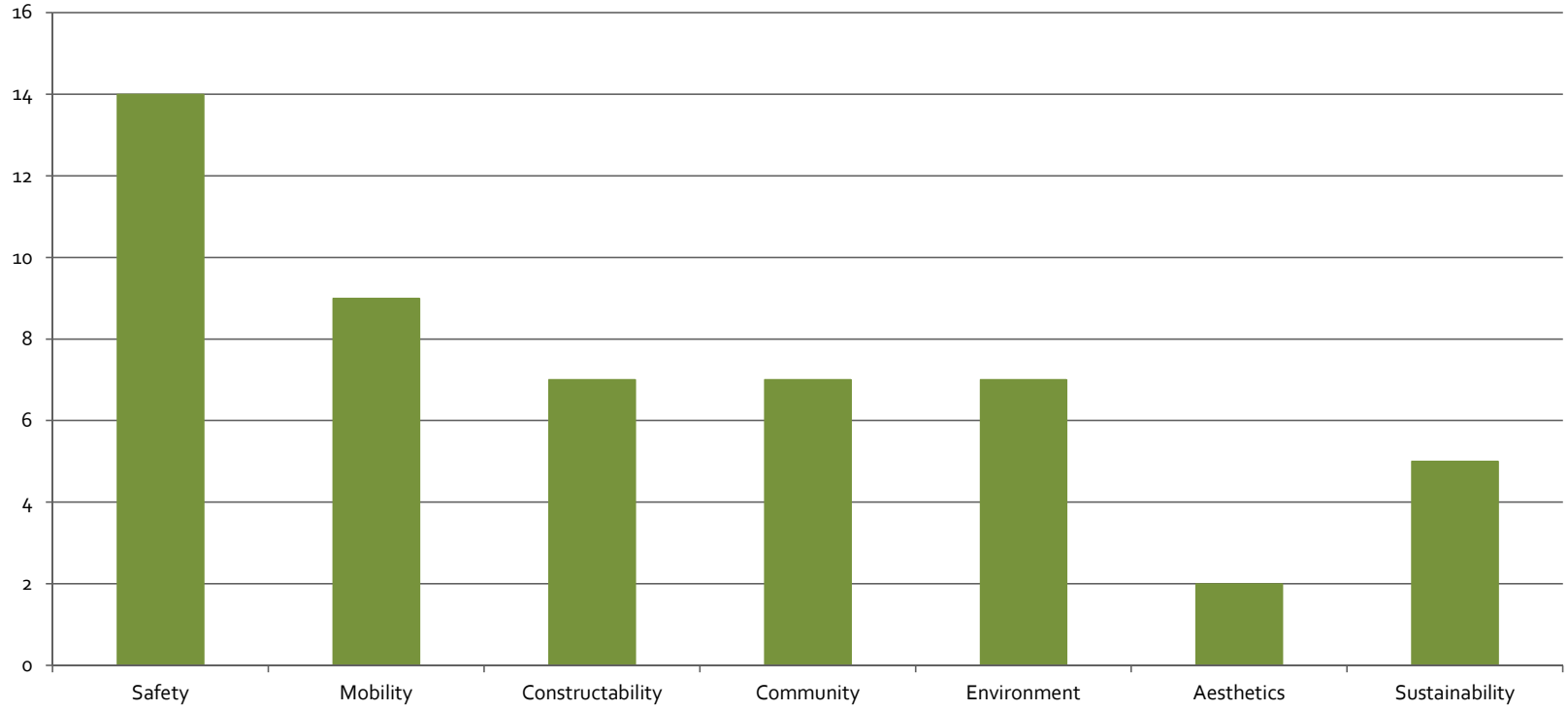

OUTREACH SUMMARY

# Is this project a high priority for the state?



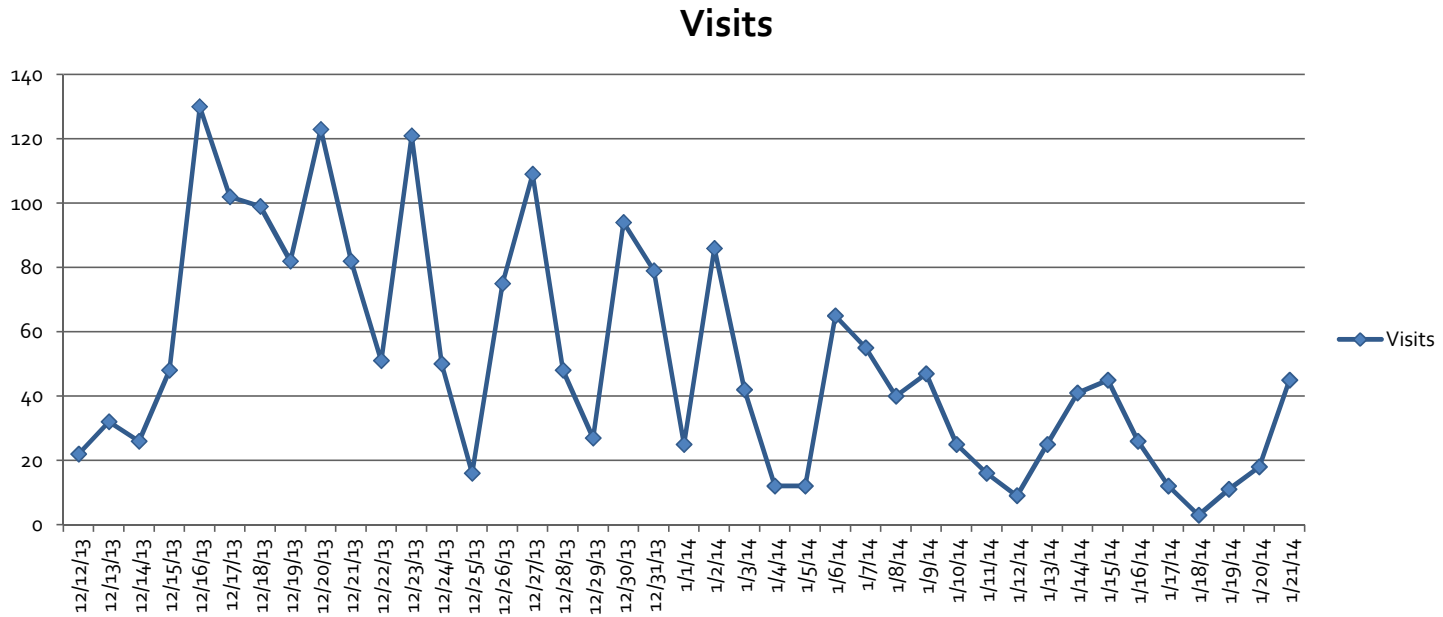

OUTREACH SUMMARY

# What core value is most important to you?



OUTREACH SUMMARY

# Web Activity



# EMERGENCY PULLOUTS

# EMERGENCY PULLOUTS

- Required Length:  510 ft to 710 ft (including tapers)
- Required Width:  12 ft to 16 ft
- Should be paved
- Should be large enough to accommodate a tractor trailer unit and at least one piece of emergency equipment

EMERGENCY PULLOUTS

# EMERGENCY PULLOUTS SUMMARY

| No | MP | Location | Length | Width | Miles Between |
|---|---|---|---|---|---|
| 1 | 232.1 | East of Empire | 510 | 16 | - |
| 2 | 233.2 | Lawson | 510 | 16 | 1.1 |
| 3 | 235.0 | Dumont | 510 | 16 | 1.8 |
| 4 | 236.6 | East of Spring Gulch | 510 | 16 | 1.6 |
| 5 | 236.8 | West of Fall River Rd | 510 | 16 | 0.2 |
| 6 | 239.0 | West Idaho Springs | 510 | 12 | 2.2 |
| 7 | 240.2 | East Idaho Springs | 510 | 16 | 1.2 |

EMERGENCY PULLOUTS

# LOCATION 3:  MP 235.0 (DUMONT)

EMERGENCY PULLOUTS

# LOCATION 3: MP 235.0 (DUMONT)

LENGTH: 510 FT WIDTH: 16 FT

CONCERNS: POTENTIAL CONFLICT ON RAMP

EMERGENCY PULLOUTS

# LOCATION 5:  MP 236.8 (WEST OF FALL RIVER)

EMERGENCY PULLOUTS

# LOCATION 5: MP 236.8 (WEST OF FALL RIVER)

LENGTH: 510 FT WIDTH: 16 FT

CONCERN: ???

# INITIAL ENVIRONMENTAL FINDINGS

# INITIAL ENVIRONMENTAL FINDINGS

| Category | Impact Description | No Impact | Minor Impact | Moderate Impact | Significant Impact |
|---|---|---|---|---|---|
| **Air Quality** | ▪ $PM_{10}$ emissions may increase<br>▪ Other pollutants decrease. | | ● | | |
| **Noise** | ▪ No analysis. | ● | | | |
| **Hazardous Materials** | ▪ Potential to encounter historic mine waste during construction. | | ● | | |
| **Farmlands** | ▪ Roadside areas classified as "farmlands" would be converted to a transportation use. | | ● | | |
| **Threatened and Endangered Species** | ▪ May affect but not likely to adversely affect Canada lynx. | | | | |
| **Migratory Birds** | ▪ No known nests. | ● | | | |
| **Terrestrial and Aquatic Wildlife** | ▪ Retaining walls and lighted signs adding to the barrier effect but median jumps effectively mitigate | | ● | | |
| **Vegetation and Noxious Weeds** | ▪ Conversion of roadside vegetation to roadway. | | ● | | |
| **Wetlands and Waters of the U.S.** | ▪ No permanent wetland impact.<br>▪ Impact to Waters of the U.S. at SH 103 bin wall. | | ● | | |

# INITIAL ENVIRONMENTAL FINDINGS

| Category | Impact Description | No Impact | Minor Impact | Moderate Impact | Significant Impact |
|---|---|---|---|---|---|
| **Riparian Areas** | ▪ 0.28 acre impacted. | | ● | | |
| **Water Quality** | ▪ Temporary construction improvements.<br>▪ BMPs will improve water quality in the study area. | | ● | | |
| **Floodplains** | ▪ Minimal impact at SH 103 bin wall. | | ● | | |
| **Historic Properties** | ▪ No direct impacts.<br>▪ Noise and visual impacts to 13 properties. | | ● | | |
| **Archaeological and Paleontological Resources** | ▪ No resources. | ● | | | |
| **Section 4(f)** | ▪ No Section 4(f) uses.<br>▪ Temporary occupancy to 3 properties. | ● | | | |
| **Land Use** | ▪ Improvements are consistent with existing and planned future land uses | ● | | | |
| **Socio-Economic** | ▪ Temporary impacts because of access changes during construction. Positive permanent impacts due to mobility increases and reductions in traffic on frontage road | | ● | | |

# INITIAL ENVIRONMENTAL FINDINGS

| Category | Impact Description | No Impact | Minor Impact | Moderate Impact | Significant Impact |
|---|---|---|---|---|---|
| **Environmental Justice** | ▪ Visual impacts in Lawson because of a new retaining wall.<br>▪ Wall will decrease noise by 2 dB to 4 dB. | | ● | | |
| **Transportation** | ▪ Vehicle miles of travel increases.<br>▪ Vehicle hours of travel decreases.<br>▪ Speed increases.<br>▪ Travel time decreases.<br>▪ Volumes on frontage road decreases.<br>▪ Safety increases. | | | ● | |
| **Parks and Recreation** | ▪ Temporary impacts to 5 resources.<br>▪ Improvements to pedestrian facilities in 3 locations. | | ● | | |
| **Visual** | ▪ Effects of retaining walls, signage, additional pavement | | ● | | |
| **Energy** | ▪ Small reduction in energy consumption. | | ● | | |

# SIGNAGE

PROPOSED SIGNAGE

# NEW SIGNAGE CONSIDERATIONS

| WHAT | ACCESS | TOLLING | ATM |
|---|---|---|---|
| HOW | FHWA Compliance | Static vs. Dynamic | Lane Use |

PROPOSED SIGNAGE

## Steps to Refinement

- Reviewed Intent of ATM
- Created Full Coverage Plan Based on Line of Sight
- Cross Referenced and Revised location based on Important Views and Historic Properties
- Sign Consolidation Exercise
- Revised Full Coverage Plan to Address CSS Process and meet Intent of ATM

PROPOSED SIGNAGE

## EXPRESS LANE ENTRANCE

### 2MILE WARNING SIGN

### STA. 167+00

- No historic viewshed concerns
- Minimal Impact to Mountain Viewshed

PROPOSED SIGNAGE

## EXPRESS LANE

### TOLL SIGN

### STA. 202+00

- No historic viewshed concerns
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE


## EXPRESS LANE ENTRANCE

1 MILE WARNING SIGN

STA. 217+20

- No historic viewshed concerns
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE


## EXPRESS LANE ENTRANCE

### ½ MILE WARNING SIGN

### STA. 243+60

- No historic viewshed concerns
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## EXPRESS LANE ENTRANCE

STA. 270+00

- No historic viewshed concerns
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## EXPRESS LANE

TOLL SIGN

STA. 303+20

- No historic viewshed concerns
- Reservoir and Saxon Mt. viewshed

PROPOSED SIGNAGE

## EXPRESS LANE ONLY SIGN

STA. 327+50

- No historic viewshed concerns
- Reservoir and Saxon Mt. viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 348+50

- West of Lawson  Historic District
- No historic viewshed concerns

# PROPOSED SIGNAGE

## ATM SIGN

STA 370+00

- East of Lawson  Historic District
- Minimal Mountain viewshed impact

PROPOSED SIGNAGE

## ATM SIGN

STA 399+40

- Views of Continental Divide West of Downieville

PROPOSED SIGNAGE

## ATM SIGN

STA 416+50

- No historic viewshed concerns
- Minimal Impact to Mountain Viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 439+00

- No historic viewshed concerns
- Minimal Impact to Mountain Viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 468+20

- No historic viewshed concerns
- Minimal Impact to Mountain Viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 495+30

- No historic viewshed concerns for Dumont Train Depot
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 515+00

- No historic viewshed concerns
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 548+80

- No historic viewshed concerns for mine tailings
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 576+00

- No historic viewshed concerns
- Minimal Impact to Mountain and Continental Divide viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 602+00

- No historic viewshed concerns
- Minimal Impact to Mountain and Continental Divide viewshed
- Minimal Impact to Residences

PROPOSED SIGNAGE

## ATM SIGN

STA631+00

- No historic viewshed concerns
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 653+30

- No historic viewshed concerns
- Minimal Impact to Mountain Viewshed and Maude Monroe Mine viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 679+50

- Minimal historic viewshed concerns for West Idaho Springs
- Minimal Impact to Mountain viewshed and Maude Monroe Mine viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 707+30

- Minimal historic viewshed concerns for Idaho Springs Historic District
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## ATM SIGN

ST735+00

- Minimal historic viewshed concerns for Idaho Springs Historic District
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## ATM SIGN

STA 758+80

- Minimal historic viewshed concerns for Idaho Springs
- No Impact to Mountain viewshed

PROPOSED SIGNAGE

## EXPRESS LANE ENTRANCE SIGN

### FOR RE-ENTRY AFTER IDAHO SPRINGS

STA. 780+00

- **No historic viewshed concerns Minimal Impact to Mountain viewshed**

PROPOSED SIGNAGE

## EXPRESS LANE TOLL SIGN

### FOR RE-ENTRY AFTER IDAHO SPRINGS

STA. 792+70

- No historic viewshed concerns for Idaho Springs
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

## EXPRESS ONLY SIGN

STA. 808+00

- Minimal historic viewshed concerns for Idaho Springs
- Minimal Impact to Mountain viewshed

PROPOSED SIGNAGE

STA 523+00

## CAMERA EXAMPLE

# PROPOSED SIGNAGE

## CAMERA AND OVERHEAD SIGN EXAMPLE

STA. 303+20

# SH 103 Interchange

SH 103-INTERCHANGE
Pedestrian Railing on SH 103

## PEDESTRIAN RAIL INTENT

- Protection of Motorists Below from Snow and Objects
- Protection of Pedestrian and Bicycle on SH 103 Bridge
- Aesthetic Element

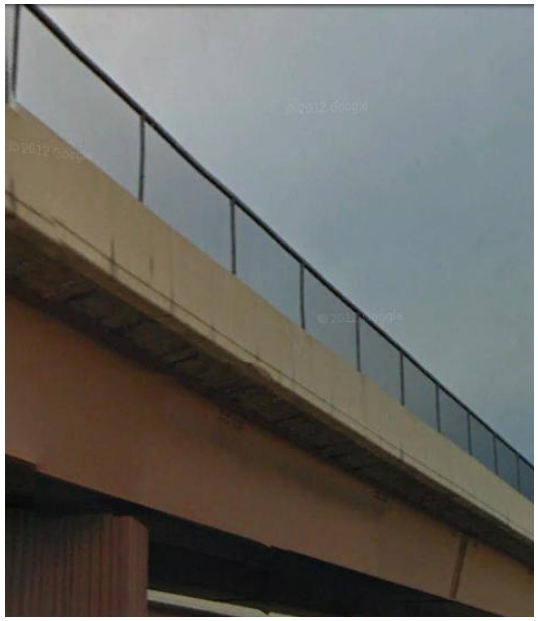
## DESIGN STANDARDS

- 2" Max Opening
- 7'10" Min Height
- Bridge Rail Required

## APPLICATION OF AESTHETIC GUIDELINES

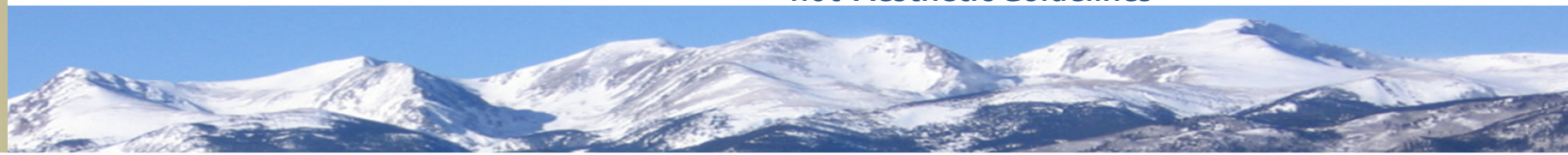
- Sleek, Smooth Transitions
- Sinuosity to Reflect Natural Hydrology
- Visual Design Continuity
- Emphasis on Shadow and Light

# SH 103-INTERCHANGE
## Pedestrian Railing on SH 103

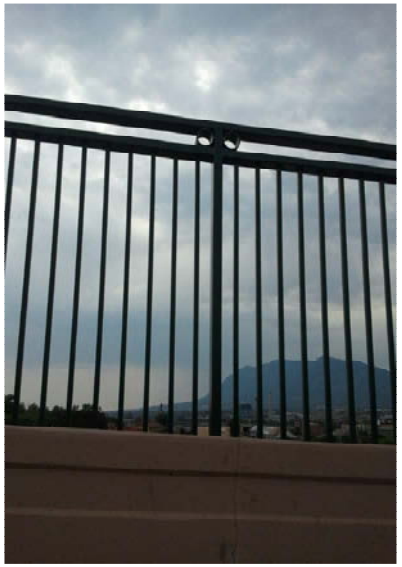


**Standard Pedestrian Rail**

- Vinyl Coated Chain Link with Type 7 Barrier
- No Columns
- Meets Ped Rail Requirements and Design Standards, not Aesthetic Guidelines



# SH 103-INTERCHANGE
## Pedestrian Railing on SH 103



**Picket Pedestrian Rail**

- Iron Pickets with Type 7 Barrier
- No Columns
- Meets Ped Rail Requirements, Design Standards and Aesthetic Guidelines with some alteration

# SH 103-INTERCHANGE
# Pedestrian Railing on SH 103



**OPTION 1: Straight Rail**

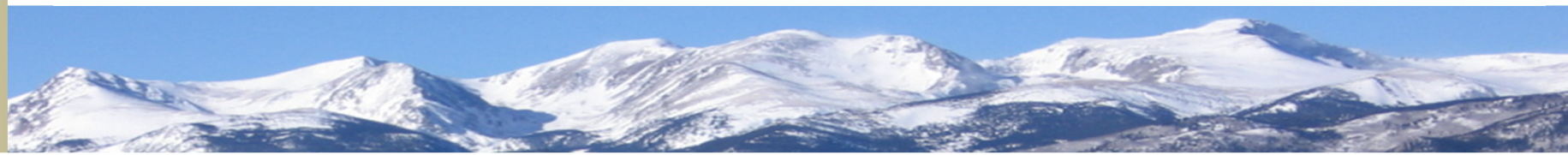
- 8 ft Wrought Iron Picket Fence with Type 10
- 2" Spacing Between Pickets
- No Transition from Fence to Ground Plane
- Meets Ped Rail Requirements and Design Standards

# SH 103-INTERCHANGE
# Pedestrian Railing on SH 103



## OPTION 2: Single Curve Rail

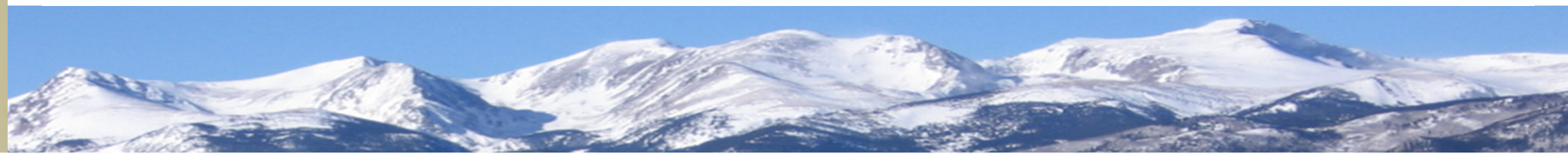
- 8 ft Wrought Iron Picket Fence with Type 10
- 2" Spacing Between Pickets
- 35ft Transition from Bridge to Ground Plane
- Meets Ped Rail Requirements, Design Standards and Aesthetic Guidelines



# SH 103-INTERCHANGE
# Pedestrian Railing on SH 103

## OPTION 3: Double Curve Rail

- 8 ft Wrought Iron Picket Fence with Type 10
- 2" Spacing Between Pickets
- 45ft Transition from Bridge to Ground Plane
- Meets Ped Rail Requirements, Design Standards and Aesthetic Guidelines



# EAST IDAHO SPRINGS
# Exit 241 Interchange

# EAST IDAHO SPRINGS BRIDGE
## Exit 241 Interchange


EAST IDAHO SPRINGS BRIDGE
Exit 241 Interchange

## Existing Conditions


EAST IDAHO SPRINGS BRIDGE
Exit 241 Interchange

## Roundabout Option


EAST IDAHO SPRINGS BRIDGE
Exit 241 Interchange

## T-Interchange Option


# NOISE

# PROJECTS REQUIRING NOISE ANALYSIS

Type I projects

- Adding traffic capacity, adding or striping new through-traffic lanes
- Adding auxiliary lanes that are not turning lanes
- Alignment shifts of more than half the distance between receptor and highway edge
- Vertical changes of 5 or more feet
- Requires noise analysis

Type II projects

- Retrofitting noise walls to areas identified as impacted by former highway projects, but do not involve new road construction.
- No longer funded program (since 1999)

Type III projects

- Do not require noise analysis
- Include bridge replacements, rehabilitations, repaving, maintenance work
- Work that is not a Type I or Type II project

NOISE

# Highway Traffic Noise Regulations

Noise Abatement Criteria (NAC) are categories of land use that define the allowable noise levels & threshold for noise mitigation

A - Areas of exceptional outdoor serenity and quiet

B – **Outdoor residential**

C - **Noise sensitive outdoor land uses such as parks, schools**

D – Buildings with interior noise sensitivity such as recording studios, churches, auditoriums

E – **Noise sensitive outdoor businesses uses such as outdoor restaurant seating, motels**

F – Non-noise sensitive land uses such as industrial, commercial, agricultural land uses

G – Undeveloped lands

NOISE

# Abatement Criteria

All areas exceeding NAC thresholds must be considered for noise abatement

Noise modeling of barrier geometries determines the potential amount of noise reduction

All noise abatement must meet feasibility & reasonableness criteria to be constructed using federal funds

## Feasibility

- Must achieve at least 5 decibel reduction
- Must be constructible, less than 20 feet tall
- No fatal flaw maintenance, safety or critical environmental habitat issues

NOISE

# Abatement Criteria

## Reasonableness

**The following three criteria must be collectively met to be considered reasonable abatement:**

1. Reduction design goal must reduce noise 7 dBA
2. Cost benefit Index must be less than $6800 /receptor/dBA reduced
3. Benefited owners and residents must be surveyed for abatement approval

(Only those receptors receiving 5dBA or more reduction from the proposed mitigation are used in calculations or have a say in whether noise barrier is constructed)

NOISE

# Abatement Criteria

**If noise abatement is determined to not be feasible for a site:**

- No further noise mitigation analysis is required.
- No abatement measure is recommended.

**If any of the three required reasonableness abatement criteria can not be met:**

- The test for Reasonableness has failed.
- This is not a best of 3 decision. No further reasonableness evaluation is required.
- No abatement measure is recommended.

NOISE

# Mountain Corridor Noise Research

CDOT Research Report

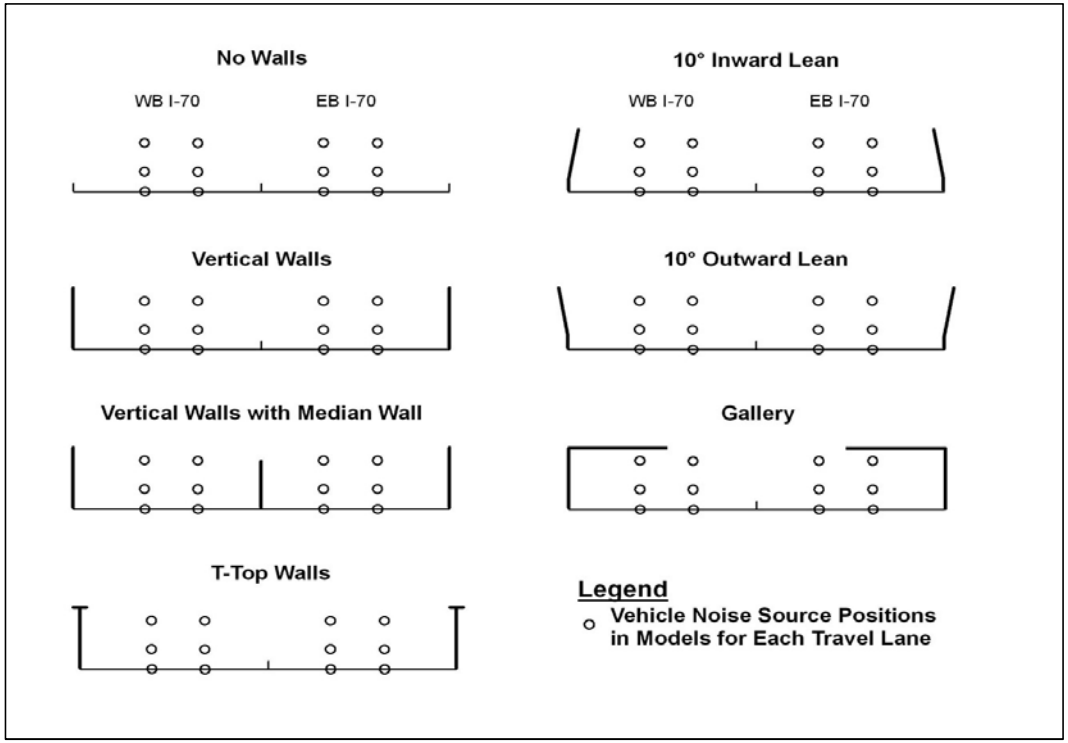
*Investigation Into Effective Traffic Noise Abatement Design Solutions for Mountain Corridors* was completed June 2013

- Conducted worldwide noise barrier survey
- Modeled noise reduction effectiveness/distribution
  - ✓ Different wall configurations and orientations
  - ✓ Actual I-70 mountain topography
  - ✓ Reflective walls vs absorptive wall treatment
- Assessed cost-effectiveness of mitigation options
- Addressed weather impacts to barrier effectiveness

NOISE

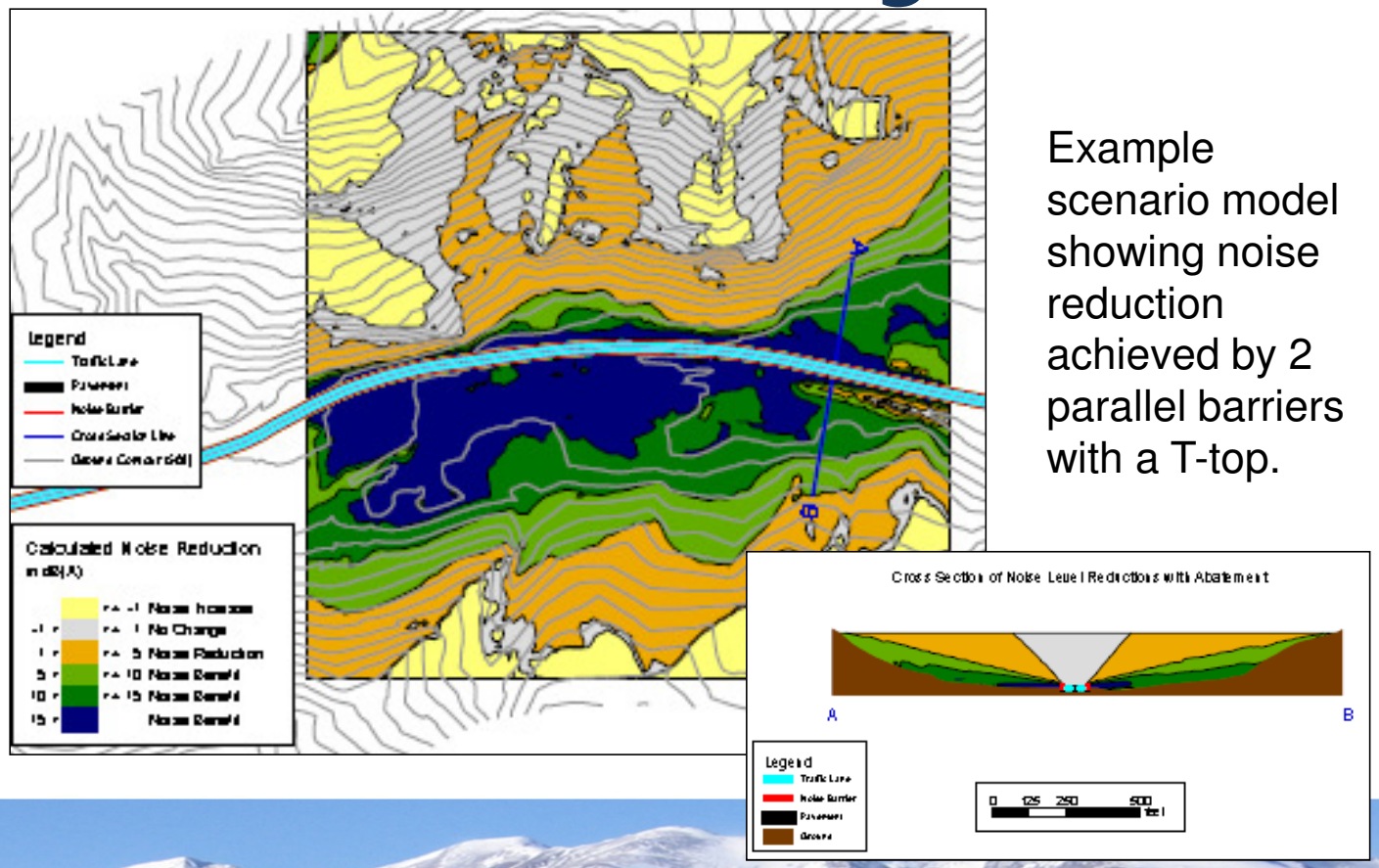
# Noise Wall Scenario Modeling

Various noise wall configurations evaluated at each sample site. Walls were placed along edge of highway shoulders to simulate simple modeling geometries.




NOISE

# Research Modeling Results



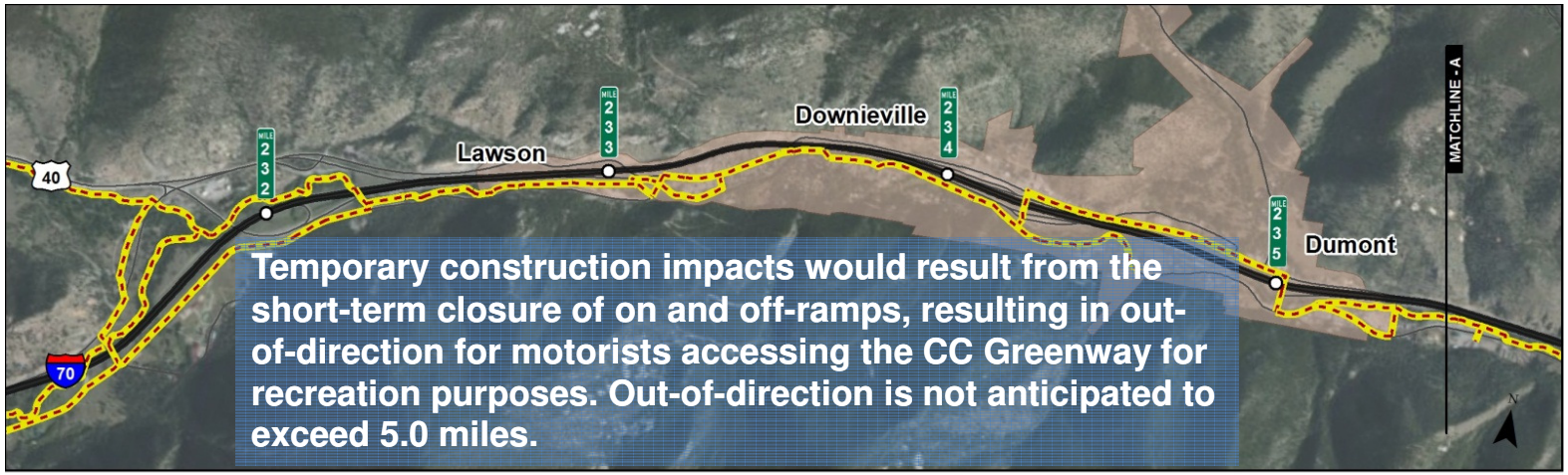

Example scenario model showing noise reduction achieved by 2 parallel barriers with a T-top.

NOISE

Extended Height Wall at Lawson: 2-4 decibel noise reduction

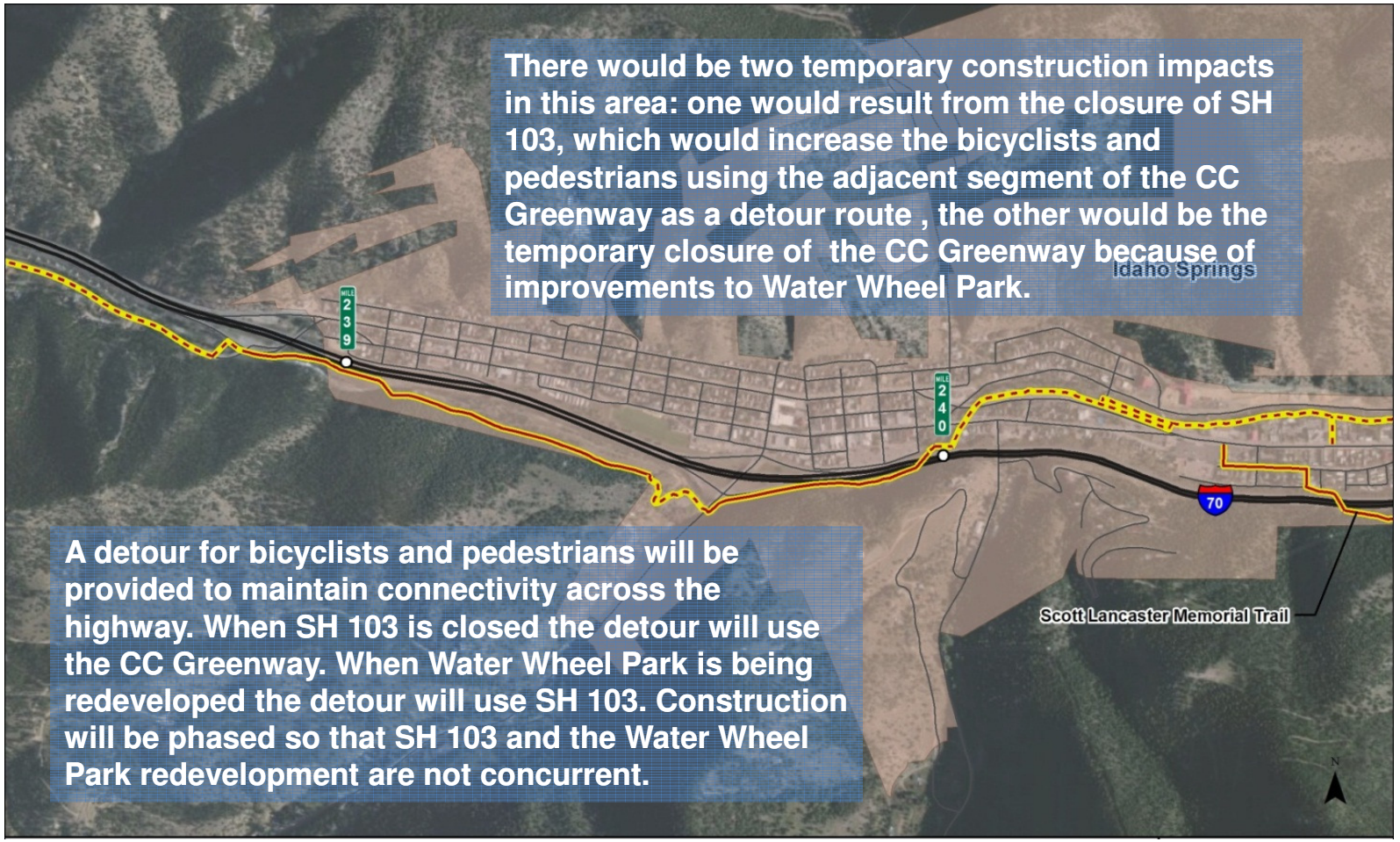
# GREENWAY

# GREENWAY
# MP 232 - 239

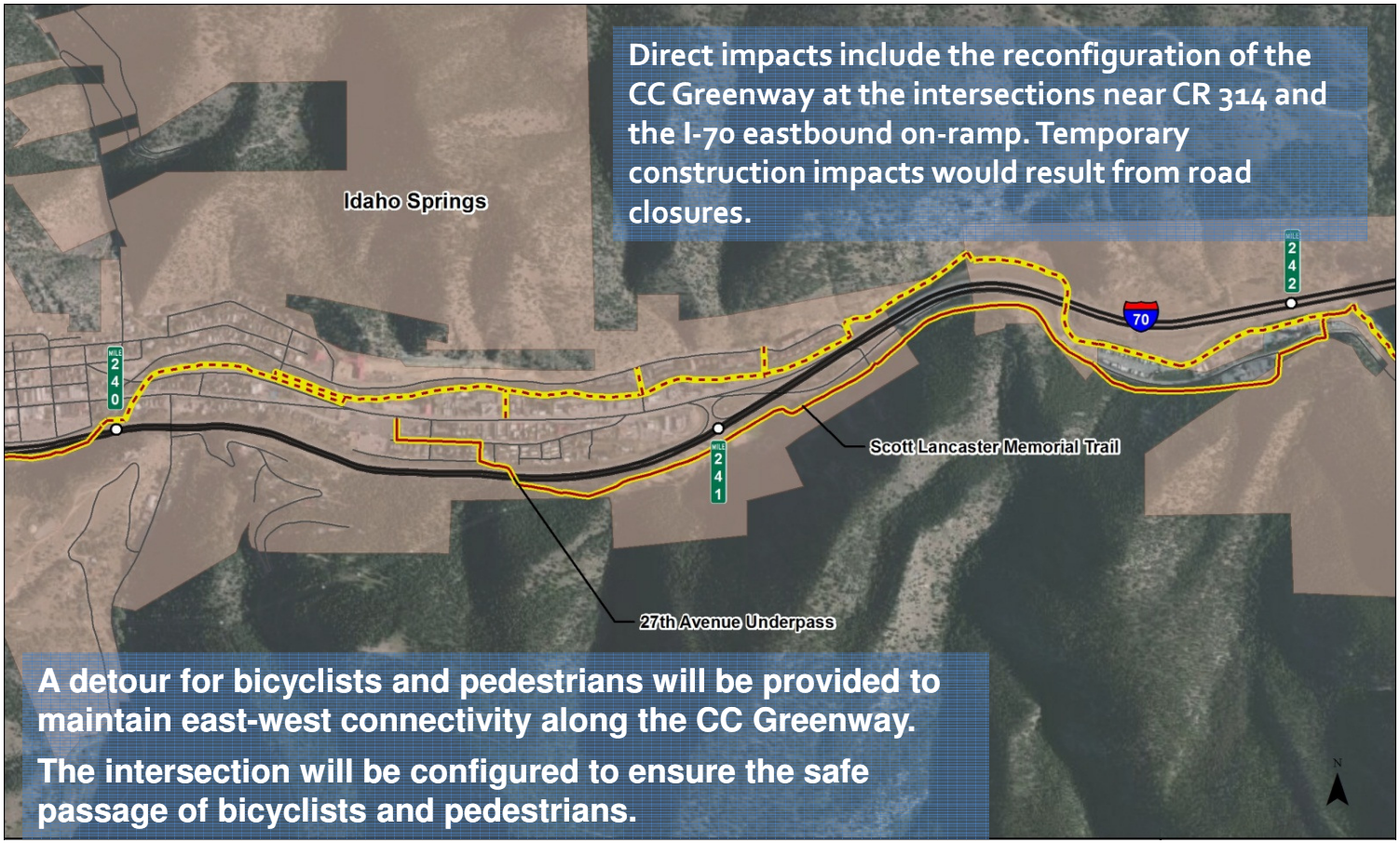




# GREENWAY
# MP 239 - 240




# GREENWAY
# MP 240 - 242




GREENWAY
Section 4 (f)

# CC Greenway

**Clear Creek County and the City of Idaho Springs have concurred that any use of the CC Greenway resource would meet the criteria of a temporary occupancy. Mitigation for these impacts include detours to maintain trail continuity and access and construction personnel being available to ensure safe passage during periods of active construction.**

# OUTSTANDING ISSUES

- Drainage
- Snow Removal/ Maintenance
- Barrier/ Guardrail
- Class of Action
- Aesthetics
- Local Roadway Network

# EVALUATION CRITERIA

1. Addresses safety during PPSL operations
2. Maintains safety during non-peak times
3. Improves mobility and reliability during peak times for both I-70 and the local roadway network
4. Minimizes the effort required to maintain the operation
5. Enable the project team to achieve the goal of opening the PPSL
6. Creates infrastructure investments that are reasonable to construct and provide the best value for their life cycle, function and purpose.
7. Allows for a process to engage and communicate with all the local, regions and national users of the I-70 Mountain Corridor
8. Creates opportunities to "correct past damage"
9. Provides access and protects opportunities for enhancements to tourist destinations, community facilities, interstate commerce and also limits disproportionate effects to the community.

# EVALUATION CRITERIA

10. Incorporates sustainability by using locally available materials and environmentally- friendly process
11. Protects or creates unique features for the areas as a gateway
12. Protects wildlife needs
13. Protects Clear Creek
14. Protects the defining historical elements of Clear Creek County
15. Meets CDOT's and industry standards
16. Achieves the Mountain Mineral Belt aesthetic guidelines
17. Meets the I-70 Mountain Corridor design criteria
18. Preserves opportunities for the AGS and the ultimate preferred alternative
19. Adaptable for future changes/projects (including Idaho Springs Visioning)

# NEXT STEPS

- Have a Baby!
- East of Idaho Springs (Exit 241 Interchange)
- Continue work on outstanding Issues
- Bus On Shoulder Introduction 1:00pm

FUTURE MEETINGS

# FUTURE TECH TEAM MEETINGS

- DATES

  - Monday 2/24 at Trail Ridge Conference Room in Golden
  - Monday 3/24 at Clear Creek School Commons Area

All meetings are scheduled from 8:30am to **12:00**pm.

# THANK YOU!!!

**STATE OF COLORADO**
DEPARTMENT OF TRANSPORTATION
REGION 1 I-70 MTN CORRIDOR PROGRAM
425A CORPORATE CIRLCE - GOLDEN, CO 80401
(720) 497-6900 (OFFICE), (720) 497-6901 (FAX)

## I-70 EB Peak Period Shoulder Lane Project

**Project Number: NHPP 0703-401**
**Project Code: 19474**

# Technical Team Meeting #9

**January 27, 2014**

CDOT I-70 Mountain Corridor | HDR Engineering, Inc.