I-70 Frontage Road Improvements
Old US 40 / CR 314

Project Leadership Team / Technical Team Meeting #4
January 18, 2012

Jim Bemelen, I-70 Corridor Manager
David Singer, I-70 Corridor Env. Manager
Benjamin Acimovic, Project Manager
Janet Gerak, Project Env. Manager

Agenda

1:05	Agenda Review, Process and Updates
1:15	Engineering refinements
2:30	Traffic Control During Construction
2:45	Aesthetic Considerations
3:10	Resolution of the Greenway Issues
3:20	CATEX update
3:40	Twin Tunnels Progress Updates
3:50	Process Clarifications and Decisions Reached
3:55	Next Steps

Process Overview

- Categorical Exclusion for frontage road improvements east of Idaho Springs to Hidden Valley
- Project Schedule

– PLT/TT Meeting #1	August 31, 2011
– Scoping	September 7, 2011
– PLT/TT Meeting #2	October 26, 2011
– PLT/TT Meeting #2.5	November 1, 2011
– Greenway ITF	November 22, 2011
– Field Inspection Review	December 1, 2011
– Clear Creek Board meeting review	December 12, 2011
– PLT/TT Meeting #3	December 15, 2011
– Engineering Coordination meeting	December 21, 2011
– PLT/TT Meeting #4	**January 18, 2012**
– Idaho Springs City Council	**TBD**
– Rafting Company Coordination	**TBD**
– PLT/TT Meeting #5	**February, 2012**
– Final Office Review	**March 2012**
– Ad date for Phase I	**April 2012**
– Construction of Phase I	**Summer /Fall 2012**

- Anticipating $6.25M project budget - for design and construction

Meeting materials on website

Updates

•David Singer is a new dad!

•Response to Clear Creek Cty Dec 14 letter

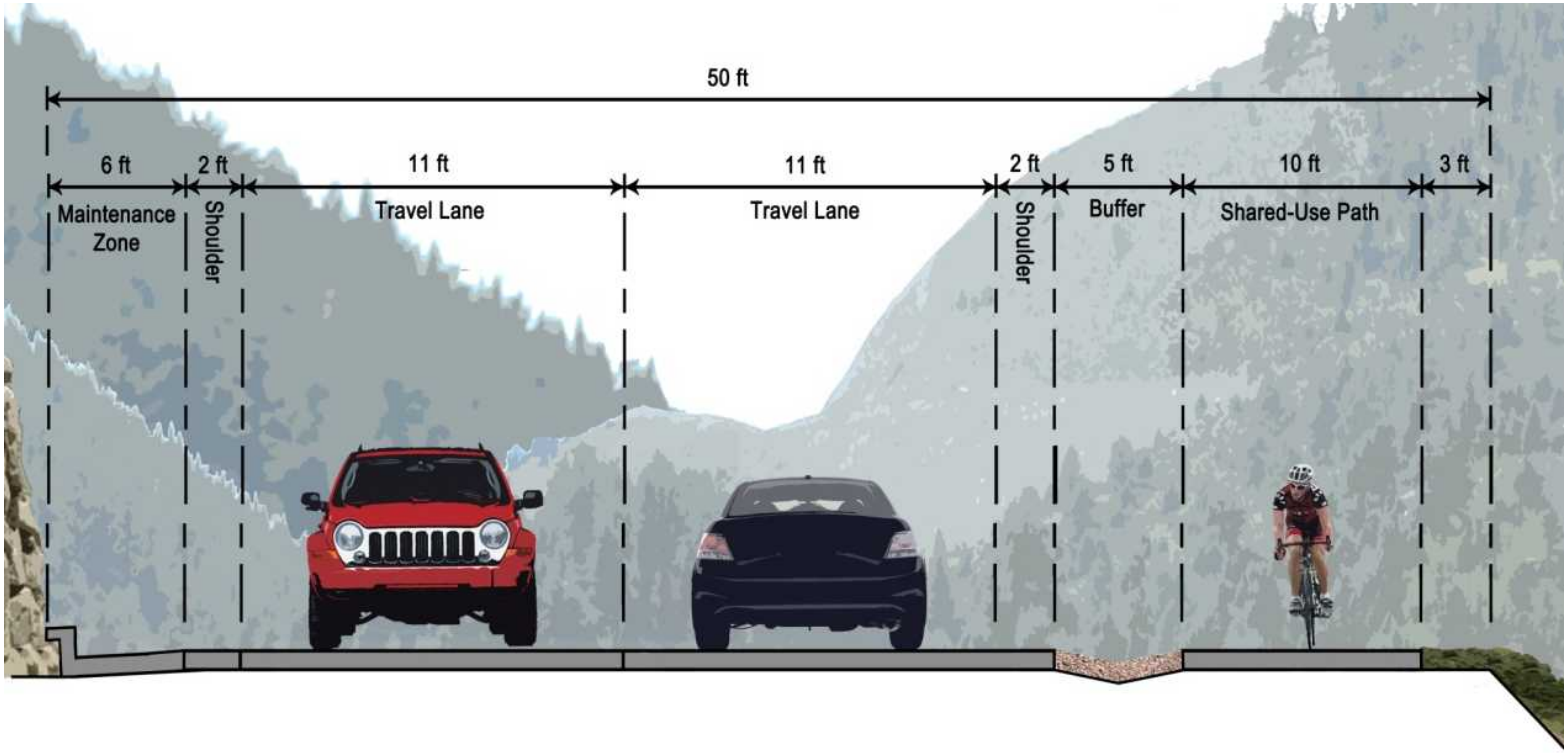
•Recap of January 13th field visit with Construction Project Engineer Jim Van Dyne, and Landscape Arch. Jen Klaetsch

•Field visit funny hat competition – winner Ben Acimovic!

•Utilities – Unable to identify funds for non-project utility enhancements. Project utility coordination mtg next week.

•Other meetings
- •SWEEP – Thursday Jan 19
- •ALIVE – Friday Jan 20
- •106 – February 16

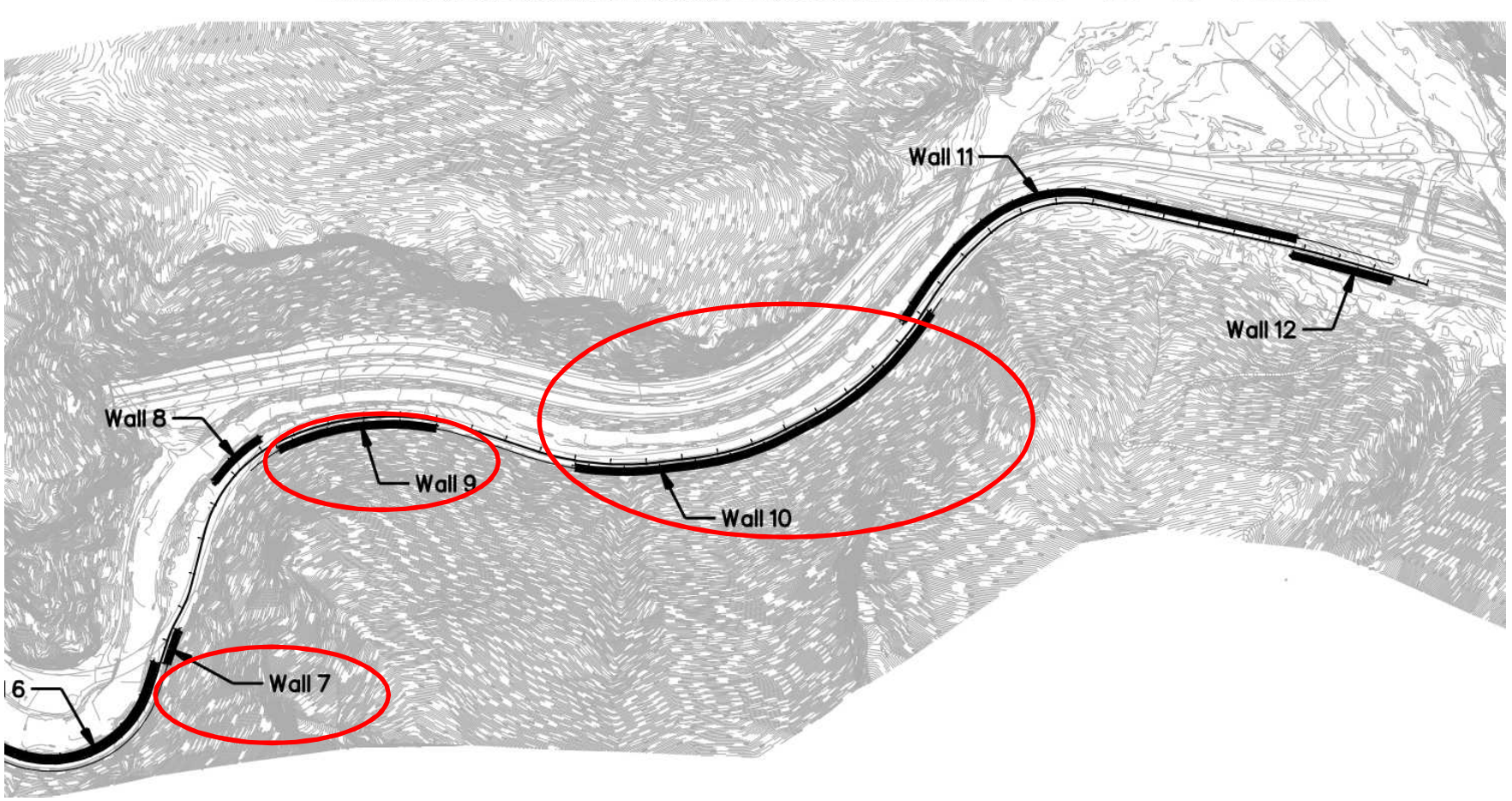
Endorsed Phase I cross section



Decisions required today

- Cut side wall type, dimension, tier characteristics
- Guardrail treatment
- Parking area dimension
- Crosswalk design at end of separated path
- Section at Bell property
- Traffic control during construction

Phase I Cut Side Walls



Three Cut Side Wall Options

- Rockery
- Soil Nail with sculptured shotcrete
- Soil Nail with formliner

Tiering and undulation

- Wall height maximum
- Tiering
- Wall length consistency

Rockery Wall Design and Example

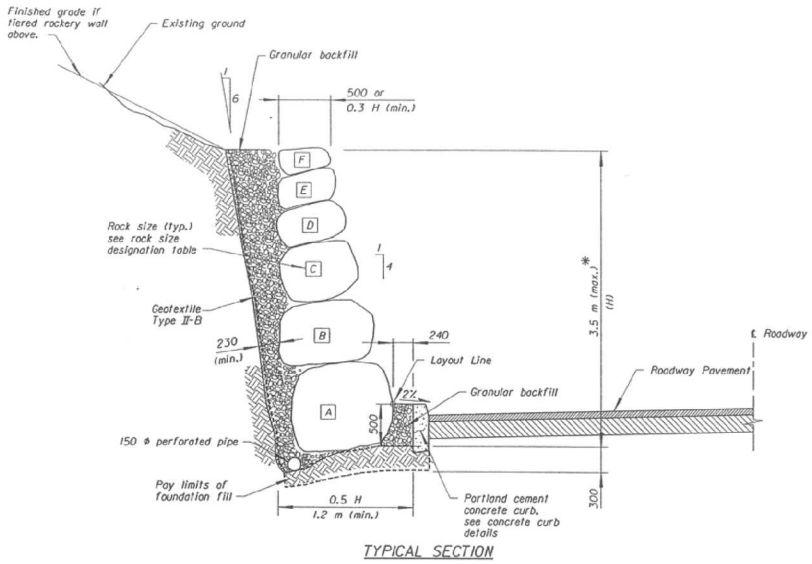


Figure 6. Graphic. Typical rockery section from Guanella Pass bid documents.

Rockery wall design details

Figure 79. Photo. Although built to strict material and construction standards, this new rockery wall along the Guanella Pass Road in Colorado is a non-AASHTO design.

Rockery Wall Pros and Cons

Definitions from FHWA

- **Rockery: The use of natural boulders as a gravity retaining structure.**

Rockery/Rock wall

Pros	Cons
Natural look	Would require multiple tiers
Limited chase up slope if not multiple tiers	CCC engineering and maintenance concerns
	Limited lateral and structural support
	Need stable slope to build against
	No CDOT standard

Rockery Wall Examples

Figure 12. Photograph. Two-tier, 7.3-m (24-ft) rockery, 15th Avenue at 12th Street, Puyallup, Washington (Site 2), with guy wire anchored at base of rockery.

Soil Nail with Shotcrete

- http://www.123engineering.com/ima

Soil Nail + Shotcrete Pros and Cons

Definitions from FHWA

- **Shotcrete Facing: Wall facing comprised of shotcrete which may be sculpted, painted or stained**.

Soil Nail with shotcrete

Pros	Cons
Surface undulation – good shadows	Concern with less natural look and/or color matching.
Less fill required – limits construction impacts	Blending between natural rock and sculpted shotcrete
Variety of aesthetic treatments (natural cut rock look to boulder look)	More difficult to match fill/cantilever wall treatment
Faster construction rate than rockery walls	

Soil Nail with Formliner

Soil Nail + Formliner Pros and Cons

Definitions from FHWA

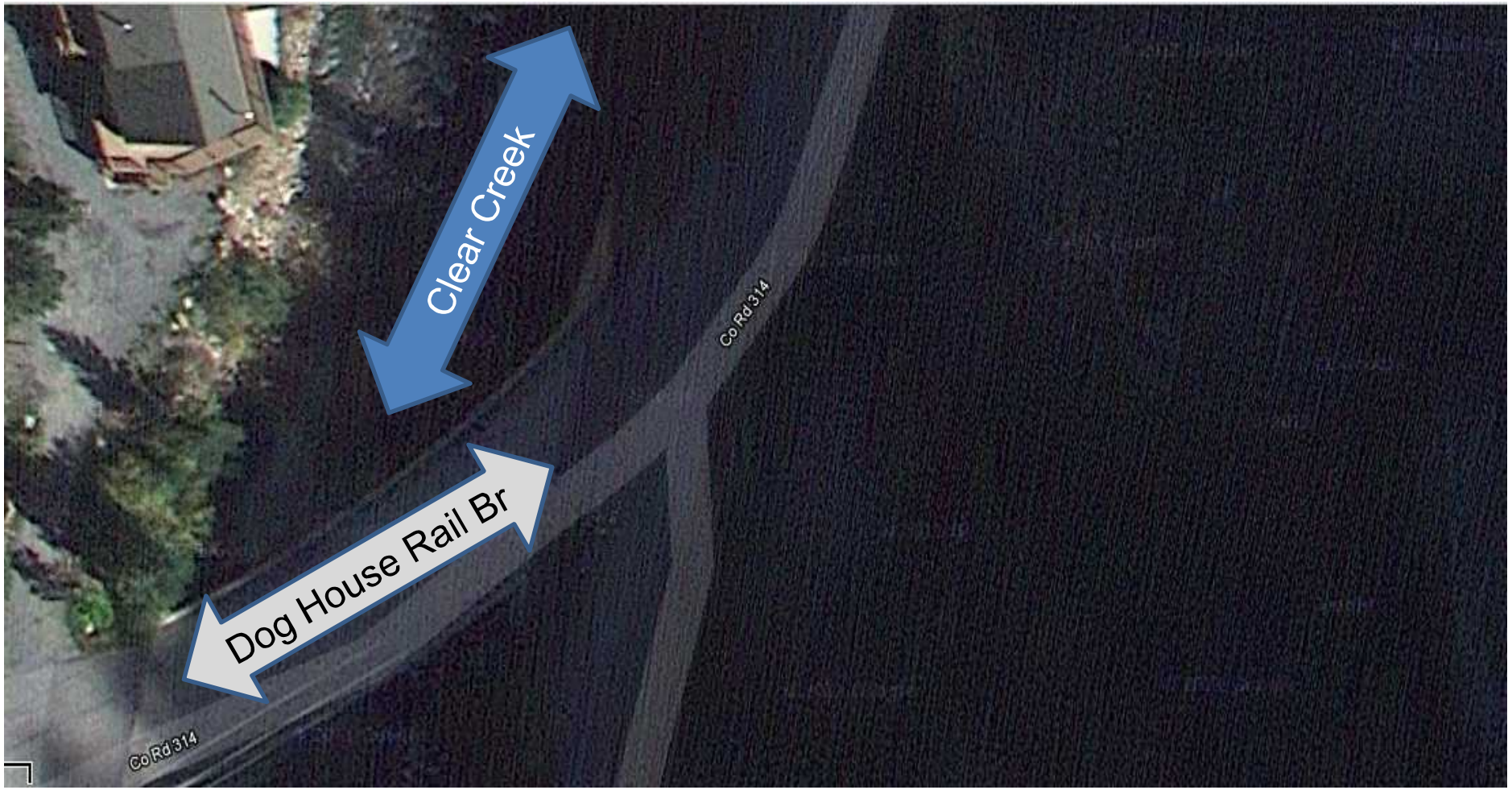
- **Form Liner Treatments: An ornamental liner with raised decorative patterns. The liner is placed inside the concrete forms, so that an impression of the decoration will is made when the concrete is poured in the forms.**

Soil nail with formliner

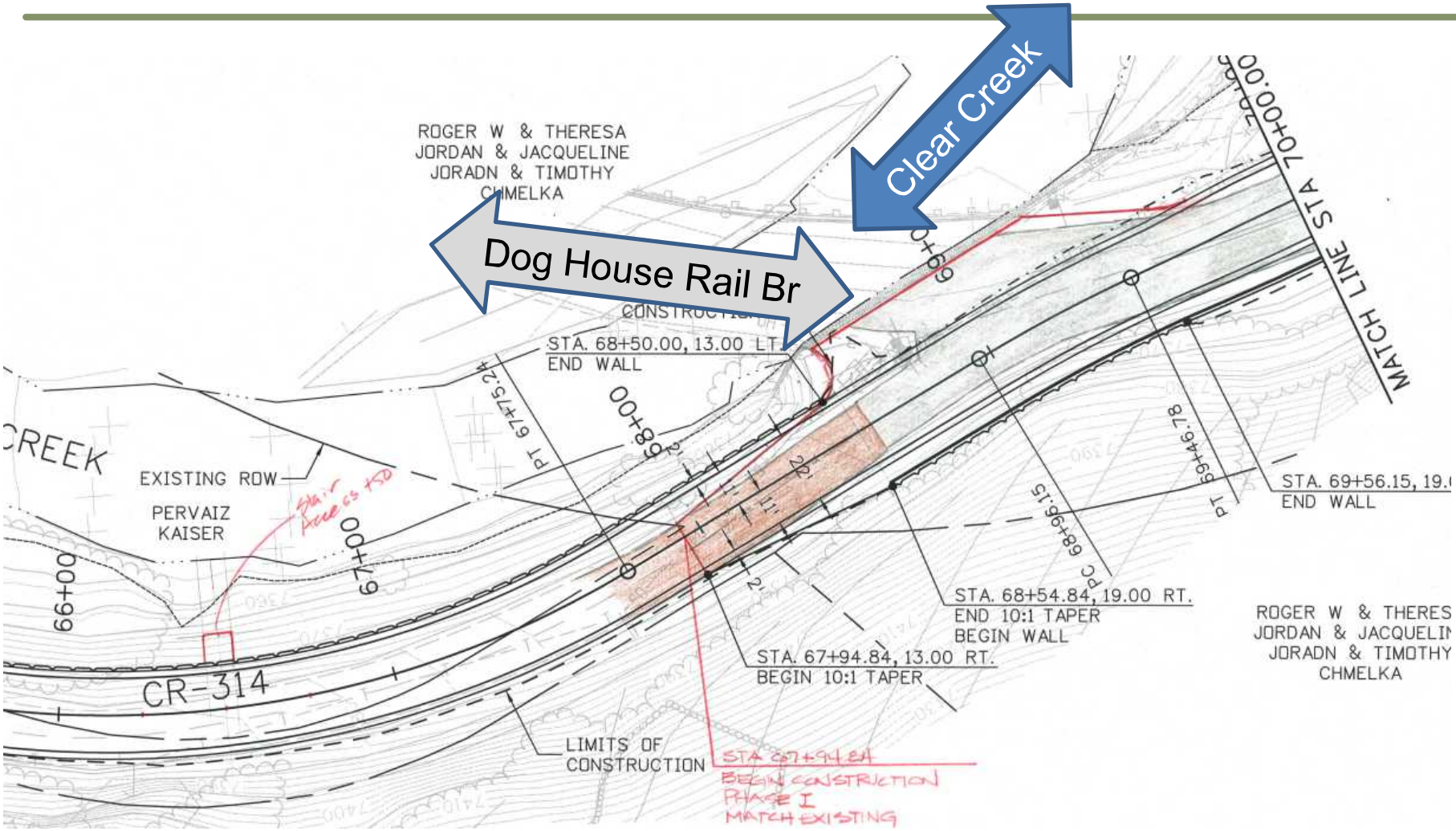
Pros	Cons
Controlled look	Would require fill behind formliner and natural undulation
Can better match fill/cantilever wall	Does not meet 300' undulation preference by CCC – rigid/flat
Fastest construction rate	Potential maintenance with crash

Design Refinement Areas

Refinement: West Transition Area



Refinement: West Transition Area



Cantilever railing location

Cantilever Railing concepts

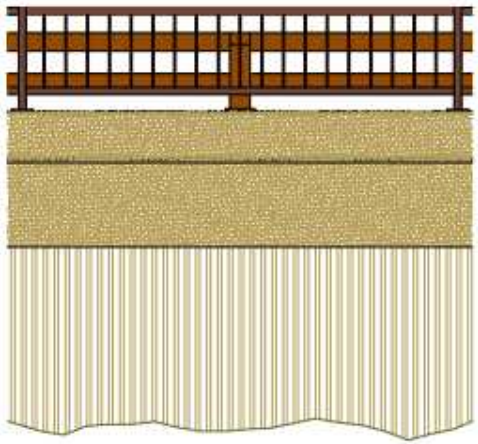
Idaho Springs Pedestrian Rail

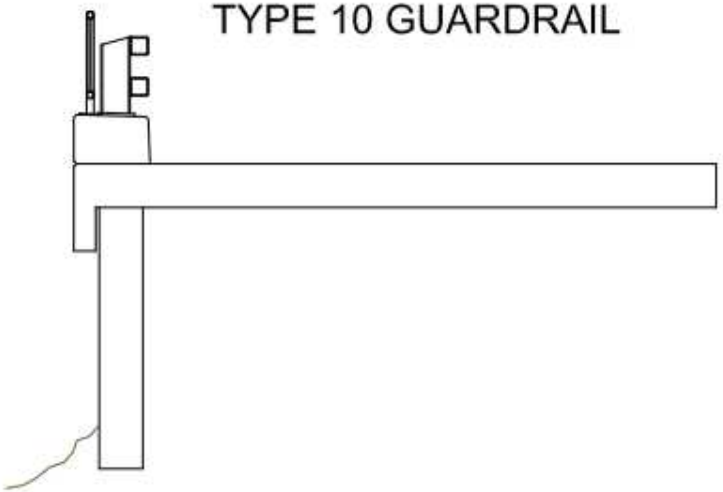
B | Simple vertical textures provide depth and shadow to large wall faces.

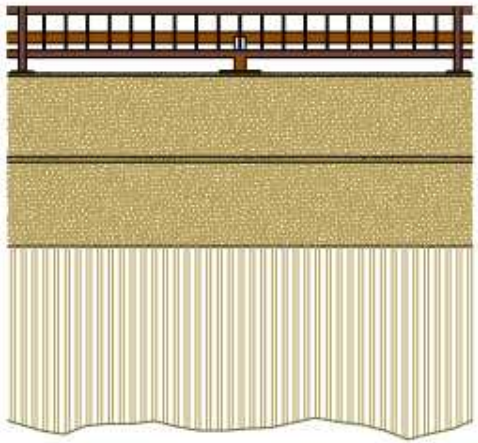
Glenwood Springs Wall Treatment

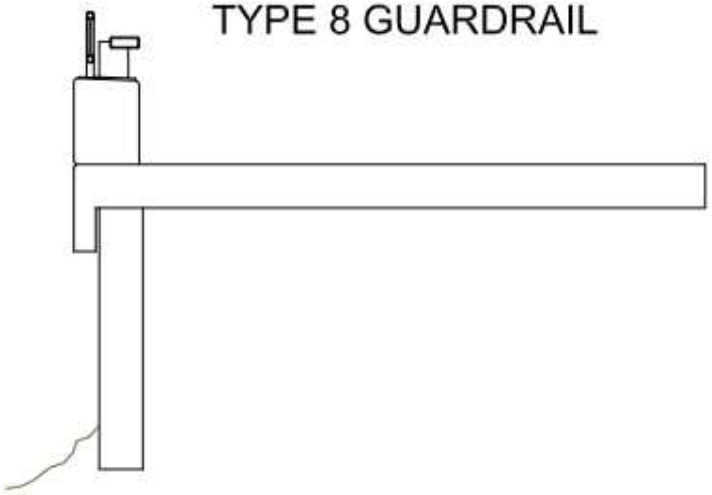
Glenwood Springs Box Rail

Bike / Pedestrian Railing concepts

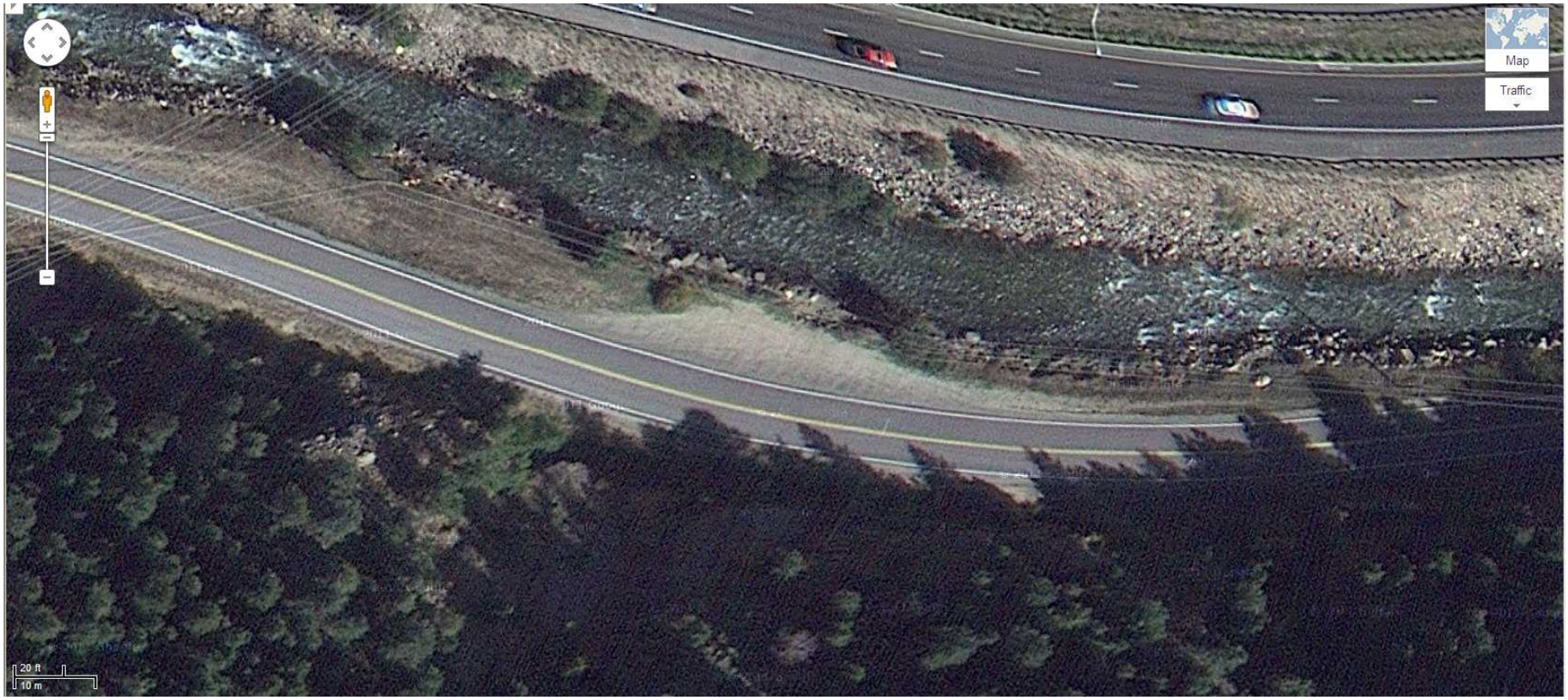




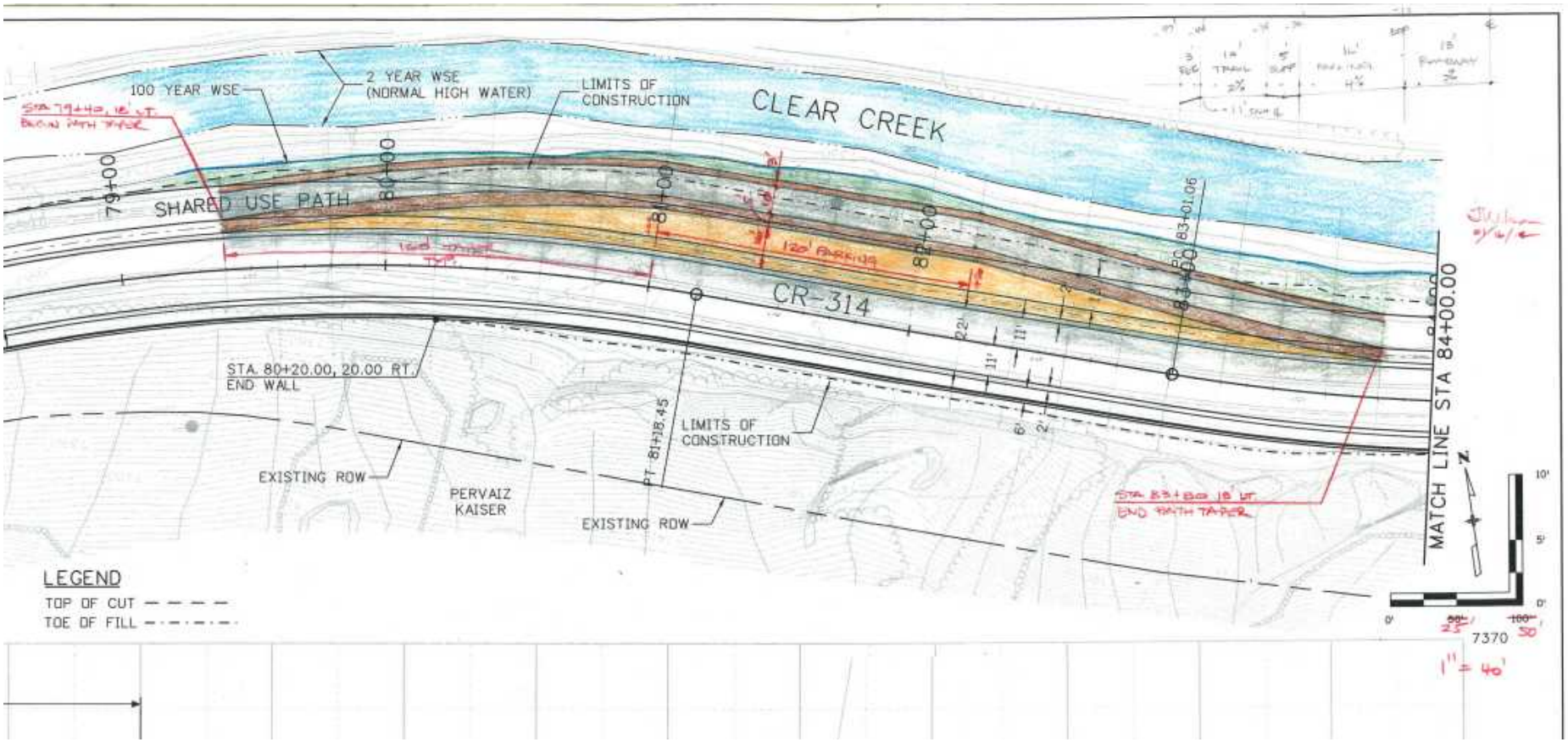




Refinements: Parking Area

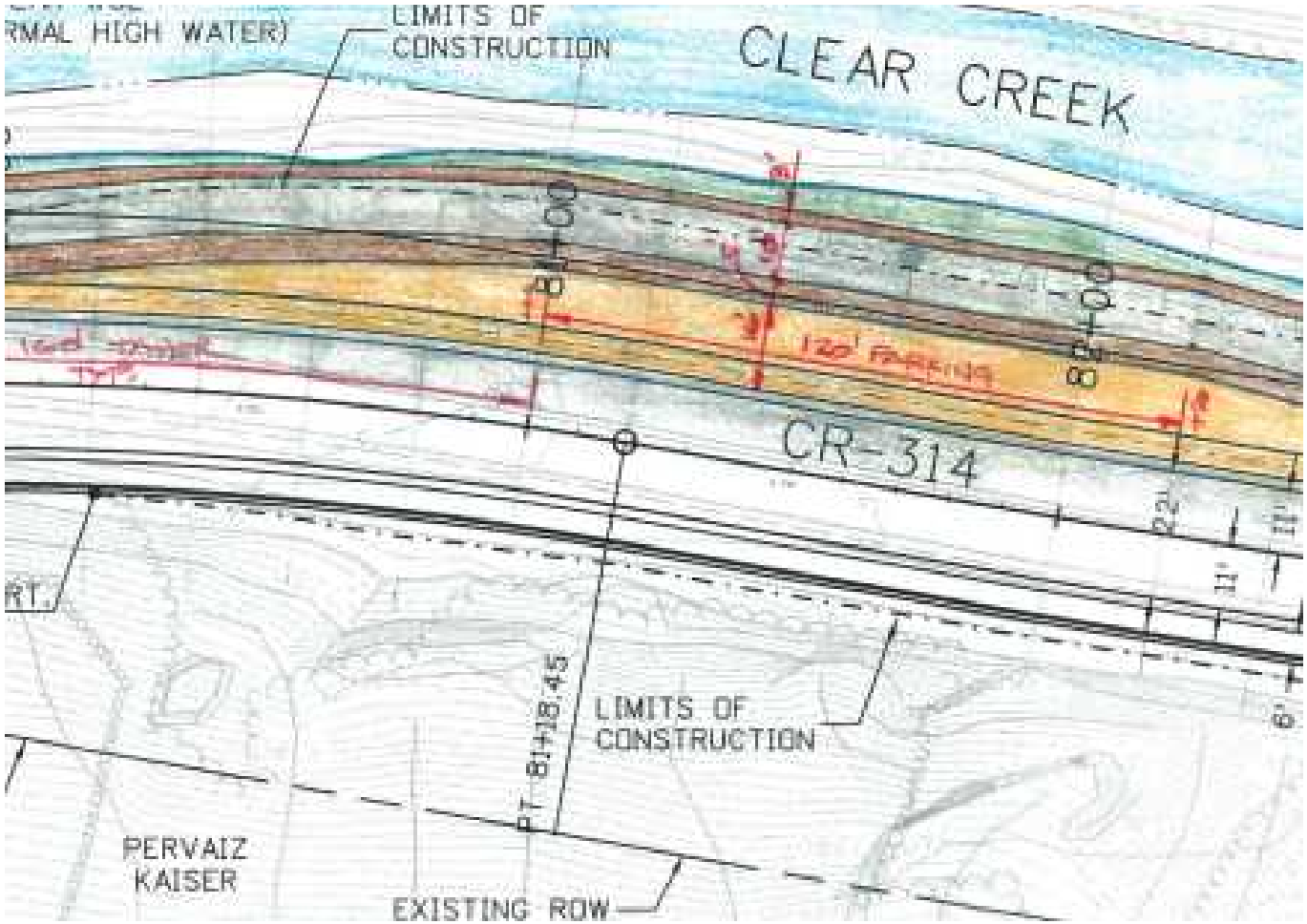


Refinements: Parking Detail



Refinements: Parking Detail

- 160’ long taper area
- 16’ X 120’ wide parking area



Refinements: Trail Crossing Area

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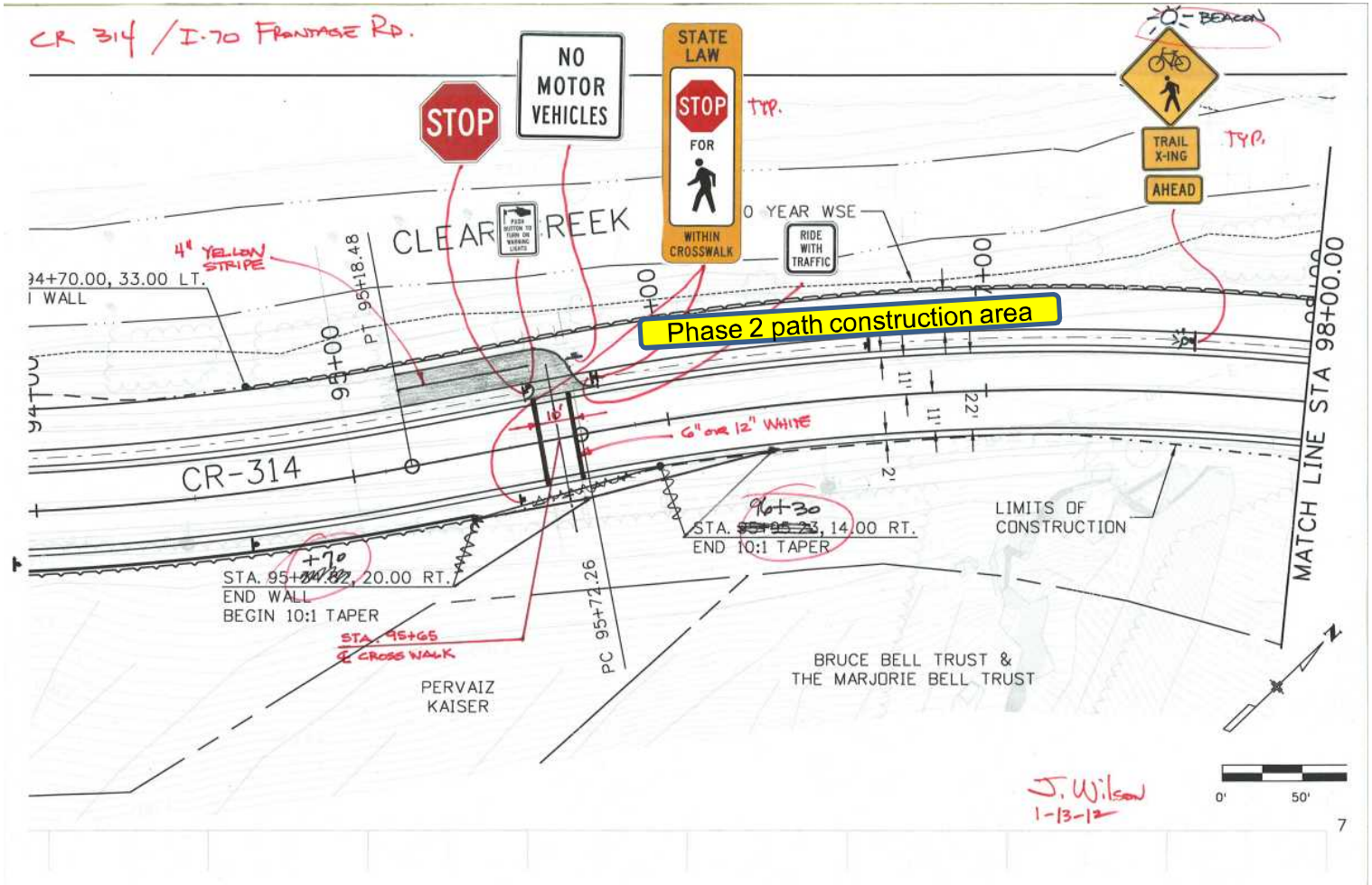

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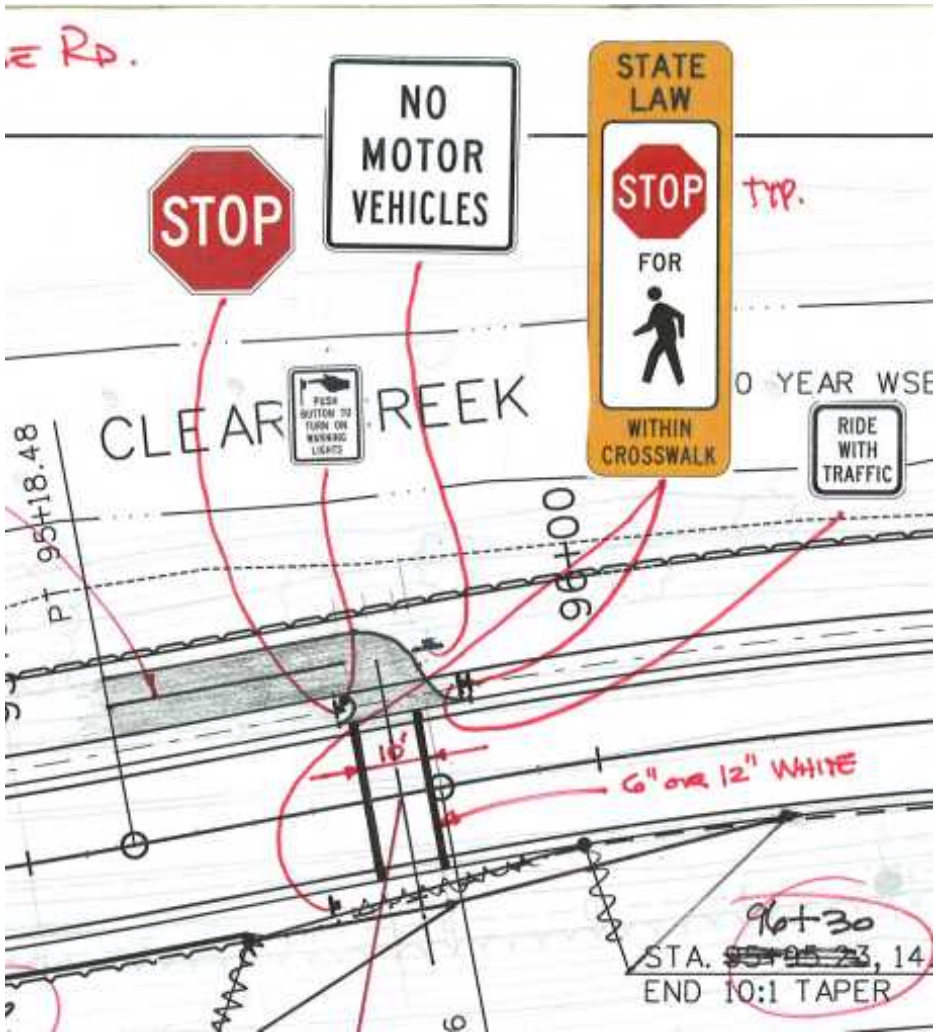
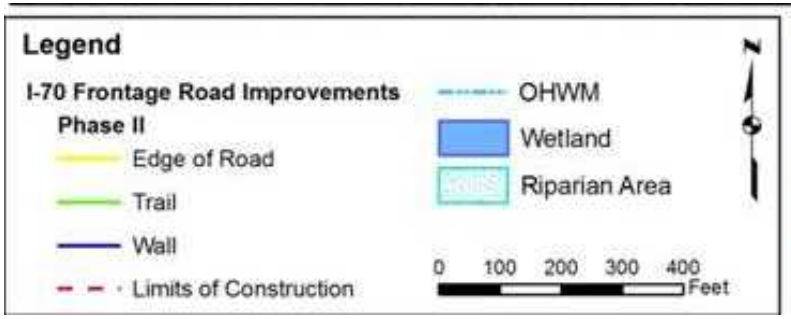
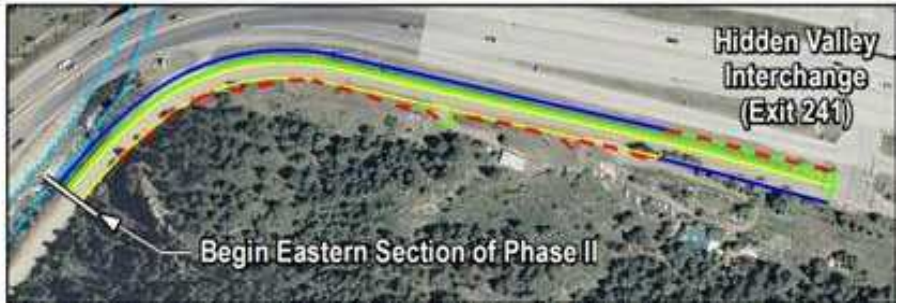


Section at Bell property

Phase I - overlay

Phase II – Walls and trail





Traffic Control During Construction

- Concerns: safety and speed of construction
- Options
  - full closure (safest, quickest, least expensive)
  - limited access (30-50% more construction time)
    - open to bike ped
    - 1 lane/lead car
  - access outside work zone
- Bike and Ped access
- Rafting and Fishing, Biking Access
- Creek incident management plan

Decisions required today

- Cut side wall type
- Guardrail treatment
- Parking area dimension / materials
- Crosswalk design at end of separated trail
- Section at Bell property
- Traffic control during construction

I-70 CSS Aesthetic Guidance for the Mountain Mineral Belt design segment

Features of Special Significance Map

01 | Transportation and Land Relationships
- Adapting the Highway to Existing Topography

02 | Transportation Facilities Alignment
- [illegible] and Lane Separations

03 | Structures that Support Transportation Facilities
- Existing Highway Features
- Bridge Structures
- Retaining Walls Supporting the Highway

04 | Interchanges
- Interchange Design

05 | Guardrails, Barriers, and Edge Delineation
- Guardrails, Barriers, and Edge Delineation

06 | Color Selection and Consistency
- Color Selection and Application

07 | Earthwork, Embankment, and Restoration of Existing Disturbance
- Earthwork and Grading
- Rock Cuts and Modification
- Restoration and Naturalized Appearance of Disturbed Areas
- Landscape Retaining Walls

08 | Hydrologic Features
- [illegible] and Hydrologic Features

09 | Landscape Planting, Revegetation, and Topsoil Management
- Replication of Existing Landscape Patterns
- Landscape Planting
- Topsoil Management

10 | Wildlife Corridors and Crossings
- Wildlife Fencing and Crossings

11 | Community Interface
- Protecting Adjacent Communities
- Linkages and Connections
- Hierarchy of Access

12 | Sound Attenuation
- Sound Attenuation

13 | Recreational and Cultural Resource Access
- Recreational and Cultural Resource Access

14 | Road Services and Adjunct Facilities
- Road Services

15 | Advanced Guideway System
- Advanced Guideway System

16 | Transportation Lighting and Illumination
- Lighting

17 | Signage
- Signage

18 | Utilities in the Corridor
- Utilities

19 | Construction Material Management
- Management of Construction Materials

Aesthetics – structural design

Cut walls are consistent with guidance except for recommendation to build walls over 12 feet below the road

MOUNTAIN MINERAL BELT design segment

03 | STRUCTURES THAT SUPPORT TRANSPORTATION FACILITIES

Visual design continuity should exist throughout the corridor, linking existing and new transportation facility structures. Bridges should be of similar proportion and structural components should be designed using like materials and finishes.

Each retaining wall should be constructed of single material with a visually simple texture that renders a shadow pattern on the surface. Retaining walls that include decorative pictorial patterns and multiple materials, shapes, and styles create visual confusion and should not be used in the I-70 Mountain Corridor.

RETAINING WALLS SUPPORTING THE HIGHWAY

Design Strategies to Be Employed

- Install roadway retaining walls greater than 12' in height below the elevation of the roadway as described in the Design Criteria.
- Provide space for landscape screening treatments in front of all retaining walls that are visible from the roadway or adjacent communities (A).
- Incorporate wall materials that have a consistent texture and pattern (B).
- Employ simple vertical textures and patterns on walls to create shadows and interest (B).
- Use grading strategies to minimize the height of retaining walls along the corridor (C).
- Utilize landscape platforms and turn the ends of walls to meet with the grades of hills and slopes to ensure that retaining walls are integrated with adjoining slopes (D).
- Design walls with a single material, style, and method rather than a mix of materials -even if wall height varies.
- Design walls to include an appropriate cap with an overhang to create shadows and interest.

TUNNELS

Design Strategies to Be Employed

- Provide lighting and light colored reflective surfaces in the tunnel to eliminate the black hole effect.
- Flare tunnel portals and extend them out from the rock cut face. The use of headwalls perpendicular to the travel lanes is strongly discouraged (E).

A| Where possible, allow for landscape screening to buffer the view of retaining walls.

B| Simple vertical textures provide depth and shadow to large wall faces.

C| Incorporate earthwork solutions in conjunction with retaining walls in order to limit retaining wall height.

D| Turning the ends of walls helps integrate them into the adjoining slope.

E| Flare tunnel portals and extend them out from the rock cut face.

Aesthetics - guardrails

Guidance calls for:

•Type 3 Guardrail W-beam (non-galvanized) with wooden posts for guard rails.

Or

•Color concrete barriers

MOUNTAIN MINERAL BELT design segment

05 | GUARDRAILS, BARRIERS, AND EDGE DELINEATION

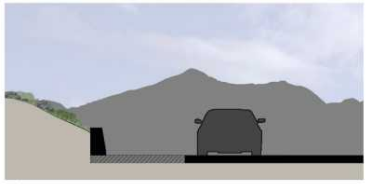
Guardrails will be constructed using Type 3 Guardrail-W Beam with a rusted rail finish and wooden posts. Any concrete barrier rail will be colored to match the segment color selection. An identical design will be used throughout the corridor. A recovery zone is preferable to guardrail or barriers for protection from edge obstacles.

GUARDRAILS, BARRIERS, AND EDGE DELINEATION

Design Strategies to Be Employed

- Use Type 3 Guardrail W-beam with wooden posts for guard rails. Eliminate the use of galvanized "W" rails (A).
- Color concrete barriers using the selected colors from the design segment color palette in order to blend the roadway into the surrounding environment. See Section 06 | Color Selection and Consistency for color palette.
- Incorporate landform and planting directly with concrete barrier walls (B).
- The use of cable rail is strongly discouraged in this segment due to the long term maintenance costs and aesthetics.
- Utilize continuous concrete barriers rather than segmented movable barriers (C).
- Provide edge delineation through applied markings and reflectors rather than painting bright contrasting colors on concrete barriers.

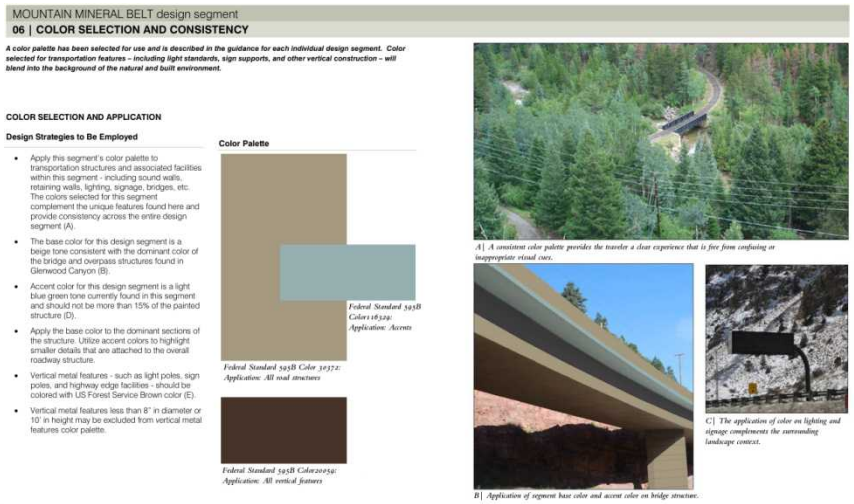
A| Type 3 Guardrail W-beam should be used for guard rails throughout this design segment.



B| Planting and landform should be incorporated with barrier rail walls.

Aesthetics - color

To determine any variations – we will write a spec to have contractor provide rock samples and cast test panels for CCC and IS review



MOUNTAIN MINERAL BELT design segment

06 | COLOR SELECTION AND CONSISTENCY

A color palette has been selected for use and is described in the guidance for each individual design segment. Color selected for transportation features – including light standards, sign supports, and other vertical construction – will blend into the background of the natural and built environment.

COLOR SELECTION AND APPLICATION

Design Strategies to Be Employed

- Apply this segment's color palette to transportation structures and associated facilities within this segment - including sound walls, retaining walls, lighting, signage, bridges, etc. The colors selected for this segment complement the unique features found here and provide consistency across the entire design segment (A).
- The base color for this design segment is a beige tone consistent with the dominant color of the bridge and overpass structures found in Glenwood Canyon (B).
- Accent color for this design segment is a light blue green tone currently found in this segment and should not be more than 15% of the painted structure (D).
- Apply the base color to the dominant sections of the structure. Utilize accent colors to highlight smaller details that are attached to the overall roadway structure.
- Vertical metal features - such as light poles, sign poles, and highway edge facilities - should be colored with US Forest Service Brown color (E).
- Vertical metal features less than 8" in diameter or 10' in height may be excluded from vertical metal features color palette.

Color Palette

Federal Standard 595B Color 16329: Application: Accents

Federal Standard 595B Color 30372: Application: All road structures

Federal Standard 595B Color20059: Application: All vertical features

A| A consistent color palette provides the traveler a clear experience that is free from confusing or inappropriate visual cues.

B| Application of segment base color and accent color on bridge structure.

C| The application of color on lighting and signage complements the surrounding landscape context.

Color Palette

Federal Standard 595B Color 16329: Application: Accents

Federal Standard 595B Color 30372: Application: All road structures

Federal Standard 595B Color20059: Application: All vertical features

Aesthetic details – color

Aesthetics – Landscaping

Seed mix will be consistent with the recommended “Montane” shrubs, perennials and grasses for areas:

•Along the trail “recovery zone”

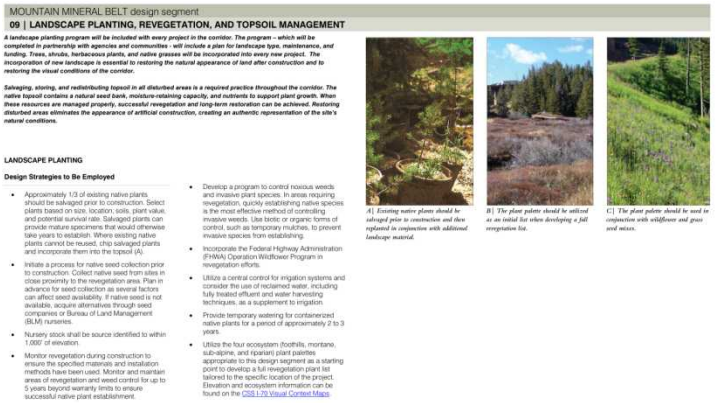
•Within the buffer

•Above the rockery walls

•And other areas disturbed by construction

MONTANE ECOSYSTEM (8,000’ to 9,500’) NATIVE SPECIES

Trees	Shrubs	Perennials/Grasses
• White Fir, *Abies concolor* • Engelmann Spruce, *Picea engelmannii* • Colorado Spruce, *Picea pungens* • Lodgepole Pine, *Pinus contorta latifolia* • Limber Pine, *Pinus flexilis* • Ponderosa Pine, *Pinus ponderosa* • Southwestern White Pine, *Pinus strobiformis* • Narrowleaf Cottonwood, *Populus angustifolia* • Douglas Fir, *Pseudotsuga menziesii* • Rocky Mountain Juniper, *Juniperus scopulorum* • Bristlecone Pine, *Pinus aristata* • Pinon Pine, *Pinus edulis* • Quaking Aspen, *Populus tremuloides* • Gambel Oak, *Quercus gambelii*	• Mountain Mahogany, *Cercocarpus montanus* • Red Twig Dogwood, *Cornus sericea* • Western Chokecherry, *Prunus virginiana* • Rocky Mountain Willow, *Salix monticola* • Native Mountain Ash, *Sorbus scopulina* • Rock Spirea, *Holodiscus dumosus* • Whitestem Currant, *Ribes inerme* • Bristly Currant, *Ribes lacustre* • Western Thimbleberry, *Rubus parviflorus* • Red-Berried Elder, *Sambucus racemosa* • Bearberry, *Arctostaphylos patula* • Kinnikinnik, *Arctostaphylos uva-ursi* • Silver Sagebrush, *Artemisia cana*	• Aspen Daisy, *Erigeron speciosus* • Blanket Flower, *Gaillardia aristata* • Sticky Geranium, *Geranium viscosissimum* • Fairy Trumpets, *Ipomopsis aggregate* • Blue Flax, *Linum lewisii* • Bee Balm, *Mondarda fistulosa* • White-Tufted Evening Primrose, *Oenothera caespitosa* • Pasque Flower, *Pulsatilla patens* • Scarlet Bugler Penstemon, *Penstemon barbatus* • Mat Penstemon, *Penstemon caespitosus* • Smooth Penstemon, *Penstemon glaber* • Shell Leaf Penstemon, *Penstemon grandiflorus*



MOUNTAIN MINERAL BELT design segment

09 | LANDSCAPE PLANTING, REVEGETATION, AND TOPSOIL MANAGEMENT

A landscape planting program will be included with every project in the corridor. The program – which will be completed in partnership with agencies and communities – will include a plan for landscape type, maintenance, and funding. Trees, shrubs, herbaceous plants, and native grasses will be incorporated into every new project. The incorporation of new landscape is essential to restoring the natural appearance of land after construction and to restoring the visual conditions of the corridor.

Salvaging, storing, and redistributing topsoil in all disturbed areas is a required practice throughout the corridor. The native topsoil contains a natural seed bank, moisture-retaining capacity, and nutrients to support plant growth. When these resources are managed properly, successful revegetation and long-term restoration can be achieved. Restoring disturbed areas eliminates the appearance of artificial construction, creating an authentic representation of the site’s natural conditions.

LANDSCAPE PLANTING

Design Strategies to Be Employed

- Approximately 1/3 of existing native plants should be salvaged prior to construction. Select plants based on size, location, soils, plant value, and potential survival rate. Salvaged plants can provide mature specimens that would otherwise take years to establish. Where existing native plants cannot be reused, chip salvaged plants and incorporate them into the topsoil (A).
- Initiate a process for native seed collection prior to construction. Collect native seed from sites in close proximity to the revegetation area. Plan in advance for seed collection as several factors can affect seed availability. If native seed is not available, acquire alternatives through seed companies or Bureau of Land Management (BLM) nurseries.
- Nursery stock shall be source identified to within *1,000’* of elevation.
- Monitor revegetation during construction to ensure the specified materials and installation methods have been used. Monitor and maintain areas of revegetation and weed control for up to 5 years beyond warranty limits to ensure successful native plant establishment.
- Develop a program to control noxious weeds and invasive plant species. In areas requiring revegetation, quickly establishing native species is the most effective method of controlling invasive weeds. Use biotic or organic forms of control, such as temporary mulches, to prevent invasive species from establishing.
- Incorporate the Federal Highway Administration (FHWA) Operation Wildflower Program in revegetation efforts.
- Utilize a central control for irrigation systems and consider the use of reclaimed water, including fully treated effluent and water harvesting techniques, as a supplement to irrigation.
- Provide temporary watering for containerized native plants for a period of approximately 2 to 3 years.
- Utilize the four ecosystem (foothills, montane, sub-alpine, and riparian) plant palettes appropriate to this design segment as a starting point to develop a full revegetation plant list tailored to the specific location of the project. Elevation and ecosystem information can be found on the CDS I-70 Visual Context Maps.

A| Existing native plants should be salvaged prior to construction and then replanted in conjunction with additional landscape material.

B| The plant palette should be utilized as an initial list when developing a full revegetation list.

C| The plant palette should be used in conjunction with wildflower and grass seed mixes.

Resolution of Greenway ITF items

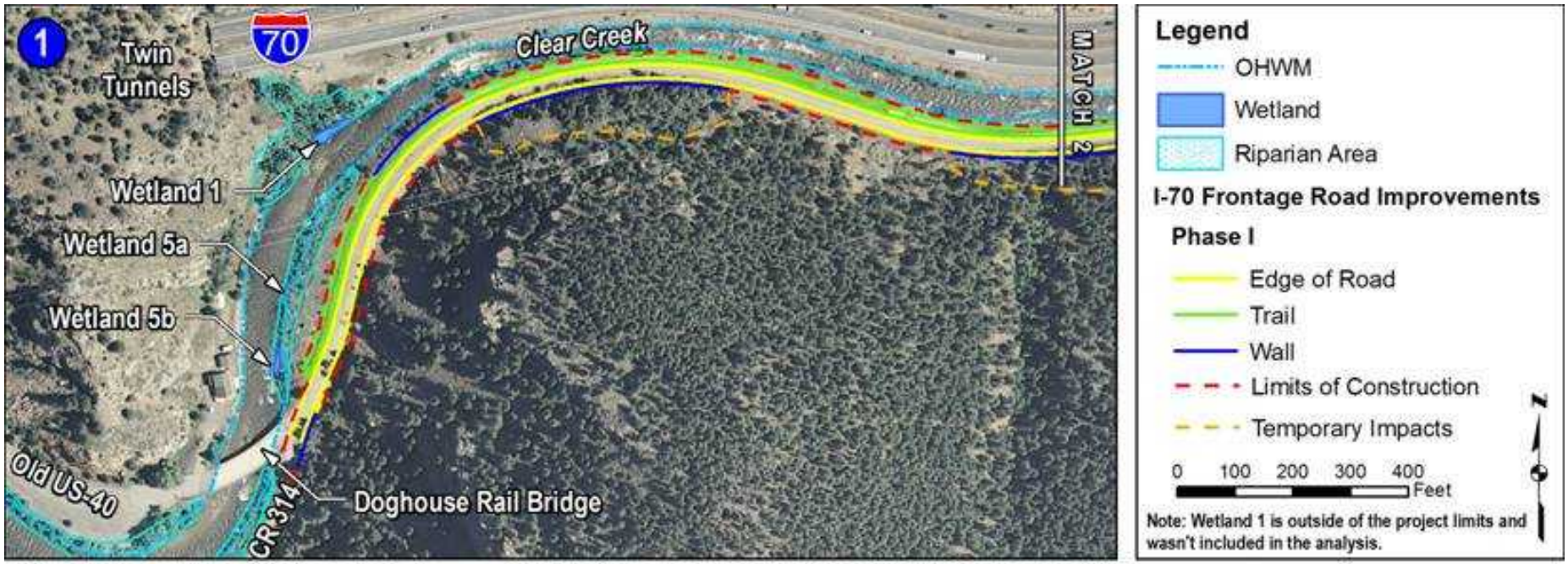
1. CDOT to confirm ROW needs for the Greenway alignment.
2. *Present Greenway plan for review at the Idaho Spring City Council*
3. CDOT to develop property ownership map
4. CDOT to clarify restrictions related to high power lines
5. Tim Mauck confirmed the County preference to have the trail on the creek side of Phase I
6. Team clarified that ROW needs in gravel road don't impact historic areas
7. CDOT provided a letter documenting intent to preserve the functionality, visibility, and character of the Lancaster Bridge.
8. Team clarified that bike trail will be 10 feet

I-70 Frontage Road Improvements

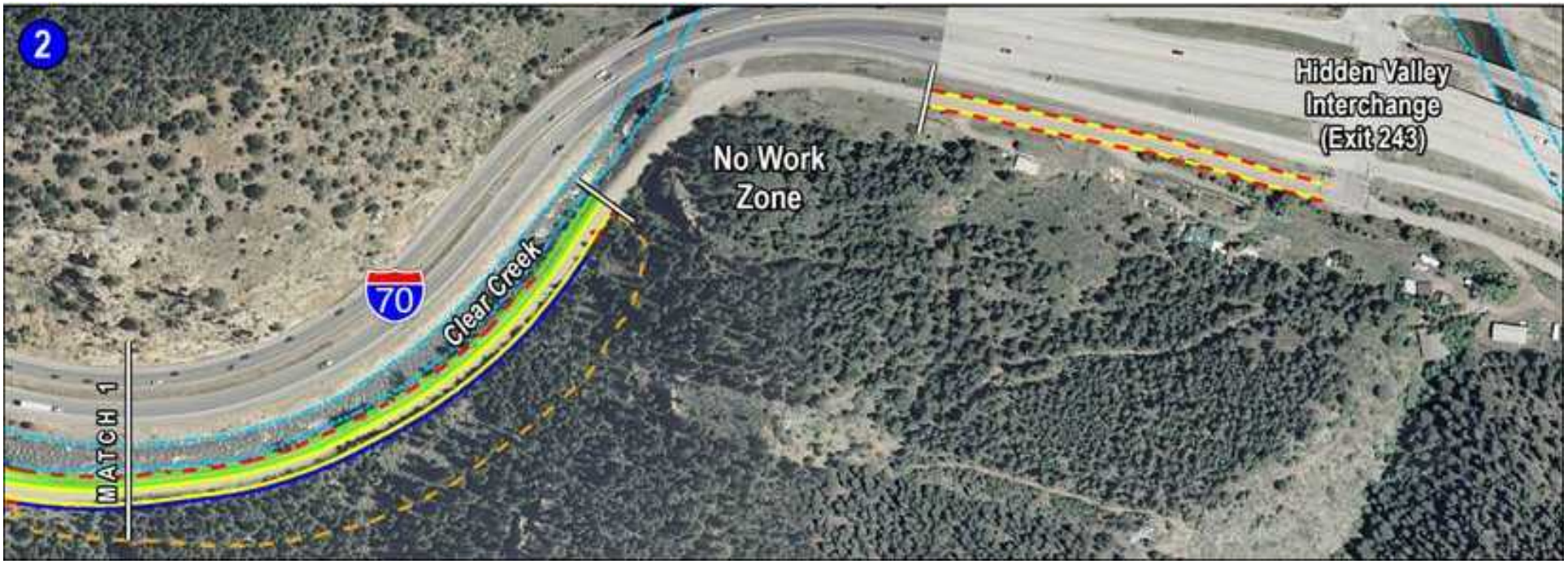
Categorical Exclusion Update

- Separate Action Memo
- Wetlands
  - No impacts in phase I
  - Minimal impacts in phase II
- Historic Resources
- Concept Screening Report

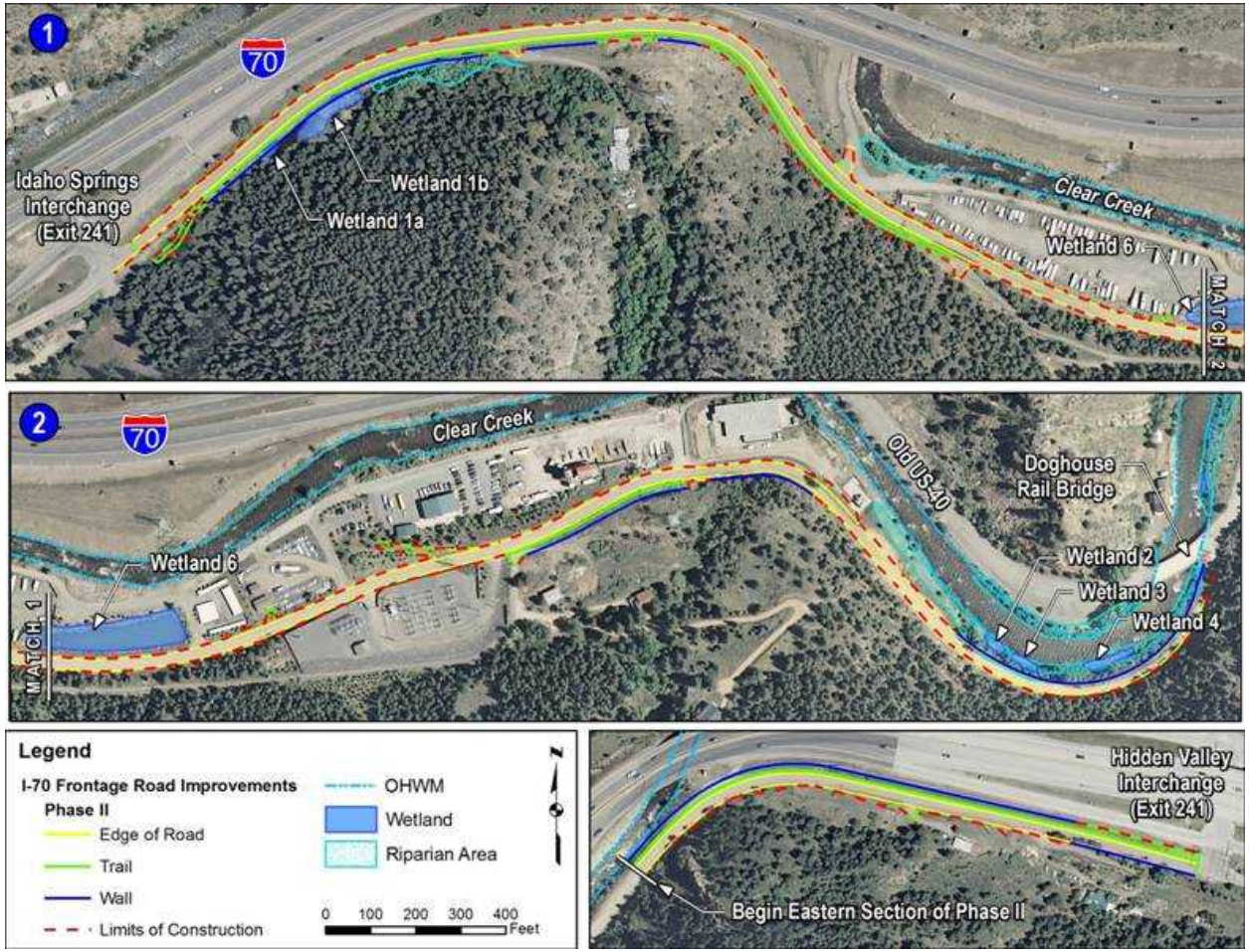
Wetlands / Riparian analysis



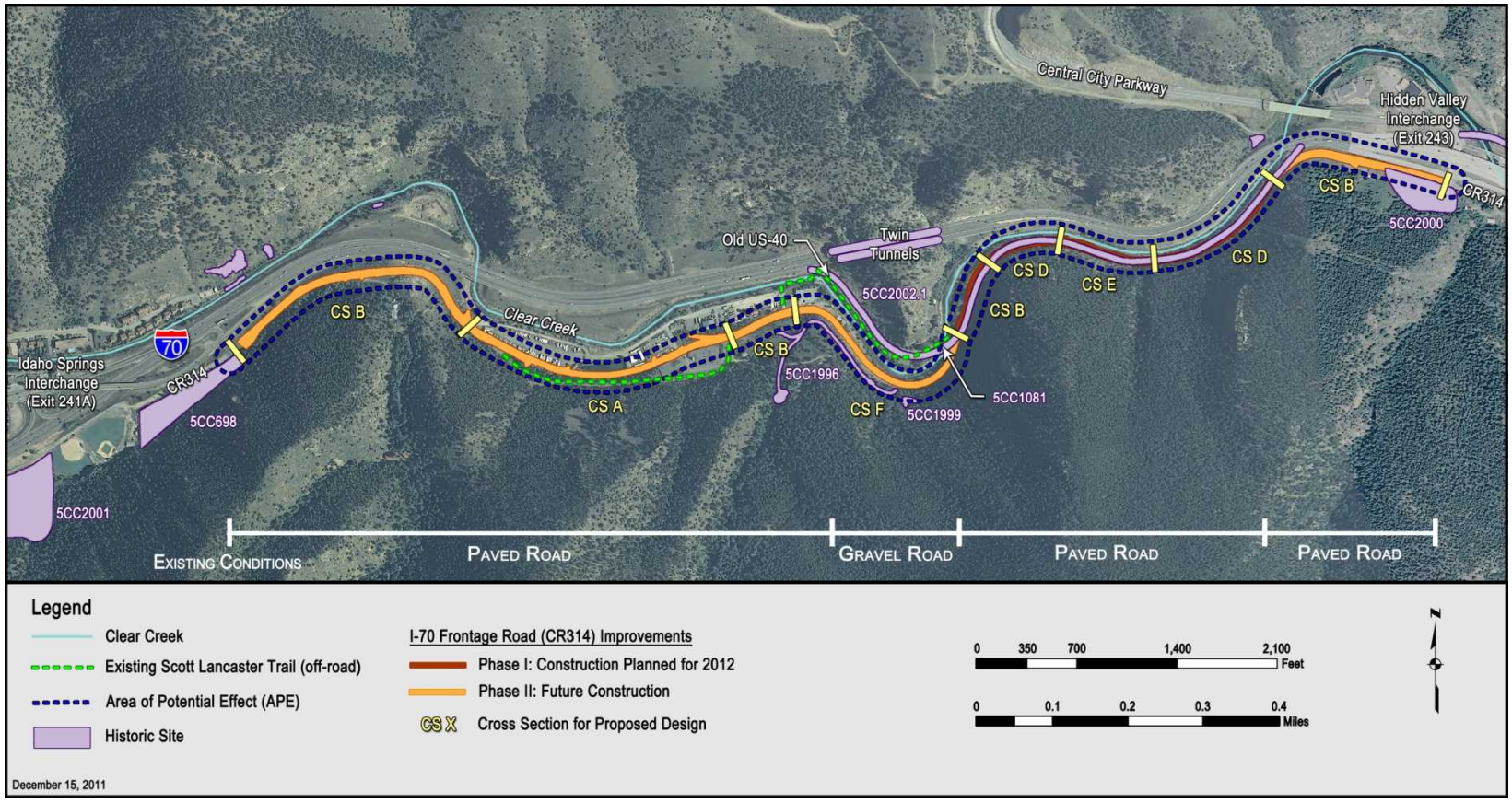
Wetlands / Riparian analysis



Wetlands – Phase II

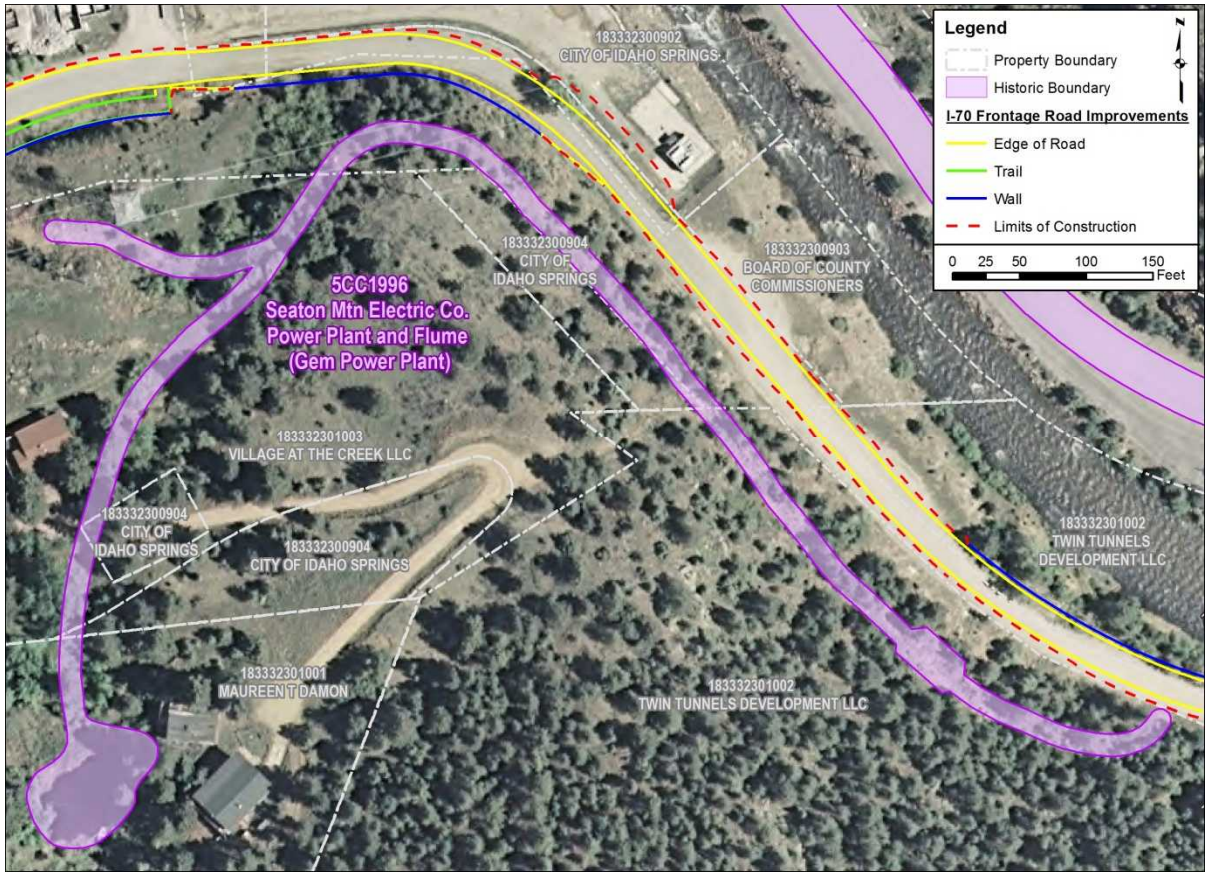


Historic Resource Avoidance



Historic Resource Avoidance

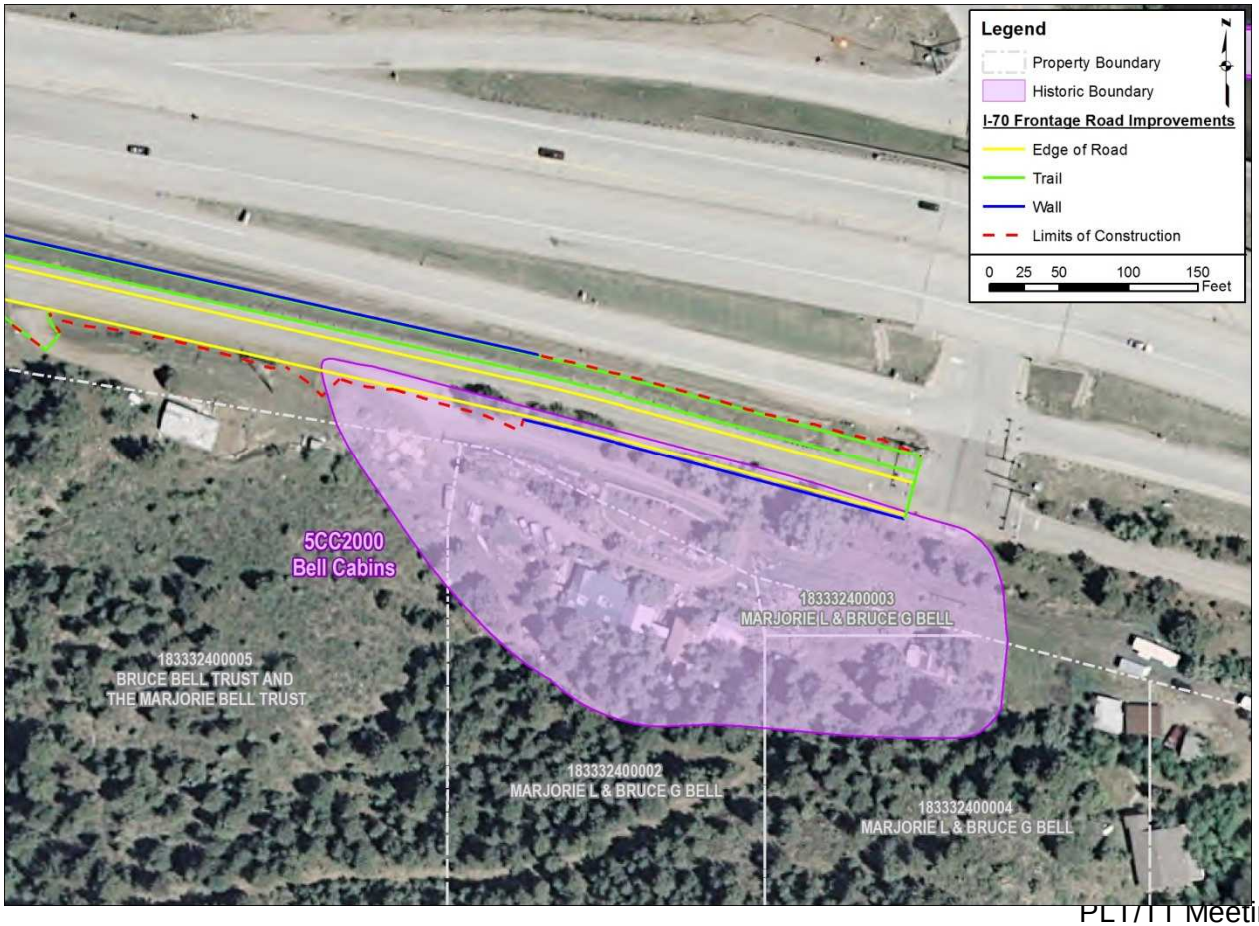
- 5CC1996 – Seaton Mountain Electric Company Hydroelectric Plant and Flume (aka Gem Power plant)



I-70 Frontage Road Improvements

Historic Resource Avoidance

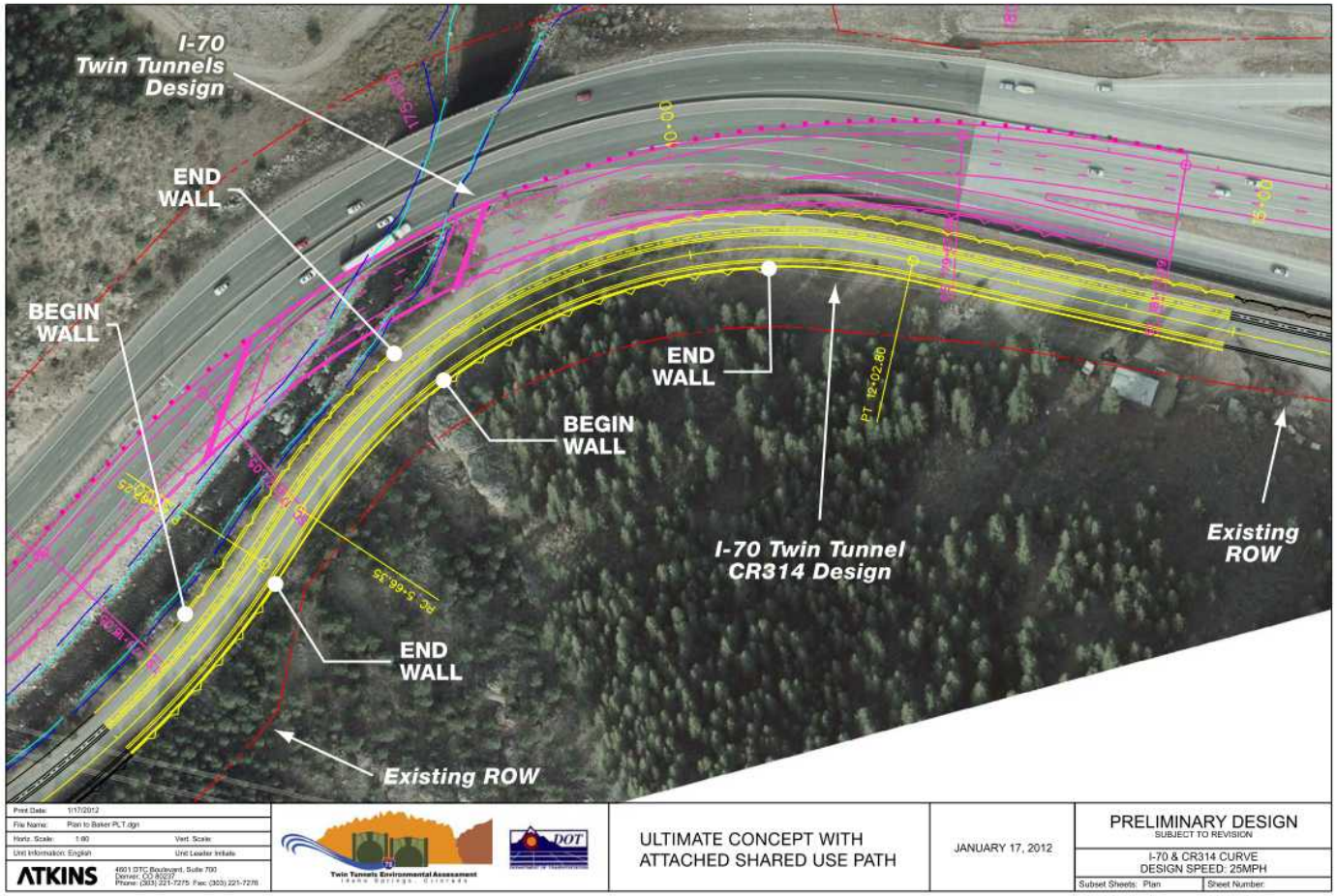
- 5CC2000 - Bell Property



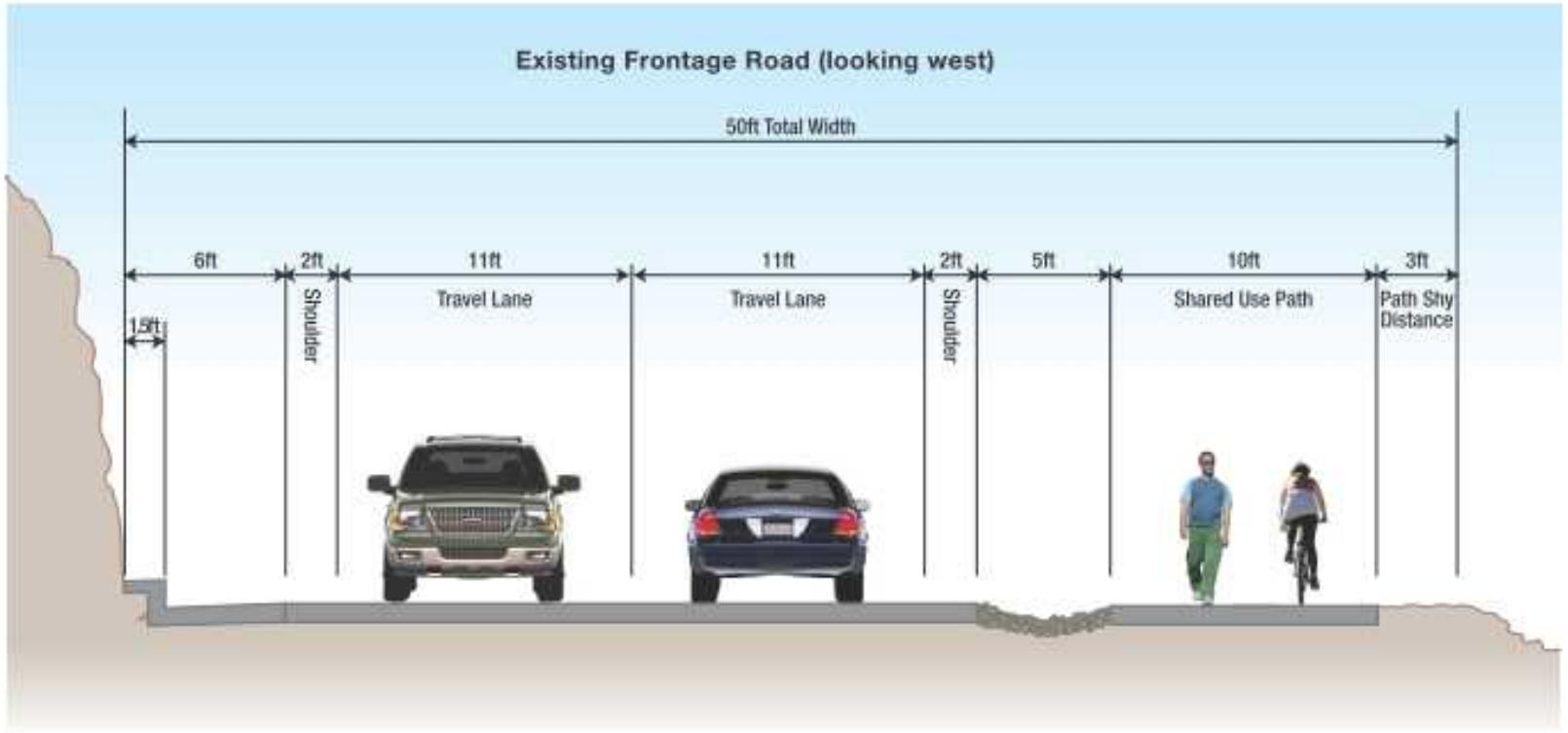
Items to be addressed by Twin Tunnels Team

- Impacts of I-70 bridge reconstruction
- Detour construction details
- Guard rail adjustments
- Buffer seeding/restoration

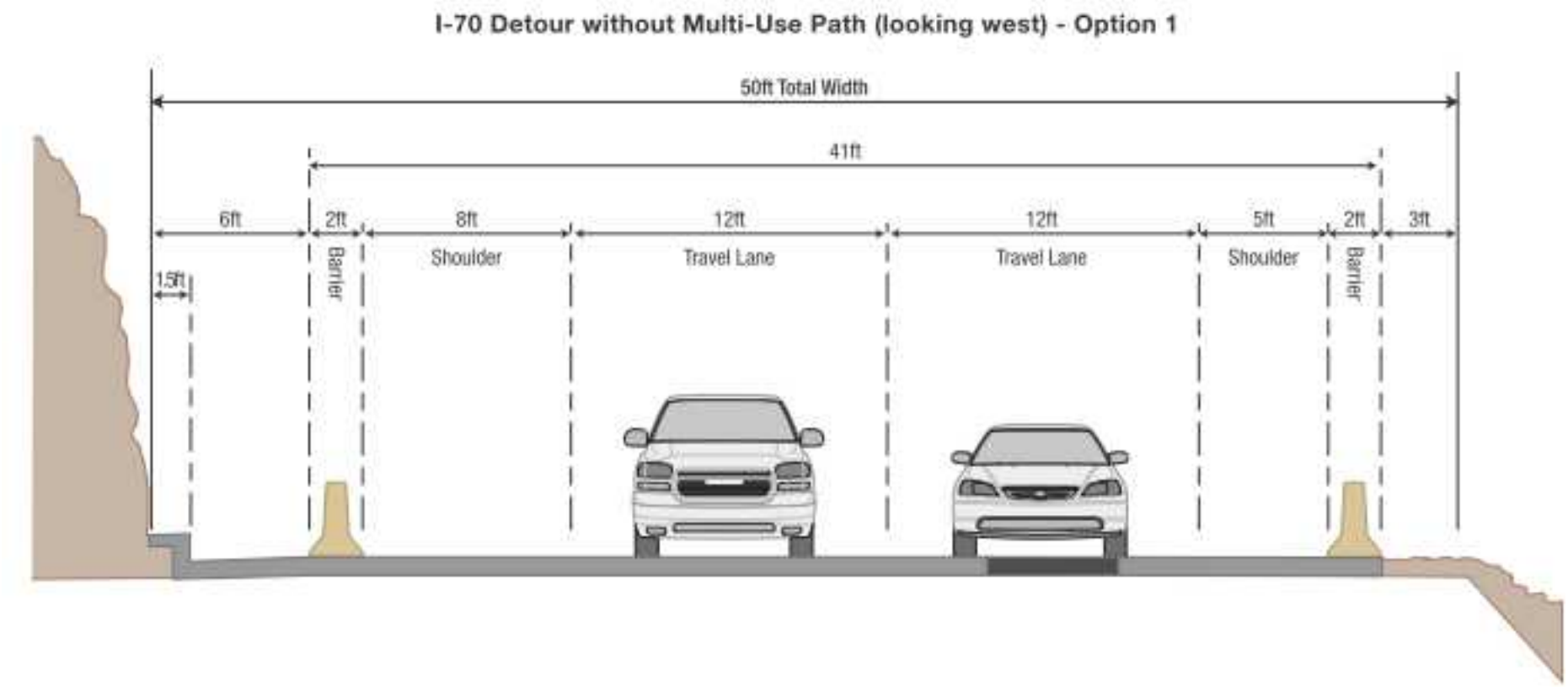
Potential I-70 bridge reconstruction



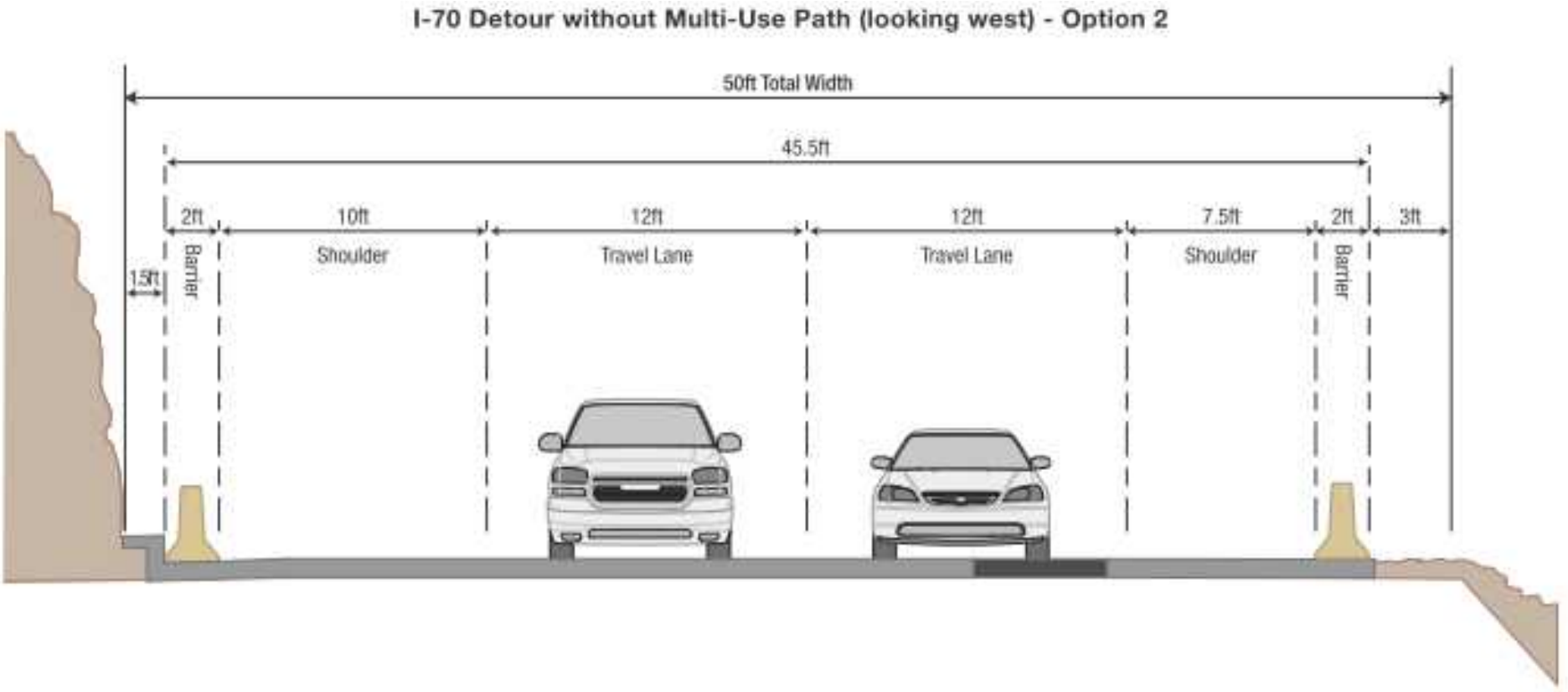
Twin Tunnel (post phase I) existing condition



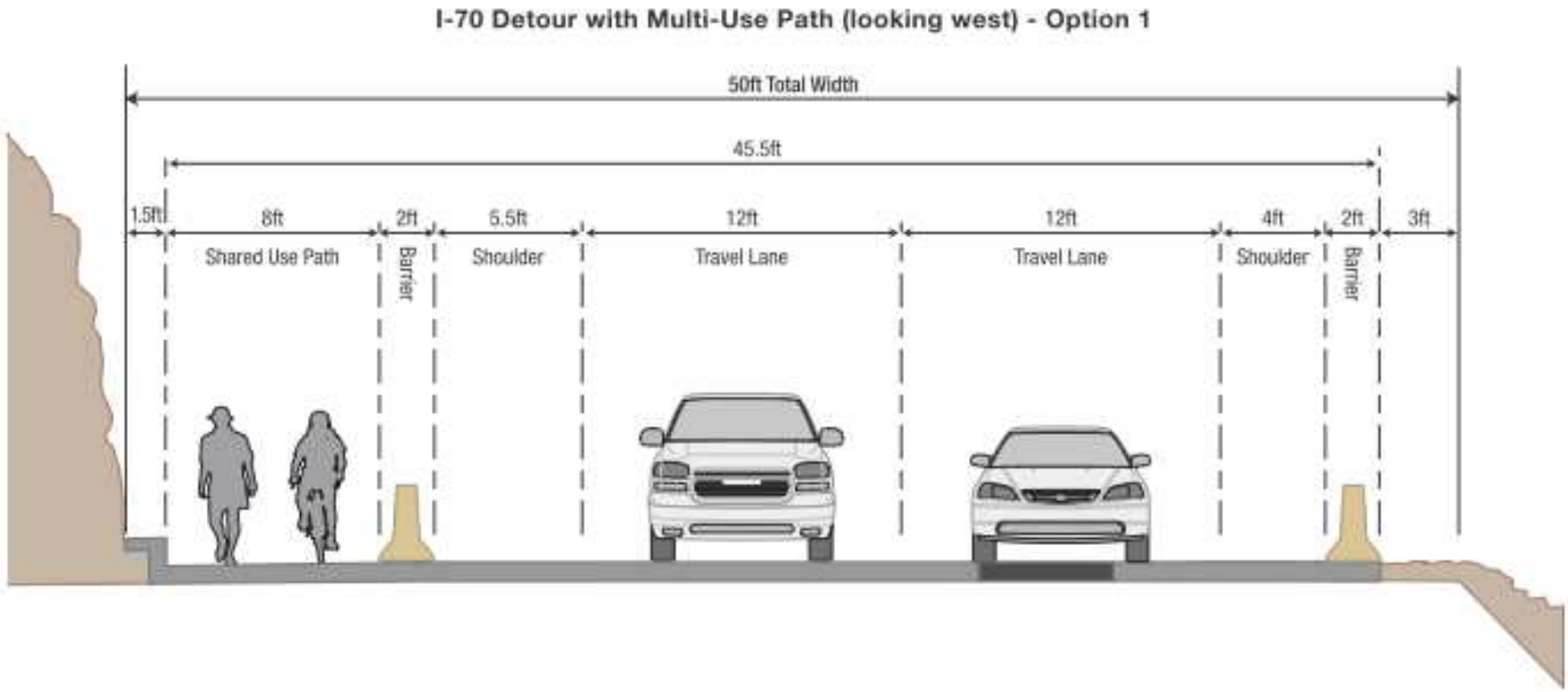
Twin Tunnel Team proposed detour cross sections: without path - option 1



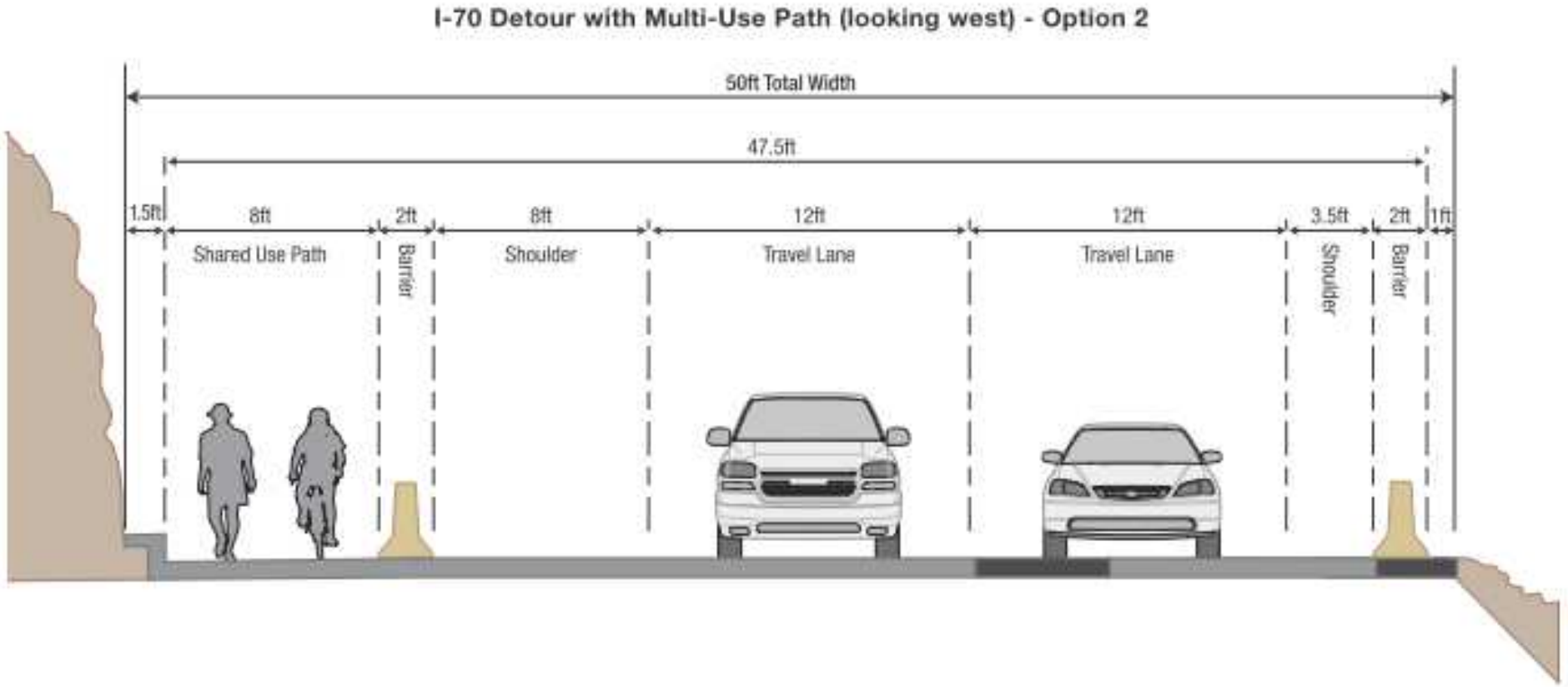
Twin Tunnel Team proposed detour cross sections: without path – option 2



Twin Tunnel Team proposed detour cross sections: with path - option 1



Twin Tunnel Team proposed detour cross sections: with path – option 2



Process Clarifications

- Jim Bemelen working on IGA with Clear Creek County Commissioners to define the appropriate documentation to define responsibilities for construction (use of doghouse), maintenance, revisiting doghouse rail bridge.
- Idaho Springs City Council - 2nd and 4th Mondays at 7pm

Decisions reached

- Engineering decisions
  - Cut side wall characteristics
  - Guardrail treatment
  - Parking section dimension / materials
  - Crosswalk design at end of separated trail
  - Section at Bell property
  - Traffic control during construction
- Confirmation of resolution/approach
  - Aesthetic approach
  - Greenway issue resolution
  - Historic resource resolution

FOR Distribution List plan

- CDOT Personnel – Electronic submittal
- Posted on CDOT website
- Clear Creek County (Delivered to Idaho Springs Courthouse)
  - Eight 11x17 copies of plans
  - Eight copies of specifications
- City of Idaho Springs (Delivered to Idaho Springs Courthouse)
  - Five 11x17 copies of plans
  - Five copies of specifications

Next Steps

- Idaho Springs City Council
  - Follow-up Needed
- Rafting company coordination
- PLT/TT Future Meetings
  - February: Final PLT/TT before construction
    - Final design finishes and colors for rails and walls
    - Anything else?
- Final Office Review
  - March 2012