

**A LANDSCAPE LEVEL INVENTORY
OF VALUED ECOSYSTEM
COMPONENTS (ALIVE)
ISSUE TASK FORCE (ITF)
MEETING MINUTES**

Meeting Notes



I-70 Floyd Hill to Veterans Memorial Tunnels

Project: I-70 Floyd Hill to VMT
Meeting: ALIVE Issue Task Force Meeting
Date: April 20, 2018; 10:00 am to 12:00 pm
Location: CDOT Region 1, 425 Corporate Circle, Golden, CO

Attendees:
See Attached Sign-in Sheet

Summary of Action Items	Responsibility	Status
1. Follow up to see if there are site specific locations that may still be using sand for treatment	Neil Ogden	
2. Look into designs for rockfall netting that minimize entanglement	Julia Kintsch and Stephanie	
4. Check with drone footage used for rock fall to see if it caught any issues with entanglement or animals	Neil Ogden	
5. Provide preliminary crossing design and or schematics to Clear Creek County to facilitate opportunities for partnerships with local development	Neil Ogden	
6. Look into opportunities for conservation easements	Neil Ogden, add to agenda for ROW meeting	
7. Coordinate with Joe Walter on additional wildlife carcass information to add into reporting	Julia Kintsch and Keith Hidalgo	

SUMMARY OF DISCUSSION

[Note: Action items are in [blue](#).]

1) Welcome / Introductions

Self-introductions were done by the group

2) Project Overview

Vanessa Henderson (CDOT) gave a project overview as shown in the attached presentation.

3) ALIVE MOU and Previous Studies

Julia Kintsch (ECO-Resolutions) provided background on the ALIVE MOU, roles of members of the ALIVE committee, and described the Linkage Interference Zones and mortality data in the Floyd Hill Study Area as shown in the attached presentation. For more information on the ALIVE MOU refer to: https://www.codot.gov/projects/i-70-old-mountaincorridor/final-peis/final-peis-documents/20_App_E_ALIVE_MOU_Rev50.pdf

The ALIVE MOU came out of the Context Sensitive Solutions process and was part of the I-70 EcoLogical project that was a Regional Ecosystem Framework for Terrestrial and Aquatic Wildlife along the I-70 Mountain Corridor.

<https://www.codot.gov/projects/i70tuntunnels/other-documents/plt-technical-team/issued-task-forces/waterresources/A%20Regional%20Ecosystem%20Framework%20for%20Terrestrial%20and%20Aquatic%20Wildlife%20Along%20the%20I-70%20Mountain%20Corridor.pdf>).

Included the identification of 17 Linkage Interference Zones (2011) that updated the original 13 LIZs (2004). Requested agreement on using 2011 LIZ. ALIVE representatives present agreed to use the 2011 LIZs.

ALIVE Implementation Matrix <https://www.codot.gov/resolveuid/0928f54fb1e94dfa8a57a996edcc7e77> (what questions should be asked at each stage of the project life cycle, currently in project development)

I-70 EcoLogical Guidelines for Enhancing Wildlife Permeability:
<https://www.codot.gov/resolveuid/34aa4c925fb245f0848e7473e6f9325d>

Clear Creek Junction LIZ from MP 243.0 – 244.9

Julia Kintsch presented the Wildlife-Vehicle Collision rate, carcass collection numbers and other connectivity issues in this LIZ to the ALIVE committee. Identified improving bridges over Clear Creek and wildlife crossing at 244.9.

Stephanie Gibson (FHWA): Recommendation on fencing? Julia Kintsch responded that yes, fencing should always be considered when structures are discussed.

Beaver Brook LIZ from MP 245.5 – 250.2 (project area ends MP 248)

Julia Kintsch presented the Wildlife-Vehicle Collision rate, carcass collection numbers, Preble's habitat, and other connectivity issues in this LIZ to the ALIVE committee. Identified crossing opportunities at MP's 246.5, 247, 247.5 and 248.2.

Aquatic Connectivity (included to see what the needs are)

Julia Kintsch presented on aquatic connectivity as identified in the presentation

Julia Kintsch presented the ALIVE Implementation Matrix as shown in the presentation.

Jo Ann Sorensen (Clear Creek County): Should we also be asking the same questions under project design (phasing in the matrix)? Yes, we should be asking the questions listed under the first 3 phases, up to project design.

Alison Michael (USFWS): ALIVE came out of one of the core values from the original CSS process. These are things that the collaborative effort came up with to improve conditions in the corridor.

I-70 Traffic and Revenue Study (<https://www.codot.gov/projects/i-70mountaincorridor/trafficrevenuestudy>) An overview of the study is provided, but a link to download the report isn't available. For further information about the project, contact Benjamin Acimovic, CDOT project manager at Benjamin.Acimovic@state.co.us, phone 720-497-6936.

Julia Kintsch provided an overview of the wildlife connectivity issues discussed during the study.

Neil Ogden (CDOT): Was cost determined for the crossing at 247? Where it was headed, but not finished.

Alison Michael: Where is 247? Located between Hyland and Beaver Brook exits.

4) Wildlife Connectivity Issues and Concerns

Julia Kintsch presented on the various wildlife issues and concerns identified in previous studies and for the Floyd Hill Study Area, data needed, effects on wildlife, and initial mitigation recommendations. Extended discussion on Bighorn Sheep.

Jo Ann Sorenson: Are there issues related to the maintenance of the highway? Yes, but these issues came from the public meeting last summer.

Doreen Sumerlin (USFS): Did anything come up related to the increase of more sand in the creek due to more pavement lanes? Yes, came up at SWEEP.

Jo Ann Sorenson: Do we have a clear understanding of the maintenance activities? And what is used on the corridor.

Neil Ogden: Areas treated by traction sand recently changed – now being used from Empire Junction to 241 interchange (east Idaho Springs), magnesium chloride is being used from 241 to Denver. **Neil will follow up to see if there are site specific locations that may still be using sand.**

Francesca Tordonato (CDOT): Was there a high number of bears picked up?

Joe Walter (CPW): Not last year, but 4 or 5 the year before. May be due to population and weather. Not a lot of opportunity for hunters on the Front Range. Not on the steep part of Floyd Hill, but typically between Floyd Hill and El Rancho. Bears don't have consistent crossing (like lions). Tend to be more adaptable in crossings.

Wildlife-vehicle collision issue:

Julia Kintsch provided an overview of wildlife-vehicle collisions and carcass data for the Floyd Hill Project area and which species made up the majority of reporting.

A lot of the data is not reported. Not seeing all of the numbers, but can see patterns. **Joe has more informal data which he can provide on other locations on wildlife carcasses that he has collected in the study area.**

Canada Lynx issues:

Julia Kintsch provided an overview of lynx and likely habitat for lynx for the Floyd Hill Study Area.

Preble's Meadow Jumping Mouse issues:

Julia Kintsch provided information on the Preble's habitat located in the Floyd Hill Study Area.

Jo Ann Sorenson: When you're talking about rip-rap, is there an advantage to using rocks that are more difficult to climb on? Tend to use a standard material, rather than something like river rock that may not be able to interlock and stay there and help avoid erosion. For wildlife passage, creating a bench or small pathway through the rip-rap may be helpful. Where it is really steep, there may not be many opportunities. Maybe there are ways to span wider.

Jo Ann Sorenson: Rafting access issues with the steep banks, could we make slopes more accommodating for them too? Need to find opportunities for mutual benefit, although in some places may want to avoid human activity.

Connectivity issues for Terrestrial Fauna:

Julia Kintsch provided information on connectivity issues for elk and mule deer in the Floyd Hill Study Area.

Bighorn Sheep issues:

Julia Kintsch provided information on connectivity issues for bighorn sheep in the Floyd Hill Study Area.

Doreen Sumerlin: Important to point out lambing areas, project could potentially impact and should be considered from a cumulative effect from previous impacts. There were timing restrictions for blasting on Twin Tunnels. Timing restrictions on blasting to avoid lambing will be similarly imposed here.

Doreen Sumerlin: Are the sheep kills on I-70 or on US 6? Mainly on US 6 (not crossing), but cannot tell from the map. Due to curves and sight distance. Sheep are everywhere now that the area is starting to green up. They will cross US 6, rarely will they cross I-70.

Aquatic connectivity issues:

Julia Kintsch provided information on aquatic connectivity issues in the Floyd Hill Study Area. Only issue is at Beaver Brook.

Keith Hidalgo (Atkins): Noted in conversations with Paul Winkle (CPW Aquatic Biologist) that the only fish on Beaver Brook is at a stocked reservoir upstream, but no fish in Beaver Brook until much further downstream, closer to Clear Creek. Joe noted that there is no need for aquatic connectivity at this location.

Raptor entanglement issues:

Julia Kintsch presented on concerns that raptors may become entangled in rock fall mitigation netting as shown in the presentation.

Francesca Tordonato: How does it relate to rockfall mitigation, last recommendation may not work. May be competing interests in design. Follow up with Mark or Jeff Peterson. Having more information may be able to help us balance all of the needs. Need to continue to design rockfall nets with these incidents in mind. Look at design to minimize entanglement. [Julia and Stephanie to follow up.](#)

Jo Ann Sorenson: When drones were being used to check rockfall, did they pick up information? [Neil to follow up.](#)

5) Mitigation Considerations

Julia Kintsch presented on mitigation considerations in the Floyd Hill Study Area.

Wildlife Overpass

Julia Kintsch presented on possible wildlife overpass locations in the Floyd Hill Study Area.

Wildlife Underpasses

Julia Kintsch presented on possible wildlife underpass locations in the Floyd Hill Study Area and discussed it needs to be in conjunction with fencing.

6) Map Review

Maps of the corridor were reviewed by the group. An overview of the discussion for each of the four maps is described below.

Study Area Overall

- Tiered rock walls where rock cuts are so that the walls are not impassible for wildlife, where feasible
- Upsize culverts where possible with natural bottoms?
- Ramps/shelves in pipes, culverts, etc?
- Better roadside visibility of wildlife = good

Western Segment

- Reduce vegetation along roadway to increase visibility of wildlife (bighorn sheep)
- Straightening out w-curves also improves visibility of wildlife, reduces safety risk
- Can Clear Creek move north of the highway?
- Higher walls along $\frac{3}{4}$ and $\frac{1}{4}$ with balanced?
- Sheep mortality on east side of VMT
- Gold mine shafts?

Central Segment

- Tunnel good for wildlife (bighorn sheep)
- Tiered potential wildlife impact
- Operations at bridges to span wider for wildlife?
- Locations for underpass?
- Locations for overpasses/crossings?
- Sheep and bear use areas at US 6 Junction
- Deer jumping off bridge?
- Erosion – reduce average grade?

Eastern Segment

- Partnership with Developer for wildlife overpass structure?
- Bridge for connectivity or tubes w/ramps?
- Construction easement possible?
- Two locations for an overpass?
- PMJM trapped here in 2004 downstream on Beaver Brook

Map 1 (Veteran Memorial Tunnels area)

Anthony Pisano (Atkins): Options in the west include tunnel or rock cut. Rock cut would involve moving the creek slightly to the south. Does not change the angle of the road going into the tunnels.

Central City Parkway – one or both bridges over Clear Creek are likely to be replaced, depending on how the frontage road ties in.

Doreen Sumerlin: Are there issues with the extent of the vertical walls? Look for opportunities for animals to get around. A tiered wall may make more sense than a vertical wall. Would be great for Geotech and ALIVE recommendations to be the same for walls.

Julia Kintsch: Straightening the curve east of the tunnels is helpful for bighorn mortality rate. Wildlife fencing would also be a help to mortality. Tunnels added wildlife friendly fencing on west side. Top and bottom are smooth, middle are barbed for wildlife friendly fencing in this area.

Map 2 (around US 6 interchange)

Anthony Pisano: Not too many changes in this area. Not sure about property impacts yet. A lot of the alignment changes are within CDOT right of way. Still working out the details of how the greenway comes through. Trying not to impact the interchange. Tiered rock cut to the east of the interchange. Then a tunnel (for westbound) and rock cut for eastbound.

Doreen Sumerlin: What does tiered mean? Like Glenwood Canyon? More like stair stepped rock, soil nail walls. Need to consider how the animals can get out or escape the highway. Will have an extra wide ditch for sight distance and catching rocks.

Alison Michael: Can a crossing structure be located over the eastbound section where westbound is in a tunnel? May be challenges but could be considered. Would have to cross EB lanes and frontage road.

Joe Walter: Don't want sheep crossing the road.

Doreen Sumerlin: Tunnel is huge benefit to wildlife over non-tunnel alternatives.

Julia Kintsch: Need to consider the crossing at US 6 and the suggested location – these might be better crossing locations than opposite the new WB tunnel.

Doreen Sumerlin: How feasible are having larger spans for bridges? Think there are opportunities for that. May depend on the frontage road connection and other things. Rafters have requested some of the walls under the interchange at US 6 remain.

Neil Ogden: How would having the greenway underneath conflict with wildlife crossing? Mainly lighting issues, but may not conflict. Would be better for a separate connection. Some examples in Region 1 without lighting. Hasn't been a big issue with leaving it dark, but could be safety issues. One at C 470 and South Platte River.

Julia Kintsch: Would be good to have some of the culverts upsized to provide for crossing. (e.g., every ¼ mile). Does not need to be a box culvert, can be pipes.

Keith Hidalgo: Pointed out some of the features from SWEEP for the drainage system could be enhanced/upsized for smaller wildlife as well.

Doreen Sumerlin: Agreed and liked the idea of shelving for small rodents in new or existing culvert pipes.

Vanessa Henderson: Curious about the gulch. Sheep are using for moving, and in the Frei area. Sheep are mostly on US 6.

Map 3 (west side of Floyd Hill)

Anthony Pisano: Adding a third lane westbound, may end up with small sections of wall. Most if not all widening to occur on south side and moving the EB lanes over.

Julia Kintsch: At 244.9 potential underpass location. Right under the WB pullout, close to 245. How feasible would it be in this location, would still have to cross US 40. A bridge or arch would be good. Shorter lengths are definitely better. Over 120 feet usage drops off. Don't need to add areas for additional light. This may be a preferred location over the crossing in Map 4, and would offer better spacing between crossing opportunities at the bottom of Floyd Hill and top of Floyd Hill, but both locations have challenges.

Overpass option right next to the underpass from the cut slope on the south side to the wide pullout on the north side of I-70. Connection to Clear Creek junction. But will have to consider other needs, such as use of the pullout by law enforcement and maintenance.

Map 4 (Floyd Hill summit)

Anthony Pisano: Adding a third lane westbound, along the slope. Will add a full diamond at one of the interchanges.

Julia Kintsch: Overpass at 247, would have to figure out land use in this area. On the south proposing 400-unit development. Maybe an opportunity for partnership with development, and right of way may be needed from the developer. **Adam Springer (Clear Creek County) will follow up when more is known about what is needed. May advance design for crossing in this area.**

Mountain bike and hiking trails going in nearby on open space properties north of 246.5. Also looking for pedestrian access to open space. But need to discourage pedestrian use on a wildlife overpass. Hwy 9 cost was 1.8M (66-foot span). Most comparable structures would be on South I-25, but design and costs are not finalized.

Doreen Sumerlin: Are conservation easements possible with the project? **Maybe, Neil will look into it with the right of way group.**

Neil Ogden: If an additional off-ramp is added at CR 65 over Beaver Brook, what could the issues and opportunities be? Bridge rather than fill would be a better option in this area.

Consider upsizing Beaver Brook culvert and adding a dry shelf (with vole/mouse tube) for small fauna passage.

7) Next Steps

Next steps for the project include:

- Conduct field reconnaissance and address data gaps to refine mitigation recommendations
- Create table of mitigation options for evaluation
- Coordinate with design team
- Partnership opportunities
- Next ALIVE meeting – late summer/early fall

8) Project Schedule

Upcoming dates for future tasks include:

- Existing Conditions/Data Collection
 - Fall 2017 through 2018
- NEPA/30% Design
 - Winter 2017/2018 through Spring 2020
- Final Design followed by Construction (pending funding availability)

- Spring/Summer 2020
- Construction 2021-2024

9) Questions

Field visits before the next meeting. No additional questions.

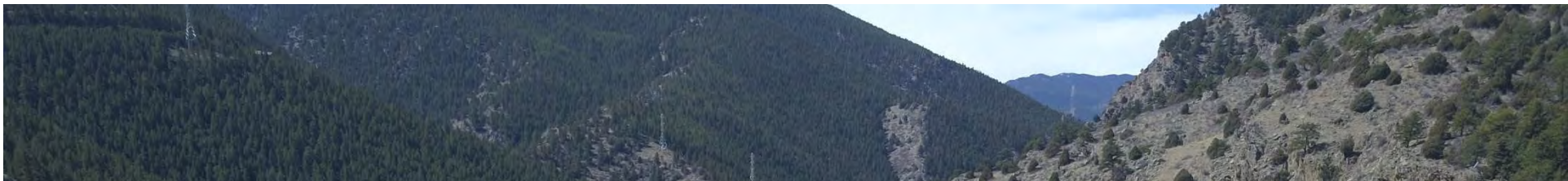
Sign-In Sheet



I-70 Floyd Hill to Veterans Memorial Tunnels

Project: I-70 Floyd Hill to Veterans Memorial Tunnels EA
Meeting: ALIVE Issues Task Force Meeting
Date/Time: April 20, 2018; 10:00 am to 12:00 pm
Location: CDOT Region 1, 425 Corporate Circle, Golden, CO

Initial	Name	Agency	Address	Phone	E-Mail
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JS	JoAnn Sorensen	CCA	PO Box 2000 GT 80444	303.679-2409	jsorensen@co.deer-creek.co.us
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AS	Alan Springer	Deer Creek		3/679-2361	aspringer@co.deer-creek.co.us



I-70 Floyd Hill to Veterans Memorial Tunnels

ATKINS



ALIVE Meeting

April 20, 2018



I-70 Floyd Hill to Veterans Memorial Tunnels

Agenda

- Welcome / Introductions
- Project Overview
- ALIVE MOU and Previous Studies
- Wildlife Connectivity Issues and Concerns
- Mitigation Considerations
- Next Steps
- Project Schedule



I-70 Floyd Hill to Veterans Memorial Tunnels

Project Overview and Background



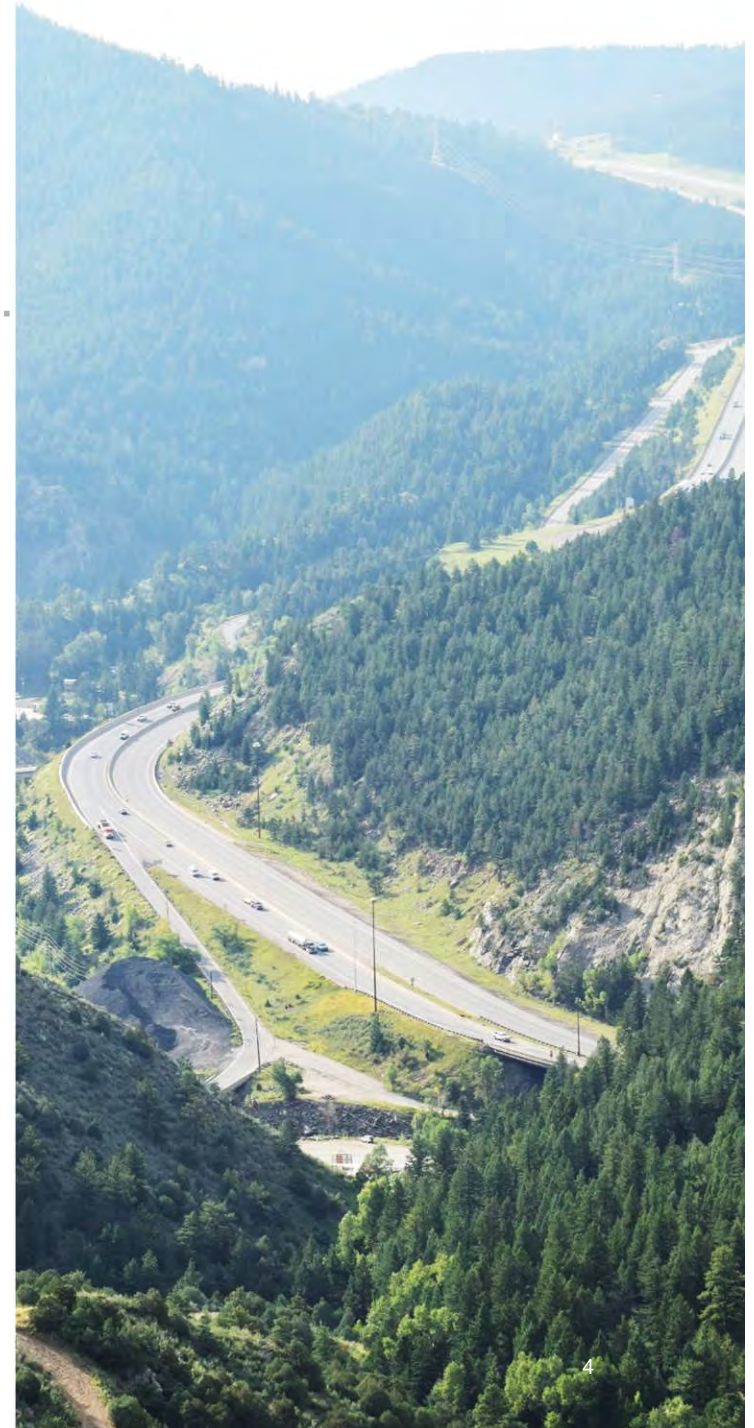


I-70 Floyd Hill to Veterans Memorial Tunnels

Purpose

The purposes of the I-70 Floyd Hill to Veterans Memorial Tunnels project are to:

- Improve travel time reliability, safety, and mobility and address the deficient infrastructure on westbound I-70 through the Floyd Hill area of the I-70 Mountain Corridor.
- Improve multimodal connectivity and provide an alternate route parallel to the interstate mainline in case of emergency or severe weather conditions.





I-70 Floyd Hill to Veterans Memorial Tunnels

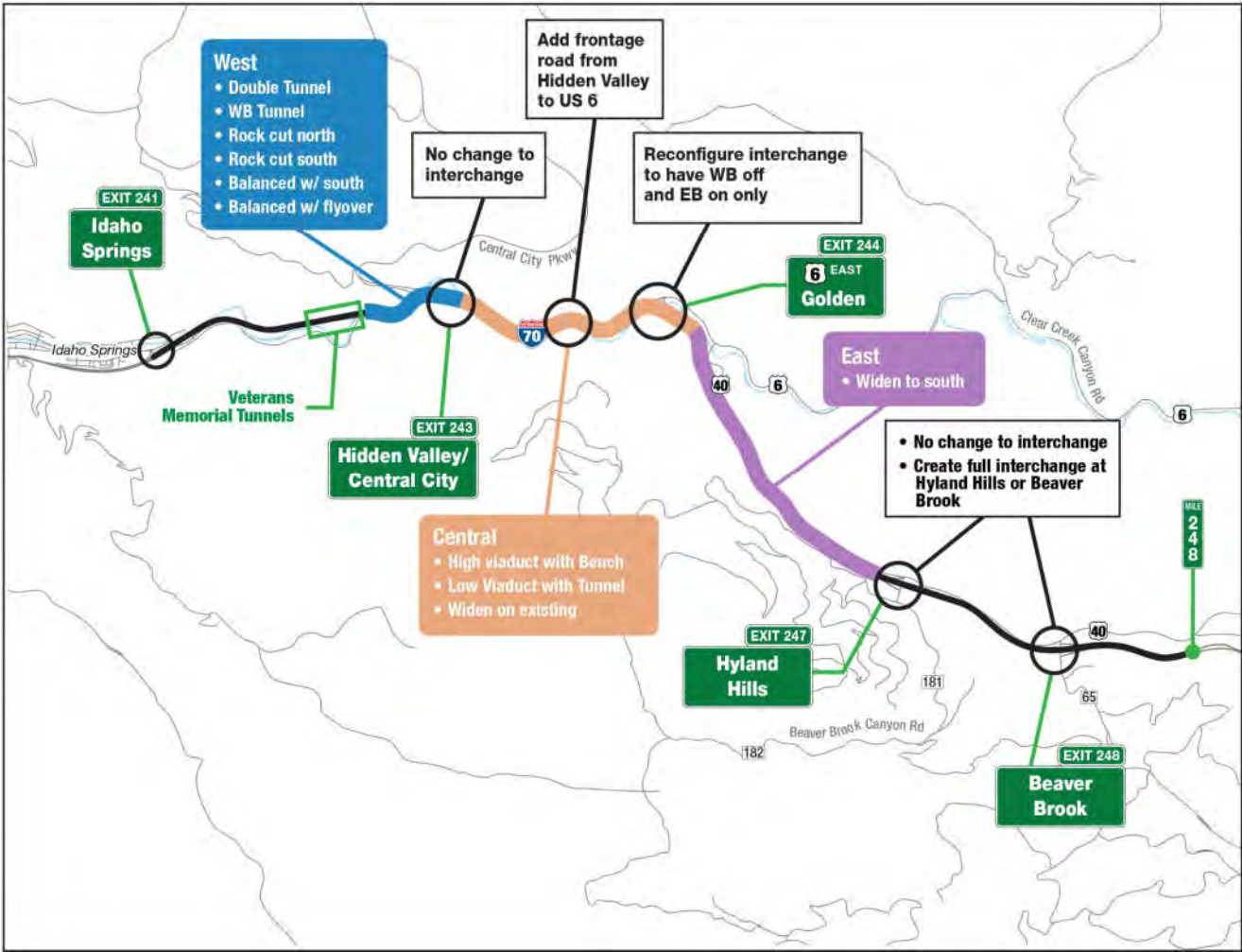
Proposed Action

- Provides a 3rd lane from the top of Floyd Hill through the tunnel (2011 ROD)
 - Evaluating options for tunneling, rock cuts, and benches at two locations (bottom of Floyd Hill and just west of Hidden Valley)
 - Evaluating west terminus (dropping 3rd lane and tie-in with WB PPSL)
 - Evaluating need for truck climbing/acceleration lane with eastbound on-ramp addition at US 6
 - Evaluating additional intersection and interchange improvement needs throughout
- Addition of trail and frontage road between tunnel and US 6 (2011 ROD)
- Evaluating eastbound curve safety improvements



I-70 Floyd Hill to Veterans Memorial Tunnels

Design Options





I-70 Floyd Hill to Veterans Memorial Tunnels

ALIVE MOU

- Background
 - Objective of streamlining coordination and improving connectivity for terrestrial and aquatic wildlife.
 - Signed 2008
- Commitments
 - Ensures agencies' cooperation in early and full implementation of corrective actions to solve permeability problems in identified LIZs.
 - 'Full implementation of a successful ALIVE outcome would require the participation by all Parties and other stakeholders in the commitment of resources beyond those meant for transportation mitigation.'



I-70 Floyd Hill to Veterans Memorial Tunnels

I-70 EcoLogical

- *A Regional Ecosystem Framework for Terrestrial and Aquatic Wildlife along the I-70 Mountain Corridor*
 - Identification of Linkage Interference Zones (2011)
 - Update of original LIZs (2004)
 - ALIVE Implementation Matrix
- *Guidelines for Improving Connectivity for Terrestrial and Aquatic Wildlife in the I-70 Mountain Corridor*



I-70 Floyd Hill to Veterans Memorial Tunnels

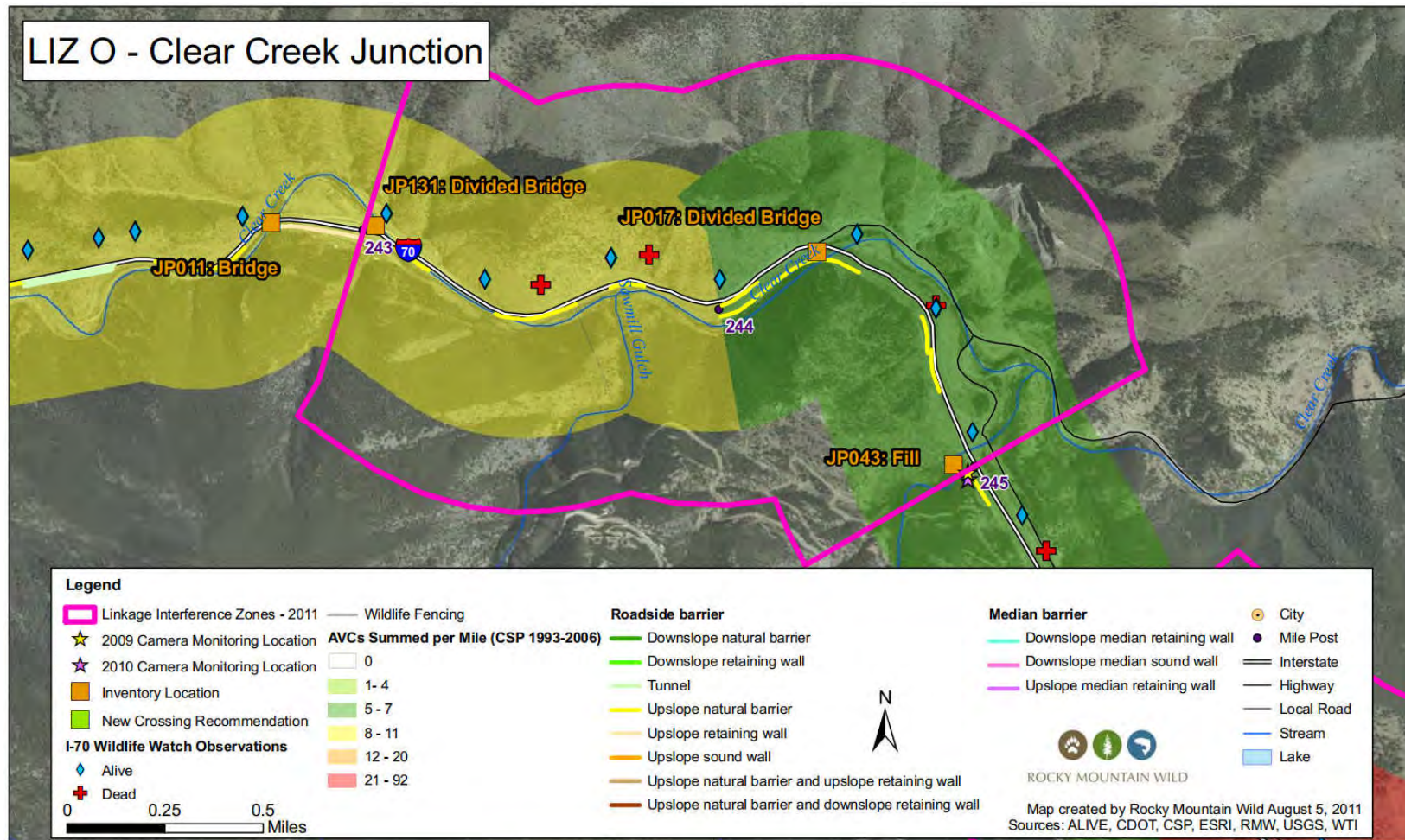
Clear Creek Junction LIZ

- MP 243.0 – 244.9
- Elk and mule deer; also bighorn sheep, Canada lynx, mountain lion, Preble's meadow jumping mouse
- WVC rate: Moderate-low
- Land Status: Private both sides of I-70
- Existing bridges provide little opportunity for wildlife passage
- Concrete median barrier throughout LIZ
- EcoLogical mitigation recommendations:
 - Improve passage under existing bridges over Clear Creek at Central City Parkway and bottom of Floyd Hill
 - Install new wildlife crossing ~MP 244.9 (note, wildlife monitoring conducted at this location)



I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek Junction LIZ Map





I-70 Floyd Hill to Veterans Memorial Tunnels

Existing bridges in the Clear Creek LIZ



Clear Creek/Central City Parkway

Clear Creek/ US 6 Interchange





I-70 Floyd Hill to Veterans Memorial Tunnels

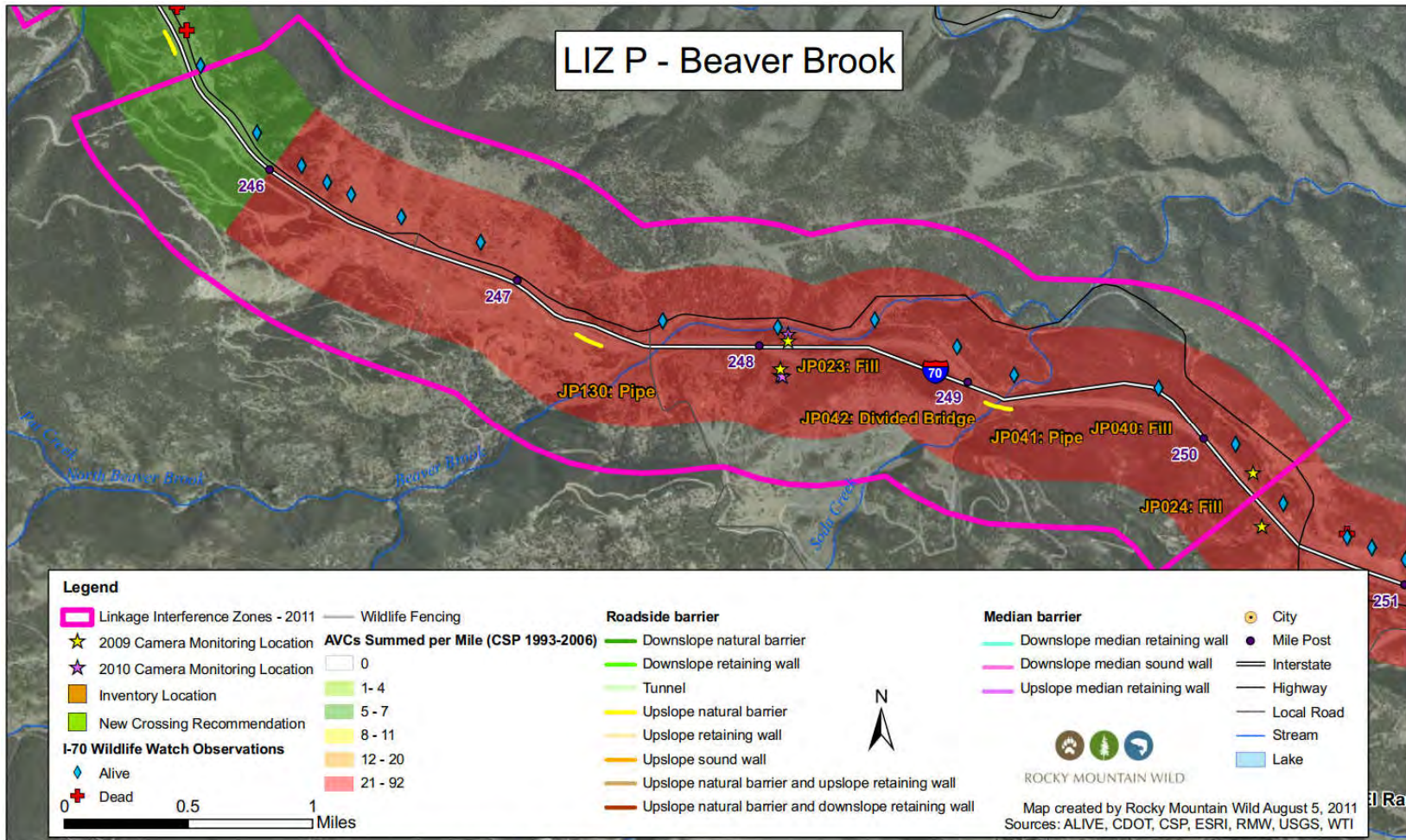
Beaver Brook LIZ

- MP 245.5 – 250.2 (project area ends MP 248)
- Elk, mule deer; also black bear, Canada lynx, mountain lion, northern leopard frog, Preble's meadow jumping mouse
- WVC rate: Very high
- Land Status: Private both sides of I-70
- Concrete median barrier MP 245.5 – 246.6
- EcoLogical mitigation recommendations:
 - Investigate opportunities to install new wildlife crossings, e.g., MP 246.5; MP 247; MP 247.5 (Preble's occupied habitat along Beaver Brook); MP 248.2 (monitoring location)



I-70 Floyd Hill to Veterans Memorial Tunnels

Beaver Brook LIZ Map





I-70 Floyd Hill to Veterans Memorial Tunnels

Aquatic Connectivity

- MP 243 – Bridge over Clear Creek, Hidden Valley interchange
 - Currently good aquatic connectivity; maintain
- MP 244.2 – Clear Creek, US 6 interchange
 - Currently good aquatic connectivity; maintain
- Beaver Brook
 - CMP provides drainage only



I-70 Floyd Hill to Veterans Memorial Tunnels

ALIVE Implementation Matrix

- Developed for I-70 EcoLogical project
- Considerations during project development:
 - Target species movement needs; barriers to movement; opportunities?
 - Changes or potential changes to wildlife habitat or movements?
 - Permeability concerns outside of LIZs?
 - Potentially conflicting mitigation actions?



I-70 Floyd Hill to Veterans Memorial Tunnels

I-70 Traffic and Revenue Study

- Initiated in 2013 to explore solutions to congestions on I-70 Mountain Corridor
- Study terminated in 2014
- ALIVE Committee revisited mitigation recommendations from EcoLogical
 - Highlighted wildlife overpass at MP 247 as a feasible location
 - Confirmed value of connectivity at Clear Creek/US6



I-70 Floyd Hill to Veterans Memorial Tunnels

Wildlife Issues Discussion

- Identify:
 - Initial list of issues and concerns
 - Information and data needs
 - Initial mitigation recommendations





I-70 Floyd Hill to Veterans Memorial Tunnels

Project's Effects on Wildlife

- Habitat loss due to expanded highway footprint
 - Highway widening, new alignment, rock cuts
- Increase in barrier effect:
 - Increased number of traffic lanes
 - Increasing traffic volumes
 - Retaining walls, median and shoulder barriers
 - Lighting at interchanges and signs
- Potential increase in wildlife-vehicle collisions



I-70 Floyd Hill to Veterans Memorial Tunnels

Initial Stakeholder Concerns

- Threatened and Endangered Species
 - Canada lynx
 - Preble's meadow jumping mouse
- Bighorn sheep winter range and mortality
- Connectivity for terrestrial wildlife
- Reduce wildlife-vehicle collisions
- Clear Creek is a high value fishery
 - Improve fish passage and reduce channelization



I-70 Floyd Hill to Veterans Memorial Tunnels

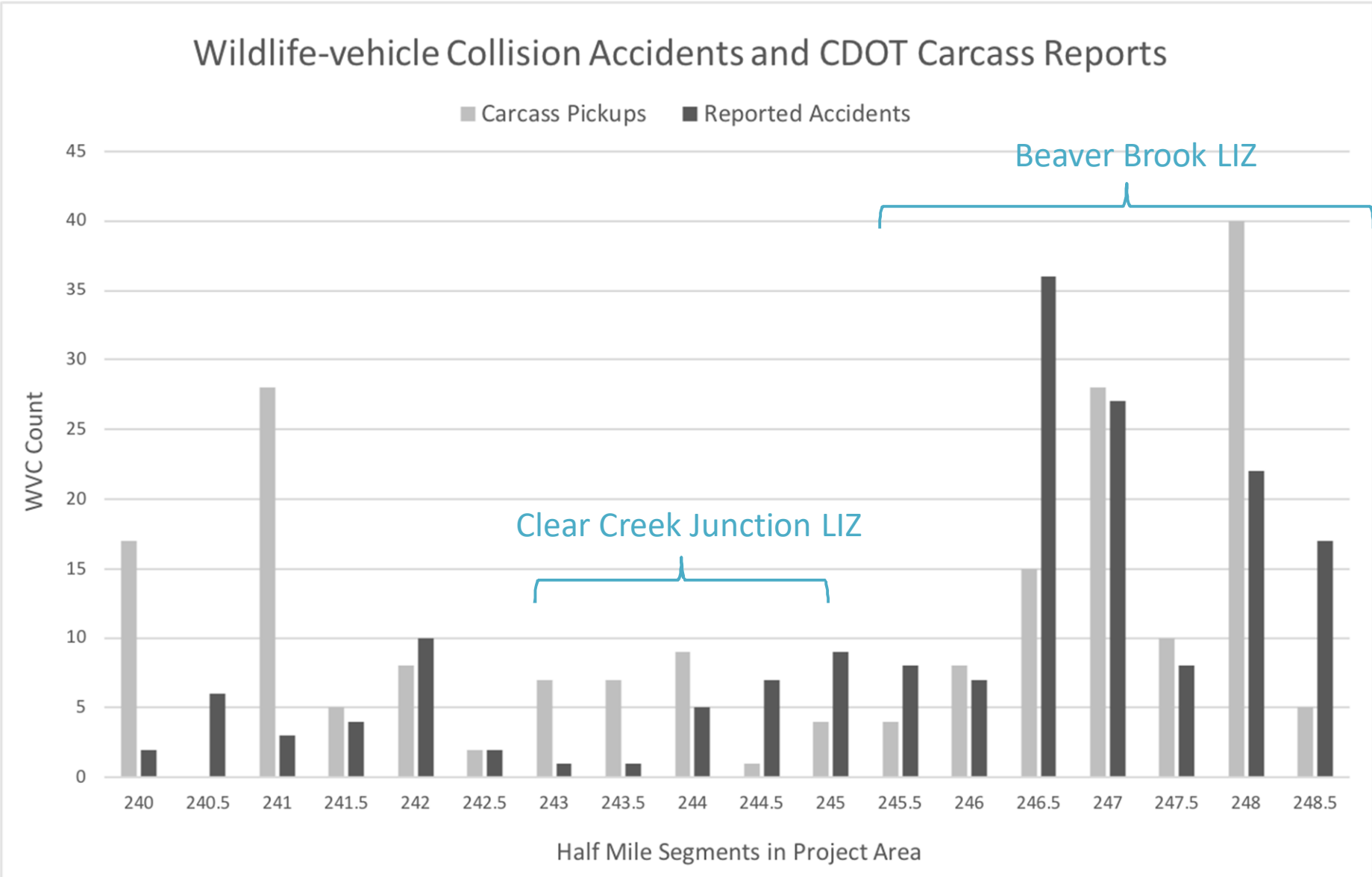
Issue: Wildlife-Vehicle Collisions

- 2.5 WVC/mile/year (carcass pickups recorded by CDOT Maintenance, 2007-2016)
- 175 reported accidents (10 years, MP 240-248)
- Primarily mule deer (46%) and elk (26%); also black bear, bighorn sheep, mountain lion, other medium sized fauna





I-70 Floyd Hill to Veterans Memorial Tunnels

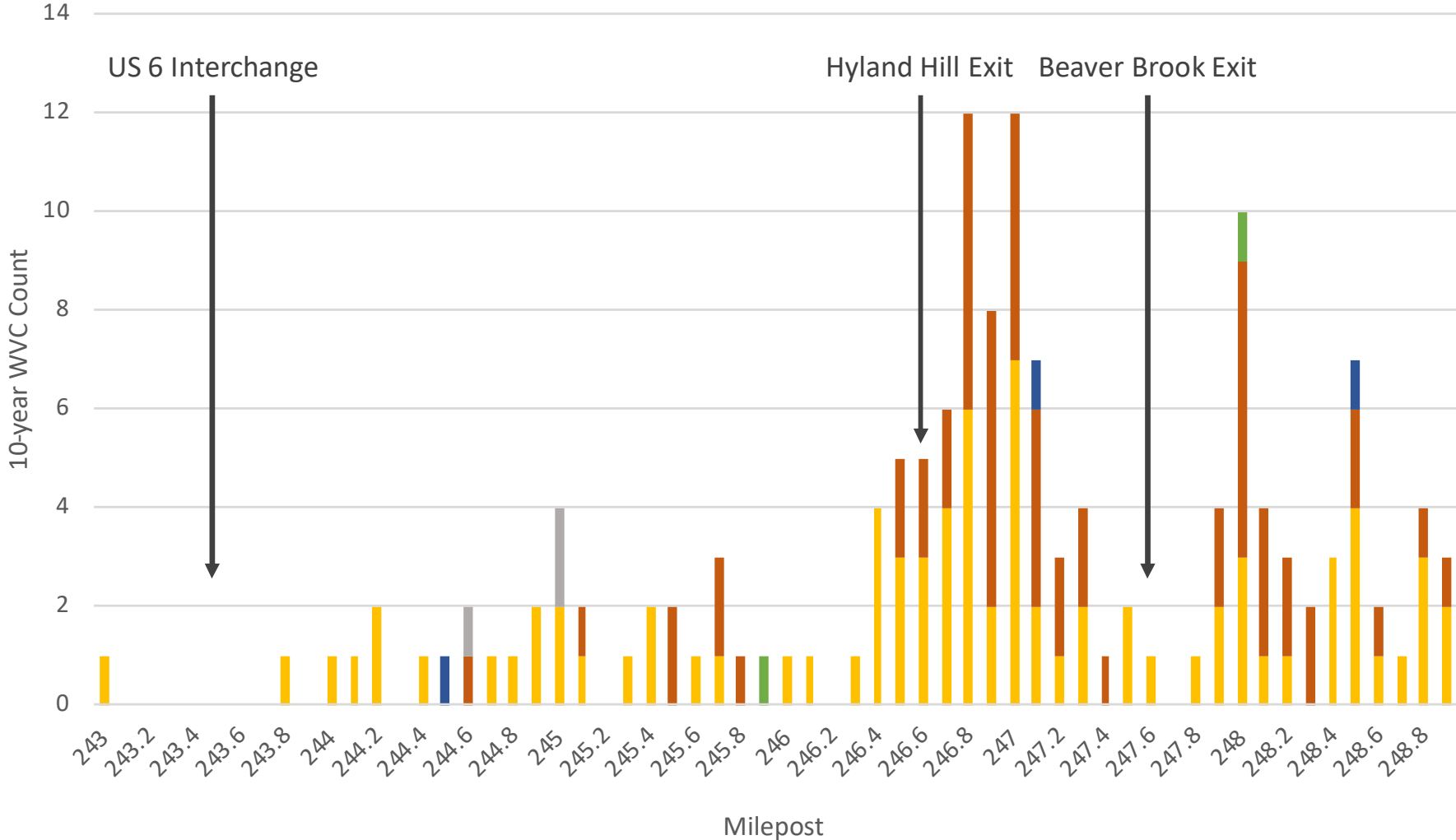




I-70 Floyd Hill to Veterans Memorial Tunnels

WVC Reported Accidents 2007-2016

■ DEER ■ ELK ■ BEAR ■ LION ■ UNKNOWN

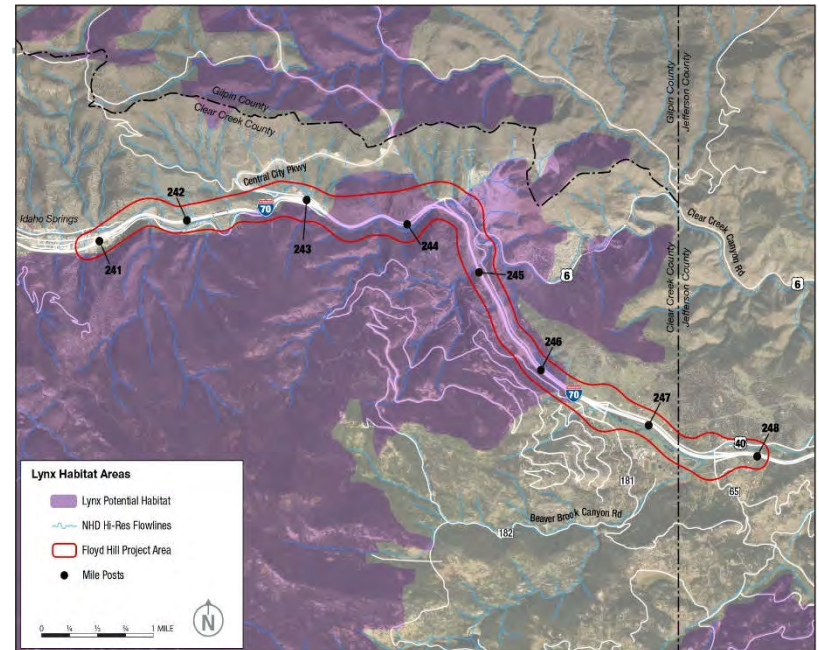




I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Canada Lynx

- Suitable lynx habitat
 - Mostly low probability of lynx highway crossing; high probability around Hidden Valley and middle of Floyd Hill (Baigas et al. 2017)
- Barriers to movement:
 - Highway footprint and traffic volume
 - Retaining walls, median & shoulder barriers
 - Lighting (primarily at interchanges) & lighted signs
- Cumulative effects

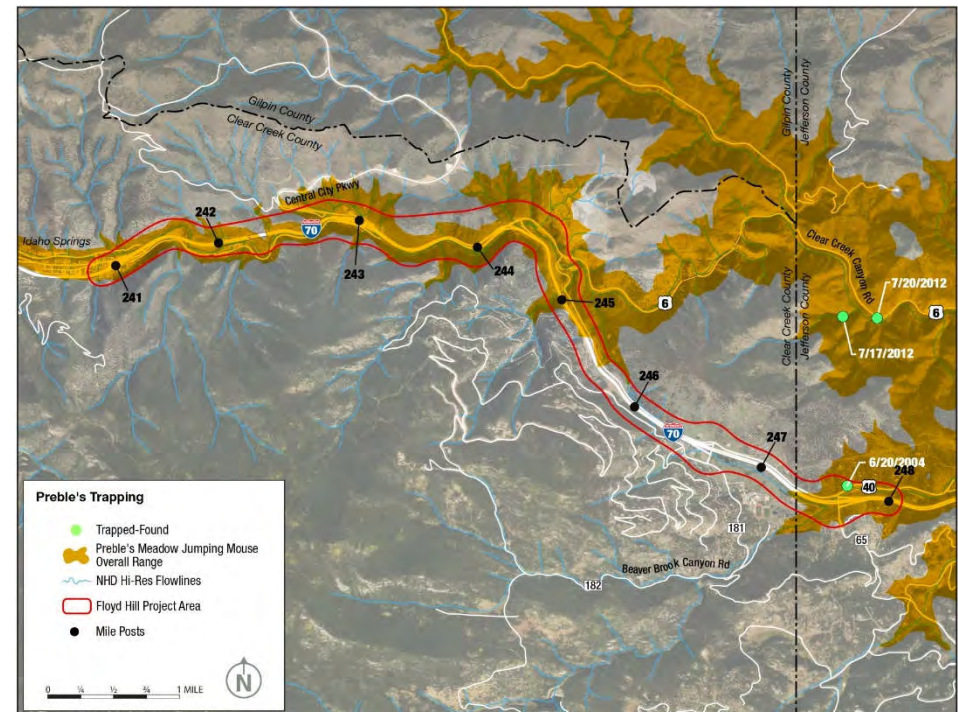




I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Preble's Meadow Jumping Mouse

- Overall range
 - Occupied habitat in Beaver Brook watershed (upstream of I-70); no riparian connectivity under I-70
 - No suitable habitat along Clear Creek
 - No critical habitat

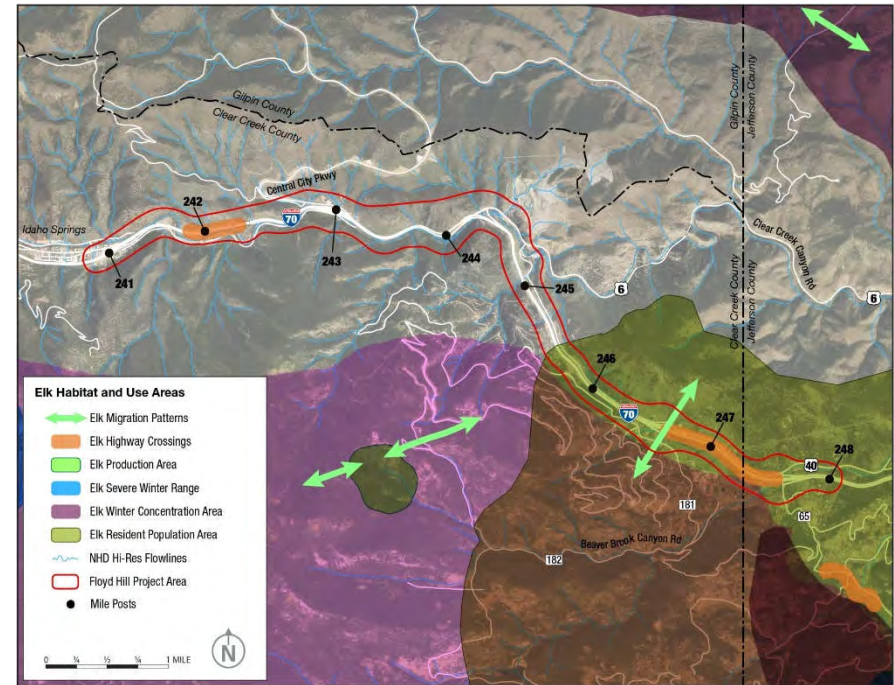
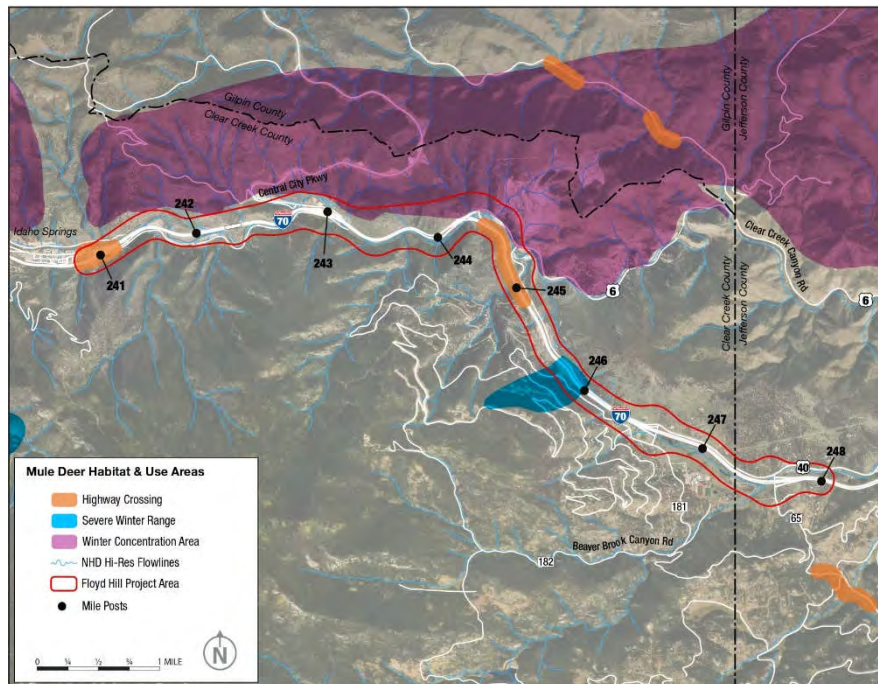




I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Connectivity for Terrestrial Fauna

Elk migration top of Floyd Hill; resident population
– WVC hotspot east side of Floyd Hill



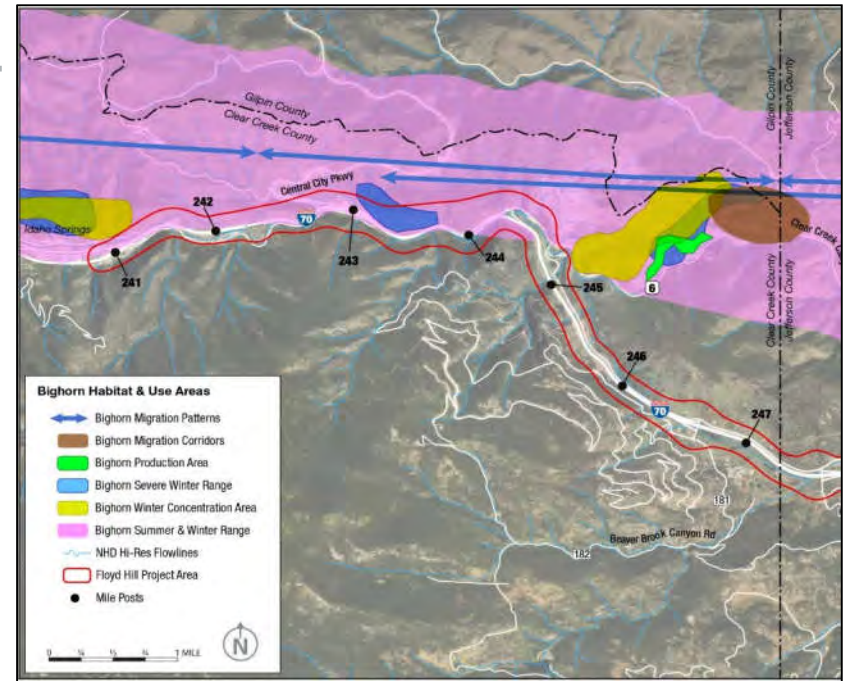
Mule deer winter concentration, severe winter range and highway crossing zones



I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Bighorn Sheep

- Bighorn sheep overall and winter range north of I-70
- Mortality due to WVC
 - Primary source of mortality for Georgetown herd
 - Hotspots:
 - East side of VM Tunnels
 - I-70/US 6 junction
 - De-icing minerals and spring green-up act as attractants to road shoulders
- Previous mitigation:
 - Decreased upland trees adjacent to road (Twin Tunnels project)
 - Replaced barbed-wire with wildlife-friendly fence west of tunnels (EBPPSL)





I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Bighorn Sheep



Bighorn sheep WVC 2006-2011, Huwer 2015



I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Aquatic Connectivity

- Fish passage
 - Clear Creek is stocked.
No connectivity or dewatering issues for native fish species





I-70 Floyd Hill to Veterans Memorial Tunnels

Issue: Raptor Entanglement

- Concern that raptors may become entangled in rock fall mitigation netting.
 - Two incidents previously reported (Steamboat Springs & Durango)
 - Further research needed to determine scope of this problem across the state.
 - Recommend, when feasible, pin down the top of the mesh to be flush with or close to the rock wall to avoid large openings.



I-70 Floyd Hill to Veterans Memorial Tunnels

Potential Wildlife Mitigation Summary

MILEPOST	RECOMMENDATION	CHALLENGES
243	Improve passage for wildlife under existing bridges, including CDOT access road	Limited feasibility to improve passage for large fauna without replacing bridges
244.2	Integrate wildlife movement into new interchange/bridges	Extensive infrastructure including interchange & trail
244.9	Wildlife underpass at fill slope under I-70	Outside of LIZs; Challenging terrain
246.5	Wildlife overpass	Challenging terrain, land ownership
247	Wildlife overpass	Potential development on north side
247.5	Riparian crossing	Limited feasibility; Extensive restoration required



I-70 Floyd Hill to Veterans Memorial Tunnels

Mitigation Considerations

- Wildlife Overpass
 - Given highway footprint & US 40, overpass will be most effective structure type for elk
 - Greatest need for elk crossing structure around the top of Floyd Hill
- Wildlife Underpasses
 - Improve wildlife passage at Clear Creek/US 6 interchange
 - May consider large culverts for deer, bear, mountain lion and other fauna
- Install wildlife-exclusion fencing in conjunction with crossing structures



I-70 Floyd Hill to Veterans Memorial Tunnels

Mitigation Considerations

- Bighorn activity mostly north of I-70; Need to reduce roadside attractants & improve driver visibility
 - West side of Veterans Memorial Tunnels
- Partner & Stakeholder Roles
 - Explore need and opportunities for additional complementary mitigation funding, conservation easements, landowner coordination



I-70 Floyd Hill to Veterans Memorial Tunnels

MAP REVIEW

- Considerations for Central Section
- Considerations for West Section



I-70 Floyd Hill to Veterans Memorial Tunnels

Next Steps

- Conduct field reconnaissance and address data gaps to refine mitigation recommendations
- Create table of mitigation options for evaluation
- Coordinate with design team
- Partnership opportunities
- Next ALIVE meeting – late summer/early fall



I-70 Floyd Hill to Veterans Memorial Tunnels

Schedule

- **Existing Conditions/Data Collection**
 - Fall 2017 through 2018
- **NEPA/30% Design**
 - Winter 2017/2018 through Spring 2020
- **Final Design followed by Construction***
 - Spring/Summer 2020
 - Construction 2021-2024



**Pending funding availability*



I-70 Floyd Hill to Veterans Memorial Tunnels

Questions



Meeting Notes



I-70 Floyd Hill to Veterans Memorial Tunnels

Project: I-70 Floyd Hill to Veterans Memorial Tunnels (VMT) NEPA and 30% Design
Meeting: ALIVE Site Visit #1 / Meeting #2
Date: June 6, 2018
Location: Site Visit

Attendees:

Lauren Boyle, CDOT
Vanessa Henderson, CDOT
Keith Hidalgo, Atkins
Julia Kintsch, ECO-resolutions
Alison Michael, USFWS
Alex Nelson, CDOT
Neil Ogden, CDOT
Anthony Pisano, Atkins
JoAnn Sorenson, Clear Creek County
Adam Springer, Clear Creek County
Doreen Sumerlin, USDA Forest Service
Martha Tableman, Clear Creek County
Francesca Tordonato, CDOT
Carrie Wallis, Atkins

Summary of Action Items	Responsibility	Status
1. Contact Clear Creek County Road and Bridge re: WVC on Saddleback Road	Julia	
2. Provide guidance and specifications for wildlife crossing designs (e.g., dimensions, slopes, substrate, bench width)	Julia	
3. Develop cross section of potential wildlife crossings	Anthony	
4. Provide traffic analysis demonstrating how I-70 realignment is projected to affect truck traffic from the quarry on US 40	Neil	
5. Preble's habitat assessment and coordination with USFWS and CDOT regarding potential mitigation.	Keith	

Summary of Discussion

[Note Action Items are in [blue](#).]

General comments:

- Herds around the I-70 corridor in the Floyd Hill project area are more accustomed to traffic noise and people.
- Different herds and species concerns at the top of Floyd Hill vs at the bottom, in Clear Creek Canyon.
- Wildlife overpass considerations
 - The longer the span, the wider it needs to be.

- Ungulates, in general, and elk, in particular, require good visibility across or through a crossing structure. Elk are extremely predator wary.
- Prohibit human use of wildlife crossing structures; where human use inevitable, design trails to limit impacts to wildlife movement. Note, Clear Creek County can incorporate seasonal or nightly closures on open space properties.
- Maintain or improve existing small culverts for carnivores (e.g., black bear, mountain lion) and other medium and small sized fauna throughout the project area; May also consider new small culverts for these species to reduce WVC involving these species.
- When replacing bridges, increase bridge spans to create space for a wildlife bench of pathway.
- [Julia will provide more detailed specifications and guidelines to assist in design.](#)

The group visited eight locations to discuss potential mitigation solutions and the challenges and opportunities at each location. Below, the challenges and opportunities of each potential mitigation location are summarized.

Top of Floyd Hill Segment/Beaver Brook LIZ (~MP 245.5-248)

- Lots of elk movement and elk WVC
- Daily movements across I-70 for deer and elk (not a migration corridor).

1. MP 247, Potential overpass location

- Elk commonly use the meadow on the south side of I-70.
- WVC hotspot for elk as well as deer.
- Challenges:
 - Private lands and potential development including potential to build out office park on the north side, and a proposal to develop undeveloped lands between the wetlands and the high school south of I-70. Constructing a large overpass at this location would require assurances that lands on either side are protected from development.
 - An overpass at this location would need to span 6 lanes of I-70 with a grassy median, 2 lanes of US 40, and the wetlands on the south side of I-70. Given this long span, the overpass would need to be 200' wide.
 - Wetlands on the south side of I-70.
- Opportunities:
 - The proposal to build a residential development is in the very early stages and the developer has indicated a willingness to include a wildlife corridor in the development plan. Continued coordination with Clear Creek County planning (Adam Springer) can get this included in the development.
- [Consider both this location and the location to the east \(from cut slope to west of the log home builder\). Anthony to create cross sections for both of these locations.](#)

2. MP 246.5, Potential overpass location

- WVC hotspot for elk as well as deer.
- Issues:
 - An overpass at this location would need to span 6 lanes of I-70 (no grassy median) and 2 lanes of US 40; while it is a shorter span than at MP 247, the overpass would still need to be 150-200' long.
 - Requires coordination with landowner of 35-acre parcel on the north side where the overpass would connect to adjacent to the open space.
 - Mountain bike/hiking trail development on open space will increase human activity on north side.
 - Saddleback Road immediately to south (residential access road) where wildlife would exit overpass.

- Opportunities:
 - Overpass could be constructed from bench on the south side to cut slope on the north side – site offers good visibility across the overpass.
 - 108-acre open space on north side, which connects to additional open space in Clear Creek Canyon (Oxbow Open Space).
 - Could implement traffic calming measures or animal detection system on Saddleback Road, and conduct neighborhood outreach to mitigate potential increase in WVC on Saddleback Road. Martha noted that residents of this area are used to living with wildlife and looking for wildlife as they're driving.

3. MP 245.6, Potential overpass location

- Issues:
 - Steep slopes from I-70 to US 40.
 - Private lands on east side of US 40 and west side of I-70.
 - Outside of the highest WVC area.
- Opportunities:
 - Cut slopes on either side of US 40 and I-70

Clear Creek Canyon Segment/Clear Creek Junction LIZ (MP 243-244.9)

- Target species include bighorn sheep as well as elk and mule deer
- I-70 is largely a barrier to ungulate movement through this segment, although crossings are still attempted. Bighorn sheep movement is primarily east-west on the north side of I-70.

4. MP 244.9, Potential over- or underpass locations

- Potential underpass through fill at Johnson Gulch, or overpass from cut slope north of the gulch to bench/pullout along westbound I-70.
- Issues:
 - East side drops immediately on to US 40, which has high traffic speeds coming downhill
 - An underpass at Johnson Gulch would require removing the pullout along eastbound I-70 over the structure to reduce the length of the underpass.
- Opportunities:
 - Large, natural drainage with limited development.
 - Would it be possible to continue the wildlife crossing under or over US 40?

5. MP 244.4, Planned WB bridge

- Issues:
 - East side drops immediately on to US 40. Traffic speeds slower than at location 4, but wildlife would still have to navigate across US 40. Alternatively, could fence US 40 (both sides, but this would create a fencing maze on the east side of the wildlife crossing that would direct animals down to Clear Creek/US 6 or up US 40, where there are no safe crossings.
- Opportunities:
 - Westbound I-70 will be on a bridge from here to the westbound tunnel; Eastbound lanes will move on to current westbound alignment; Current eastbound lanes will be removed. Could also put eastbound I-70 on a bridge to create a wildlife crossing at this location.

6. MP 244.2, Clear Creek bridges

- Issues:
 - High human activity (bike path, rafters)

- Opportunities:
 - Both eastbound and westbound bridges will be replaced – replace with a wider span to create a natural bench for wildlife passage separate from the bike path on the south side of the creek.
 - Dirt parking lot on the south side of the creek (accessed from the I-70 eastbound off-ramp) will be removed.

7. MP 243, Central City Parkway, bridges over Clear Creek

- Issues:
 - These bridges are not currently part of the project.
 - There are multiple bridges at this location, including the I-70 mainline, the westbound off-ramp, eastbound on-ramp and an adjacent access road on the north side of I-70. All of the bridges have riprap slopes and limited clearance, prohibiting passage by ungulates and other wildlife.
- Opportunities:
 - If adjustments to the Hidden Valley interchange are required then there will be an opportunity to improve wildlife passage under the bridges.

8. MP 242.7, Clear Creek bridges

- The group did not visit location but discussed it.
- Issues:
 - Central City Parkway bridge over Clear Creek immediately to north has steep riprap banks with no pathways for wildlife passage. Would it be possible to create pathways through the riprap on either side of the bridge to improve the functionality of this structure for wildlife passage?
- Opportunities:
 - In order to flatten the curves east of the Veterans Memorial Tunnels, these bridges will be realigned. Replace with a wider span to create natural benches for wildlife passage on either side of the creek.
 - The greenway trail will likely follow along the frontage road rather than following the creek under the bridges at this location.

Preble's Meadow Jumping Mouse Habitat & Connectivity

9. Beaver Brook

- Issues:
 - Existing pipe culvert is very long and crosses under the Beaver Brook interchange at an angle.
 - Riparian connectivity under I-70 would be very difficult and expensive to restore.
 - Private landowner at culvert outlet has removed riparian vegetation and built a barn and domestic livestock yard just adjacent to the riparian corridor.
- Opportunities:
 - Investigate opportunities to restore riparian habitat.
- [Atkins to conduct habitat assessment upstream and downstream.](#)
- [Francesca, Alison and Keith to coordinate on Preble's assessment, including the magnitude of the project's impacts to upstream habitat and the need for connectivity under I-70.](#)

Meeting Notes



I-70 Floyd Hill to Veterans Memorial Tunnels

Project: I-70 Floyd Hill to Veterans Memorial Tunnels (VMT) NEPA and 30% Design
Meeting: ALIVE Issue Task Force Meeting
Date: October 16, 2018; 9:00 am to 11:00 am
Location: CDOT Region 1, 425 Corporate Circle, Golden, CO

Summary of Action Items	Responsibility	Status
1. Set up a meeting with Joe Walter to review decisions made to date and to get CPW input on locations that are being advanced for further consideration	Julia (coordinate with Vanessa & Francesca)	
2. Meet with the show home landowner to discuss the idea of a wildlife crossing structure at Location #2	Vanessa (with support from Keith and Julia)	
3. Overlay parcel boundaries with the mitigation locations being carried forward. Review relative to Locations #2 & 3, as well as location #7 once the alignments for the new bridges are available	Keith	
4. Integrate Preble's habitat mapping into the T&E report	Keith	
5. Scheduler Preble's trapping for late Spring 2019	Keith & Francesca	
6. Explore sizing a box culvert for bears and other carnivores at Location #6 (Johnson Gulch)	Anthony, Tyler	
7. Coordinate with the Clear Creek County Greenway Authority and Open Space Department regarding Location #7	Julia & Keith	
8. Identify appropriate measures to prevent wildlife from getting onto the bridge decks at the bottom of Floyd Hill	ATKINS Team	
9. Ensure features to minimize barriers to bighorn sheep movements at the tunnel portals, particularly the east portal	ATKINS Team	
10. Determine fence alignment and fence end treatments to minimize wildlife incursions onto the highway	ATKINS Team	
11. Schedule ALIVE Meeting #4 to review wildlife mitigation and roadway designs	Vanessa	

Participants

Chelsea Beebe, Jefferson County	Alison Michael, US Fish and Wildlife Service
Lauren Boyle, CDOT, Region 1	Anthony Pisano, ATKINS
Stephanie Gibson, Federal Highway Administration	JoAnn Sorenson, Clear Creek County
Keith Hidalgo, ATKINS	Doreen Summerlin, USDA Forest Service
Julia Kintsch, ECO-resolutions	Francesca Tordonato, CDOT, Region 1
Tyler Larson, ATKINS	Mandy Whorton, Peak Consulting Group

Summary of Discussion

[Note Action Items are in [blue](#).]

1) Welcome and Introductions

Lauren Boyle gave an introduction and started off the meeting. She identified her role as CDOT project manager under Neil Ogden and explained that Vanessa Henderson and Neil were attending a tunneling short-course at the Colorado School of Mines and sent apologies for missing the meeting.

2) Meeting Objectives

Julia Kintsch started the presentation.

The objective of this meeting was to review the challenges and opportunities at each potential mitigation location in the Beaver Brook and Clear Creek Linkage Interference Zones (LIZs) and to receive input from the ALIVE Committee regarding which mitigation locations are recommended to carry forward for further evaluation and which are recommended to defer or eliminate.

- The CMGC process allows for additional flexibility as new information or new design elements may allow new opportunities to emerge to enhance or refine the wildlife mitigation recommendations, particularly related to constructability.

3) Action Items Review

Action Items that carry over from previous meetings include:

- Provide preliminary crossing design and or schematics to Clear Creek County to facilitate opportunities for partnerships with local development (Neil Ogden). This action item will be addressed once the mitigation locations are finalized and preliminary designs completed.
- Look into opportunities for conservation easements (Vanessa Henderson). This action item will be addressed once the mitigation locations are finalized.
- Coordinate with Colorado Parks and Wildlife (Joe Walter) on additional wildlife carcass information to add into reporting (Julia Kintsch and Keith Hidalgo). This action item is being pursued.

Stephanie Gibson had a question about use of sand in the corridor (regarding a previous action item to determine locations that may be still using sand for treatment). Mandy responded that this issue was related to effects on fish habitat and also raised by the SWEEP Committee regarding water quality. CDOT maintenance has confirmed that magnesium chloride is used primarily east of the Veterans Memorial Tunnels but that sand is still used for traction along Floyd Hill, particularly in the uphill sections (adjacent to Clear Creek).

4) Review of ALIVE Concerns and Project Updates

Julia gave a review of the Beaver Brook LIZ and the Clear Creek LIZ, target species and wildlife-vehicle collisions (WVC) in each LIZ. She identified that Beaver Brook LIZ extends east outside of the Floyd Hill Project study area.

The I-70 Mountain Corridor Biological Opinion (I-70 ROD and FPEIS, Attachment A, pp. 9-11) states: "A minimum of 13 wildlife crossings will be installed with a maximum number of 25 possible, after which the program will be assessed for effectiveness... These crossings will be installed in the 13 LIZs identified by the ALIVE Committee or subsequent documents." Since the PEIS, subsequent research has identified 17 LIZs.

Mandy requested more background about goals for the Beaver Brook and Clear Creek LIZs and how many wildlife crossings are required. Julia responded that there are different populations of wildlife at each LIZ; that across the I-70 Mountain Corridor LIZs are of varying lengths; and that depending on the LIZ, more than one wildlife crossing per LIZ may be warranted. The Beaver Brook LIZ, for example, is 4.7 miles long and even within that LIZ, different wildlife populations are supported (primarily elk in the western portion; primarily mule deer in the eastern portion of the LIZ).

Alison Michael: Is this the final design step for this segment of the I-70 mountain corridor, or is this an interim measure like some of the recent projects? Mandy identified that this project addresses the preferred alternative specific highway improvements from the PEIS. This will be the final improvements for the Floyd Hill area for the near term unless additional projects and budgeting comes forward, which is unlikely in this area since there are many other unmet needs in the rest of the corridor, as identified in the PEIS. Discussion identified that there would be a separate element for transit to meet long-term needs. Additional highway capacity will be unlikely to be included further. It is unlikely to have future capacity improvements or wildlife mitigation from future projects. Alison commented that it is unfortunate that there will not be any improvements at Beaver Brook for Preble's (assuming they are present). Francesca Tordonato noted that if this project results in impacts to Beaver Brook, mitigation would be included. She also noted that CDOT may conduct trapping next summer (2019) and DNA testing to determine if Preble's are present.

5) Mitigation Matrix: Review of Potential Mitigation Actions

The group reviewed the mitigation matrix and the roll plot for the following discussion.

a. Beaver Brook LIZ

Five mitigation locations were presented:

#1 – MP 250, Ruby Ranch Road – underpass location in large fill slope. This location is in the Beaver Brook LIZ but outside of the Floyd Hill Project study area. It was developed based on concerns with disturbing the wetland complex in the Beaver Brook area (Locations #2 through #5), where potential fen wetlands were identified (testing confirmed that the wetlands do not qualify as fens but are of high quality). Location #1 is not recommended because it is

outside of the project area but was investigated and will be carried forward as an alternative mitigation location if neither Location # 2 nor # 3 are feasible.

#2 – MP 247.3, Meadow/Show Home – overpass location. Recommend that this location be carried forward for further design refinements.

#3 – MP 247.2, Meadow/Storage Units – overpass location. Recommend that this location be carried forward for further design refinements.

#4 – MP 247.0, Meadow/High School – overpass location. The group agreed that this location be eliminated from further consideration. The primary impediments to this location are the wetland impacts and that this location is most likely to be impacted by potential development on both the south and north sides of I-70.

#5 – MP 246.3, Floyd Hill West – overpass location. The group agreed that this location be eliminated from further consideration. The primary impediments to this location is that it is not a primary wildlife habitat area or I-70 crossing location and it would require funneling elk from the east side of the Floyd Hill exit and over Hyland Hills Interchange road to the overpass location.

Mandy: All of the locations at the top of Floyd Hill (Locations #2-5) serve the same wildlife populations.

Julia provided an overview of the two possible overpass designs for Locations # 2 & 3:

- Arches: Composed of three arch structures over the opposing lanes of I-70 and US 40. Arch structures are designed to be buried with soil and can accommodate variable slopes on the approaches and across the length of the structure. Arches could potentially look like tunnels to drivers, which may cause bottlenecks for traffic moving through the arches if drivers slow down on approach.
- Bridges: Composed of a single slab with multiple spans. Soil depth on a bridge structure increases cost. Bridges have a more open appearance for drivers, and as a result, drivers approaching the structures are less likely to slow down.

Stephanie: What are the issues regarding weight and structure design? Mandy and Julia responded that soil (up to 5 feet deep to prevent vegetation roots from freeze and thaw cycles), snowpack and snowmelt all add weight to a structure, and that the static weight of soil requires a higher level of engineering than the temporary weight of a semi-truck crossing a bridge. Julia noted that foam blocks have been used in some structures to allow landscaping on structures with lower soil loads.

In follow-up research, Julia confirmed that the soil depth used on a wildlife overpass in Ontario is 60cm (2') and has grasses and shrubs. In addition, the 19th St Lid in Golden has 18-24" soil depth where grasses were planted. However, the landscape architect noted that the Golden lid design is based on limited experience as the 'park deck' is newer to Colorado. The 19th St Lid also used an air cavity in the deck support to help insulate the soil. It should

be noted that damage to the vegetation occurs when there are multiple freeze/thaw cycles in a given season.

Stephanie Gibson noted that the 19th Street Lid used foam blocks. Julia confirmed with the landscape architect that foam blocks were used on landscaping berms with plantings. Similarly, an overpass in Yoho National Park in Canada used buried foam blocks along the sides of the overpass to provide noise and light attenuation for animals on the structure.

Stephanie asked if we could do tall, open arches like the VMT to prevent the tunnel effect for drivers. Tyler responded about limitations of the height and size of the tunnels at this location. Lauren identified that if traffic analysis suggests the arch design could cause a bottleneck, then CDOT would look strongly at a bridge to avoid pinch-point. Mandy also pointed out that a wildlife overpass is not nearly as long as the VMT and the tunnel effect would not be as significant.

Julia reviewed considerations for an overpass structure. A 200' wide overpass is recommended to ensure wildlife use (particularly elk) of a 300' long structure. However, she noted that a narrower overpass could be considered, although there would be tradeoffs:

- Resident and wintering animals may be able to adapt to a narrower structure better than if the structure was being designed for migratory populations.
- These populations are already habituated to human activity and may be more tolerant of a narrower structure than a wilder population.
- A narrower structure would provide some level of connectivity over I-70, but it would be expected to receive lower levels of use and, in particular, may limit use by both sexes and across age groups (e.g., individual males or small bachelor groups may be more likely to use the structure than a cow with a calf).

Mandy: What is more important for the width, the approach, the middle, or where? Julia identified that not only the approach but also at the top of the approach before an animal has committed to crossing are the most common places where animals repel. Julia identified that hour-glass shaped bridges have worked in other locations and saved costs.

Julia mentioned narrower overpasses can work where the span length is much shorter, or depending on the target species; however, elk require wider structures (underpasses or overpasses) than many other species. Lauren identified that engineers want the minimum identified but that recommendations will help discussions with contractors later on. Anthony also provided input that being open to changes during later discussions is beneficial.

Francesca noted that it would be helpful to compare the costs of wider structure vs a narrower one – if the cost difference isn't that much greater, then the added benefit is worth a higher cost. Mandy also identified that the effort to look at narrowing the structure was also a focus to minimize the wetland impacts when there was a concern of fen wetlands. It has since been confirmed that the wetlands are not fens, although they are still high-quality wetlands.

Lauren Boyle shared an email from Adam Springer (Clear Creek County) regarding the proposed development in the meadows on the south side of I-70. The developer has received push back from the neighborhood regarding plans for high-density apartments and commercial development at the meadows property (Location #3). The status of the proposal remains uncertain. Further research provided by JoAnn Sorensen (Clear Creek County) indicated that both Locations #2 and #3 are on the show home property but the status of development of the meadows property is still concerning given the high wildlife use on this parcel.

Alison: Could the parking lot at the show home be moved to the other side of the structure, away from the approach to an overpass? JoAnn noted that the visibility of the show home to I-70 is the primary marketing for the show home. Similarly, the owner may be reluctant to reduce lighting at the show home. Regardless, these items should be broached in a discussion with the landowner. **The group agreed that a conversation with the land owner is an important next step for this location before moving forward with design.** After the meeting, JoAnn provided the owner's contact information to CDOT, and **Vanessa Henderson (CDOT) will contact the owner to set up a discussion.**

Julia asked for each of the stakeholders present to share their thoughts and additional considerations regarding Locations # 2 & 3:

- JoAnn Sorensen (Clear Creek County) – After clarifying that the south approach of an overpass at Location # 2 would be at a lower elevation than the show home, she noted that the landowner may be open to a decreased width overpass, or a design that angles the bulk of the approach slope towards the meadow and away from the show home. Location # 3 will depend more on the plans for development of the meadows property. **Recommended action item to overlay parcel boundaries with mitigation locations.**
- Francesca Tordonato (CDOT) – Recommended engaging with the meadows developer to get assurances that Location #3 is good long-term mitigation investment. #2 and #3 are the best options, but further investigations are required to determine which of the two is best. She also noted that wetland impacts have an option to do on-site mitigation or existing banks in other places.
- Stephanie Gibson (FHWA) – Noted that we are dealing with something that is existing (Show Home) that we know will be problematic (#2) and the unknown development (#3). #3 looks longer, more expensive. #2 is shorter but the brightly lit show home would limit use. She recommended obtaining easements to get longer-term assurances for wildlife use.
- Alison Michael (USFWS) – In addition to what others had already state, she wanted to know what the potential is for Preble's habitat upstream from Locations #2 and #3 – is there a habitat connection between Beaver Brook and the meadow wetlands? **Recommended action item to determine whether the wetlands may provide Preble's habitat.**

- Chelsea Beebe (Jefferson County) – What is the future land use of the surrounding area, beyond the immediate crossing locations? What are the long-term habitat protection needs in the broader landscape? She also noted that Location #3 offers a better sight distance for drivers. She asked whether human use of an overpass would be prohibited? Julia identified that yes, want to keep it to wildlife use, not humans.
- Julia confirmed with the group that filtering down to Locations # 2 and 3 and eliminating Locations # 4 & 5 is agreed upon by the group.

b. Clear Creek LIZ

Five mitigation locations were presented:

6, MP 244.9, Johnson Gulch – underpass location. This location was eliminated for a large crossing structure due to constructability issues and because US 40 is immediately to the east.

#7, MP 244.2, Two Bears Bridges – add wildlife bench under bridges. The bench would be adjacent to and set slightly above the greenway with a vegetated buffer between the wildlife bench and the greenway. Recommend that this location be carried forward for further design refinements.

#8, MP 242.8, Clear Creek Bridges (east of VMT) – add wildlife pathways. This location was eliminated because the future bridge alignment will not support complete north-south movements.

*Francesca noted that Location #6 could still have value as a smaller carnivore crossing and should be retained as a mitigation recommendation during drainage design. **Carry Location # 6 forward for further consideration as a carnivore crossing.***

The group noted that wildlife moving to/from the south side of the bridges will have to come off the slopes immediately adjacent to the western-most bridge. On the north/east side of the bridges, the bench should continue beneath the westbound off-ramp bridge. There is room to clear out a pathway beneath the existing span.

Stephanie asked about changing the stream shape and improving resiliency. Clear Creek is channelized with steep rip rap banks. Mandy provided input on other sections of the stream that have been discussed for improvements. This location is a concern for rafting use. Many other users of the creek as well. Fishing, rafting, pull-out between easy to moderate/difficult rafting.

Stephanie identified that based on the photos, there are opportunities to enhance the conditions and make it more aesthetically pleasing and more wildlife/habitat friendly.

*Francesca made a note of deer deaths from getting on these bridges and getting to a pinch-point and jumping off and dying. **It was noted that measures should be taken to prevent***

wildlife from getting onto the bridges.

Stephanie asked if we had a 3D model. Tyler answered we do not have it yet.

JoAnn requested that the **Project Team coordinate with the Clear Creek County Greenway Authority regarding the wildlife bench at Location #7, as well as Clear Creek County Open Space.**

Stephanie and others emphasized that we are also avoiding additional impacts by choosing the tunnel alternative versus expanding the road footprint and making additional rock cuts.

Doreen noted that the east tunnel portal design should be reviewed by the ALIVE Committee for recommendations to minimize impacts to bighorn sheep habitat and movements.

Consider a stair-step design or other features to facilitate bighorn sheep movement and reduce barriers at the tunnel portals.

Francesca asked about the ability to keep Location #1 in the progression if there are fatal flaws with Location #2 and Location #3. The ATKINS Project Team stated that the objective is to mitigation within the project limits; however, it will be kept as a backup if the others don't meet the requirements. Julia identified that additional sites were looked at because of the initial concerns regarding the presence of the fens. During that process both Locations # 1 & 2 were added to the mitigation matrix as potential wildlife crossing mitigation locations.

In addition to these notes, the project team summarized the issues and actions associated with the crossings being carried forward. That summary is attached to these notes for the ALIVE Committee information and input.

The next ALIVE meeting is projected for winter 2018/19. At this meeting ALIVE members will provide comment on initial wildlife mitigation and roadway designs.

Summary of Agreements

1. Agreed to eliminate Locations # 4, 5 and 8 from further consideration. Location #1 will be retained as an alternative pending a decision on Locations # 2 and 3. Location #6 will be retained for consideration for a medium-sized culvert.
-

Attachments – Presentation slides and Locations #2 and #3 summary



I-70 Floyd Hill to Veterans Memorial Tunnels

ATKINS

ALIVE Meeting #3

October 16, 2018



I-70 Floyd Hill to Veterans Memorial Tunnels

Agenda

- Welcome / Introductions
- Action Items Review
- Project Updates
- Mitigation Matrix: Review of Potential Mitigation Actions
 - Beaver Brook LIZ
 - Clear Creek Junction LIZ
- Next Steps & Review of Action Items



Meeting Objectives

- Review Mitigation Matrix
 - Challenges and opportunities at each potential mitigation location in the Beaver Brook and Clear Creek Linkage Interference Zones
 - New locations added to mitigation matrix
- Refine List of Potential Mitigation Actions
 - Recommendations for mitigation locations to carry forward or eliminate



I-70 Floyd Hill to Veterans Memorial Tunnels

Wildlife Mitigation

- Beaver Brook LIZ
 - 4.7 miles long
 - Very high WVC – mostly elk WVC in western portion of LIZ; mostly deer WVC in eastern portion
- Clear Creek Junction LIZ
 - 1.9 miles long
 - Moderately-low WVC through canyon
- ALIVE Goals:
 - Improve connectivity for wildlife across I-70 and reduce WVC
 - At least one wildlife crossing per LIZ (Biological Opinion)



I-70 Floyd Hill to Veterans Memorial Tunnels

Action Items Checklist (April meeting)

Summary of Action Items	Responsibility	Status
1. Follow up to see if there are site specific locations that may still be using sand for treatment	Neil Ogden	✓
2. Look into designs for rockfall netting that minimize entanglement	Julia Kintsch and Stephanie Gibson	✓
4. Check with drone footage used for rock fall to see if it caught any issues with entanglement or animals	Neil Ogden	✓
5. Provide preliminary crossing design and or schematics to Clear Creek County to facilitate opportunities for partnerships with local development	Neil Ogden	
6. Look into opportunities for conservation easements	Vanessa Henderson	
7. Coordinate with Joe on additional wildlife carcass information to add into reporting	Julia Kintsch and Keith Hidalgo	

Anthony P. Isaacs, Atkins
 JoAnn Sorenson, Clear Creek County
 Adam Springer, Clear Creek County
 Doreen Sumnerlin, USDA Forest Service
 Martha Tableman, Clear Creek County
 Francesca Tordonato, CDOT
 Gabe Wallis, Atkins

Action Items Checklist (June Site Visit)

Summary of Action Items	Responsibility	Status
1. Contact Clear Creek County Road and Bridge re: WVC on Saddleback Road	Julia	✓
2. Provide guidance and specifications for wildlife crossing designs (e.g., dimensions, slopes, substrate, bench width)	Julia	✓
3. Develop cross section of potential wildlife crossings	Anthony	✓
4. Provide traffic analysis demonstrating how I-70 realignment is projected to affect truck traffic from the quarry on US 40	Neil	✓
5. Preble's habitat assessment and coordination with USFWS and CDOT regarding potential mitigation.	Keith	✓

Summary of Discussion

[Note Action Items are in [blue](#).]

General comments:

- Herds around the I-70 corridor in the Floyd Hill project area are more accustomed to traffic noise and people.
- Different herds and species concerns at the top of Floyd Hill vs at the bottom, in Clear Creek Canyon.
- Wildlife overpass considerations
 - The longer the span, the wider it needs to be.



I-70 Floyd Hill to Veterans Memorial Tunnels

Project Area





Initial Stakeholder Concerns

- Threatened and Endangered Species
 - Canada lynx
 - Preble's meadow jumping mouse
- Bighorn sheep winter range and mortality
- Connectivity for terrestrial wildlife
- Reduce wildlife-vehicle collisions
- Clear Creek is a high value fishery
 - Improve fish passage and reduce channelization



Project's Effects on Wildlife

- Habitat loss due to expanded highway footprint
 - Highway widening, new alignment, rock cuts
- Increase in barrier effect:
 - Increased number of traffic lanes
 - Increasing traffic volumes
 - Retaining walls, median and shoulder barriers
 - Lighting at interchanges and signs
- Potential increase in wildlife-vehicle collisions



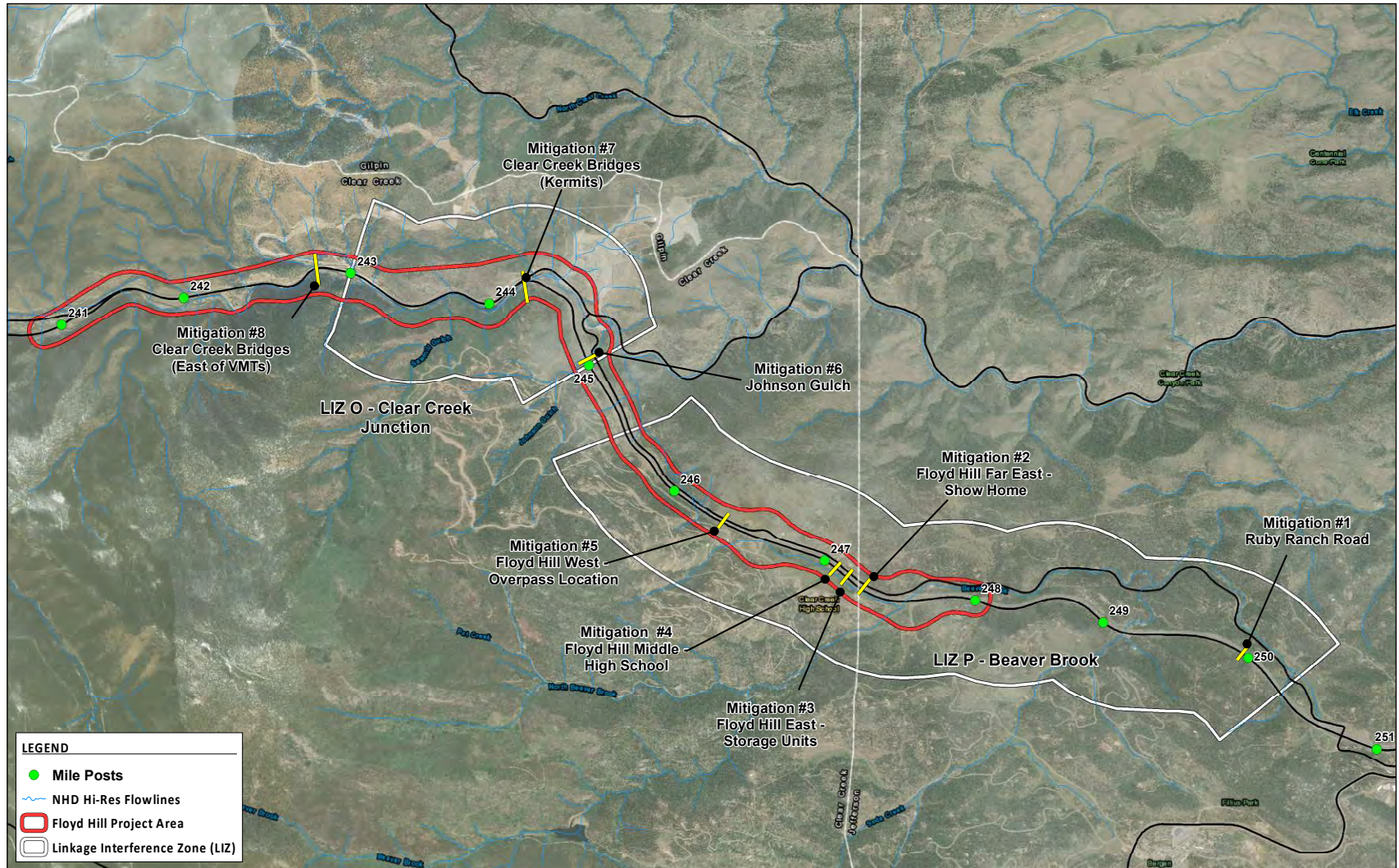
Updates Since June Site Visit

- CDOT/Consultant meeting to review conceptual designs, challenges and opportunities at each location
 - Created Mitigation Matrix
 - Opportunities for mitigation outside of project boundary in eastern portion of Beaver Brook LIZ?



I-70 Floyd Hill to Veterans Memorial Tunnels

Mitigation Locations Considered





Beaver Brook LIZ Mitigation Locations

- 1 – MP 250, Ruby Ranch Road – Underpass (outside of study area)
- 2 – MP 247.3, Meadow/Show Home – Overpass
- 3 – MP 247.2, Meadow/Storage Units – Overpass
- 4 – MP 247.0, Meadow/High School – Overpass
- 5 – MP 246.3, Floyd Hill West - Overpass



Beaver Brook LIZ – Locations Considered

1 – MP 250, Ruby Ranch Road – Underpass (outside of study area)

2 – MP 247.3, Meadow/Show Home – Overpass

3 – MP 247.2, Meadow/Storage Units – Overpass

4 – MP 247.0, Meadow/High School – Overpass

5 – MP 246.3, Floyd Hill West – Overpass



Beaver Brook LIZ: Locations Eliminated

- #4: MP 247.0, Meadow/High School Overpass
 - Eliminated due to greater wetland impacts and potential for this site to be more impacted by planned development on south side of I-70.
- #5: MP 246.3, Floyd Hill West Overpass
 - Eliminated due to lower wildlife value & WVC; Would require fencing and deer guards across Floyd Hill Exit to direct animals to crossing location.

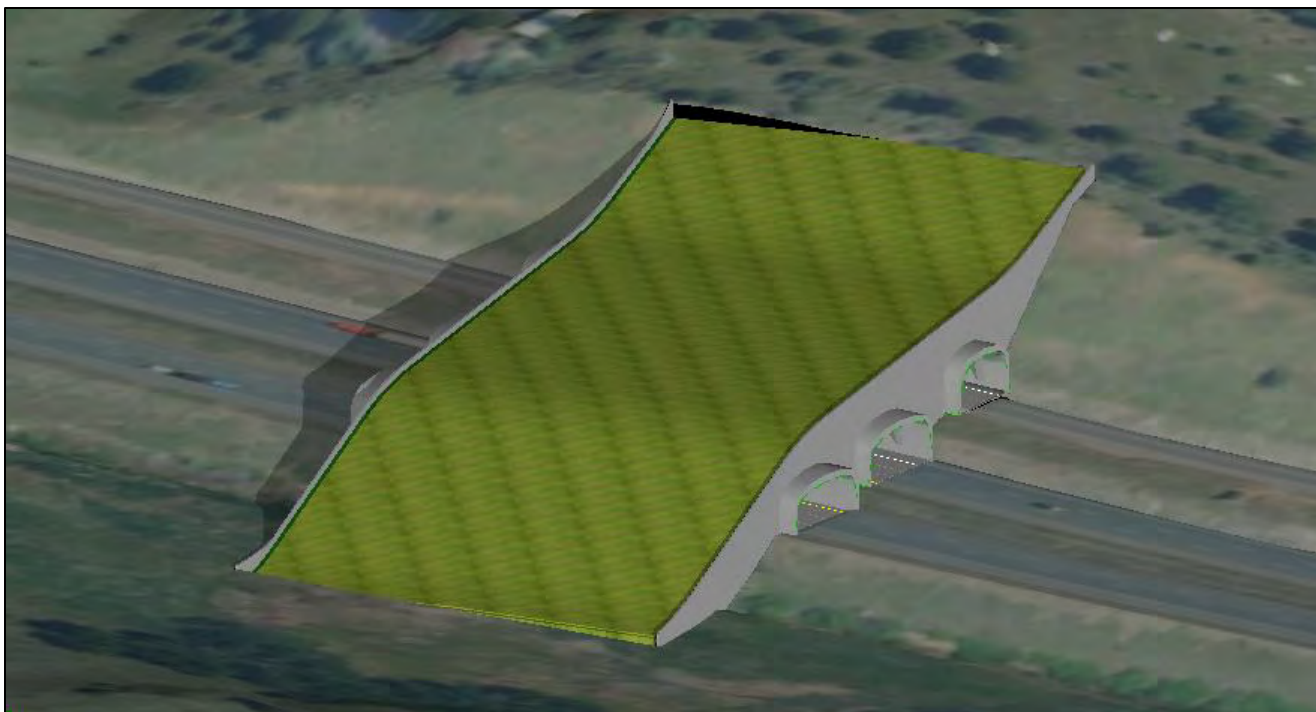


I-70 Floyd Hill to Veterans Memorial Tunnels

Wildlife Overpass Options

Arches

- Three arches over opposing I-70 lanes and US 40
- Designed to be buried; Allows variable slopes





I-70 Floyd Hill to Veterans Memorial Tunnels

Wildlife Overpass Options

Bridges

- Single bridge with multiple spans
- Bridge/fill weight will increase cost
- More open appearance





Beaver Brook LIZ Considerations

- Overpass Width
 - Given the length of an overpass spanning I-70 and US 40, recommended overpass width is 200'
 - However, residential and wintering animals may be more likely to adapt to a narrower structure, also because these populations are already habituated to human activity
 - A narrower structure would not be expected to receive high levels of use, but would provide some connectivity across interstate barrier



I-70 Floyd Hill to Veterans Memorial Tunnels

MP 247.2 Meadow Overpass (#2)





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 247.2 Meadow Overpass (#3)





I-70 Floyd Hill to Veterans Memorial Tunnels

Design Concepts

- View concepts, wetlands, parcel boundaries



Beaver Brook LIZ Discussion

- Are there any fatal flaws associated with Location #2 or #3?
- What alternative design refinements might improve locations carried forward? e.g., narrower structures?
- Is there additional information that would help in determining the best location(s) or design of wildlife-highway mitigation?
- Do any of the locations need habitat protection to be successful?



Clear Creek LIZ – Locations Considered

6 – MP 244.9, Johnson Gulch

- Possible location for wildlife underpass

7 – MP 244.2, Two Bears

- Add wildlife bench under new bridges

8 – MP 242.8, Clear Creek bridges east of VMT

- Location is outside of LIZ, but planned bridge realignment considered as opportunity for wildlife passage under I-70



Clear Creek LIZ Mitigation Locations

6 – MP 244.9, Johnson Gulch

- Possible location for wildlife underpass

7 – MP 244.2, Two Bears

- Add wildlife bench under new spans

8 – MP 242.8, Clear Creek bridges east of VMT

- Location is outside of LIZ, but planned bridge realignment considered as opportunity for wildlife passage under I-70



Clear Creek LIZ: Locations Eliminated

- #6: MP 244.9 Johnson Gulch
 - Eliminated due to constructability issues, and US 40 immediately to east with high traffic speeds leaves wildlife with nowhere to go on north/east side; May increase WVC risk on US 40.
- #8: MP 242.8, Clear Creek bridges east of VMT
 - Eliminated because future bridge alignment leaves nowhere for wildlife to go on the south side between bridges and frontage road walls.



I-70 Floyd Hill to Veterans Memorial Tunnels

MP 244.2 Two Bears (#7)





Clear Creek Junction LIZ Discussion

- Are there any fatal flaws associated with Location #2 or #3?
- What alternative design refinements might improve locations carried forward? e.g., narrower structures?
- Is there additional information that would help in determining the best location(s) or design of wildlife-highway mitigation?
- Do any of the locations need habitat protection to be successful?



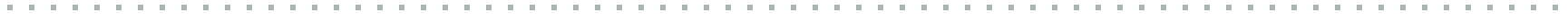
I-70 Floyd Hill to Veterans Memorial Tunnels

Next Steps and Action Items





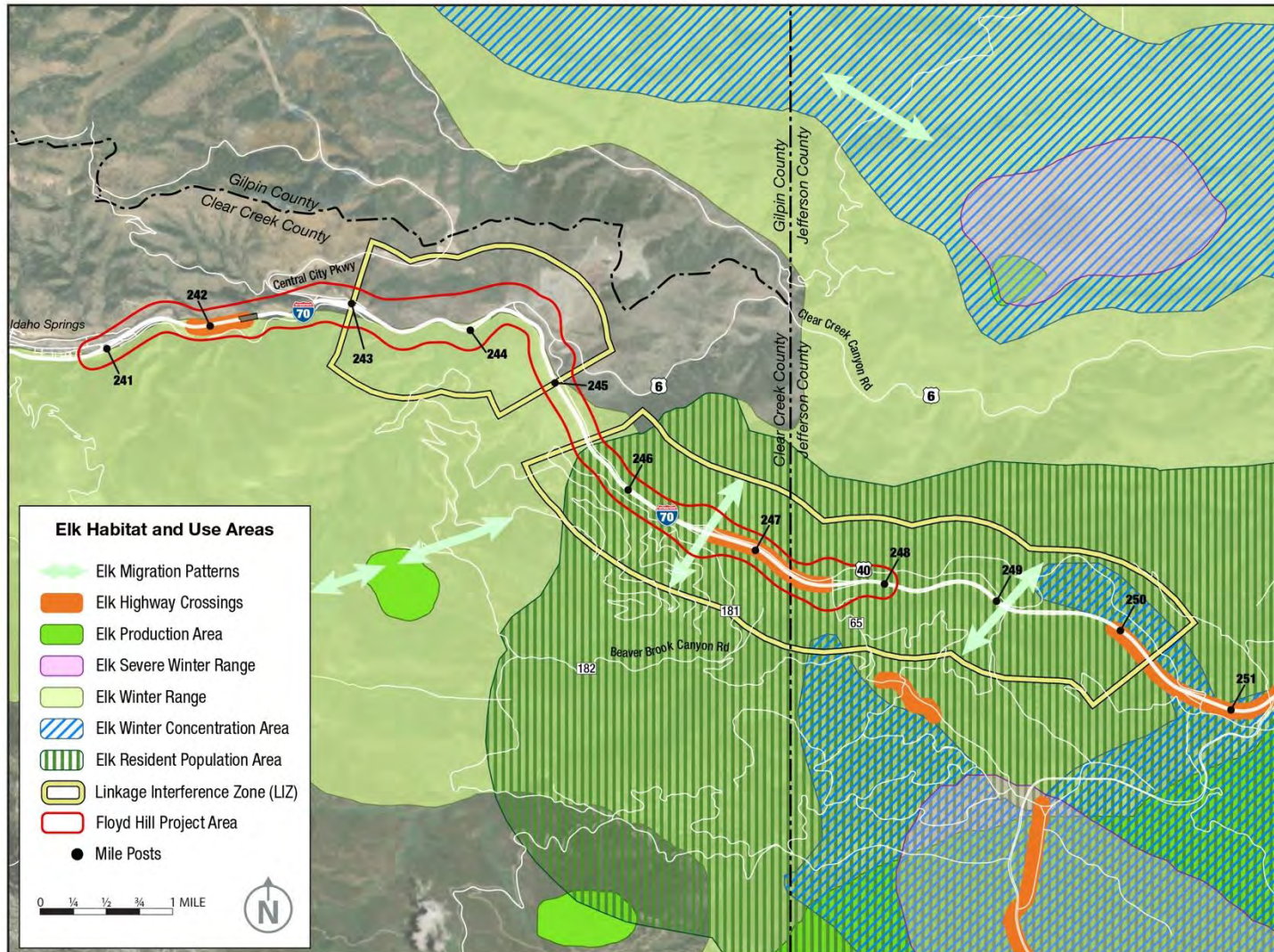
I-70 Floyd Hill to Veterans Memorial Tunnels





I-70 Floyd Hill to Veterans Memorial Tunnels

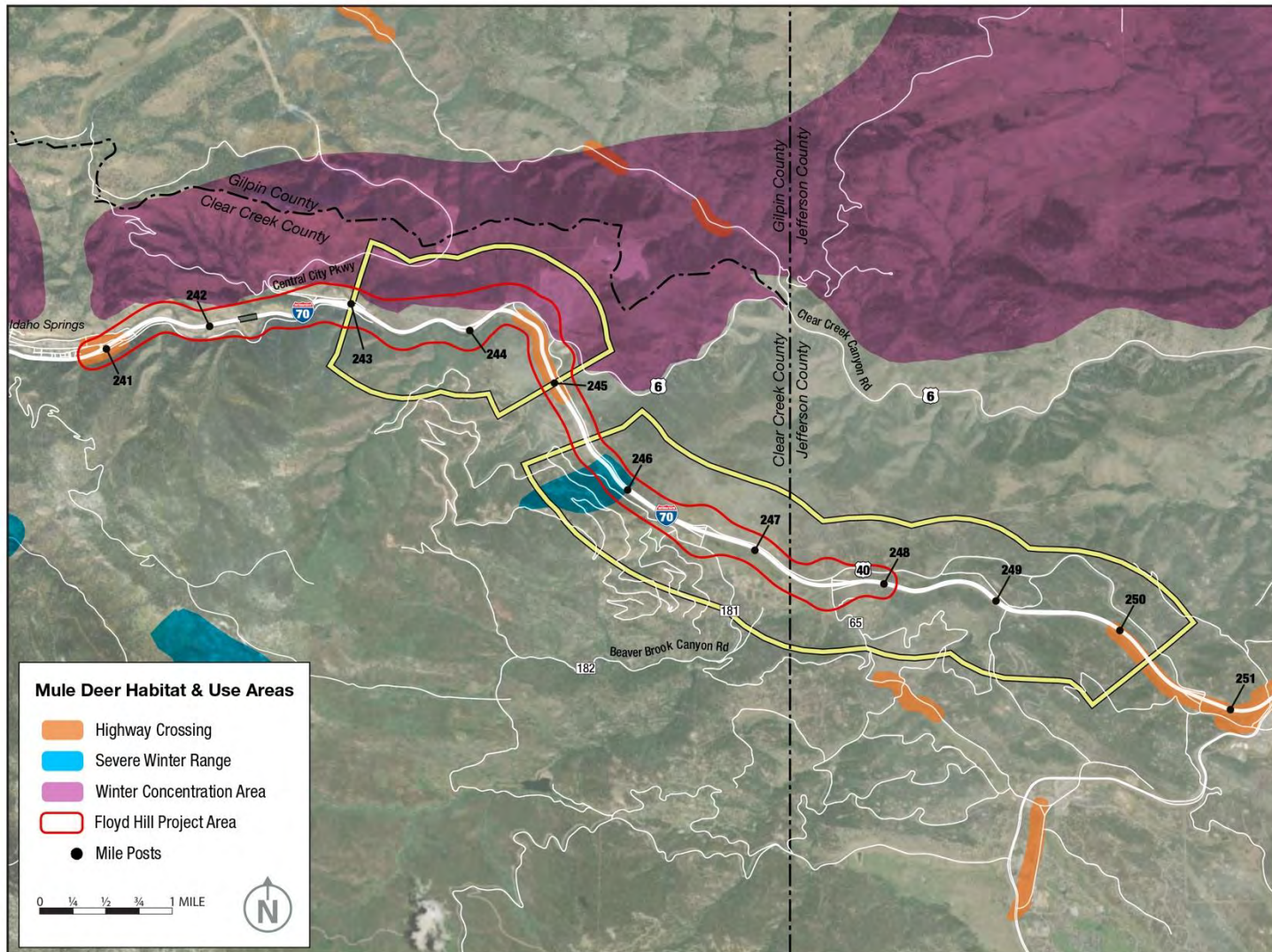
Elk Habitat and Movement Patterns





I-70 Floyd Hill to Veterans Memorial Tunnels

Mule Deer Habitat and Movements

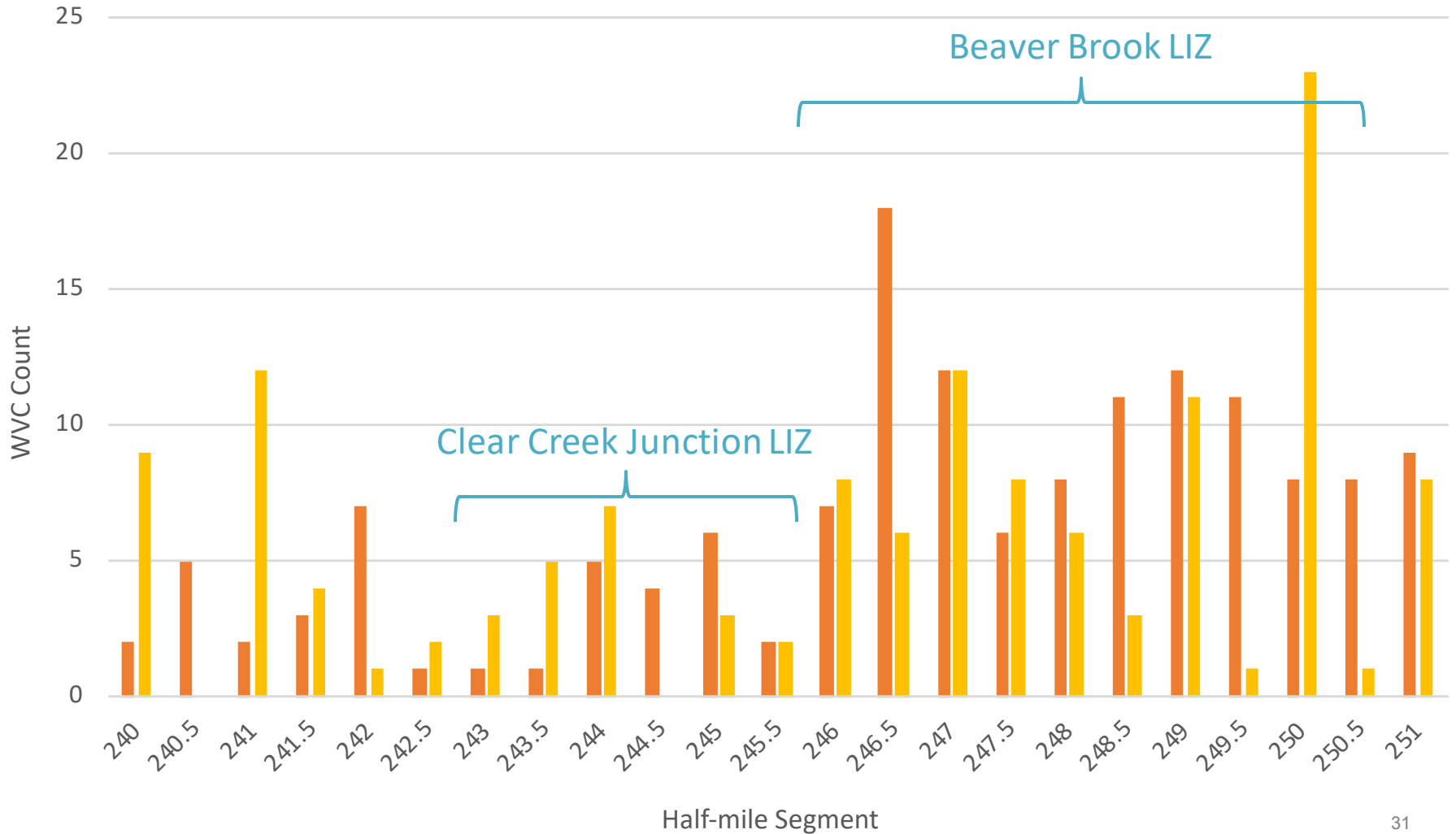




I-70 Floyd Hill to Veterans Memorial Tunnels

Reported WVC Crashes and Carcass Pickups (2006-2017) - Mule Deer

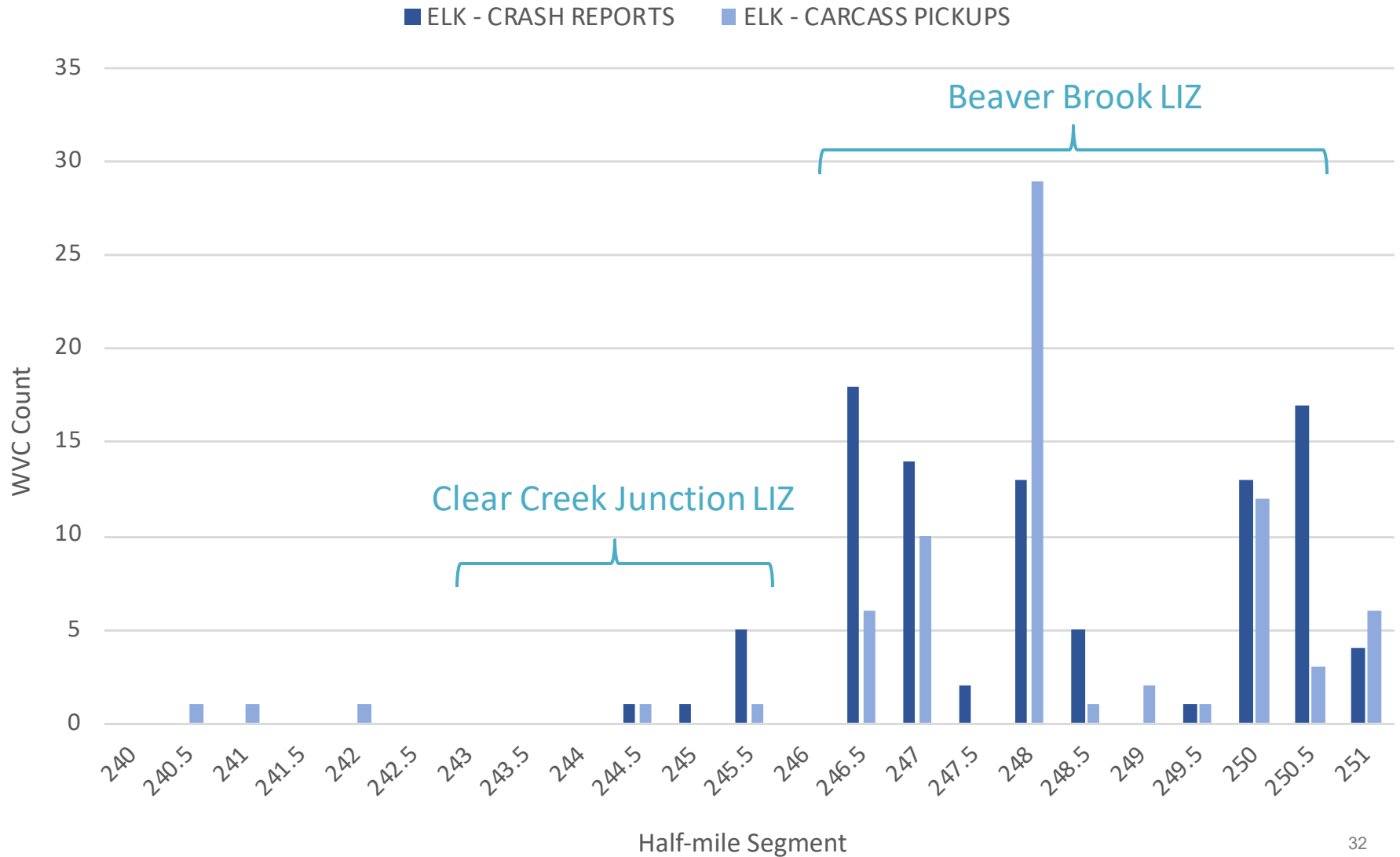
■ DEER - CRASH REPORTS ■ DEER - CARCASS PICKUPS





I-70 Floyd Hill to Veterans Memorial Tunnels

Reported WVC Crashes and Carcass Pickups (2006-2017) - Elk





Wildlife Underpass Options

- Create pathways for wildlife under existing or new bridges
 - Easier opportunity for improving wildlife passage
- Construct new wildlife underpass through embankments under the highway
 - Challenging to maintain traffic during construction





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 250 Ruby Ranch Road Underpass (#1)





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 250 Ruby Ranch Road Underpass (#1)



Clear Creek LIZ Crossing

Crossing Location # 7: One location for **underpass**, incorporating a dedicated wildlife bench into multiuse greenway/wildlife/creek crossing under the US 6/I-70 bridges

Primary use = mule deer

Secondary use = carnivores, bighorn sheep



Existing I-70 bridges spanning the bike path, Clear Creek & the I-70 westbound on-ramp.

INITIAL QUESTIONS TO ANSWER

Design

- What are the vertical and horizontal profiles? Vertical clearance and shared width with greenway?
- Where / how does the bench continue on the north side to direct animals away from I-70, US 6 and US 40 and prevent animals from going back onto the highway?
- What additional elements may be needed to ensure wildlife use, e.g., vegetation enhancements, guide fencing?

Land Use

- What are the existing and future land uses and property ownership for habitat on north and south side of I-70 (and US 6 and US 40)?
- What are the conflicts, if any, with Two Bears, trailhead, or rafting uses?
- How would the crossing work with the greenway? How can human and wildlife uses be buffered?

Biology

- How can the wildlife crossing be most open and inviting to deer and carnivores?
- How do we prevent animals from getting onto the highway – e.g., fencing, trails, approach treatments?
- Where would the wildlife bench be located, and are stream improvements (reduced channelization) possible/necessary?
- Are there additional measures that need to be incorporated to minimize impacts to bighorn sheep (or deer) that get trapped on bridges (above the crossing)?

Other considerations in this LIZ

- Bighorn sheep conflicts at the tunnel entrance/exits
- Where possible, design or create culverts that accommodate bear or smaller animal passage, in particular, a box culvert at Location #6 Johnson Gulch.

Beaver Brook LIZ Crossing

Crossing Locations #2 and #3: Two locations under review for **overpass**, both in the Beaver Brook meadow near CR 65

Primary use = elk

Secondary use = mule deer, carnivores

Location #2 extends from the low point on the center right of the photo on the north side of the frontage road across I-70; Location #3 would run from the cut slope to the meadow.



INITIAL QUESTIONS TO ANSWER

Land Use and Right of Way

- What are the existing and future land uses and property ownership for habitat on north and south side of I-70 (and US 40)?
- What are the conflicts with the Show Home? Initial conflicts identified = parking lot, lighting, human activity.
- Are there other development plans on the north side properties?
- What are the activities / conflicts that occur at the storage unit site, and what are plans for the property in future?
- What is the status of development of the Beaver Brook meadow?
- Are conservation easements possible to protect the lands around the crossing from development?
- What is the temperature of the land owners? Is land owner opposition a fatal flaw to one or both locations?

Design

- What are the loading requirements for the overpass with soil, and are there alternatives, such as foam blocks or hollow sections?
- What is the skew of the bridges, and how does that affect site distance on I-70?
- How significant is the potential “tunnel effect” creating a new bottleneck from drivers slowing through the tunnel, and what are options to reduce this potential problem?
- What are strategies to minimize impacts to wetlands on the south side – options to minimize width and fill? Incorporate culverts or other features to maintain hydrologic connectivity for wetland complex.

Biology

- How can the approaches be most inviting for elk use?
- What will be the fence alignment and what measures will be employed to prevent end-arounds? Where will escape ramps be located? Where are deer guards are needed and what design will best meet mitigation and landowner needs?
- What are the movement patterns of the existing herds, and how might the crossing change patterns?
- What are the human and land use conflicts that may limit use of the crossings?
- Does the layout of CR 65 ramp affect the crossing?



Floyd Hill - ALIVE ITF Meeting #4 Summary
January 9, 2020, 9 AM to 11 AM
CDOT Golden - Lookout Mountain Conference Room

Welcome and Introductions

Vanessa Henderson, CDOT, welcomed the group and reviewed the agenda. Self-introductions followed. Attendees are listed at the end of the notes and on the attached sign-in. Meeting materials are also attached; suggested updates from the ALIVE ITF to the mitigation matrices discussed at this meeting have been included in attachments.

Project Status and Updates

Vanessa provided an overview of project status and the development of a second, non-tunnel alternative called the Canyon Viaduct Alternative, as well as the previously developed Tunnel Alternative that has two design options (North Frontage Road and South Frontage Road). CDOT has secured about half of the anticipated construction funding and is moving forward with NEPA. Impact analysis will be starting this month. A second public meeting is planned for Thursday, February 27, and the EA and public hearing are planned for the fall, with the NEPA process completed early in 2021 pending funding.

Meeting Objectives

Julia Kintsch with Eco-Resolutions reviewed the meeting objectives and noted that CDOT is looking for concurrence from the ALIVE committee on which mitigation options to move forward in the Beaver Brook Linkage Interference Zone (LIZ) and provide input for the Technical Team's CSS matrix on the wildlife considerations for each of the alternatives in the Clear Creek LIZ.

Beaver Brook LIZ

Option A: Crossing Structure west of County Road 65

Julia introduced the crossing option (Option A) for the Beaver Brook LIZ. She reviewed the map showing the refined crossing location and fencing and then reviewed the matrix comparison (attached) regarding the wildlife and biological considerations, political considerations, economic considerations, social support, and feasibility for this mitigation option.

Question: It seems like there are a lot of challenges with this location. Why was it selected and what else was considered?

Response: Previously, the ALIVE ITF conducted a site visit and explored all possible locations for a crossing within the LIZ. After much discussion, the group agreed that this location is the most suitable for a crossing based on land use, wildlife presence (direct access to the habitat that the elk herd uses the most adjacent to I-70), and wildlife-vehicle collisions (WVCs), among other factors.

Question: Can the number of animals using the crossing be predicted?

Response: The density of animals in this location is lower than other locations in Colorado where wildlife crossings have been implemented (such as State Highway 9) because it is not a wildlife migration corridor. As a result, wildlife numbers using this crossing are anticipated to be much lower than other crossings. However, the team is confident that animals will use a well-designed crossing provided that future development and human activity does not inhibit wildlife activity in this area.

Comment: The lower density description in the matrix is a neutral consideration and should be changed to black, not red, in the matrix. The group agreed and the matrix was revised accordingly.

Land Use Considerations: Adam Springer/Clear Creek County gave an update on the development plans for the commercially zoned property near the meadow. The property was recently purchased by the Frei Corporation but their plans are unknown. There is potential for development of single-family residential units; however, water supply is an issue in this area. Preserving habitat in this area would be important to ensuring long-term success of the crossing.

Political considerations: The recent Colorado executive order on wildlife crossings is another political consideration that should be added to the matrix. The group agreed, and this was added to the matrix.

Feasibility: It was decided that the word “unfavorable” should be changed to “less favorable.” The matrix was revised for this change in wording.

Question: Are there other examples of human impacted landscapes where wildlife crossings have been implemented?

Response: Generally, wildlife crossings are found in more “wild” areas, but it is not unprecedented. In Park City, there is a wildlife crossing in a residential area but it is a much smaller crossing and the buildings are farther away.

General comment about Option A Matrix: The matrix seems a little negative in tone. If this is going to be a public document and this option is selected, the wording should be rephrased.

Response: Agree. The team is confident that the wildlife crossing could be designed to be effective and that animals would use it. However, it is important to consider that the numbers for use would not be high and the costs would be very high. This reality was the primary reason for developing another option.

Option B: Onsite Mitigation and Mitigation Fund to Develop Wildlife Crossing(s) in a Different Location in the Mountain Corridor

After considering the challenges of Option A, the team began to question if there was a better mitigation option that would achieve the goals of improving wildlife passage across the Mountain Corridor. Julia reviewed the Option B components, which include habitat preservation, wildlife fencing to reduce WVCs, and contribution to a wildlife crossing mitigation fund used to develop wildlife crossing in another LIZ within the CDOT Region 1 section of the I-70 Mountain Corridor, particularly one where another transportation project is not planned. The approach of building mitigation and wildlife crossings in locations outside project boundaries is supported by FHWA’s Ecological guidance,

Question: Have we installed wildlife fencing without crossings before?

Response: This is generally not recommended but, yes, much of I-70 through Eagle County includes fencing with very limited crossing opportunities. However, there are some specific cases where fencing alone may be warranted to mitigate WVCs that occur in areas where connectivity for wildlife is not necessary. The matrix notes that this is generally not a best practice. Option B does provide some opportunity for animals to cross at the existing undercrossing at Soda Creek Road. Joe Walters/CPW said animals do and would likely use that crossing.

Question: How would the funding for the mitigation fund be determined?

Response: The contribution to the mitigation fund would be the same dollar amount as the cost of constructing the crossing (Option A), which has an early estimate of \$15 million. The money would be dedicated to constructing a crossing in a different LIZ within CDOT Region 1. Several potential locations have been identified that could be pursued with the funding. (Purchasing and conserving the habitat on the south side of I-70 at the Option A crossing location to the extent possible is included in both Option A and Option B.)

The group suggested that protecting land around or otherwise improving the Soda Creek crossing might also be another option.

The group noted some interest in Option B but identified some questions that need to be answered before they could provide concurrence on which option to pursue in NEPA. The group felt more information was needed about the on-site mitigation and the process for determining and implementing offsite mitigation. Some of the questions that need to be addressed:

- Are conservation easements possible at the meadow property?
- What additional improvements are needed/feasible at Soda Creek?
- How long would it take to get an agreement on a new crossing location? What would be the timeframe for implementing a new crossing, and how would CDOT manage that as a separate project?
- How would the mitigation fund be structured? How would it work? How do projects get triggered? How would CDOT spend the money?
- How does the ALIVE MOU need to be changed?
- How would mitigation commitments be addressed later (if not included as part of this project)?

Clear Creek LIZ

Julia provided a brief overview of the roadway alternatives in the Clear Creek LIZ, including visualizations of how the roadway infrastructure relates to Clear Creek and riparian habitat. She noted that the Clear Creek LIZ has some north-south connectivity issues, but the primary consideration is access to and movement along the riparian habitat east-west through the project area, with connectivity north at the US 6 junction.

Comment: Shading should be considered for all bridges.

Comment: The South Frontage Road option of the Tunnel Alternative seems like a lot of roadway infrastructure on both sides of the creek. The North Frontage Road option seems better because more of the roadway is away from the creek.

Comment: The Canyon Viaduct Alternative may provide more opportunity for riparian mitigation.

Comment: Clear Creek County has plans for a park on the north side of the knob cut with the Canyon Viaduct Alternative.

Comment: The South Frontage Road option may have some issues with flood resiliency.

Comment: The South Frontage Road option has lots of roadway where there could be habitat. It also cuts off wildlife access from the south.

Comment: Specify that the connectivity goal for this LIZ is east-west along the riparian corridor rather than north-south across I-70.

Next Steps

The group agreed that a follow up was needed to further discuss the Clear Creek LIZ and Option B for the Beaver Brook LIZ. The project team will work on gathering additional data requested by the ALIVE ITF and follow up in 6 to 8 weeks.

The following actions are needed:

- Mitigation Fund: Develop parameters for where and how money could be used.
 - Determine if a long-term fund is desirable or if a new crossing project should be developed concurrent with the Floyd Hill project.
 - Determine how the amount of the fund contribution is set and committed.
 - Determine if changes to the ALIVE MOU are needed.
 - Develop a preliminary list of alternative wildlife crossing locations that could be developed in the Region 1 portion of the I-70 Mountain Corridor to evaluate the benefits.
- On-site mitigation: Clarify possibilities for on-site mitigation for Option B.
 - Soda Creek improvements
 - Evaluate potential enhancements to the existing structure.
 - Consider costs and benefits of a bridge replacement spanning the creek/riparian area to provide a better wildlife pathway under the bridge.
 - Review wildlife habitat and movement in this area and relate to land use.
 - Get traffic info from Clear Creek County for Soda Creek Road.
 - Further information on habitat protection
 - Coordinate with CDOT right-of-way to initiate conversations with the four landowners to determine willingness to collaborate and costs associated with conservation easement/purchase.
 - If these parcels are not available, are there other potential properties available around Soda Creek or south towards Bergen Park where conservation protections would benefit wildlife?
 - Overpass location (Option A)

- Coordinate with Jefferson County regarding zoning for parcels north and east of the crossing location.
- Determine fence alignments, particularly fence ends and wildlife guards.

Attendees

Amy Saxton and Adam Springer (Clear Creek County); Chelsea Beebe (Jefferson County); Stephanie Gibson (FHWA); Vanessa Henderson, Neil Ogden and Francesca Tordonato (CDOT); Alison Deans Michael (USFWS); Joe Walter (CPW); Aurelia Denasha (USFS); Anthony Pisano and Carol Coates (Atkins); Julia Kintsch (ECO-resolutions); Mandy Whorton (Peak Consulting Group).

Agenda



Project: I-70 Floyd Hill to VMT
Meeting: ALIVE Meeting #4
Date: January 9, 2020, 9:00-11:00am
Location: CDOT Region 1, 425A Corporate Circle, Golden, CO, Lookout Mountain Room

Meeting Objectives:

- Review Mitigation Option A (Wildlife Overpass) design and considerations
- Present and discuss Mitigation Option B (Alternative) in the Beaver Brook LIZ
- Obtain consensus from the ALIVE Committee on which Option to pursue in the Beaver Brook LIZ
- Update the ALIVE Committee on the new Canyon Viaduct Alternative in the Clear Creek LIZ and obtain input for inclusion in the CSS Alternatives Matrix

Agenda:

- 1) Welcome / Introductions
- 2) Project Status Review
- 3) Beaver Brook LIZ
 - a) Mitigation Option A: Overpass
 - i) Preferred location, visualizations, and discussion of matrix
 - b) Mitigation Option B: Alternative Mitigation
 - i) Description, map exhibit, and discussion of matrix
- 4) Clear Creek LIZ
 - a) Present Tunnel Alternative: North and South Frontage Road Design Options
 - i) Alignment and visualizations
 - b) Canyon Viaduct Alternative
 - i) Alignment and visualizations
 - c) Discussion of alternatives
- 5) Next Steps / Action Items



I-70 Floyd Hill to Veterans Memorial Tunnels

ATKINS

Member of the SNC-Lavalin Group

ALIVE Meeting

January 9, 2020



Meeting Objectives

- Beaver Brook LIZ
 - Review Mitigation Option A (Wildlife Overpass) design and considerations
 - Present and discuss Mitigation Option B (Alternative)
 - Obtain consensus from the ALIVE Committee
- Clear Creek LIZ
 - Update the ALIVE Committee on the new Canyon Viaduct Alternative
 - Obtain input for inclusion in the CSS Alternatives Matrix



I-70 Floyd Hill to Veterans Memorial Tunnels

Introductions

- Name
- Position
- Agency/Company



I-70 Floyd Hill to Veterans Memorial Tunnels

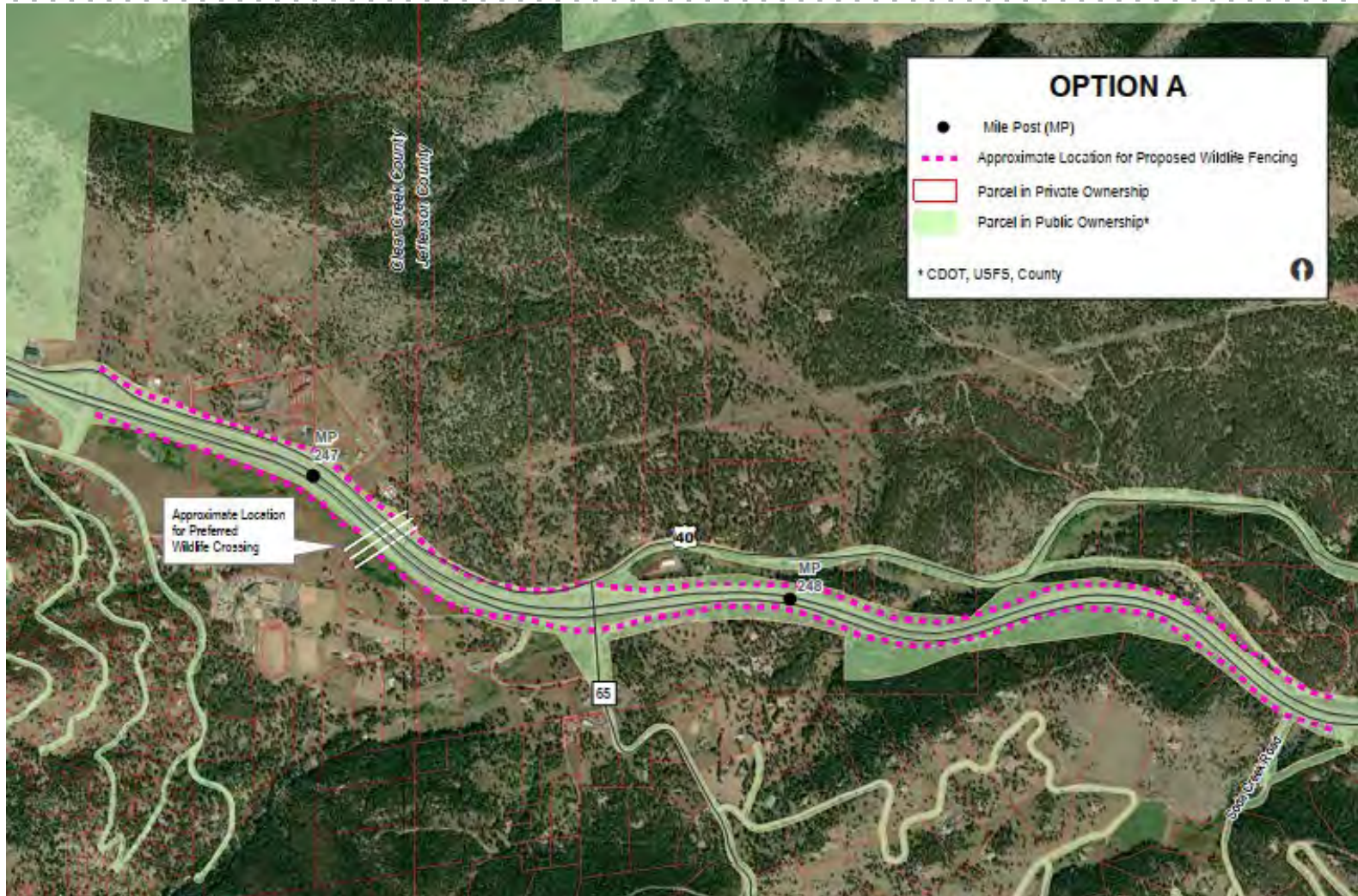
Project Status Review





I-70 Floyd Hill to Veterans Memorial Tunnels

Beaver Brook LIZ Mitigation Option A – Overpass





I-70 Floyd Hill to Veterans Memorial Tunnels

Beaver Brook LIZ Mitigation Option A – Overpass

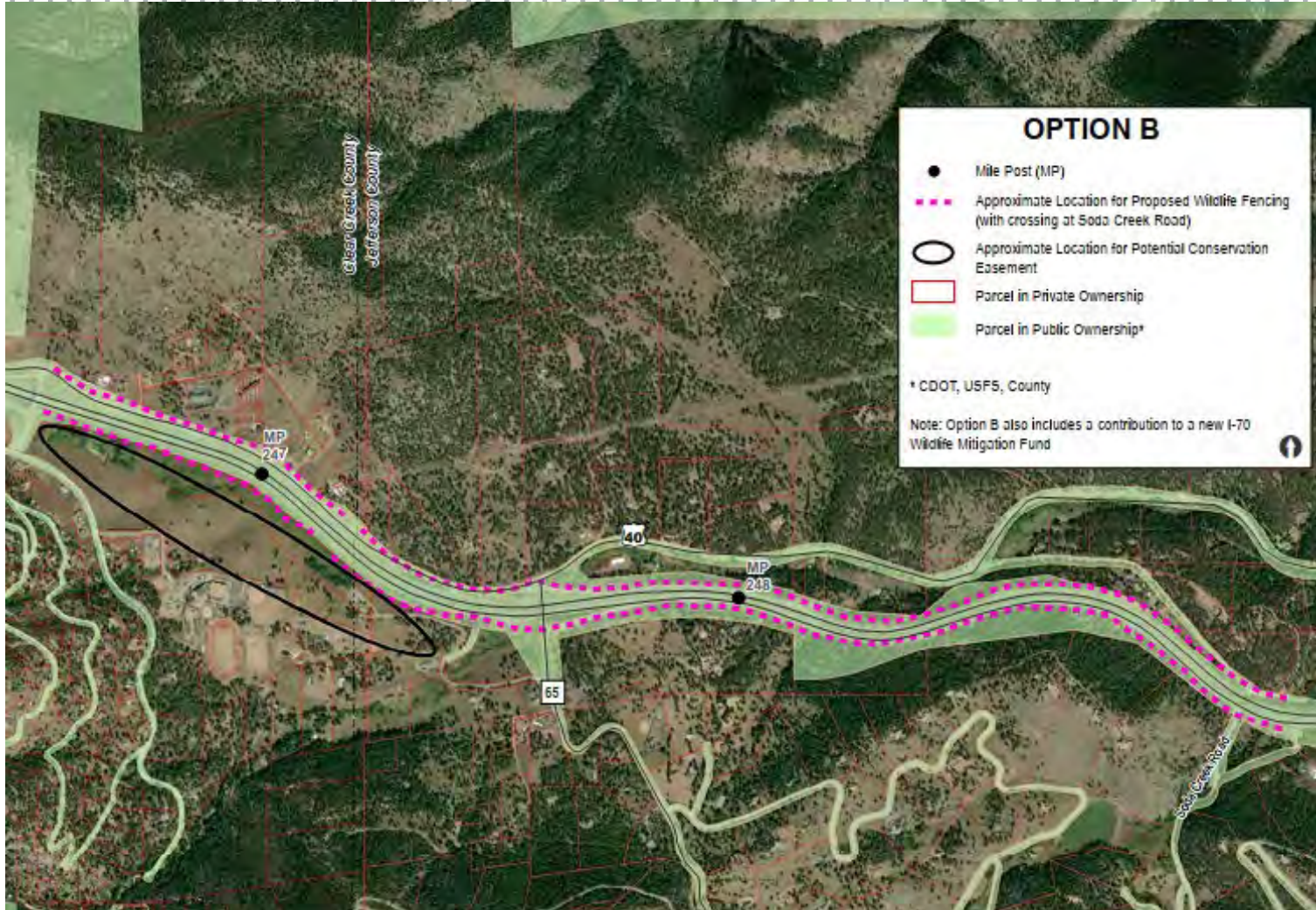




I-70 Floyd Hill to Veterans Memorial Tunnels

Beaver Brook LIZ

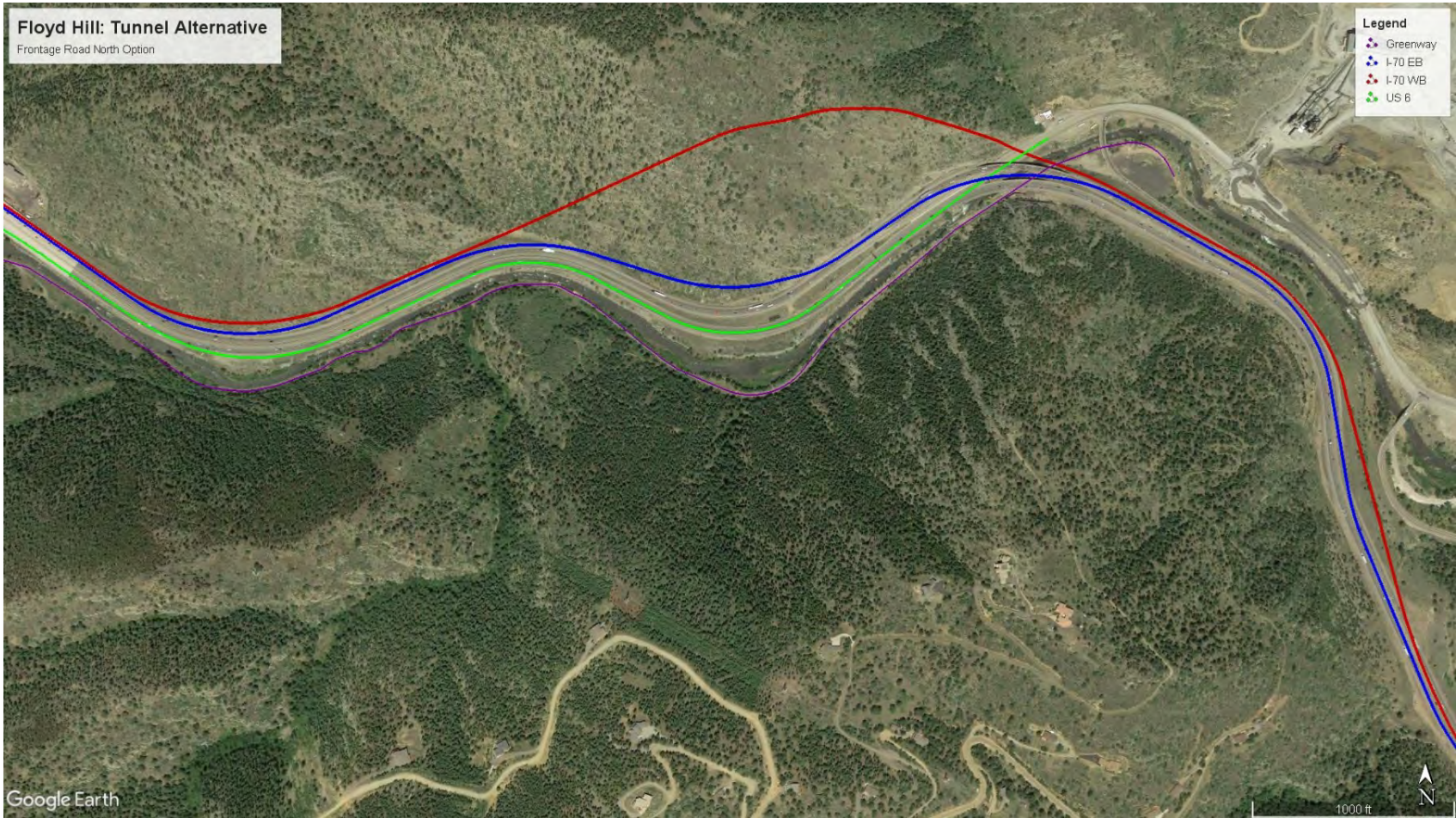
Mitigation Option B – Alternative Mitigation





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ Tunnel Alternative – North Frontage Road Design Option





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ

Tunnel Alternative – North Frontage Road Design Option



East Portal – Looking West (Figure 1)



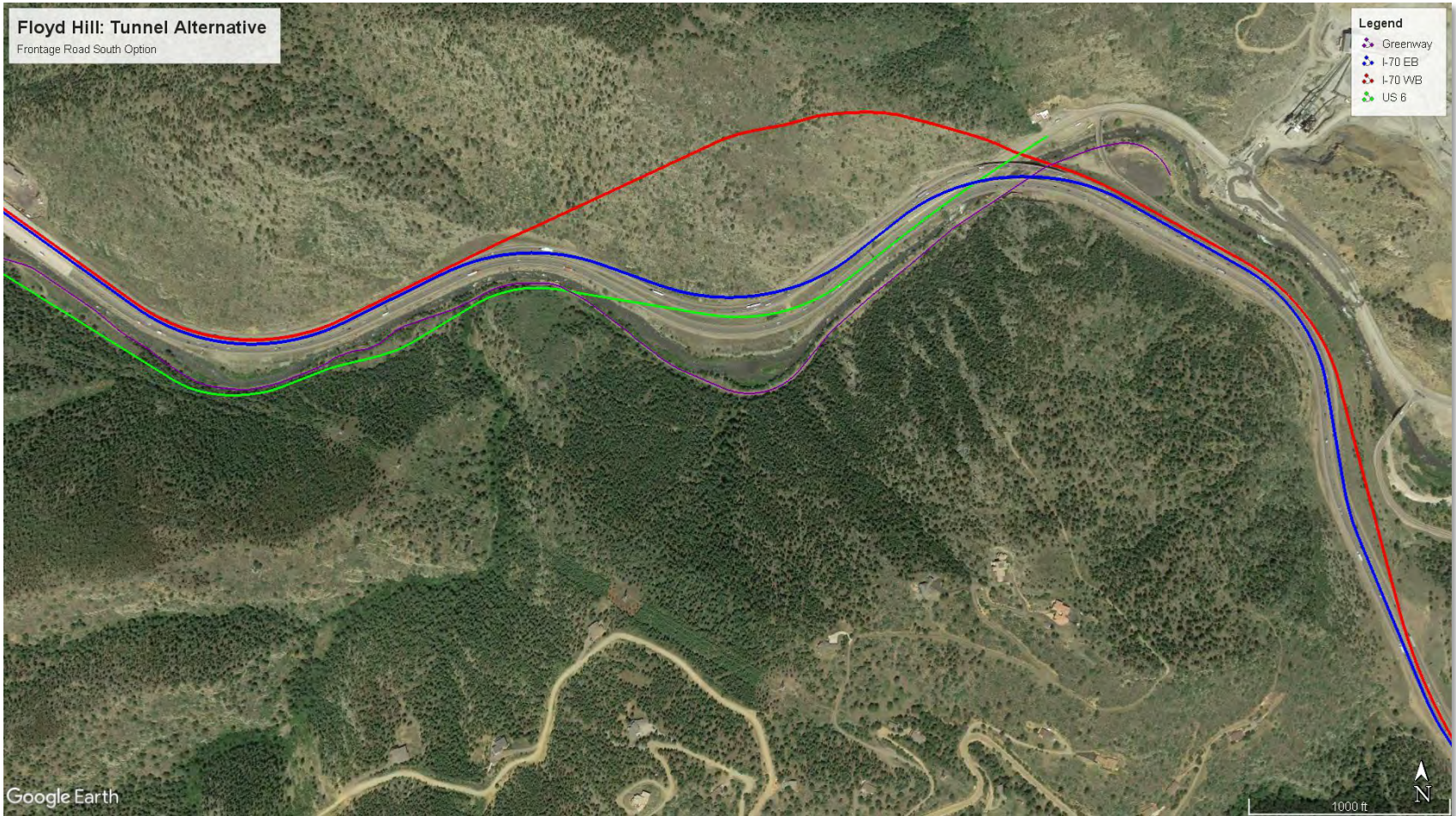
West Portal – Looking East (Figure 2)



I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ

Tunnel Alternative – South Frontage Road Design Option





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ

Tunnel Alternative – South Frontage Road Design Option



East Portal – Looking West (Figure 1)

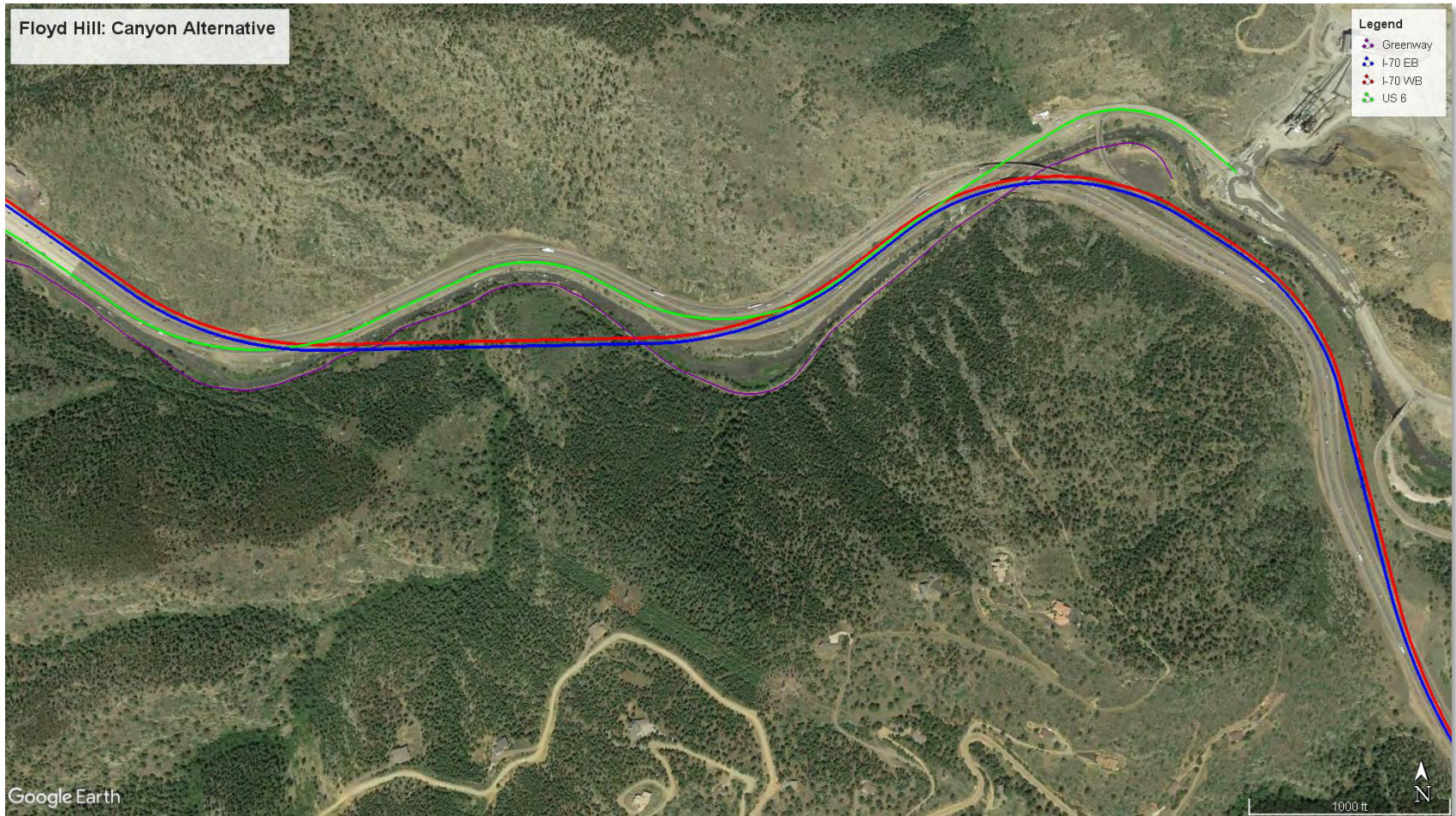


West Portal – Looking East (Figure 3)



I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ Canyon Viaduct Alternative





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ Canyon Viaduct Alternative



East Portal – Looking West (Figure 4)



West Portal – Looking East (Figure 5)



I-70 Floyd Hill to Veterans Memorial Tunnels

Comparison of Alternatives East Portal



Canyon Viaduct Alternative (Figure 4)

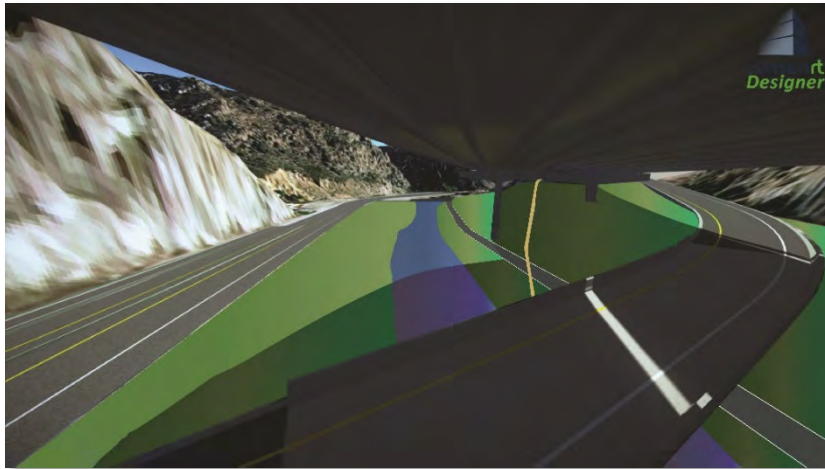


Tunnel Alt. – North and South Frontage Road Options (Figure 1)

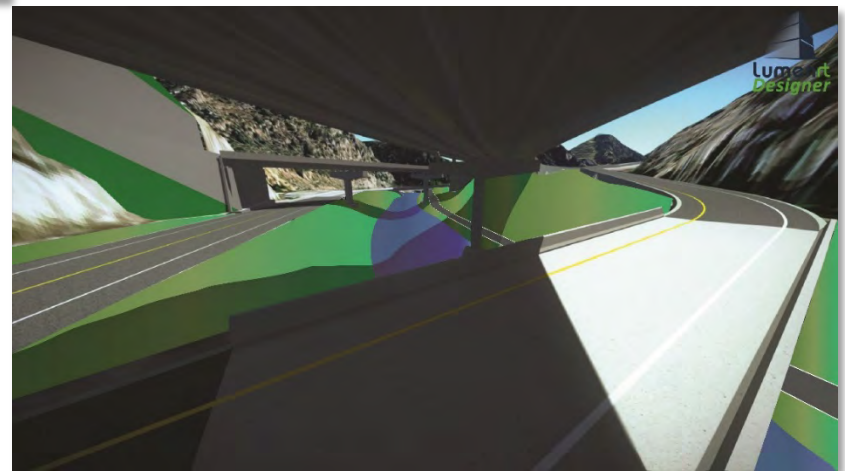


I-70 Floyd Hill to Veterans Memorial Tunnels

Comparison of Alternatives East Portal - Riparian



Canyon Viaduct Alternative (Figure 6)



Tunnel Alt. – North & South Frontage Road Options (Figure 7)



I-70 Floyd Hill to Veterans Memorial Tunnels

Comparison of Alternatives West Portal



Canyon Viaduct Alternative (Figure 5)



Tunnel Alt. – North Frontage Road Option (Figure 2)

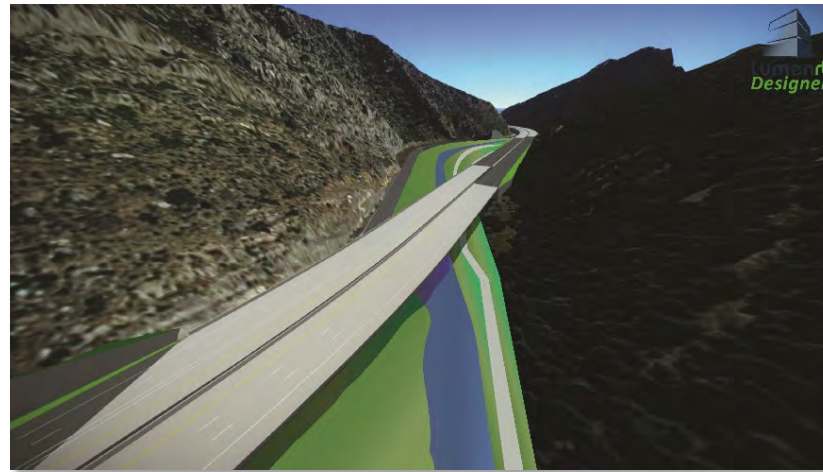


Tunnel Alt. – South Frontage Road Option (Figure 3) ¹⁶

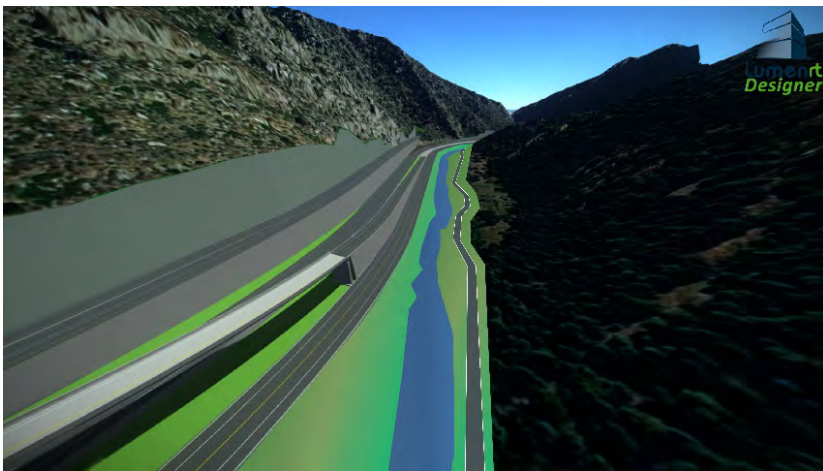


I-70 Floyd Hill to Veterans Memorial Tunnels

Comparison of Alternatives West Portal - Riparian



Canyon Viaduct Alternative (Figure 8)



Tunnel Alt. - North Frontage Road Option (Figure 9)



Tunnel Alt. - South Frontage Road Option (Figure 10)¹⁷



Next Steps

- If pursuing Option A:
 - Refine preliminary design for Overpass
- If pursuing Option B:
 - Approach County and property owners regarding conservation easement/purchase
 - Identify whether there are other large parcels available for conservation easement/purchase
 - Refine cost estimate for Option A to inform funding available for Option B
 - Develop Mitigation Fund
- Follow up with ALIVE ITF in Spring 2020



I-70 Floyd Hill to Veterans Memorial Tunnels

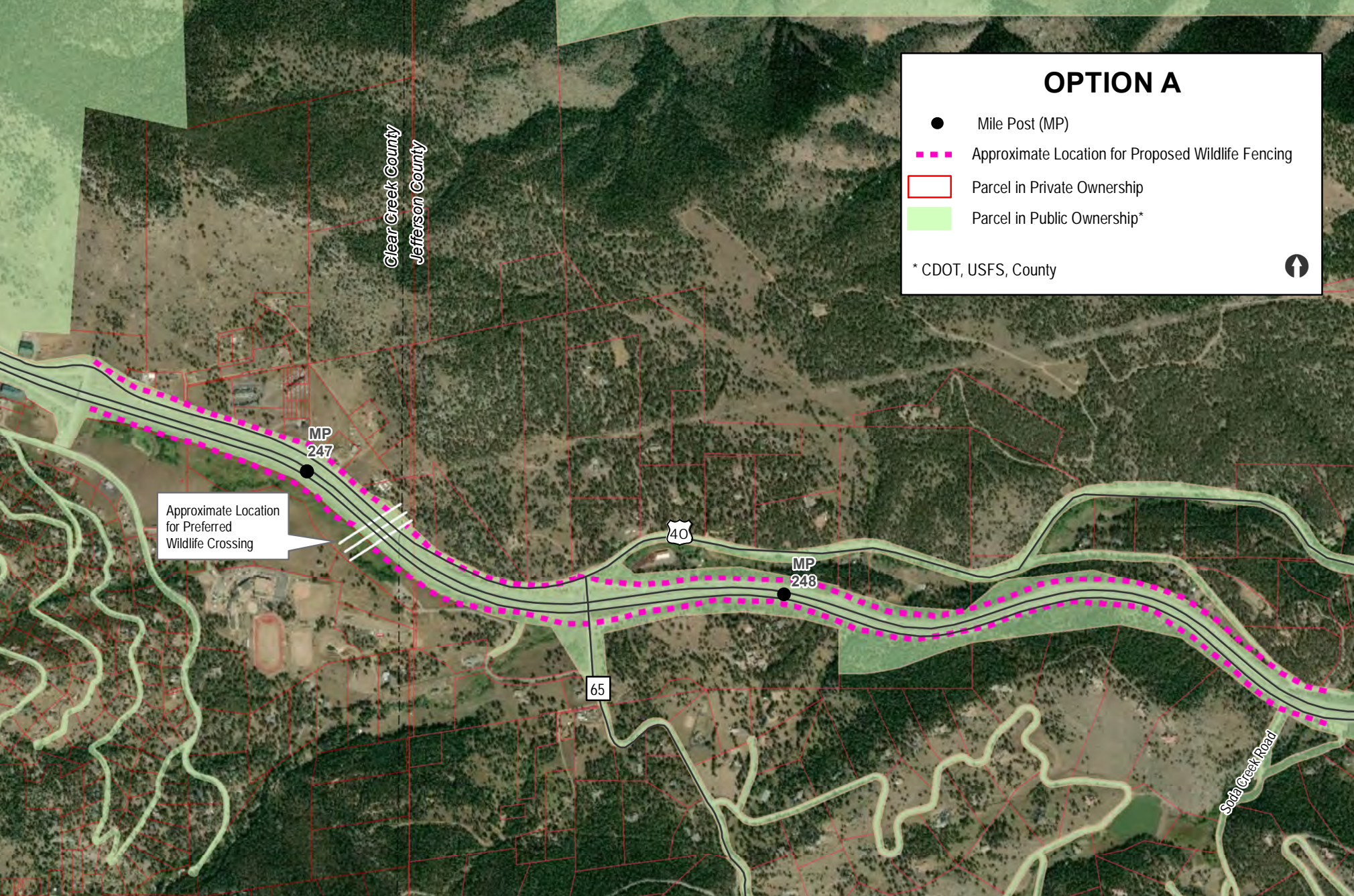
Questions



OPTION A

- Mile Post (MP)
- Approximate Location for Proposed Wildlife Fencing
- Parcel in Private Ownership
- Parcel in Public Ownership*

* CDOT, USFS, County



Clear Creek County
Jefferson County

MP
247

Approximate Location
for Preferred
Wildlife Crossing

40

MP
248

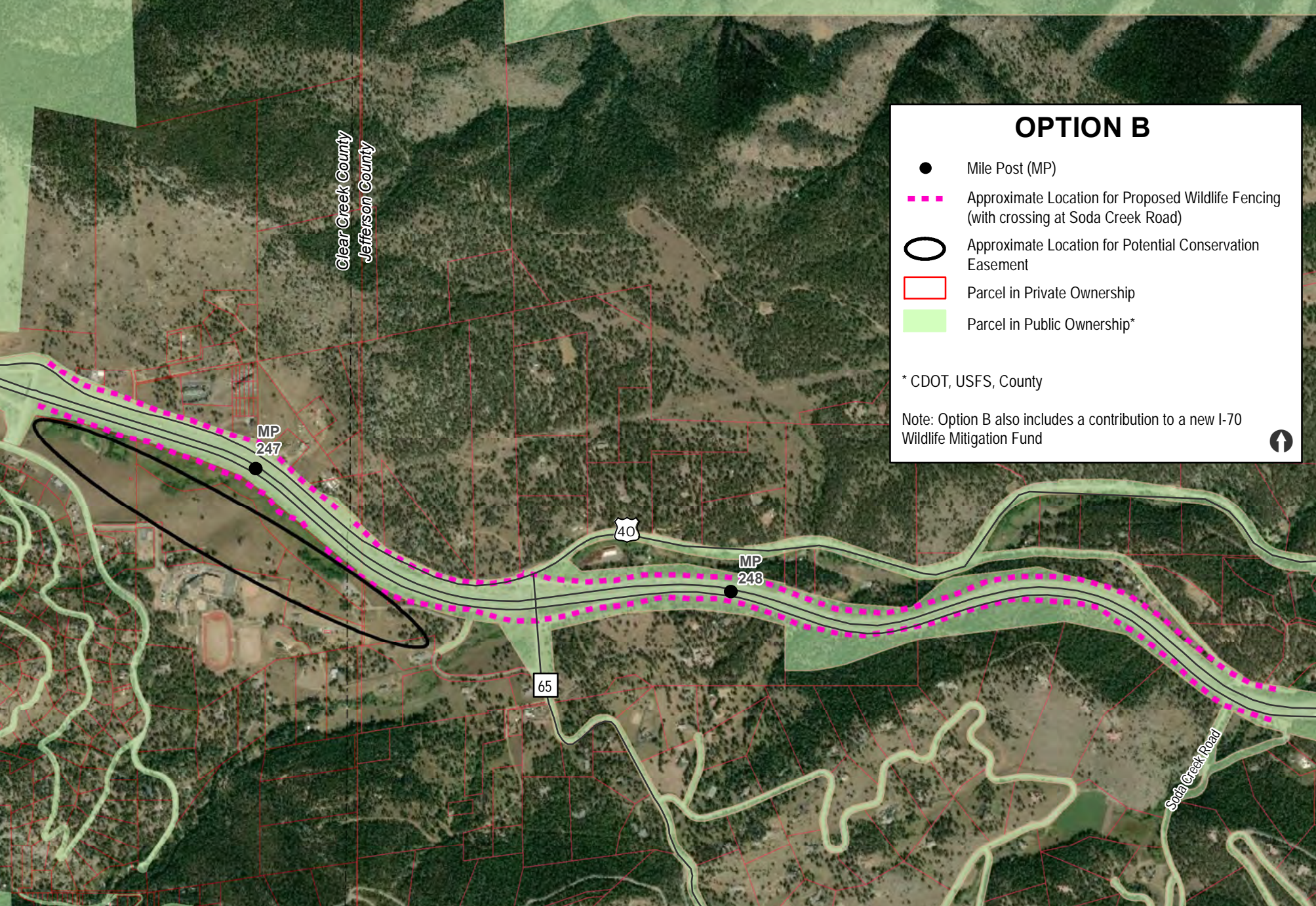
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Soda Creek Road

I-70 Floyd Hill Mitigation Alternatives Summary for the Beaver Brook Linkage Interference Zone (LIZ)

Mitigation Option	Mitigation Description	Wildlife & Biological Considerations	Political Considerations	Economic Considerations	Social Support	Feasibility	Next Steps to Advance
A. Wildlife Crossing Mitigation	Construct a wildlife overpass over I-70 & US 40 at MP 247.2 (Storage Units location). Mitigation includes wildlife exclusion fencing, escape ramps and wildlife guards along I-70 from west of the Floyd Hill exit to east of Soda Creek Road to prevent wildlife-vehicle collisions (WVC)	<ul style="list-style-type: none"> Restores landscape connectivity over I-70 & US 40, and provides greater wildlife access for resident elk south of I-70 in the Beaver Brook area to open space and undeveloped parcels north of I-70 at both the overpass location and Soda Creek Fencing mitigation along I-70 will reduce incidence of WVC and encourage safe wildlife passage under I-70 at Soda Creek Road bridge Beaver Brook LIZ is a lower connectivity priority (2003 LIZ assessment) on the Mountain Corridor; it is not a migration corridor, winter range or genetic corridor Chronic wasting disease is present in elk and deer herds in Game Management Units (GMUs) 38 & 39 Narrow, unprotected wildlife corridor due to extensive dispersed residential development and a proposed 400 unit development immediately on south side. Concern that wildlife use of the overpass will become restricted by potential future development and recreation north and south of I-70 Due to lower density wildlife populations the crossing will not have usage rates as high as other successful crossing structures (e.g., SH 9, US 160) 	<ul style="list-style-type: none"> Record of Decision (ROD) commits CDOT to wildlife crossings mitigation Governor's Executive Order in Sept 2019 supports wildlife crossings Wildlife crossing awareness is high due to other successful projects (e.g., SH 9) Highly visible and very costly mitigation project in human impacted landscape would be subject to extensive scrutiny; May impact future wildlife crossing projects in the state 	<ul style="list-style-type: none"> Overpasses will be very costly (bridge spanning eastbound and westbound I-70 and US 40) 	<ul style="list-style-type: none"> Public not clamoring for a wildlife crossing in this area (perception of costly solution to a small or non-existent problem) 	<ul style="list-style-type: none"> Very complex human landscape renders this area less favorable for a large investment in wildlife crossings infrastructure Wildlife crossings with fencing are the most effective mitigation method for reducing WVC Construction is complicated by multiple factors: Bridge over eastbound and westbound I-70 and US 40; Bridge must be 'oversized' to maintain flexibility for future operations; and will likely require short-term closures on I-70 & US 40 	<ul style="list-style-type: none"> Refine preliminary design: <ol style="list-style-type: none"> approaches geometry/roadway criteria right of way needs refined cost estimate Follow up with ALIVE ITF in Spring

LEGEND: Green = Potential Benefit
 Red = Potential Challenge
 Black = Neutral



OPTION B

- Mile Post (MP)
- ■ ■ ■ Approximate Location for Proposed Wildlife Fencing (with crossing at Soda Creek Road)
- Approximate Location for Potential Conservation Easement
- Parcel in Private Ownership
- Parcel in Public Ownership*

* CDOT, USFS, County

Note: Option B also includes a contribution to a new I-70 Wildlife Mitigation Fund



I-70 Floyd Hill Mitigation Alternatives Summary for the Beaver Brook Linkage Interference Zone (LIZ)

Mitigation Option	Mitigation Description	Wildlife & Biological Considerations	Political Considerations	Economic Considerations	Social Support	Feasibility	Next Steps to Advance
B. Alternative Mitigation Plan	In lieu of constructing a wildlife crossing in the Beaver Brook LIZ, pursue a multi-part mitigation strategy consisting of: 1. Contribute to an I-70 Mountain Corridor Connectivity Mitigation Fund to construct a wildlife crossing elsewhere in the Region 1 portion of the Mountain Corridor [e.g., the Mt. Vernon Creek LIZ (MP 252.8-257.6) - according to the 2011 EcoLogical Report this area had the highest WVC rate in the Mountain Corridor; or around Soda Creek (~MP 250) in the Beaver Brook LIZ, which had the highest WVC from 2012 to 2016] 2. Pursue a conservation purchase or easement in the meadow/wetland complex area on the south side of I-70 at the top of Floyd Hill 3. Install wildlife exclusion fencing and associated wildlife guards, escape ramps, and pedestrian access gates along I-70 west of the Floyd Hill exit to east of Soda Creek Road to prevent WVC	<ul style="list-style-type: none"> •Connectivity value of LIZ is more historical than current - habitat protection is a greater need for this herd than connectivity across I-70 •Potential to permanently protect high quality wetlands and meadow habitat, one of the last vestiges in this landscape; these parcels are important for this elk herd, whose habitat has already been severely restricted and fragmented by development and roads •Fencing mitigation along I-70 will reduce incidence of WVC and encourage safe wildlife passage under I-70 at Soda Creek Road bridge •Direct mitigation funding towards higher priority LIZs in the Mountain Corridor •This option does not include a wildlife crossing structure and no connectivity improvements will be made in this portion of the LIZ across I-70 & US 40 at the top of Floyd Hill •Land use will only become more complex and challenging in the futures 	<ul style="list-style-type: none"> •This is the first opportunity to comply with the ALIVE MOU and restore connectivity with a new wildlife crossing in the I-70 Mountain Corridor •May require future ALIVE MOU revisions to address alternative mitigation options and priorities, if needed, for future projects. Must keep the intent of the ALIVE MOU intact •FHWA EcoLogical approach supports mitigation in the best place even if it's outside of project boundaries 	<ul style="list-style-type: none"> •May leverage wildlife mitigation funding to offer greater conservation benefits on the Mountain Corridor for similar costs 	<ul style="list-style-type: none"> •Option requires agreement by the project ALIVE ITF •Local community support anticipated as this option could conserve the meadow/wetland complex area 	<ul style="list-style-type: none"> •Setting up a connectivity mitigation fund is new for CDOT and will require planning among R1, R3, ALIVE and FHWA •CDOT may not be able to protect the meadow & wetland properties •Minimal design and construction (only for fencing, wildlife guards, and escape ramps) •Wildlife fencing mitigation is very feasible and effective for reducing WVC 	<ul style="list-style-type: none"> •Assess property ownership; approach County and property owners regarding conservation easement/purchase •Identify whether there are other large parcels available for a conservation purchase that would benefit connectivity to the south (Mt Evans, Bergen Peak) •Refine cost estimate for Option A (to inform funding available for Option B) •Develop Mitigation Fund •Follow up with ALIVE ITF in Spring

LEGEND: Green = Potential Benefit
 Red = Potential Challenge
 Black = Neutral

Meeting Notes



Project: I-70 Floyd Hill to VMT
Meeting: ALIVE Meeting #5
Date: February 26, 2020, 9:00am-12:00pm
Location: CDOT Region 1, 425A Corporate Circle, Golden, CO, Lookout Mountain Room

Meeting Objectives:

- Present and discuss in detail Mitigation Option B (Alternative) in the Beaver Brook LIZ
- Obtain consensus from the ALIVE Committee on which Option to pursue in the Beaver Brook LIZ
- Review and discuss wildlife considerations for the three alternative alignments (Tunnel Alternative, North and South Frontage Road Options; and Canyon Viaduct Alternative) in the Clear Creek LIZ and obtain input for inclusion in the CSS Alternatives Matrix

Agenda:

- 1) Welcome / Introductions
- 2) Follow-up on Action Items from January ALIVE Meeting
- 3) Beaver Brook LIZ
 - a) Review Mitigation Option A: Overpass
 - b) Mitigation Option B: Alternative Mitigation
 - i) Potential alternative location(s) for wildlife crossings mitigation outside of the project area on I-70 in R1 (matrix)
 - ii) In project area wildlife fencing mitigation to reduce wildlife-vehicle collisions
 - c) ALIVE recommendation for Beaver Brook LIZ mitigation
- 4) Clear Creek LIZ
 - a) Review Alternatives / Options
 - i) Tunnel Alternative: North and South Frontage Road Design Options
 - ii) Canyon Viaduct Alternative
 - b) Discussion of wildlife connectivity values, challenges, and priorities
- 5) Next Steps / Action Items



Floyd Hill - ALIVE ITF Meeting #5 Notes
February 26, 2020, 9 AM to 12 PM
CDOT Golden - Lookout Mountain Conference Room

Welcome and Introductions

The meeting began with Vanessa Henderson, Colorado Department of Transportation's (CDOT) I-70 Mountain Corridor Environmental Manager, welcoming the group, which was followed by roundtable self-introductions. Attendees are listed at the end of these notes. Alison Deans Michael, US Fish and Wildlife Service (USFWS), is retiring and was recognized as the longest standing member of the ALIVE Committee. Colorado Parks and Wildlife (CPW) members were not able to attend the meeting so Julia Kintsch with ECO-resolutions, and Francesca Tordonato, CDOT's Region 1 Environmental Program Manager, followed up with them and to obtain input on items presented during the meeting. (A summary of the follow-up is included as an attachment to these notes.)

Follow-up on Action Items from January 2020 ALIVE meeting

Many of the action items from the January 2020 ALIVE meeting were discussed as part of the meeting and are included in these notes. However, two items were discussed up front as information learned during the follow-up process affects the discussion about Mitigation Option B: 1) setting up a mitigation fund and 2) purchasing property at the top of Floyd Hill.

1) Mitigation Fund

To determine the applicability of a wildlife crossing mitigation fund for the I-70 Mountain Corridor, Vanessa and Francesca consulted with Jeff Peterson, CDOT Wildlife Program Manager. Jeff said it took several years to set up the existing CDOT Lynx In-lieu Fee Mitigation Fund and explained that mitigation dollars could remain unused in the fund for years before mitigation is constructed. With this information and given that it is unlikely that CDOT would use this fund for alternate crossing locations on future projects (i.e. this would be a one time or rare event), CDOT decided that it would be better to pursue alternate crossing project(s) concurrent with the Floyd Hill project rather than investing the time and effort in the creation of a fund for a one-time mitigation option.

Question: What if the mitigation funding doesn't line up? What if there is a surplus or not enough?

Answer: Clarifying the budget and identifying an actual substitute project would reduce the uncertainty about equivalent costs. CDOT's intention is to dedicate the same amount of money on Option B as would be required for Option A. This may result in more than one crossing being constructed.

Question: How would the new crossing or crossings be constructed? Would they be part of the Project or separate?

Answer: There are options to construct as part of the project with the same contractor or separately, but the funding and commitment would be part of this Project. The mitigation commitment would be included in the Project and would need to be completed before the Project could be closed out.

2) Property Purchases at the Top of Floyd Hill

The Colorado Attorney General advised against early discussions with property owners since the Project timing and right-of-way needs are uncertain. However, CDOT Right-of-Way staff provided information on the property values for discussion purposes. It could cost approximately \$7 to \$9 million to purchase

the four properties around the elk meadow. Purchasing these properties would reduce funds available for the construction of a crossing structure(s). Habitat availability and protection is an important consideration for wildlife crossing success; however, habitat protection alone does not mitigate for the wildlife barrier impacts associated with the project. Therefore, purchasing all four parcels has been eliminated from further consideration. However, purchasing 1-2 parcel(s) may still be an option combined with construction of a wildlife crossing structure in a different location along the corridor, depending on costs and the availability of funds.

Beaver Brook LIZ, Mitigation Option A: Floyd Hill Wildlife Overpass

Julia reminded the group of the location for Mitigation Option A, the proposed crossing (overpass) at the top of Floyd Hill. The current cost estimate for the crossing is \$17.6 million.

Julia provided information on surrounding land uses adjacent to the proposed crossing. On the north, there is a lot of protected land or low-density residential. Adam Springer, Clear Creek County, said that on the south side of I-70 in Clear Creek County there is potential for higher density commercial development but there are some water infrastructure constraints in this area.

Mitigation Option B: Alternative Wildlife Crossings Mitigation

Julia presented six alternative wildlife crossing locations on I-70 that were in the boundaries of CDOT Region 1 (see attached matrix). These locations were identified by reviewing previous recommendations (e.g., I-70 EcoLogical Study; 2014 Traffic and Revenue Study) and considering, for each location, biological value, wildlife-vehicle collision rates, land ownership and land use, construction feasibility and a cost estimate for constructing a crossing at that location. These costs are high-level estimates for comparative purposes and have not been formally reviewed, so these values are subject to change.

Julia noted that the 2003 rankings of each Linkage Interference Zone (LIZ) were included in the matrix for reference; however, these rankings were developed over 15 years ago and need to be viewed in the context of the ALIVE Committee's thinking at the time. Julia suggested the rankings weighted wildlife value more heavily than wildlife-vehicle collisions (WVCs). Alison agreed and explained that in 2003, the ALIVE Committee didn't think much could be done in the high WVC areas because there were multiple access points in those locations. Since 2003, however, crossings had been successfully implemented in these types of landscapes with access points through the fencing controlled with wildlife guards. Julia also suggested that Canada lynx reintroductions may have influenced the 2003 rankings. The species had recently been reintroduced in Colorado, and individual populations and animal movements were not well established. Alison confirmed that the rankings were geared toward lynx and explained that a breeding population of lynx has not established in this area despite earlier predictions.

Crossing Location 1 - Genesee

This location is within the Mt. Vernon LIZ and it has the highest rate of WVCs within the corridor. CPW has identified this location as an important wildlife crossing zone and CDOT has identified it as a WVC hot spot for safety improvements. The 2011 EcoLogical study documented elk, mule deer, and other species here.

The crossing would be an underpass situated near Mt Vernon creek through a large embankment.

Question: Would the crossing replace the culvert?

Answer: No. The culvert would not necessarily need to be replaced. There are examples of crossings above or adjacent to drainages that keep the existing drainage culverts in place. The riparian

corridor still attracts wildlife to the location.

A structure in this location could potentially be constructed entirely within CDOT right-of-way. Land on the south side of the interstate appears to be HOA open space. On the north side there is a vacant parcel that is for-sale-by-owner. If land in these areas could be protected it would be very beneficial to the wildlife in this area. Jefferson County zoning is not indicative of future development plans and a lot of land is zoned as “potential development” even where there are no immediate development plans or an area is already built out. If this location is selected, additional investigation would be needed to assess land use suitability.

Crossing Location 2 - Ruby Ranch

This location is within the Beaver Brook LIZ but outside of the Project area. A high rate of WVCs in this area have been reported to law enforcement. Mule deer is the primary target species, although other wildlife would also benefit. It would not serve the elk population at the top of Floyd Hill but elk could opportunistically use a crossing structure at this location.

The structure would be a wildlife underpass and it could potentially be constructed entirely within the existing CDOT right-of-way. There is a 30-foot-wide median between opposing traffic lanes. The surrounding zoning is primarily defined as ‘suburban rural’ with some parcels zoned for planned development. If this location is selected, additional investigation would be needed to assess land use suitability.

Crossing Location 3 - Soda Creek

This location is within the Beaver Brook LIZ and within the Project area. It would serve deer but is not expected to serve the elk herd at the top of Floyd Hill. There are two options for the crossing. The existing bridge could be lengthened, or a new bridge could be built at the creek crossing, which is approximately 300 feet east of the existing bridge. The existing bridge can function for wildlife passage but it is not ideal because it is a low-volume road. CPW has reported that some deer and other species cross under the roadway bridge. There is existing wildlife fencing on the north side of the interstate that will need to be replaced/extended as part of the Project whether or not a crossing structure is built.

Alison noted that Soda Creek is within potential Preble’s meadow jumping mouse (PMJM) habitat. Constructing a new riparian crossing could potentially improve PMJM habitat connectivity. **Follow-up: After the meeting, Francesca looked up PMJM habitat maps and determined that this location is not contiguous with PMJM occupied range. She also noted that no trapping has occurred at Soda Creek and determining PMJM presence would require further investigation.**

Question: What is the date range of the WVC data?

Answer: Julia will follow up. It is either 5 or 10 years; she will confirm and add the note in the matrix. **Follow-up response: the calculation of WVC crashes per mile per year is based on the most recent five years of available data, from 2014-2018.**

Crossing Location 4 - US 40

This location is within the Empire Junction LIZ on US 40. The target species for this location is bighorn sheep. It is a very important location for sheep movement and provides a genetic connection between two subpopulations of the large Georgetown herd, which is the largest in the state. CPW has identified this location as a high priority crossing area. It is recommended that a crossing at this location be designed to accommodate movement by other species as well as bighorn sheep.

There are private lands on the north and south sides of US 40 in this location. The north side is undevelopable due to steep slopes. Adam said the landowner on the south was originally planning on developing a quarry but that did not pan out and now he is interested in finding a new use for the property and may be willing to consider a conservation easement.

The cost of this crossing is less than the others because it would span a much narrower roadway footprint but there are constructability issues with rock cuts and blasting.

Question: What about the WVC area further south, along the I-70 westbound on-ramp? Would WVCs increase in this location if a wildlife crossing was constructed over US 40? Would the crossing result in more bighorn sheep movement to this area?

Answer: The specific issues with WVCs along the on-ramp to I-70 are unique to that location and are complicated because of the merge where drivers are looking over their left shoulders to enter the highway. The habitat and road salt attractants that result in bighorn WVC at the end of the on-ramp occur regardless of the proposed new crossing and would not be anticipated to increase.

The purpose of this proposed crossing would be to preserve east-west connections on the north side of I-70. This location is in the Empire Junction LIZ but does not address movement across I-70. Wildlife movement across I-70 and WVC impacts to bighorn and other wildlife would still need to be addressed and would be part of the future Empire Junction project.

Question: Could there be additional mitigation at the I-70 on-ramp hotspot as part of developing this crossing?

Answer: The Westbound Peak Period Shoulder Lane project added warning signs. The fence alignment that would be part of the overpass design may consider WVCs in this location.

Crossing Locations 5 and 6

These crossings are located on the western end of the Region 1 boundary, near the Eisenhower-Johnson Memorial Tunnels (EJMT) and are in the Bakerville LIZ. Lands on either side of the interstate are owned by the U.S. Forest Service (USFS) and managed as lynx Linkage Areas. This segment of I-70 was identified as a lynx crossing area because two lynx WVCs occurred here in the early 2000s. However, over the last 15 years lynx activity has remained low in this area.

There are important wetland areas (mapped fens) and boreal toad habitat in these locations. Julia pointed out that creating toad connectivity in this area is an option. Both locations were selected, in part, because they are situated between chain-up stations that have lighting and human activity, which are disruptive for wildlife.

There are a number of challenges to crossings in this location. First, the road grade is steep and would be challenging for building an overpass. Second, there will likely be future interstate improvements in these areas. Any structure built now would have a high probability of being rebuilt to accommodate future highway designs. Additionally, Aurelia Denasha, USFS, said that Loveland Ski Area is planning parking lot expansions and increased snow cat activity in these areas.

Alison asked if providing a crossing in this location would encourage goat population expansion, which would conflict with CPW's goal of reducing disease transmission. CPW's input will be requested to answer this question.

Wildlife Fencing in Project Area

Wildlife fencing from the top of Floyd Hill to east of Soda Creek Road is pertinent to both Mitigation

Options A and B. Julia reviewed the conceptual fencing layout for the Project. She noted that fence ends are often problematic and recommended tying the western extent of the fencing into the Highland Hills interchange. On the north side of I-70, fencing would be installed between US 40 and I-70 because there are multiple access points along US 40 which would diminish the effectiveness of the fencing. Wildlife guards would be needed at each access point but they are not impenetrable and their effectiveness is reduced by snow pack accumulation in the winter. While there is less wildlife activity from the north to south and WVCs have been less of an issue on US 40, WVCs that do occur on US 40 would not be addressed by this fence alignment.

Fencing is more challenging at the east end of the Project because of the steep slopes and guardrail. There is no room to install the fencing at the top of the hill along the north side of I-70 and fencing installed part-way down the slope would be subject to damage from plowed snow and other debris. There is existing fencing at the bottom of the slope on the north side; however, the fence end is open and animals can get around it. This will need to be addressed. On the south side of I-70, the fence end can tie into a rock feature on the cut slope east of Soda Creek Road.

Beaver Brook LIZ ALIVE Recommendations and Discussion

The attendees were asked whether they supported moving forward with Mitigation Option A or Option B.

Question: Are Option B locations more valuable for wildlife than the Option A location?

Answer: Potentially, because more than one crossing could be built and because several of the alternate crossing locations are expected to have a greater benefit for wildlife connectivity and reducing WVCs.

Question: Is it a good idea to fence the entire length of the Project without providing crossing opportunities?

Answer: We would not fence the entire length of the Project; just the area around the elk meadow at the top of Floyd Hill east to Soda Creek. This segment has the highest WVCs in the Project area.

Question: What is the value of Option A?

Answer: It would be used by the Floyd Hill elk herd and would have value in connecting the herd with habitat on the north of I-70. The migration patterns of the elk and deer herds in this area have already been disrupted by past development, so there is limited ecological or genetic benefit for the cost. However, Option A is the best way to address connectivity needs within the Project area.

There are tradeoffs with each consideration.

The group decided that Option B has greater potential and provided the following input:

- US 40 has the highest wildlife value for bighorn sheep
- The Genesee location is the only location where elk is the primary target species. While it doesn't serve the same herd on Floyd Hill, it does serve the same species.
- The Project Team is leaning toward Empire and Genesee as best options.
- The Empire location does not address the impacts of this Project because bighorn sheep movements are not being impacted. This is a problem with all the Option B alternatives. Mitigation is usually tied to project-specific impacts.

- The FHWA EcoLogical framework provides guidance to support putting mitigation in the best place even if it is outside of project boundaries.
- Option B sounds like a good idea, but we need to determine how to be equitable. There was some concern about mitigating outside of the county in which the impacts occur. Francesca noted that the Genesee location would improve safety for all drivers, including Clear Creek County residents.
- One benefit of Option A is that it would be very visible. Selecting Option B would eliminate that benefit. However, one potential downside to Option A is also that because of its visibility it may be subject to more criticism on account of its location in very residential and human-impacted landscape.
- CDOT will ensure the cost of the final mitigation package is the same as the cost of Option A.
- The Genesee and Ruby Ranch Road locations should be ranked higher than the Empire location. The Genesee location provides mitigation for the same species that would be impacted by the Project; the Ruby Ranch Road location is in the same LIZ as the Floyd Hill project area.
- Soda Creek should remain on the table because it is within the Project area and fencing would direct animals to this location. There is also potential for PMJM habitat improvements to be made at this location.
- The two Bakerville locations should be eliminated from further consideration. They are expensive, subject to a throwaway investment, and do not address project-specific impacts.

Based on the challenges associated with Mitigation Option A and the input provided for Mitigation Option B, the group decided to move forward with Option B. The next step for the ALIVE Committee will be to consider and rank the alternative crossing locations to determine the best allocation of mitigation funds.

Clear Creek LIZ

Wildlife Considerations

Julia reviewed the designs for the Tunnel Alternative (both North and South Frontage Road Design Options) and the Canyon Viaduct Alternative. For this LIZ, the opportunities for wildlife connectivity improvements are largely to improve east-west connectivity along the riparian corridor. Both alternatives are similar with respect to US 6. In general, the high I-70 bridges are not a concern. The concerns are primarily around the lower US 6 off-ramp onto I-70 eastbound and the I-70 westbound off-ramp onto US 6. The Canyon Viaduct Alternative would reconstruct the off-ramp, which might provide more opportunity for improved wildlife passage, but the existing bridges are tall (20 feet high), and even with the bridges remaining in place, there are opportunities to excavate under the eastern end spans and improve height and width of the passageway under the existing bridge.

The frontage road options have different impacts for wildlife. In general, the location of the frontage road north of Clear Creek is better for concentrating infrastructure. It is better for recreational purposes and better for wildlife as well. It might also be better for resiliency because there would be less riprap and more opportunity for creek improvements.

The group discussed potential issues with water quality and habitat/creek quality. There are concerns about the use of mag chloride and shading of the creek/riparian habitat. Mandy Whorton, Peak Consulting, noted that this is something the Stream and Wetland Ecological Enhancement Program (SWEEP) Committee will be addressing. Aurelia asked if the USFS was represented on SWEEP. Vanessa

said USFS was represented and she will follow up with Aurelia on who the current representative is.

The group indicated interest in how rock cuts may affect bighorn sheep habitat.

Next Steps

- Refine plans for Genesee, Ruby Ranch Road, Soda Creek, and Empire crossings.
- Refine cost estimates to determine equivalent mitigation to the Option A crossing at the top of Floyd Hill.
- Follow up with Jefferson County on land use and development plans for lands surrounding proposed crossings.
- Update the matrix to support the ALIVE committee in ranking the remaining crossing locations and determining how mitigation funds could be allocated. The updated matrix will include the Floyd Hill crossing for comparison purposes. It will also include the individual parcels that comprise the meadow-wetland complex at the top of Floyd Hill as well as the parcel for sale on the north side of the Genesee crossing location.

Attendees

Adam Springer (Clear Creek County); Stephanie Gibson and Melinda Urban (FHWA); Vanessa Henderson, Neil Ogden and Francesca Tordonato (CDOT); Alison Dean Michaels (USFWS); Aurelia DeNasha (USFS); Anthony Pisano and Carol Coates (Atkins); Julia Kintsch (ECO-resolutions); Mandy Whorton (Peak Consulting Group).

I-70 Mountain Corridor Region 1 Alternative Wildlife Crossing Locations

Revised March 10, 2020

Milepost	Location Name	LIZ Name	Crossing Type	Biological Value	2003 LIZ Rank*	WVC Crashes†	WVC Carcasses	Landownership & Land Use Considerations	Feasibility	High Level Cost Estimate††
254.5	Genesee	Mt. Vernon	Underpass at fill slope	<ul style="list-style-type: none"> Primary target species: Elk and mule deer. CPW identified highway crossing zone. Secondary target species: Black bear, mountain lion, fox, coyote, bobcat. Monitored location for the I-70 EcoLogical Study (2009-2010) detected elk, mule deer, coyote, fox, skunk. 	Low	Very High (3.4 WVC/mile/year)	<ul style="list-style-type: none"> WVC Carcass: High Location identified by CDOT Traffic & Safety as a WVC hotspot. 	<ul style="list-style-type: none"> Private ownership. Properties immediately adjacent to proposed structure location are undeveloped (possible to obtain conservation easements?), but residential development around the greater area. 	<ul style="list-style-type: none"> Location does not require a crossing over/under US 40, which runs farther north of this location. Offset structure to west side of drainage to shorten structure length. Possible Traffic & Safety funding. Future project is unlikely as I-70 is already 3 lanes in both directions through this segment. 	\$4.2M (bridge underpass)
250	Ruby Ranch Road	Beaver Brook	Underpass at fill slope	<ul style="list-style-type: none"> Primary target species: Mule deer & elk. CPW identified highway crossing zone. Secondary target species: Black bear, mountain lion, fox, coyote, bobcat. 	Low	High (2.8 WVC/mile/year)	<ul style="list-style-type: none"> WVC Carcass: Very high 	<ul style="list-style-type: none"> Private ownership with dispersed residential development 	<ul style="list-style-type: none"> Location is within the Beaver Brook LIZ. Location does not require a crossing over/under US 40, which runs farther north of this location. Steep fill on north side, but structure doesn't need to be at deepest part of fill. Consider how to grade north side approach or build trails into the slope leading to the structure. 30'-wide median between I-70 EB and WB lanes - could narrow median width to reduce structure length. Future project is unlikely as I-70 is already 3 lanes in both directions through this segment. 	\$4.2M (bridge underpass)
249	Soda Creek	Beaver Brook	Underpass at creek drainage	<ul style="list-style-type: none"> Primary target species: Mule deer Secondary target species: Elk, black bear, mountain lion, fox, coyote, bobcat. 	Low	High (2.8 WVC/mile/year)	<ul style="list-style-type: none"> WVC Carcass: Moderate (high within LIZ) 	<ul style="list-style-type: none"> Private ownership with dispersed residential development 	<ul style="list-style-type: none"> Creek is nearly 300' from the existing bridge Location is within the current project boundaries 	\$4.2M (bridge underpass)
US 40 MP 257.4	Empire	Empire Junction	Overpass just west of interchange spanning cliffs on N side to small cut slope on S side.	<ul style="list-style-type: none"> Primary target species: Bighorn sheep. Georgetown herd is the largest herd in CO. Location is important for genetic connectivity between 2 subpopulations. On US 40 (not I-70), but within the Empire Junction interchange area. This is the most important crossing site for bighorn along the corridor. Secondary target species: Canada lynx, black bear, mountain lion, mule deer, elk, moose, fox, coyote, bobcat. 	Medium	Low (0.4 WVC/mile/year)	<ul style="list-style-type: none"> WVC Carcass: Low Very high for bighorn sheep (Huwert 2015). 	<ul style="list-style-type: none"> Private. There is a willing landowner for a conservation easement on the south side (as of 2014). Nearby residences S & N sides of US 40 	<ul style="list-style-type: none"> A crossing structure at this location would need to accommodate future improvements around Empire Junction. US 40 has a narrower road footprint requiring a smaller crossing structure. Would require blasting/rock cut. 	\$3.1M (overpass)

I-70 Mountain Corridor Region 1 Alternative Wildlife Crossing Locations

Revised March 10, 2020

Milepost	Location Name	LIZ Name	Crossing Type	Biological Value	2003 LIZ Rank*	WVC Crashes†	WVC Carcasses	Landownership & Land Use Considerations	Feasibility	High Level Cost Estimate††
220.5	Kearney Gulch	Bakerville	Overpass (Traffic and Revenue Study recommends MP 220.5-220.7; east of rock cut, but then the creek is much closer to I-70; consider west of rock cut ~MP 220.3-4)	<ul style="list-style-type: none"> Primary target species: Canada lynx. Ivan (2012) notes that 39% of lynx I-70 crossings occurred between the EJMT and Bakerville; segment identified as high probability of lynx highway crossing by Squires et al. (2013). Linkage has lower intensity lynx movements primarily used for summer dispersal movement; there are no breeding pairs in this area. Secondary target species: bighorn sheep, black bear, mountain lion, mule deer, elk, moose, fox, coyote, bobcat, and boreal toad. Monitored location for the I-70 EcoLogical Study (2009-2010) at MP 221.8 detected bighorn sheep, elk, mule deer. 	High (Herman Gulch)	Low (0.5 WVC/mile/year)	<ul style="list-style-type: none"> WVC Carcass: Low Two lynx WVCs have been recorded in this segment around MP 217.3 & MP 221 in 2000 & 2005. Moderate for bighorn sheep (Huwert 2015). Increasing moose conflict. 	<ul style="list-style-type: none"> Arapahoe National Forest on both sides of I-70; Managed as USFS lynx linkage area Bike path adjacent to creek on south side. 	<ul style="list-style-type: none"> Good location between chain-up stations (i.e., smaller road footprint and less affected by lights and activity) Feasibility challenged by uneven grades north and south of I-70. Creek parallel on south side, but with enough room for overpass wildlife approach ramp. Sensitive wetlands along Clear Creek. Future projects in this segment are planned but details are unknown. Preferred alternative includes 6 lanes, WB auxiliary lane, and AGS. 	\$13.8M (overpass)
217.4	Dry Gulch	Bakerville	Overpass recommended. An underpass would be very long and less preferable for bighorn sheep and elk.	<ul style="list-style-type: none"> Primary target species: Canada lynx. Ivan (2012) notes that 39% of lynx I-70 crossings occurred between the EJMT and Bakerville; segment identified as high probability of lynx highway crossing by Squires et al. (2013). Linkage has lower intensity lynx movements primarily used for summer dispersal movement; there are no breeding pairs in this area. Secondary target species: bighorn sheep, black bear, mountain lion, mule deer, elk, moose, fox, coyote, bobcat, and boreal toad (breeding site on north side of I-70). Monitored location for the I-70 EcoLogical Study (2009-2010) at MP 217.2 detected elk, mule deer, coyote, fox. Bike path/recreation impacts on lynx/wildlife movement (year-round but low winter intensity) 	High (Herman Gulch)	Low (0.3 WVC/mile/year)	<ul style="list-style-type: none"> WVC Carcass: Moderately low Two lynx WVCs have been recorded in this segment around MP 217 & MP 221 in 2000 & 2005. Moderately low for bighorn sheep (Huwert 2015). Increasing moose conflict. 	<ul style="list-style-type: none"> Arapahoe National Forest on both sides of I-70; Managed as lynx linkage area. Bike path adjacent to creek on south side. 	<ul style="list-style-type: none"> Feasibility challenged by road grade (~4%); uneven grades north and south of I-70; and proximity to creek on south side. Sensitive wetlands along Clear Creek. Future projects in this segment are unknown. Preferred alternative includes 6 lanes with WB auxiliary lane and AGS. 	\$13.8M (overpass)

NOTES

*2003 LIZ rankings based on potential and existing wildlife value at time of assessment (i.e., present and past utilization as a movement corridor, adjacency to suitable habitat and potential improvement value).

†WVC crash rate calculations based on data from 2014-2018.

††High level cost estimates have not been formally reviewed and are subject to change.

ACRONYMS

- AGS = Advanced Guideway System
- CDOT = Colorado Department of Transportation
- CPW = Colorado Parks and Wildlife
- LIZ = linkage interference zone
- MP = milepost
- USFS = United States Forest Service
- WVC = wildlife-vehicle collisions



I-70 Floyd Hill to Veterans Memorial Tunnels

ATKINS
Member of the SNC-Lavalin Group

ALIVE Meeting

February 26, 2020



Introductions

- Name
- Position
- Agency/Company



Meeting Objectives

- Beaver Brook LIZ
 - In depth presentation of Mitigation Option B (Alternative)
 - Obtain consensus from the ALIVE Committee
- Clear Creek LIZ
 - Review and discuss wildlife considerations for Tunnel Alternative (North & South Frontage Road Options) and Canyon Viaduct Alternative
 - Obtain input about wildlife connectivity values for inclusion in the CSS Alternatives Matrix



Follow-up on Action Items from January ALIVE meeting

- ✓ Cost for proposed wildlife overpass
- ✓ Map zoning around proposed wildlife overpass on Floyd Hill
- ✓ Further define Mitigation Option B:
 - Determine how to set up a mitigation fund and outline parameters, timeline for development
 - Evaluate Soda Creek bridge location for potential wildlife crossing upgrade
 - Create list of potential alternative crossing locations on I-70 in R1
 - Reach out to landowners regarding potential and cost of purchase for the 4 parcels comprising the meadow-wetland complex
- ✓ Wildlife fence alignment, wildlife guards and escape ramps



I-70 Floyd Hill to Veterans Memorial Tunnels

Beaver Brook LIZ

Mitigation Option A – Overpass

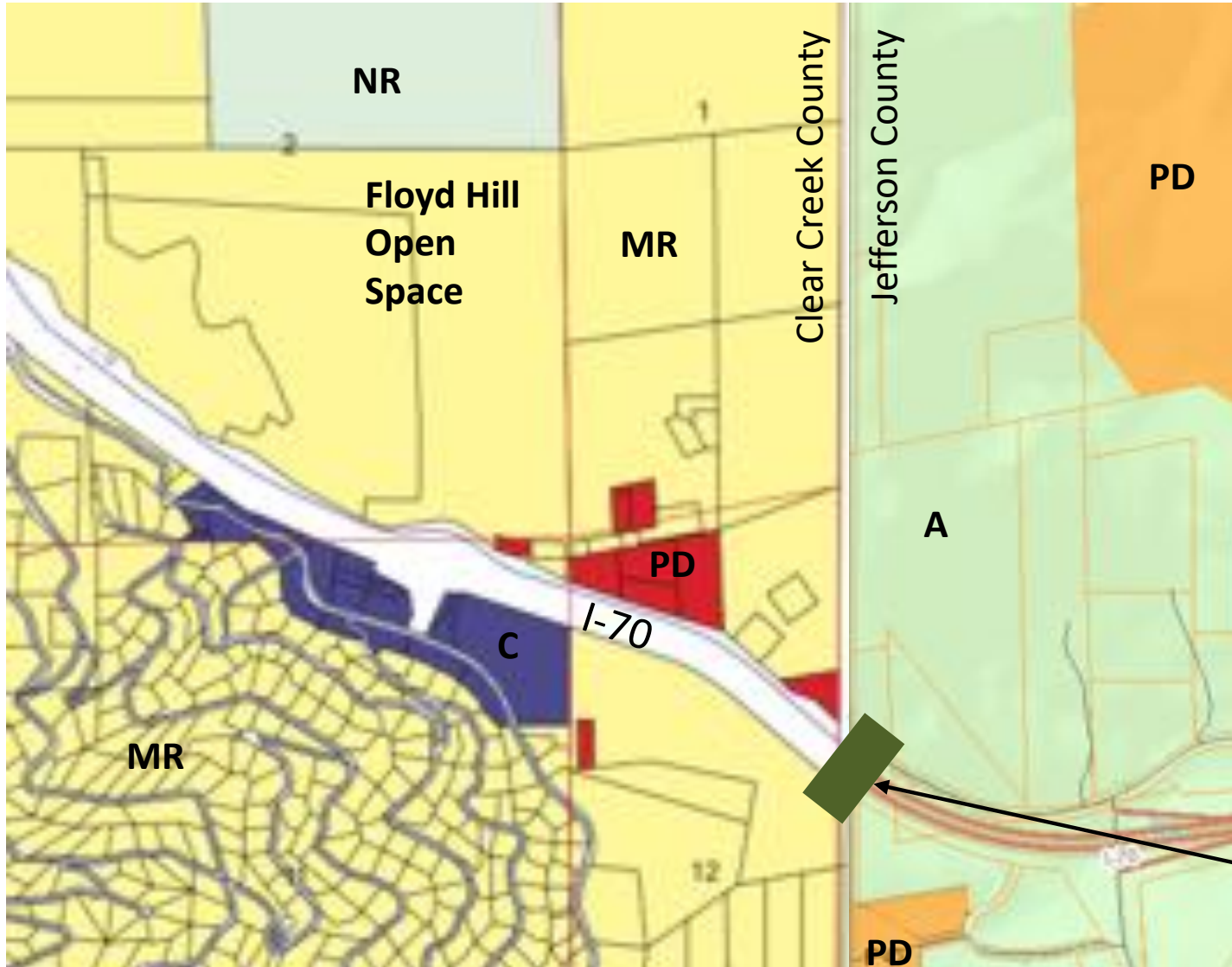




I-70 Floyd Hill to Veterans Memorial Tunnels

Beaver Brook LIZ

Mitigation Option A – Wildlife Overpass at the Top of Floyd Hill



Zoning

Clear Creek County

- C Commercial
- MR Mountain Residential
- NR Natural Resource Protection
- PD Planned Development

Jefferson County

- A Agricultural
- SR Suburban Rural
- PD Planned Development

Wildlife Overpass



Beaver Brook LIZ

Mitigation Option B

1. Select alternative location(s) for wildlife crossings mitigation on I-70 in Region 1
2. Fencing to reduce WVC at the top of Floyd Hill

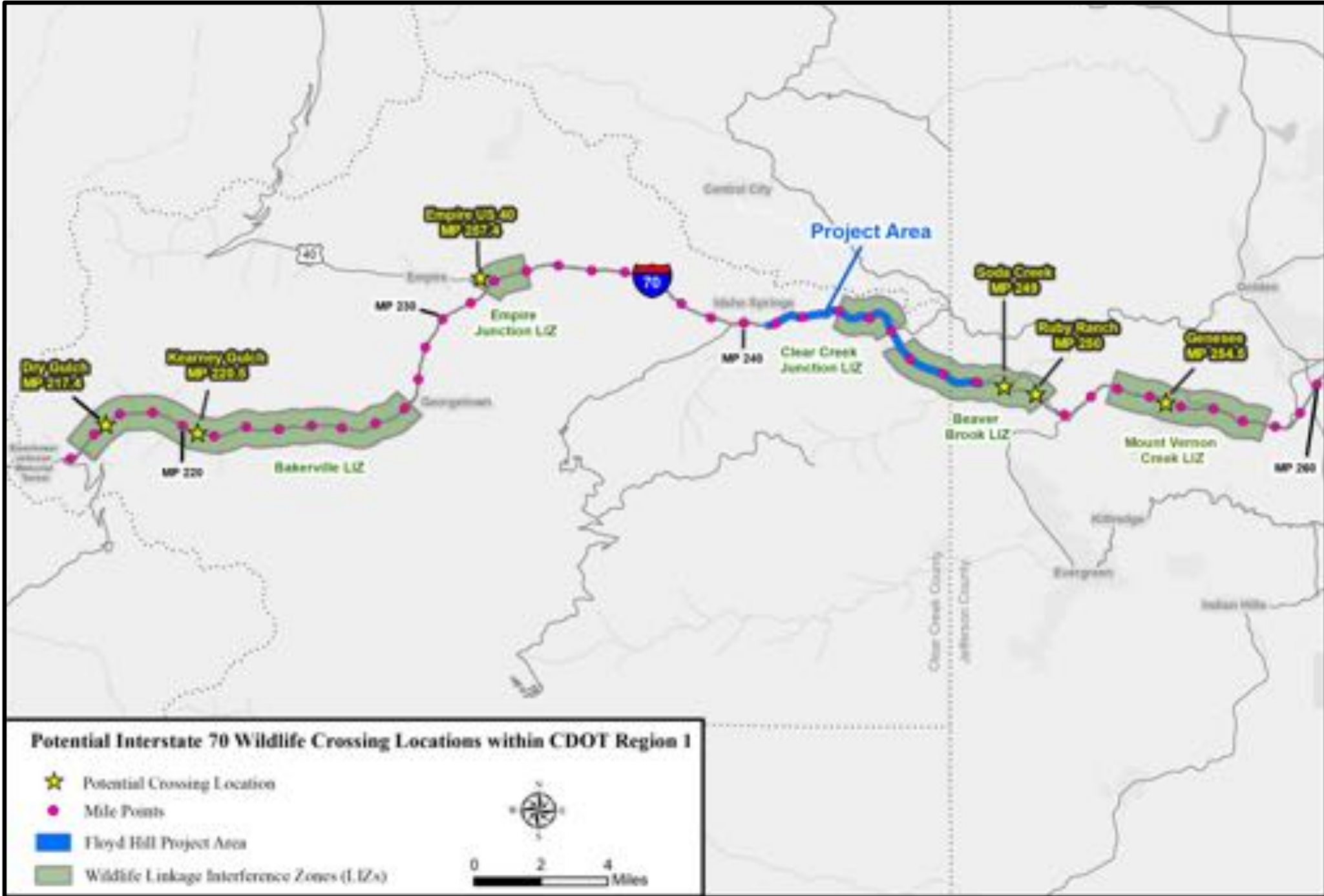


1. Alternative Wildlife Crossing Locations

- 12 locations reviewed; 6 selected for further consideration by ALIVE Committee (matrix)
- Consider:
 - Biological value
 - 2003 LIZ ranking
 - Safety (WVC crashes & carcass data)
 - Landownership & land use
 - Feasibility
 - High level cost estimate



I-70 Floyd Hill to Veterans Memorial Tunnels





MP 254.5 – Genesee

← 1 mile to Genesee Exit





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 254.5 – Genesee

Looking southwest

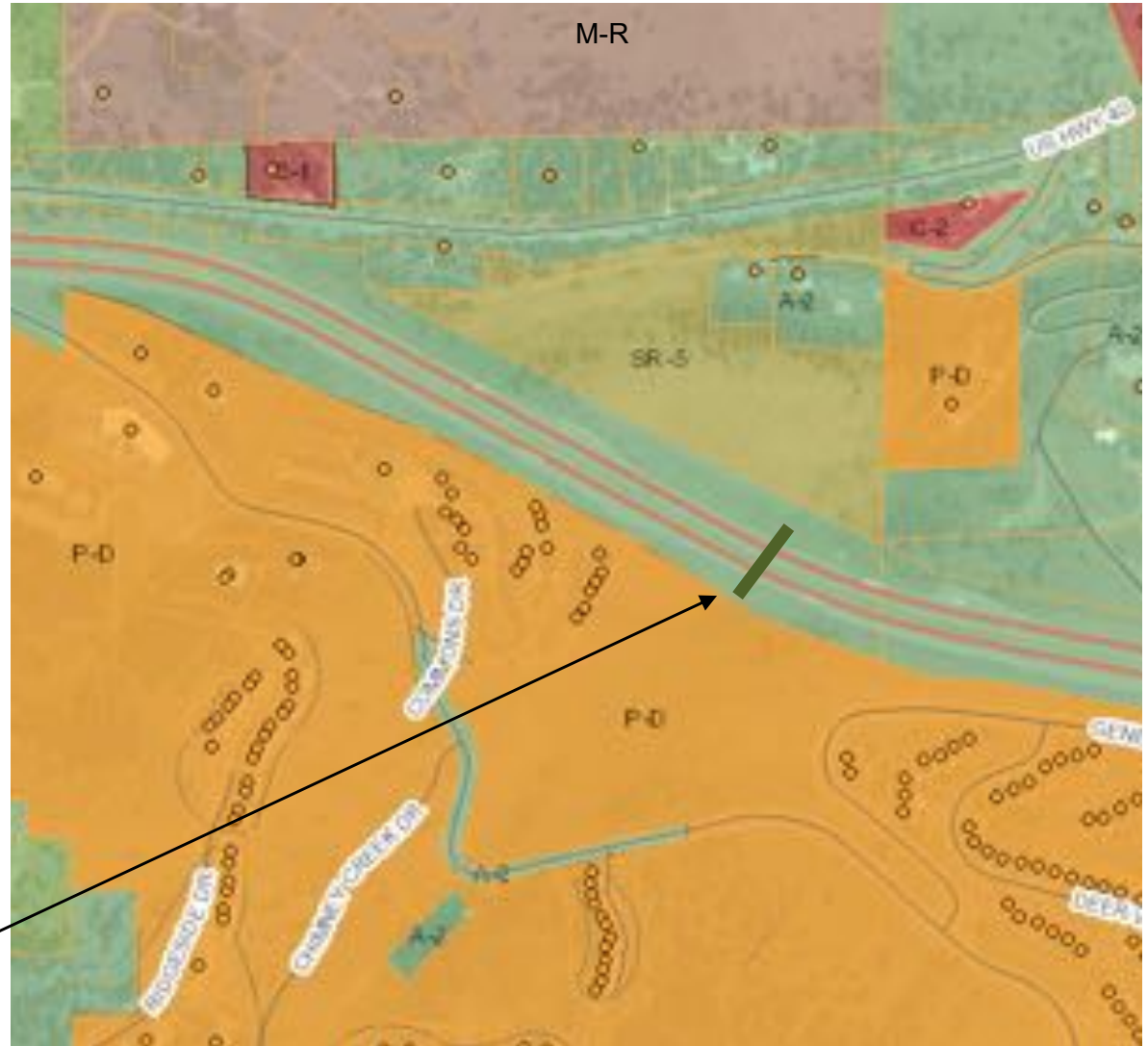




MP 254.5 – Genesee

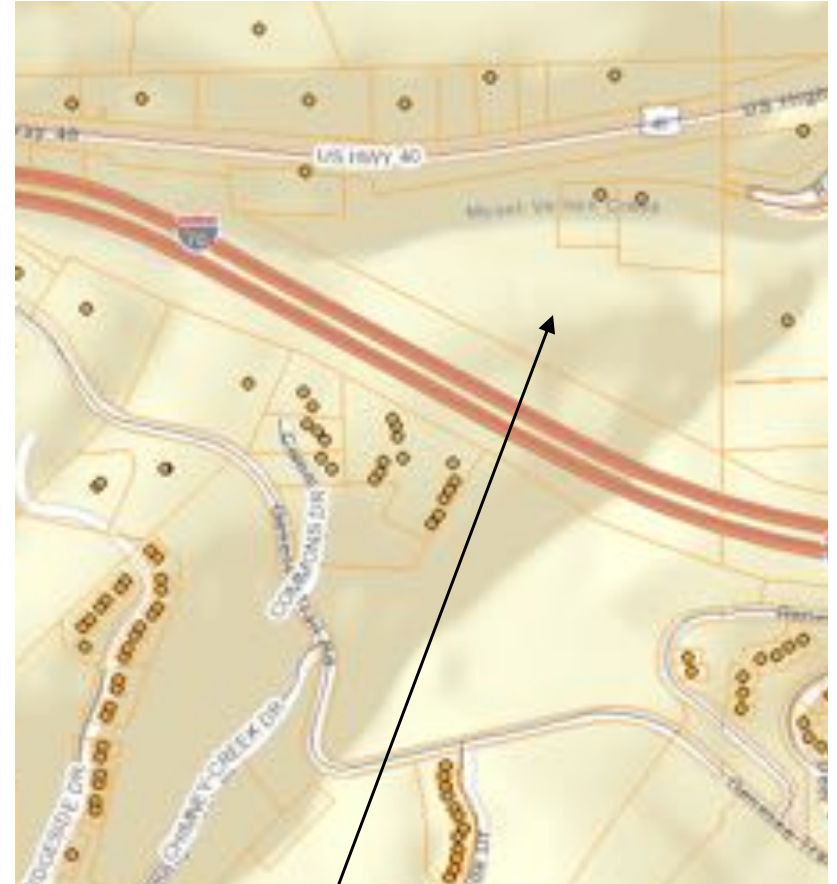
Legend

- A Agricultural
 - SR Suburban Rural
 - PD Planned Development
 - MR Mountain Residential
 - C Commercial
- Proposed Wildlife Underpass





MP 254.5 - Genesee



Vacant land for sale



MP 250 – Ruby Ranch Road



→
½ mile to
El Rancho Exit



MP 250 – Ruby Ranch Road





MP 250 – Ruby Ranch Road



Legend

A Agricultural

SR Suburban Rural

PD Planned
Development

C Commercial

Proposed Underpass



MP 249 – Soda Creek

Mule deer – winter
and overall range

Elk – resident &
winter range.

Resident elk likely to
adapt with fencing in
place; wintering elk
driven by need, e.g.,
winter severity or
human pressures

Mountain lion –
overall range





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 249 – Soda Creek

- Existing bridge is 137' wide; dirt road with riprap slopes
- Residence in front of south entrance



Would replacing this bridge with a larger structure appreciably increase wildlife passage under I-70?

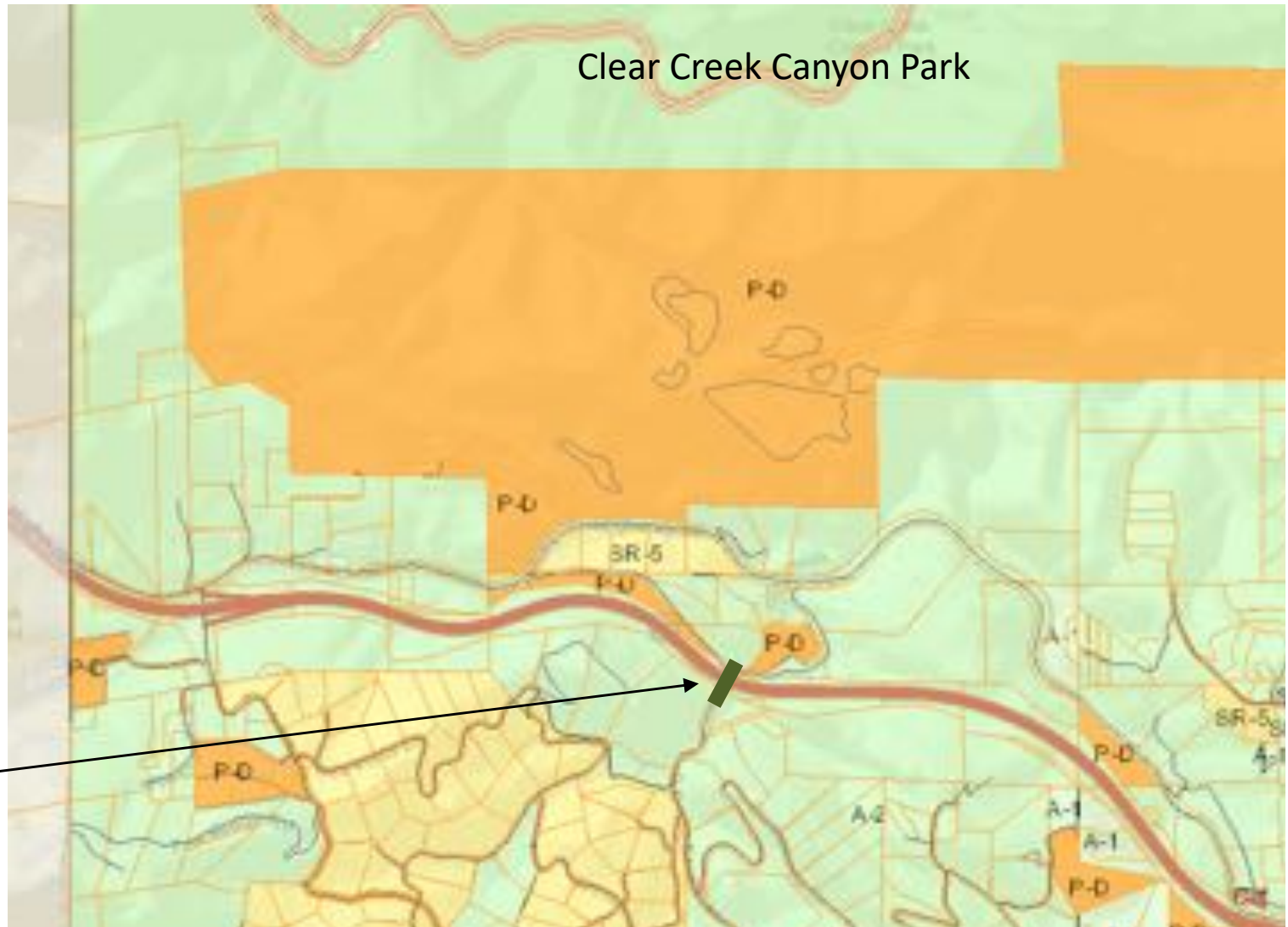


MP 249 – Soda Creek

Legend

- A Agricultural
- SR Suburban Rural
- PD Planned
Development

Soda Creek Bridge





I-70 Floyd Hill to Veterans Memorial Tunnels

US 40, MP 257.4 – Empire





I-70 Floyd Hill to Veterans Memorial Tunnels

ALIVE Meeting | February 26, 2020

US 40, MP 257.4 – Empire





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 220.5 – Kearney Gulch



→
½ mile to
Bakerville Exit



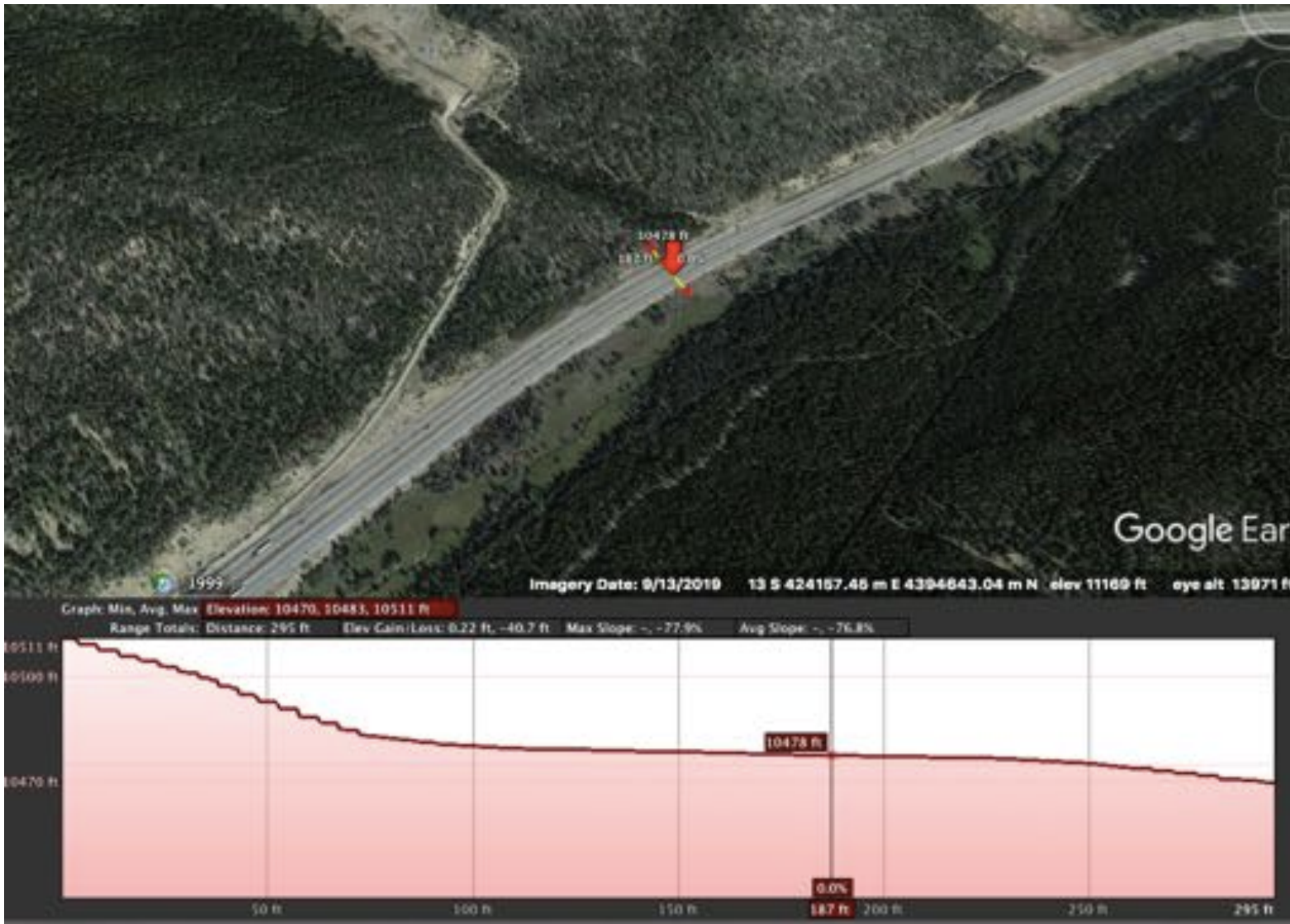
MP 220.5 – Kearney Gulch





I-70 Floyd Hill to Veterans Memorial Tunnels

MP 217.4 – Dry Gulch



→
Herman
Gulch

EJMT
←



I-70 Floyd Hill to Veterans Memorial Tunnels

MP 217.4 – Dry Gulch





2. Fencing to Reduce WVC at the top of Floyd Hill

- Install wildlife exclusion fencing along I-70 from the Floyd Hill exit to east of Soda Creek Road
 - 8 Escape Ramps
 - 1 Wildlife Guard on SH 65
 - Pedestrian Access Gates



Wildlife Fence End – Floyd Hill



2 Escape Ramps near west fence end



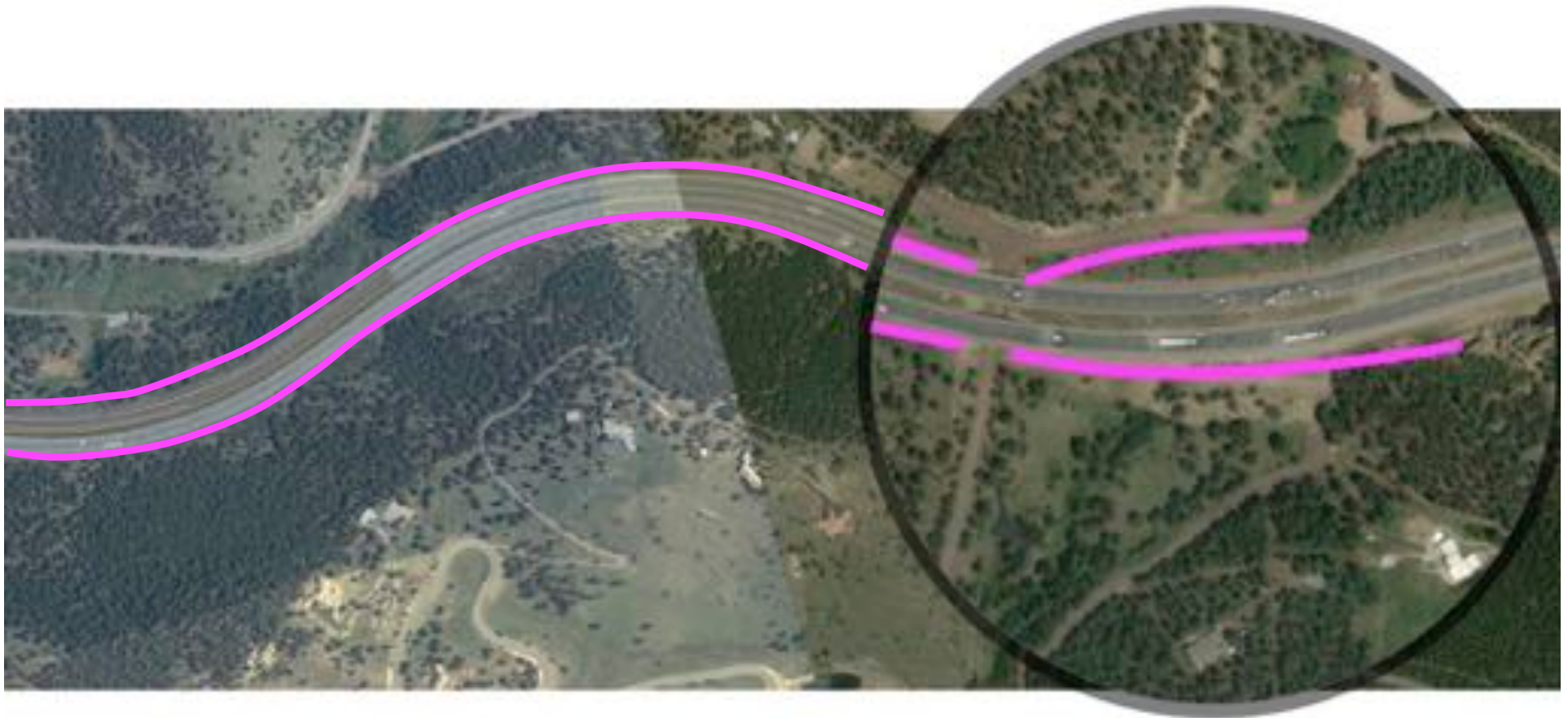
Wildlife Fence – Beaver Brook Interchange



4 Escape Ramps around interchange



Wildlife Fence End – Soda Creek



2 Escape Ramps near east fence end



East Fence End at Soda Creek





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ

Tunnel Alternative – North Frontage Road Design Option





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ

Tunnel Alternative – North Frontage Road Design Option



East Portal – Looking West (Figure 1)



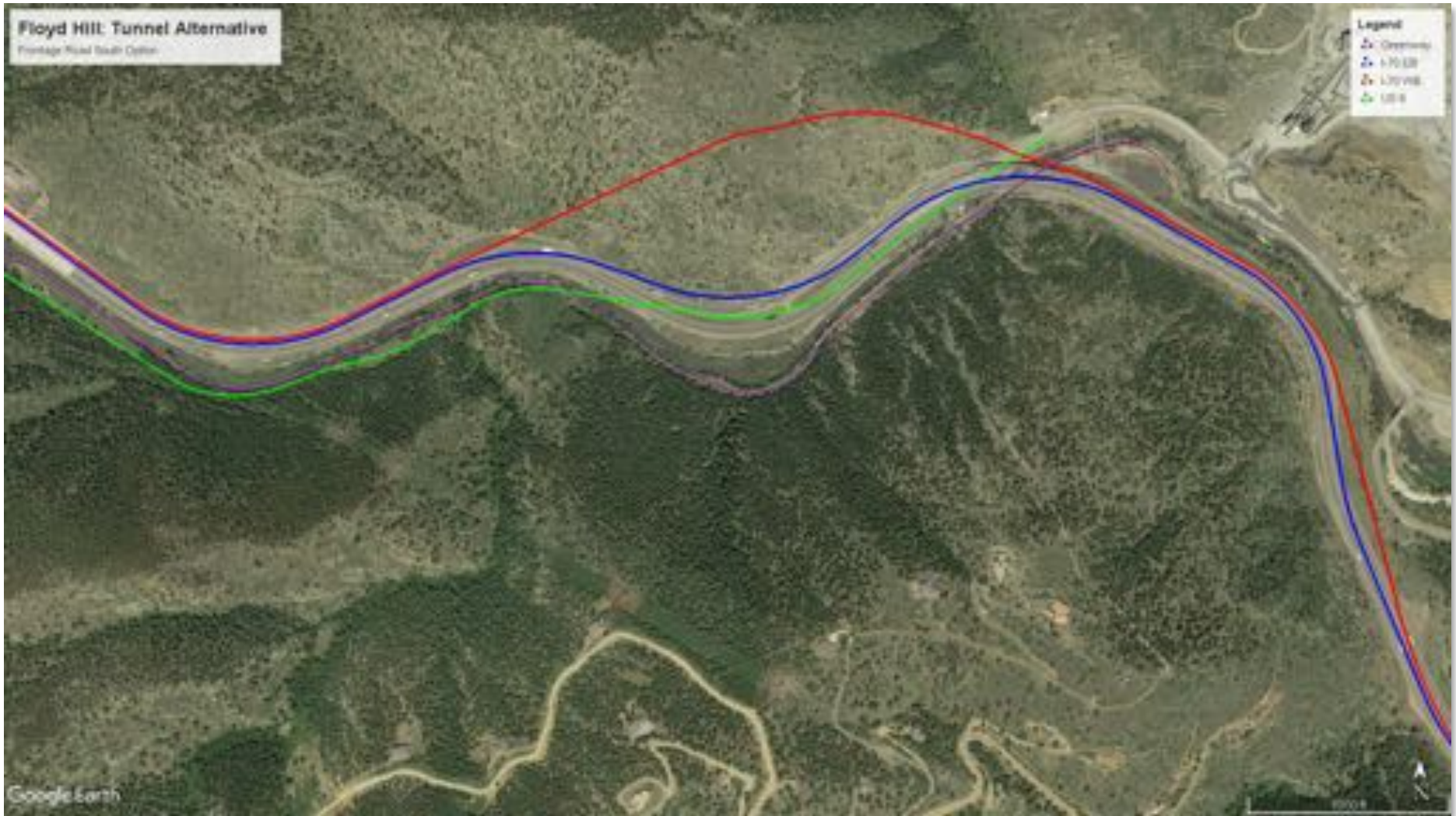
West Portal – Looking East (Figure 2)



I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ

Tunnel Alternative – South Frontage Road Design Option



Clear Creek LIZ

Tunnel Alternative – South Frontage Road Design Option



East Portal – Looking West (Figure 1)



West Portal – Looking East (Figure 3)



I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ Canyon Viaduct Alternative





I-70 Floyd Hill to Veterans Memorial Tunnels

Clear Creek LIZ Canyon Viaduct Alternative



East Portal – Looking West (Figure 4)



West Portal – Looking East (Figure 5)



I-70 Floyd Hill to Veterans Memorial Tunnels

Comparison of Alternatives

East Portal



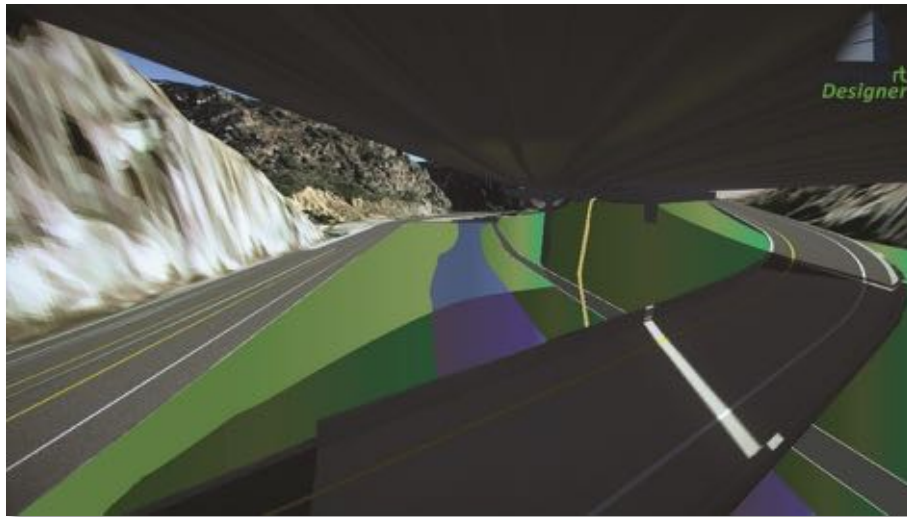
Canyon Viaduct Alternative (Figure 4)



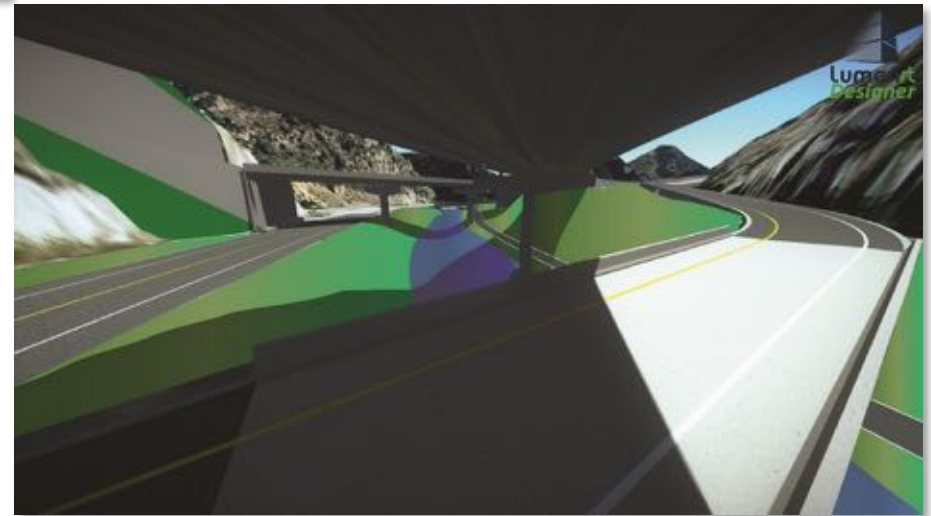
Tunnel Alt. – North and South Frontage Road Options (Figure 1)

Comparison of Alternatives

East Portal - Riparian



Canyon Viaduct Alternative (Figure 6)



Tunnel Alt. – North & South Frontage Road Options (Figure 7)



I-70 Floyd Hill to Veterans Memorial Tunnels

Comparison of Alternatives

West Portal



Canyon Viaduct Alternative (Figure 5)



Tunnel Alt. – North Frontage Road Option (Figure 2)

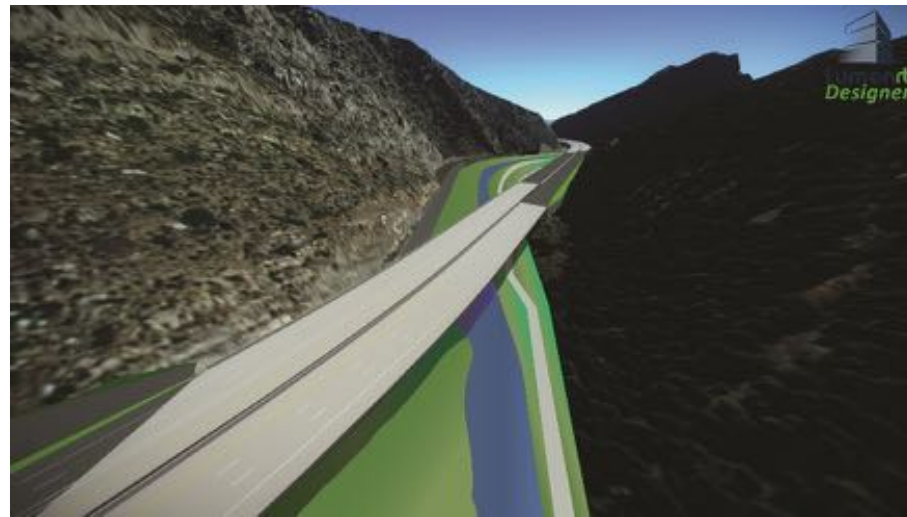


Tunnel Alt. – South Frontage Road Option (Figure 3) ³⁹

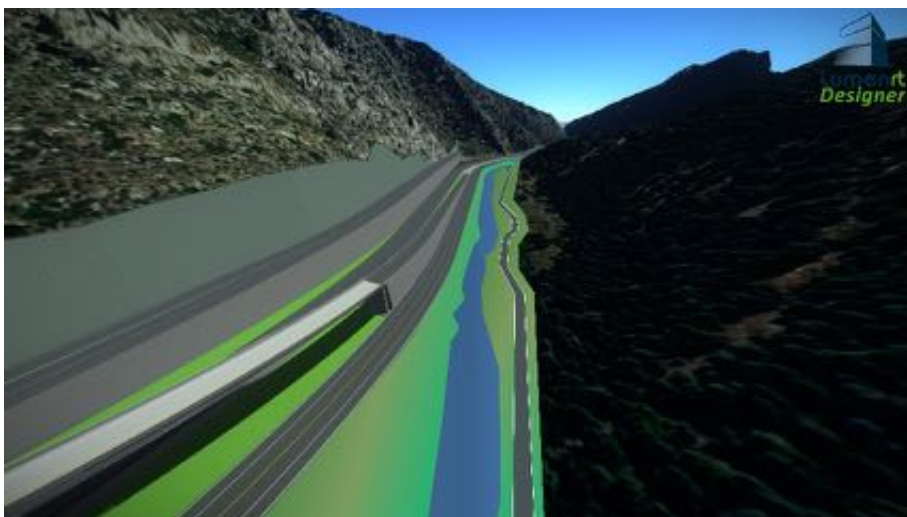


Comparison of Alternatives

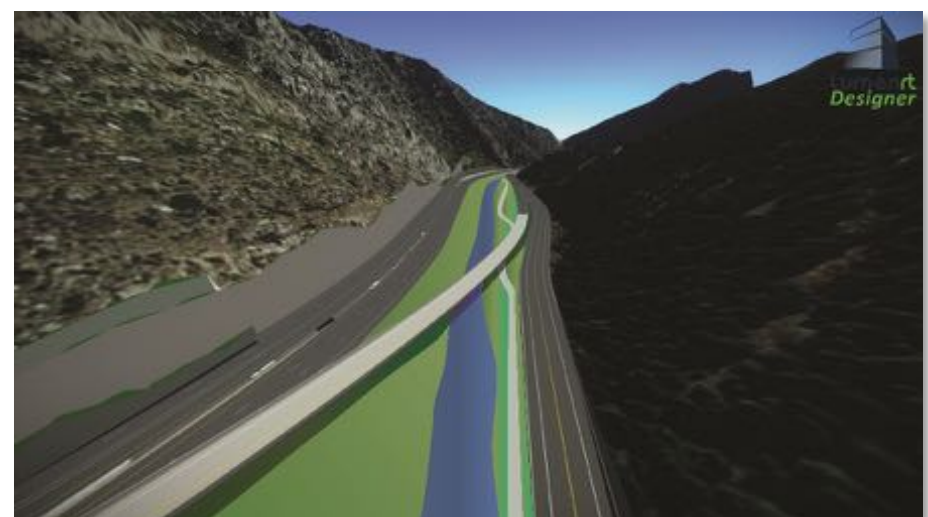
West Portal - Riparian



Canyon Viaduct Alternative (Figure 8)



Tunnel Alt. - North Frontage Road Option (Figure 9)



Tunnel Alt. - South Frontage Road Option (Figure 10)⁴⁰



Next Steps

- If pursuing Option A:
 - Refine preliminary design for Overpass
- If pursuing Option B:
 - Develop preliminary design for selected alternative wildlife crossing location(s)
- Follow up with ALIVE ITF in Spring 2020



Questions



3/18/2020- Floyd Hill ALIVE Follow-Up Discussion with CPW (Joe Walter) via Conference call- participants: Francesca Tordonato, Julia Kintsch, Joe Walter

The purpose of the conference call was to solicit comment and feedback on the Floyd Hill Project Wildlife Mitigation approach since CPW could not attend the last ALIVE meeting held on 2/26/2020.

Wildlife Mitigation Approach- Option A vs. Option B

CPW provided feedback that they are more in favor of mitigation Option B because it's a better use of funds (Joe's phrasing was "better bang for the buck").

Comments/Feedback on Alternative Mitigation Locations East of Floyd Hill

Joe was concerned about land use implications at the potential wildlife crossing locations east of Floyd Hill- his concern is that land owners may be upset about having elk funneled onto their property (similar to concern along SH 74). CDOT comment back to CPW- while there is private property and residences it is at a much lower density than along the SH 74 corridor (currently mostly large lot residential vs. higher density subdivisions on SH 74). The next ALIVE meeting will focus on soliciting detailed feedback on each of the alternative mitigation locations so they can be ranked.

US 40 Bighorn Sheep Overpass

CPW provided the same feedback consistent with previous comments- the potential US 40 wildlife overpass has high value for bighorn sheep from a genetic perspective as this is the location when the Dumont and Georgetown herds intersect. They would be in favor of increasing connectivity here to ensure long-term genetic diversity of the herd. Other bighorn sheep herds that are more isolated tend to be more susceptible to disease. Joe also said that the potential gravel quarry withdrew their application and that CPW was strongly against this quarry because of the impacts on wildlife. Joe mentioned that elk/deer mortality on I-70 doesn't really have an impact from a biological perspective in terms of herd size/health but bighorn sheep loss via wildlife vehicle collisions can have a much more pronounced population impact. Joe also thought engaging with the quarry owner or other landowners in the vicinity of the potential overpass to discuss habitat preservation via conservation easements or habitat protection would be worthwhile.

Wildlife Mitigation Options West of Georgetown

CDOT explained the challenges with the potential wildlife overpass locations west of Georgetown that were on the alternative mitigation location list. Joe mentioned that Kearney Gulch would be a better location among the western overpass locations because it has lower human use than Herman Gulch and there is more wildlife activity in the area. CPW is seeing more moose vehicle collisions in this area in the May/June timeframe between Bakerville and the Eisenhower Tunnel. They also have seen black bears hit in this area.

Regarding the comment about potential for increasing the mountain goat population expansion by building a wildlife overpass at these western locations- Joe didn't think that would be a big concern.



Floyd Hill - ALIVE ITF Meeting #6 Notes
May 19, 2020, 9 AM to 12 PM
Zoom Meeting

Welcome and Introductions

This meeting was held as an online, virtual meeting due to restrictions related to COVID-19. The meeting began with Julia Kintsch, ECO-resolutions, welcoming the group, which was followed by roundtable self-introductions. Kristin Salamack provided a longer introduction as the newest member of the ALIVE Committee, replacing Alison Deans Michael as the Colorado Department of Transportation (CDOT)/US Fish and Wildlife Service (USFWS) Liaison. A complete list of attendees is provided at the end of these notes.

Review of Decisions to Date and Follow-up on Action Items from February 2020 ALIVE meeting

At the February 2020 ALIVE meeting, the Committee determined that Mitigation Option B (alternative mitigation on the I-70 Mountain Corridor in Region 1) offered greater potential benefits in terms of wildlife connectivity and reducing wildlife-vehicle collisions (WVCs) than Mitigation Option A (an overpass at Floyd Hill). It was noted that Mitigation Option B also included wildlife fencing from the top of Floyd Hill to east of Soda Creek to reduce incidence of WVCs in this segment of the Beaver Brook Linkage Interference Zone (LIZ).

Action items from the February 2020 ALIVE meeting were discussed as part of the meeting and are included in these notes.

Beaver Brook LIZ Mitigation: Evaluation of Mitigation Alternatives in the I-70 Mountain Corridor Region 1

Julia provided an overview of the updated mitigation matrix, presented in three categories, each of which is discussed below: 1) Mitigation Option A, for comparison purposes; 2) Mitigation Option B, within project area mitigation; and 3) Mitigation Option B, outside of project area mitigation.

Kristin asked for background on the 2003 LIZ rankings. Julia provided a brief history of the origins of the ALIVE Committee and the initial identification of LIZs in 2003, and the subsequent refinement of LIZ segments as a part of the 2011 I-70 EcoLogical Study. **Follow-up: After the meeting, Julia sent Kristin the I-70 EcoLogical Report and the FHWA EcoLogical guidance document.**

1) Mitigation Option A, Floyd Hill Overpass (for comparison purposes):

The cost of the Floyd Hill overpass and associated partial acquisition of properties immediately adjacent to the overpass is estimated between \$15-20 million. The Floyd Hill project design and cost estimate is still evolving but this is the amount (\$15-20M) that is anticipated to be available for alternative wildlife mitigation.

Julia noted that while high level cost estimates were being presented for context for each of the mitigation sites, the ranking of mitigation options should be based on biological and safety values rather than cost.

2) Mitigation Option B: Mitigation Within Project Area

Mitigation locations within the project area include habitat protection of the meadow-wetland complex at the top of Floyd Hill on the south side of I-70, and a wildlife underpass at Soda Creek.

- a) **MP 247: Floyd Hill Habitat Protection.** The meadow-wetland complex is comprised of four privately owned parcels, which, for discussion purposes, have been labeled parcels 1, 2, 3 and 4.
- b) **MP 249: Soda Creek Wildlife Underpass.** There are existing eastbound and westbound bridges at this location for Soda Creek Road, a low volume dirt road used for local, residential access. This mitigation option would construct a new, dedicated wildlife underpass east of the roadway bridge, spanning the Soda Creek drainage. Joe Walter, Colorado Parks and Wildlife (CPW), noted that CPW had a trail camera at the roadway crossing from February through April 2018, which documented mostly deer and some fox using the road bridge to cross under I-70. Joe has also observed turkeys and elk tracks beneath the bridge.

As a follow-up from the February 2020 meeting regarding the potential for Preble's Meadow Jumping Mouse (PMJM) habitat along Soda Creek, Francesca Tordonato, CDOT, reviewed habitat maps and reported that the Soda Creek drainage is not contiguous with the occupied range. She noted that no trapping has occurred in the Soda Creek drainage and determining the presence of PMJM (USFWS threatened, Tier 1, Species of Greatest Conservation Need) in this area would require further investigation.

Question: Chelsea Beebe, Jefferson County, asked whether there are opportunities to improve the Soda Creek Road bridge to enhance its functionality as a multi-use wildlife crossing?

Answer: Julia replied that large and medium-sized mammals in this area are generalist species (e.g., mule deer, elk, black bear, coyote, bobcat, fox). Existing conditions at the Soda Creek bridge are adequate for these species to use the road bridge as a crossing under I-70, and the frequency of use is expected to increase with the installation of wildlife fencing along this segment, which will help to guide animals to this location. Conditions at the road bridge could be enhanced for small mammal passage with the addition of woody debris along the sides of the roadway at the base of the riprap slopes to provide cover for smaller prey species. Such an action would require coordination with the Jefferson County Roads Department.

Question: Is directing animals to use a roadway crossing under I-70 a good idea? Would it increase WVCs, especially if traffic volumes increase on Soda Creek Road?

Answer: Soda Creek Road is a very low volume road with low traffic speeds, particularly around the intersection immediately north of the roadway bridge. Given local land use and zoning, it is highly unlikely that traffic volumes or traffic speeds will increase in the future. Joe stated that he was not aware of any WVCs on Soda Creek Road (although this segment of I-70 is a WVC hotspot).

3) Mitigation Option B: Mitigation Outside of Project Area

Design concepts and high-level cost estimates were presented for five locations in CDOT Region 1 of the I-70 Mountain Corridor:

- a) **MP 254.5: Genesee Wildlife Underpass and Habitat Protection.** The concept for this location is two bridge underpasses beneath the opposing traffic lanes with an open median. The dimensions of the crossing from the perspective of wildlife passing beneath is 16' high by 100' wide by 130' long. The estimated cost for this underpass is between \$4.5-5.5 million. The property adjacent to the crossing structure on the south side of I-70 is owned by Genesee Village Homeowner's Association (HOA) and is managed as open space. On the north side of I-70 there is a 17-acre vacant land parcel that is currently for sale. Julia recommended protecting this parcel be considered in conjunction with a wildlife underpass at this location.

- b) **MP 250: Ruby Ranch Wildlife Underpass and Habitat Protection.** This proposed wildlife crossing is located in a large fill slope west of the I-70 El Rancho (Evergreen) eastbound exit. The concept, dimensions, and cost estimate for this location are the same as the Genesee location. This location is also surrounded by private lands. Julia identified three partial parcels adjacent to the wildlife crossing (excluding the portions of each parcel with a residence) that could be considered for acquisition in conjunction with the construction of a wildlife underpass. None of the parcels are currently for sale and the landowners' willingness to sell is unknown. Julia noted that while land acquisition could be considered, due to the land use and zoning in this area and the width of the CDOT right-of-way, that acquisition of these partial parcels is not essential either for the long-term functionality of the wildlife crossing or to construct the crossing, which could be built entirely within the right-of-way.

Question: Vanessa Henderson, CDOT, asked whether the steep embankments would limit wildlife access to the underpass, particularly on the north side of the underpass?

Answer: Julia said that wildlife learn where crossings are located, and game trails could be constructed on the slope to help direct animals to the crossing. Stephanie Gibson, Federal Highway Administration (FHWA), noted that the North Underpass on State Highway 9 in Grand County also has a steep approach and poor visibility from the west entrance. Julia commented that despite this feature, deer, elk and a number of other species have regularly crossed through the underpass.

Question: Chelsea asked whether traffic on US 40 to the north of this location would present a conflict?

Answer: Joe commented that traffic volumes are very low on this section of US 40, and Amy Saxton, Clear Creek County, confirmed that traffic along this segment is primarily for residential access into this area, which is characterized by low density development. Julia said that if a wildlife crossing was constructed on I-70 at this location, complementary mitigation could be implemented on US 40, such as roadside vegetation clearing to improve driver visibility and targeted signage to alert drivers.

- c) **US 40, MP 257.4: Empire Wildlife Overpass.** The concept for this location is an arch overpass spanning US 40. The width of the overpass for wildlife crossing is 100 feet. The estimated cost for this overpass is between \$3-4 million. While the target species for the overpass is bighorn sheep, elk and other wildlife are also present in the area, and the overpass would be designed as a multi-species crossing. The parcel immediately south of this location that was previously proposed (and rejected) for a quarry. The Mountain Areas Land Trust (MALT) is now in conversations with the landowner regarding putting a conservation easement on the property. Francesca and Joe, who had a phone meeting with MALT representatives in the last week, reported that landowner is supportive, and MALT has applied for a grant to CPW's Habitat Stamp Program to purchase the conservation easement. Joe reported that other landowners on both the south and north sides of US 40 around the proposed overpass may also be interested in putting easements on their properties.
- d) **MP 220.5 and MP 217.4: Kearney Gulch Wildlife Overpass and Dry Gulch Wildlife Overpass.** These two potential crossing locations were discussed together. The primary target species for both of these crossing locations is Canada lynx. At the February meeting, the group had noted that future improvements in this segment are likely but, as of yet, undetermined. Consequently, wildlife mitigation at either of these locations could result in throw-away costs. In addition, a future transportation project in this area would require additional wildlife mitigation. Joe commented that when wildlife mitigation is pursued in this area, that the Kearney Gulch location should be prioritized over Dry Gulch because it is less impacted by

recreation activities and it is farther from the land bridge over the Eisenhower-Johnson Memorial Tunnels.

Question: Kristin asked if there have been any recent Canada lynx studies?

Answer: Joe replied that CPW has not conducted any lynx studies since 2016.

Question: Kristin asked if there are any projects that would come later in this segment?

Answer: Vanessa replied that both the Maximum Program and Advanced Guideway System (AGS) are planned in this area but the timing of these projects is unknown. If either is implemented, wildlife mitigation would be included with those projects in accordance with the ALIVE MOU.

Discussion and Prioritization of Mitigation Options

Mandy Whorton, Peak Consulting Group, conducted a Zoom poll to get an initial assessment of the group's preferences and to kick off the discussion about ranking each of the locations. Each meeting participant was asked to select their top 3 locations. The poll results were as follows:

- 70% identified Genesee and 30% identified Empire as their top location;
- 60% identified Empire, 30% identified Genesee, and 10% identified Ruby Ranch as their second location;
- 50% identified Ruby Ranch, 40% identified Soda Creek, and 10% identified Empire as their third location.

The group then discussed their rankings and that factors that influenced their initial prioritizations. These notes, along with previous discussion points about each of the locations, are captured in the ranking table below.

Julia noted that this ranking will guide decision-making for determining equivalent Floyd Hill project mitigation and may also be used to help inform future mitigation projects in the Mountain Corridor in Region 1.

I-70 Mountain Corridor - Mitigation Locations Ranking

General Notes

- All crossings would include fencing (about 1 mile in each direction)

Mitigation Option	Ranking Notes	RANK
Genesee	<ul style="list-style-type: none"> Confirmed that south parcel is HOA-owned open space (won't be developed) Wouldn't want to pursue habitat parcel alone (without the crossing) but if a crossing were developed, the "for sale" parcel could be a good opportunity to improve the long-term success of the crossing, and we know the landowner is willing since it is for sale <ul style="list-style-type: none"> The acquisition of parcel or other long-term conservation agreement is important and recommended in addition to the crossing; agreement that it should be a package component since the opportunity is there now. One of the highest WVC areas on the corridor Locations is on I-70 with high recorded WVCs Supplementary mitigation funding may be available through CODT Traffic and Safety, which has identified this segment as a WVC problem area (could potentially leverage safety funding) 	1
US 40 Empire	<ul style="list-style-type: none"> Long-time priority for CPW (genetic connectivity of herds) and herd protection (high mortality in winter/early Spring) Landowner of property adjacent to crossing location on south side has applied for a CPW grant for a conservation easement and other adjacent property owners may also be interested in potential conservation easements, so there is excellent potential for habitat protection around crossing High biological value for Georgetown bighorn sheep herd Not on I-70 but within the LIZ and would improve connectivity within the Mountain Corridor Does not address project impacts; nor does it target elk or deer (target species in the Beaver Brook LIZ), although the crossing would be designed for multi-species use High species diversity of anticipated use 	2
Ruby Ranch	<ul style="list-style-type: none"> Habitat protection: would not recommend full acquisition of parcels but just the undeveloped portions without any buildings (parcels are 5-6 acres); Current zoning would not allow additional development so land acquisition may have less value 	3

	<ul style="list-style-type: none"> ○ Land acquisition is not recommended because the land is already unlikely/unable to be further developed; may want to discuss with land owners but habitat is likely to be maintained anyway (without acquisition) ○ Landowner of large parcel on north side of US 40 could be subdivided, but there are currently no plans for development; if developed, it would be very low density. • Site considerations may make this location potentially less effective and/or require additional considerations: <ul style="list-style-type: none"> ○ Steep north embankment. Would it be hard for animals to find the crossing? Deer, which are the target species in this area, are adaptable and would quickly learn to use the crossing. Elk and other species are expected to learn to use it over time. ○ US 40 conflicts. In this location, US 40 has very low traffic volumes (most traffic is on I-70 in this location) so generally not an issue; may need signage to alert US 40 drivers if crossing is implemented. • Ruby Ranch is a higher priority than Soda Creek because it would be a new crossing location since Soda Creek already has a crossing opportunity at the roadway bridge 	
Soda Creek	<ul style="list-style-type: none"> • Area of high WVCs. Fencing already included in the Project mitigation is expected to be effective in reducing WVCs and directing wildlife to the roadway bridge <ul style="list-style-type: none"> ○ Soda Creek is already planned to be fenced; a separate structure in addition to the road underpass is less of a priority since a crossing opportunity already exists in this location ○ Species potentially using this crossing are generalist species that will likely use the low-volume road crossing without additional enhancements ○ Some cover might be beneficial to smaller species ○ Because this is a dry crossing (not associated with a drainage) with a dirt/gravel surface, benches or other enhancements are not needed ○ CDOT Bridge may be sensitive to embankment or slope changes to retrofit for wildlife use • A dedicated wildlife crossing would provide more value than current road crossing <ul style="list-style-type: none"> ○ Could potentially be something that elk herd at Beaver Brook might find and use once fencing is constructed from Floyd Hill to Soda Creek ○ Providing a new crossing designed for wildlife is a better solution than funneling animals to use a road crossing (although the road is low volume) ○ Residences close to Soda Creek may complicate land use around a new crossing at the creek • Some wildlife activity observed by CPW under the roadway bridge <ul style="list-style-type: none"> ○ Animals are using the crossing now, and the fencing will help direct them to it ○ Trail camera under the bridge 2018 captured mostly deer, who used the middle of the road; some foxes on camera and evidence of elk (tracks) and observation of turkeys 	<p>New crossing is a lower “next” priority</p> <p>Including cover for small fauna at the existing roadway is a priority</p>

	<ul style="list-style-type: none"> • PMJM potential <ul style="list-style-type: none"> ○ Habitat does not appear to be contiguous or high value based on data and map review ○ Field investigation would be needed to definitively determine presence of PMJM 	
Floyd Hill (habitat protection)	<ul style="list-style-type: none"> • Four parcels identified with habitat value and are currently home to a large elk herd. <ul style="list-style-type: none"> ○ Parcels may or may not be able to be acquired; unknown if land owners would be interested in selling ○ Some parcels may be protected by land owners (Frei's purchase of parcel 1) or development restrictions (wetlands on parcel 3) ○ May want to discuss conservation opportunities for parcel 1 since it seems the Freis may be interested in protection ○ Parcel 4 is slated for high-density development and remains a concern for habitat protection ○ Of the parcels under consideration, priorities, if land acquisition were pursued, would be 2 and 4 because those are most at risk; parcel 3 may be more available due to the presence of wetlands and lack of development potential ○ Could develop partnerships with land owners or land trusts/NGOs to pursue land conservation for these parcels • Habitat protection is valuable but not as valuable without a crossing, and the other locations represent new crossings and more appropriate for connectivity mitigation across I-70 in line with ALIVE MOU 	<p>Lower "next" priority</p> <p>Pursuing partnership (e.g., Mountain Areas Land Trust) discussions is a priority</p>
Kearney Gulch	<ul style="list-style-type: none"> • High biological value • Could be included in future project but timing is unknown • High cost structures that could be throw-away • Compared to Dry Gulch, this may be a better location given the high recreation use at Dry Gulch and location farther from EJMT, which already provides some crossing opportunity 	<p>Lower priority for Project mitigation than Floyd Hill and Soda Creek</p>
Dry Gulch	<ul style="list-style-type: none"> • High biological value • Could be included in future project but timing is unknown • High cost structures that could be throw-away 	<p>Lowest priority for Project mitigation</p>

Next Steps

- Document ALIVE agreements in the Wildlife Mitigation Technical Report, which will be included as an appendix to the Environmental Report for the Environmental Assessment (EA).
- Incorporate wildlife mitigation commitments into the EA mitigation.
- Reconvene the ALIVE Committee during final design of the wildlife crossings once construction funding is identified.

Attendees

Amy Saxton (Clear Creek County); Stephanie Gibson and Melinda Urban (FHWA); Vanessa Henderson, Neil Ogden and Francesca Tordonato (CDOT); Kristin Salamack (USFWS); Aurelia DeNasha (USFS); Joe Walter (CPW); Chelsea Beebe (Jefferson County); Anthony Pisano and Carol Coates (Atkins); Julia Kintsch (ECO-resolutions); Mandy Whorton (Peak Consulting Group).

Agenda



Project: I-70 Floyd Hill to VMT
Meeting: ALIVE Meeting #6
Date: May 19, 2020, 9:00am-12:00pm
Location: Zoom meeting
<https://zoom.us/j/93456111310?pwd=RnZVWDRHMEYzR3dwREFY2cFRXTFBHZz09>
Meeting ID: 934 5611 1310
Password: 471960

Meeting Objective:

- Obtain ALIVE Committee recommendation on which combination of mitigation options in the mitigation matrix to pursue as mitigation for the Floyd Hill project

Agenda:

- 1) Welcome / Introductions
- 2) Follow-up on Action Items from February ALIVE Meeting
- 3) Beaver Brook LIZ: I-70 Mountain Corridor Region 1 Evaluation of Mitigation Options
 - a) Mitigation Option A: Floyd Hill overpass (for comparison purposes)
 - b) Mitigation Option B:
 - i) Mitigation within project area
 - ii) Mitigation outside of project area
 - c) Discussion and prioritization of mitigation options
 - i) Short list of mitigation options for Beaver Brook LIZ mitigation
- 4) Next Steps / Action Items

Milepost	Location Name	LIZ Name	Crossing Type or Habitat Protection	Biological Value & Considerations	2003 LIZ Rank*	WVC Crashes†	WVC Carcasses	Landownership & Land Use Considerations	Feasibility	High Level Cost Estimate††	ALIVE Rank
MITIGATION OPTION A (FOR COMPARISON PURPOSES ONLY)											
247.2	Floyd Hill	Beaver Brook	Overpass (storage units location) + partial acquisition of property adjacent to overpass	<ul style="list-style-type: none"> • Primary target species: Elk and mule deer. Resident elk commonly use the meadow on the south side of I-70 • Location addresses connectivity within the Beaver Brook LIZ and the Floyd Hill project area • Overpass construction impacts to wetlands 	Low	• High (2.9 WVC/mile/year)	• WVC Carcass: High (2.3 WVC/mile/year)	<ul style="list-style-type: none"> • Extensive dispersed residential development and a proposed 400 unit development immediately on south side. Concern that wildlife use of the overpass will become restricted by potential future development and recreation north and south of I-70 • Open space and undeveloped parcels to north • Human use possible 	<ul style="list-style-type: none"> • Very complex human landscape renders this area unfavorable for a large investment in wildlife crossings infrastructure • Wildlife crossings with fencing are the most effective mitigation method for reducing WVC • Construction is complicated by multiple factors: Bridge over eastbound and westbound I-70 and US 40; Bridge must be 'oversized' to maintain flexibility for future operations; and will likely require short-term closures on I-70 & US 40 	\$15-20M	n/a
MITIGATION OPTION B: WITHIN PROJECT AREA											
247	Floyd Hill - Parcel 1	Floyd Hill	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect high quality wetlands and meadow habitat important for residential elk herd 	-	-	-	<ul style="list-style-type: none"> • Parcel recently purchased by owner of gravel mine at bottom of Floyd Hill, purportedly for conservation purposes • 17 acres 	<ul style="list-style-type: none"> • Property may not be available for purchase or easement 	\$3M	
247	Floyd Hill - Parcel 2	Floyd Hill	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect high quality wetlands and meadow habitat important for residential elk herd 	-	-	-	<ul style="list-style-type: none"> • Upland parcel - owned by Frei (mine) family • 21 acres 	<ul style="list-style-type: none"> • Property may not be available for purchase or easement 	\$900,000	
247.1	Floyd Hill - Parcel 3	Floyd Hill	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect high quality wetlands and meadow habitat important for residential elk herd 	-	-	-	<ul style="list-style-type: none"> • Show home at eastern end of property would need to be split out. • Parcel dominated by wetlands, which are not developable • 16 acres 	<ul style="list-style-type: none"> • Property may not be available for purchase or easement 	\$1M	
247.2	Floyd Hill - Parcel 4	Floyd Hill	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect high quality wetlands and meadow habitat important for residential elk herd 	-	-	-	<ul style="list-style-type: none"> • Parcel slated for 400 unit development • 6 acres 	<ul style="list-style-type: none"> • Property may not be available for purchase or easement 	\$400,000	
249	Soda Creek	Beaver Brook	Underpass at creek drainage	<ul style="list-style-type: none"> • Primary target species: Mule deer • Secondary target species: Elk, black bear, mountain lion, fox, coyote, bobcat. 	Low	• High (2.8 WVC/mile/year)	• WVC Carcass: High (2.3 WVC/mile/year)	<ul style="list-style-type: none"> • Private ownership with dispersed residential development 	<ul style="list-style-type: none"> • Creek is nearly 300' from the existing bridge • Location is within the current project boundaries 	\$4.5-\$5.5M (bridge underpass)	

Milepost	Location Name	LIZ Name	Crossing Type or Habitat Protection	Biological Value & Considerations	2003 LIZ Rank*	WVC Crashes†	WVC Carcasses	Landownership & Land Use Considerations	Feasibility	High Level Cost Estimate††	ALIVE Rank
MITIGATION OPTION B: OUTSIDE OF PROJECT AREA											
254.5	Genesee	Mt. Vernon	Underpass at fill slope	<ul style="list-style-type: none"> • Primary target species: Elk and mule deer. CPW identified highway crossing zone. • Secondary target species: Black bear, mountain lion, fox, coyote, bobcat. • Monitored location for the I-70 EcoLogical Study (2009-2010) detected elk, mule deer, coyote, fox, skunk. 	Low	<ul style="list-style-type: none"> • Very High (3.4 WVC/mile/year) • Location identified by CDOT Traffic & Safety as a WVC hotspot. 	<ul style="list-style-type: none"> • WVC Carcass: Very High (3.4 WVC/mile/year) 	<ul style="list-style-type: none"> • Private ownership. Properties immediately adjacent to proposed structure location are undeveloped, but residential development around the greater area. 	<ul style="list-style-type: none"> • Location does not require a crossing over/under US 40, which runs farther north of this location. • Offset structure to west side of drainage to shorten structure length. • Possible Traffic & Safety funding. • Future project is unlikely as I-70 is already 3 lanes in both directions through this segment. 	\$4.5-\$5.5M (bridge underpass)	
254.5	Genesee	Mt. Vernon	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect habitat adjacent to proposed Genesee underpass 	-	-	-	<ul style="list-style-type: none"> • Zoned Residential; recommended 1 dwelling/10 acres • 17 acres 	<ul style="list-style-type: none"> • Property currently for sale • This action should only be pursued in conjunction with a wildlife underpass at MP 254.5 	\$800,000	
250	Ruby Ranch Road	Beaver Brook	Underpass at fill slope	<ul style="list-style-type: none"> • Primary target species: Mule deer & elk. CPW identified highway crossing zone. • Secondary target species: Black bear, mountain lion, fox, coyote, bobcat. 	Low	<ul style="list-style-type: none"> • High (2.8 WVC/mile/year) 	<ul style="list-style-type: none"> • WVC Carcass: High (2.6 WVC/mile/year) 	<ul style="list-style-type: none"> • Private ownership with dispersed residential development • Zoned Residential; recommended 1 dwelling/10 acres 	<ul style="list-style-type: none"> • Location is within the Beaver Brook LIZ. • Location does not require a crossing over/under US 40, which runs farther north of this location. • Steep fill on north side, but structure doesn't need to be at deepest part of fill. Consider how to grade north side approach or build trails into the slope leading to the structure. • 30'-wide median between I-70 EB and WB lanes - could narrow median width to reduce structure length. • Future project is unlikely as I-70 is already 3 lanes in both directions through this segment. 	\$4.5-\$5.5M (bridge underpass)	
250	Ruby Ranch Road - Parcel 1	Beaver Brook	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect habitat adjacent to proposed Ruby Ranch underpass 	-	-	-	<ul style="list-style-type: none"> • 5-cabin Bed & Breakfast • Area of interest is ~2.5 acres 	<ul style="list-style-type: none"> • This action should only be pursued in conjunction with a wildlife underpass at MP 250 	\$300,000 (partial acquisition)	
250	Ruby Ranch Road - Parcel 2	Beaver Brook	Conservation purchase or easement	<ul style="list-style-type: none"> • Potential to permanently protect habitat adjacent to proposed Ruby Ranch underpass 	-	-	-	<ul style="list-style-type: none"> • Zoned Residential; recommended 1 dwelling/10 acres • Area of interest is ~2.5 acres 	<ul style="list-style-type: none"> • This action should only be pursued in conjunction with a wildlife underpass at MP 250 	\$250,00 (partial acquisition)	

I-70 Mountain Corridor Region 1 Evaluation of Wildlife Mitigation Option

Revised May 11, 2020

Milepost	Location Name	LIZ Name	Crossing Type or Habitat Protection	Biological Value & Considerations	2003 LIZ Rank*	WVC Crashes†	WVC Carcasses	Landownership & Land Use Considerations	Feasibility	High Level Cost Estimate††	ALIVE Rank
250	Ruby Ranch Road - Parcel 3	Beaver Brook	Conservation purchase or easement	<ul style="list-style-type: none"> Potential to permanently protect habitat adjacent to proposed Ruby Ranch underpass 	-	-	-	<ul style="list-style-type: none"> Zoned Residential; recommended 1 dwelling/10 acres Area of interest is ~3 acres 	<ul style="list-style-type: none"> This action should only be pursued in conjunction with a wildlife underpass at MP 250 	\$300,000 (partial acquisition)	
US 40 MP 257.4	Empire	Empire Junction	Overpass just west of interchange spanning cliffs on N side to small cut slope on S side.	<ul style="list-style-type: none"> Primary target species: Bighorn sheep. Georgetown herd is the largest herd in CO. Location is important for genetic connectivity between 2 subpopulations. On US 40 (not I-70), but within the Empire Junction interchange area. This is the most important crossing site for bighorn along the corridor. Secondary target species: Canada lynx, black bear, mountain lion, mule deer, elk, moose, fox, coyote, bobcat. 	Medium	<ul style="list-style-type: none"> Low (0.4 WVC/mile/year) 	<ul style="list-style-type: none"> WVC Carcass: Low Very high for bighorn sheep (Huer 2015). 	<ul style="list-style-type: none"> Private. There is a willing landowner for a conservation easement on the south side (as of 2014). Nearby residences S & N sides of US 40 	<ul style="list-style-type: none"> A crossing structure at this location would need to accommodate future improvements around Empire Junction. US 40 has a narrower road footprint requiring a smaller crossing structure. Would require blasting/rock cut. 	\$3-4M (overpass)	
220.5	Kearney Gulch	Bakerville	Overpass (Traffic and Revenue Study recommends MP 220.5-220.7; east of rock cut, but then the creek is much closer to I-70; consider west of rock cut ~MP 220.3-4)	<ul style="list-style-type: none"> Primary target species: Canada lynx. Ivan (2012) notes that 39% of lynx I-70 crossings occurred between the EJMT and Bakerville; segment identified as high probability of lynx highway crossing by Squires et al. (2013). Linkage has lower intensity lynx movements primarily used for summer dispersal movement; there are no breeding pairs in this area. Secondary target species: bighorn sheep, black bear, mountain lion, mule deer, elk, moose, fox, coyote, bobcat, and boreal toad. Monitored location for the I-70 EcoLogical Study (2009-2010) at MP 221.8 detected bighorn sheep, elk, mule deer. 	High (Herman Gulch)	<ul style="list-style-type: none"> Low (0.5 WVC/mile/year) 	<ul style="list-style-type: none"> WVC Carcass: Moderate (1.1 WVC/mile/year) Two lynx WVCs have been recorded in this segment around MP 217.3 & MP 221 in 2000 & 2005. Moderate for bighorn sheep (Huer 2015). Increasing moose conflict. 	<ul style="list-style-type: none"> Arapahoe National Forest on both sides of I-70; Managed as USFS lynx linkage area Bike path adjacent to creek on south side. 	<ul style="list-style-type: none"> Good location between chain-up stations (i.e., smaller road footprint and less affected by lights and activity) Feasibility challenged by uneven grades north and south of I-70. Creek parallel on south side, but with enough room for overpass wildlife approach ramp. Sensitive wetlands along Clear Creek. Future projects in this segment are planned but details are unknown. Preferred alternative includes 6 lanes, WB auxiliary lane, and AGS. 	\$13.5-14.5M (overpass)	

Milepost	Location Name	LIZ Name	Crossing Type or Habitat Protection	Biological Value & Considerations	2003 LIZ Rank*	WVC Crashes†	WVC Carcasses	Landownership & Land Use Considerations	Feasibility	High Level Cost Estimate††	ALIVE Rank
217.4	Dry Gulch	Bakerville	Overpass recommended. An underpass would be very long and less preferable for bighorn sheep and elk.	<ul style="list-style-type: none"> • Primary target species: Canada lynx. Ivan (2012) notes that 39% of lynx I-70 crossings occurred between the EJMT and Bakerville; segment identified as high probability of lynx highway crossing by Squires et al. (2013). Linkage has lower intensity lynx movements primarily used for summer dispersal movement; there are no breeding pairs in this area. • Secondary target species: bighorn sheep, black bear, mountain lion, mule deer, elk, moose, fox, coyote, bobcat, and boreal toad (breeding site on north side of I-70). • Monitored location for the I-70 EcoLogical Study (2009-2010) at MP 217.2 detected elk, mule deer, coyote, fox. • Bike path/recreation impacts on lynx/wildlife movement (year-round but low winter intensity) 	High (Herman Gulch)	• Low (0.3 WVC/mile/year)	<ul style="list-style-type: none"> • WVC Carcass: Moderate (1.1 WVC/mile/year) • Two lynx WVCs have been recorded in this segment around MP 217 & MP 221 in 2000 & 2005. • Moderately low for bighorn sheep (Huerfano 2015). • Increasing moose conflict. 	<ul style="list-style-type: none"> • Arapahoe National Forest on both sides of I-70; Managed as lynx linkage area. • Bike path adjacent to creek on south side. 	<ul style="list-style-type: none"> • Feasibility challenged by road grade (~4%); uneven grades north and south of I-70; and proximity to creek on south side. • Sensitive wetlands along Clear Creek. • Future projects in this segment are unknown. Preferred alternative includes 6 lanes with WB auxiliary lane and AGS. 	\$13.5-14.5M (overpass)	

NOTES

*2003 LIZ rankings based on potential and existing wildlife value at time of assessment (i.e., present and past utilization as a movement corridor, adjacency to suitable habitat and potential improvement value).

†WVC crash rate calculations based on data from 2014-2018.

††High level cost estimates have not been formally reviewed and are subject to change.

ACRONYMS

- AGS = Advanced Guideway System
- CDOT = Colorado Department of Transportation
- CPW = Colorado Parks and Wildlife
- LIZ = linkage interference zone
- MP = milepost
- USFS = United States Forest Service
- WVC = wildlife-vehicle collisions



I-70 Floyd Hill to Veterans Memorial Tunnels

ATKINS
Member of the SNC-Lavalin Group

ALIVE Meeting #6

May 19, 2020



Zoom Meeting Format

- Keep meeting handouts handy
- Will take pauses throughout today's meeting to ask for questions, comments
- Please remain on mute unless you have a question or comment
- We will also monitor the chat box for your questions & comments
- Poll feature (example)



Introductions

- Name
- Position
- Agency/Company



Meeting Objectives

- Obtain ALIVE Committee recommendation on which combination of mitigation options in the mitigation matrix to pursue as mitigation for the Floyd Hill project



Review of Decisions to Date

- At the February 2020 ALIVE meeting, the ALIVE Committee determined that Mitigation Option B (alternative mitigation on the I-70 Mountain Corridor in Region 1) offered greater potential benefits than Mitigation Option A (Floyd Hill overpass)
 - Mitigation Option B also includes wildlife fencing from the top of Floyd Hill to Soda Creek



Follow-up on Action Items from February ALIVE meeting

- ✓ Refine plans for Genesee, Ruby Ranch Road, Soda Creek and Empire crossings
- ✓ Refine cost estimates to determine equivalent mitigation to the Option A crossing at the top of Floyd Hill
- ✓ Follow up with Jefferson County on land use and development plans for lands surrounding proposed crossings
- ✓ Update the mitigation matrix to support the ALIVE Committee's ranking of how to allocate mitigation funds.
 - Include the Floyd Hill crossing for comparison purposes
 - Include parcels that are of interest for habitat protection:
 - Meadow-wetland complex at the top of Floyd Hill
 - Parcels adjacent to potential crossing structure locations



Mitigation Option A – Floyd Hill Overpass

For comparison purposes:



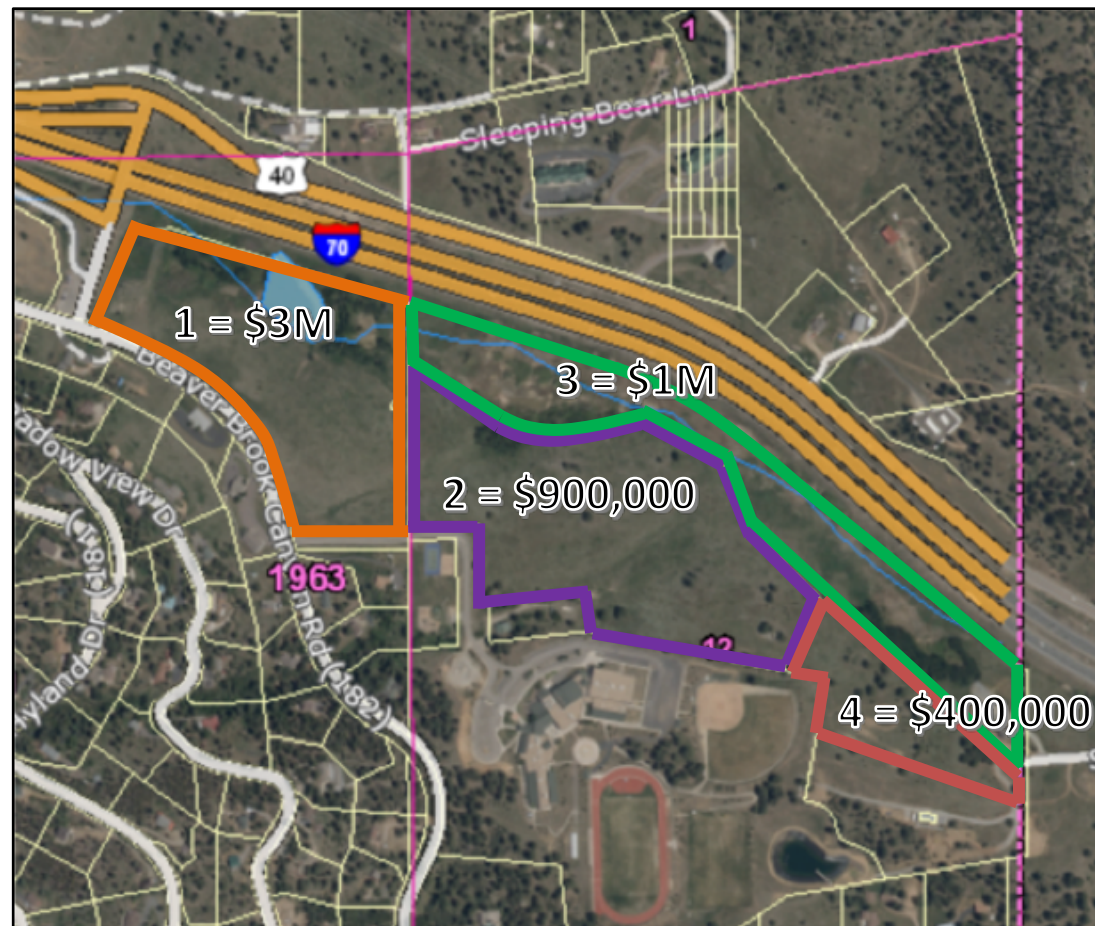
Estimated Cost:
\$15-20 million
For overpass and
partial acquisition of
property adjacent to
overpass



Mitigation Option B: Within Project Area

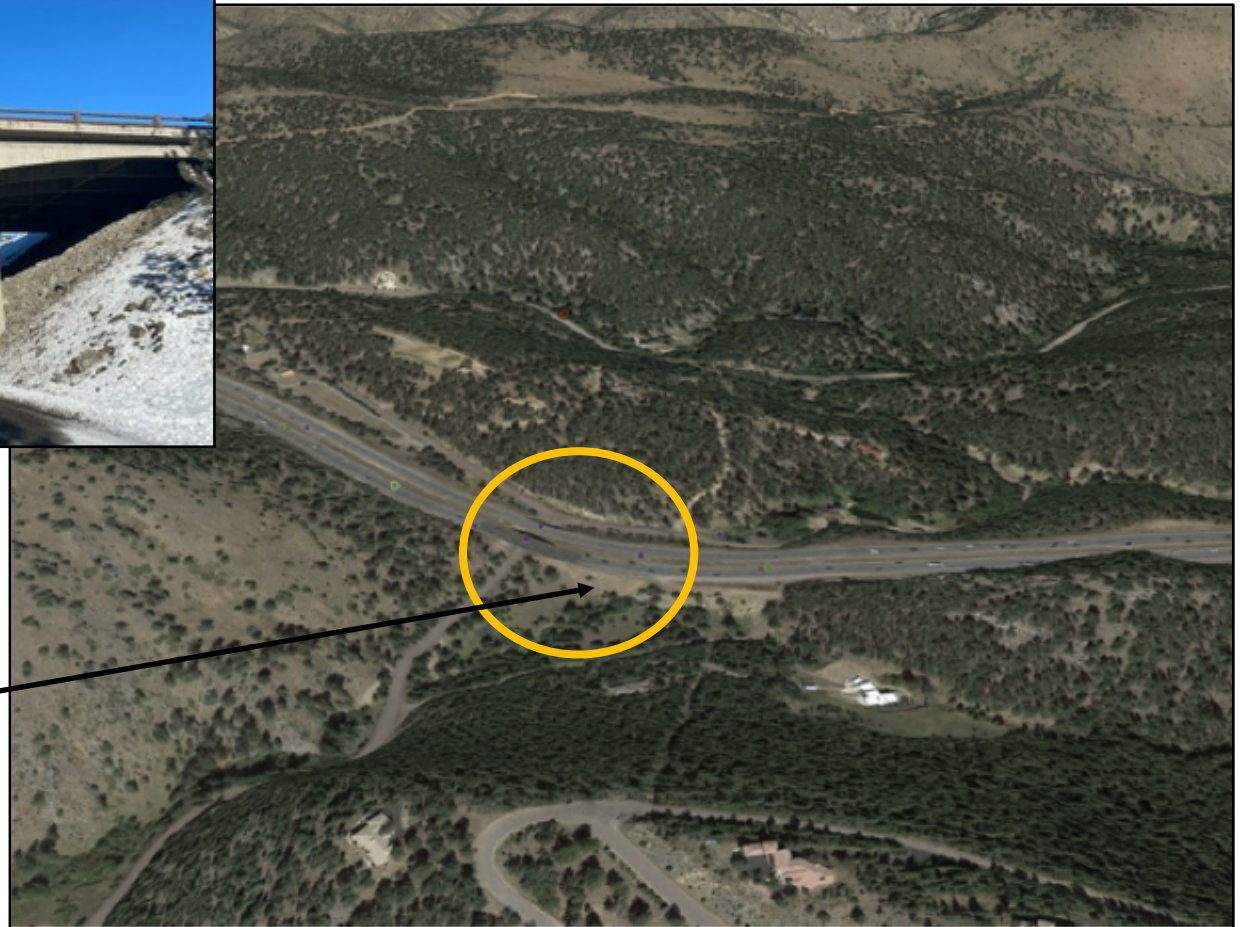
MP 247 Floyd Hill: Habitat Protection

- Meadow-wetland complex
 - 4 parcels





MP 249 – Soda Creek: Wildlife Underpass

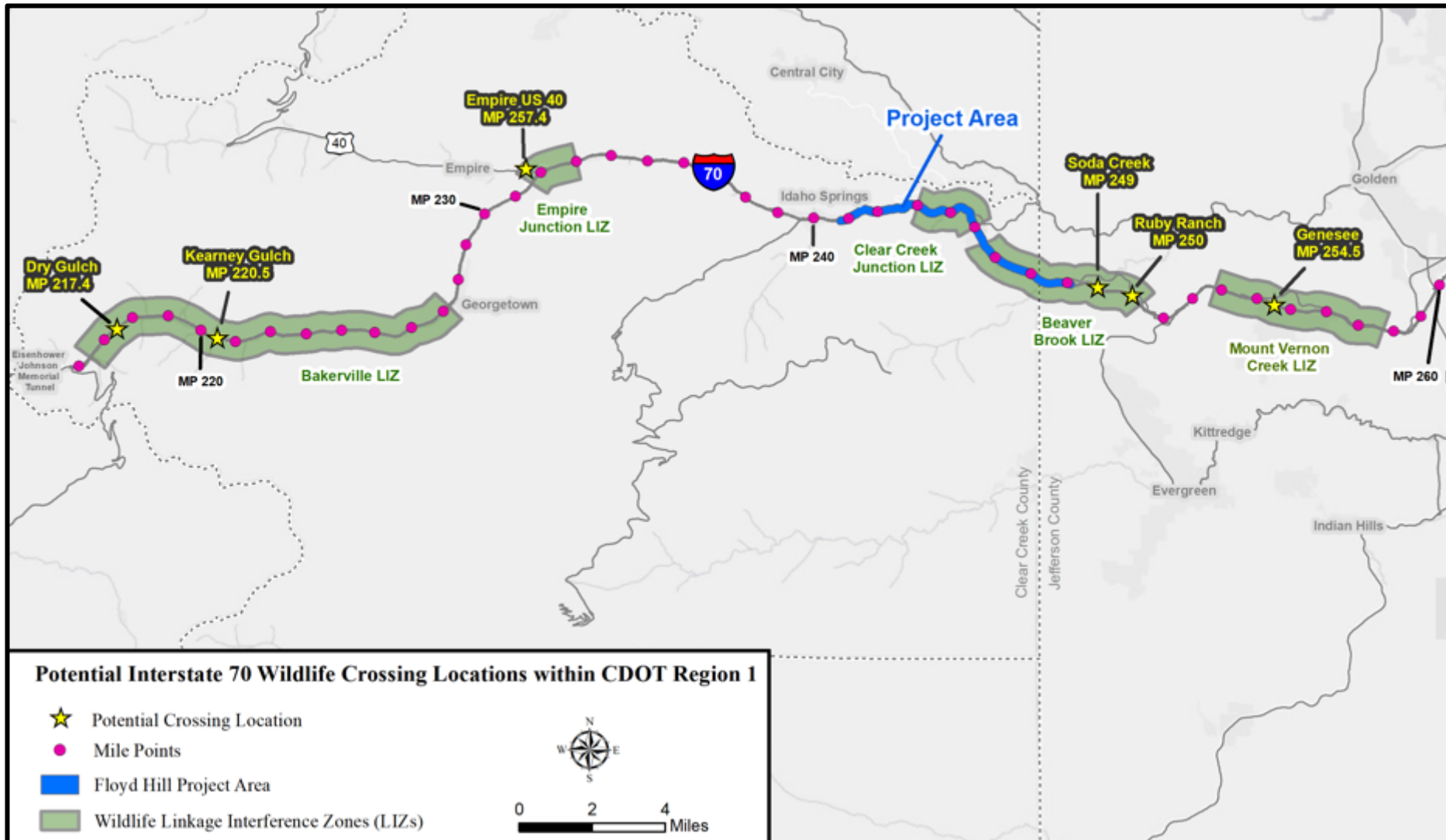


Estimated Cost:
\$4.5 – 5.5M

Construct new
wildlife underpass
at creek drainage



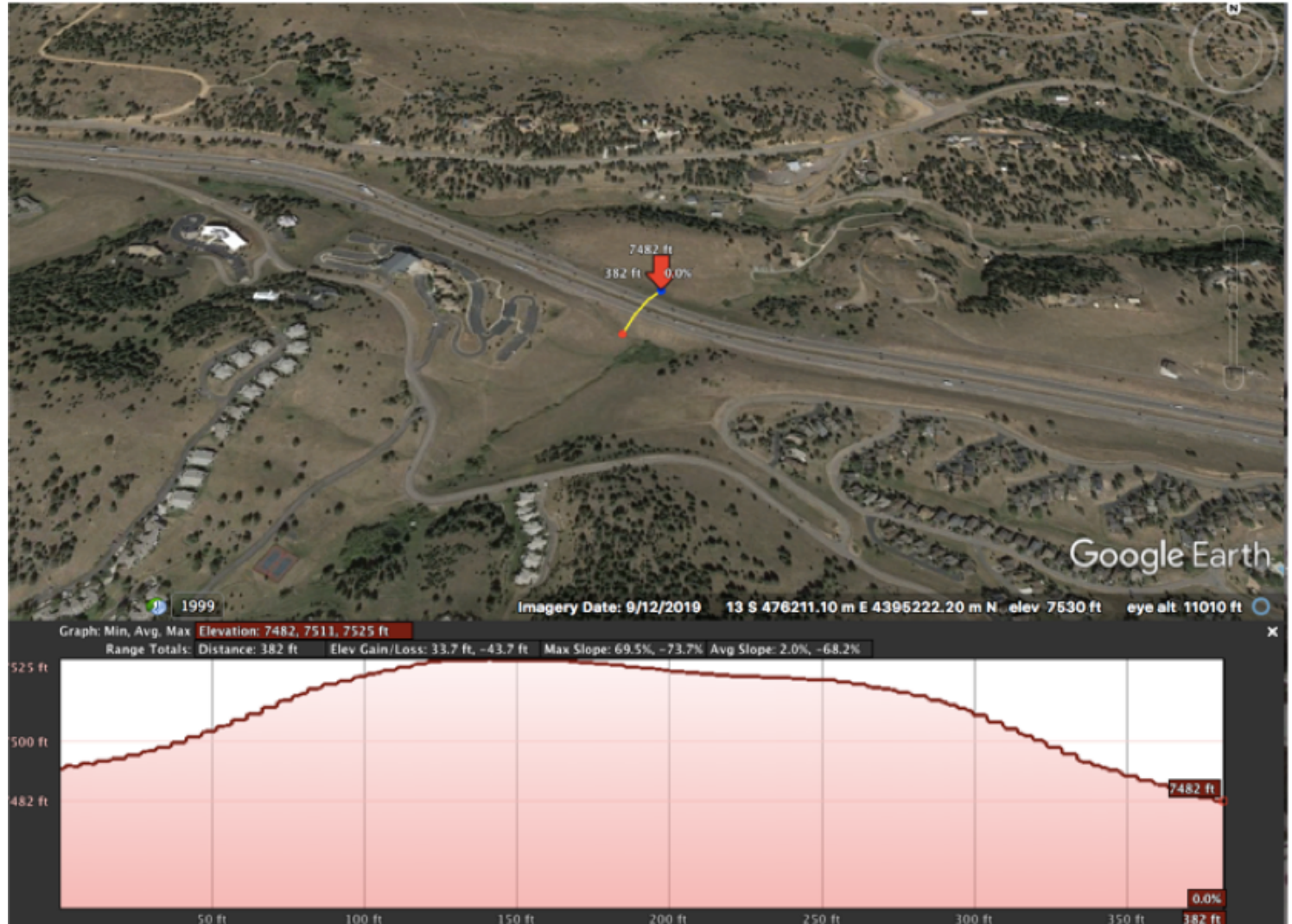
Mitigation Option B: Outside of Project Area





MP 254.5 – Genesee Wildlife Underpass

← 1 mile to Genesee Exit





MP 254.5 – Genesee: Wildlife Underpass



Estimated Cost:
\$4.5 – 5.5M

Bridge underpass
16'H x 100'W x 130' L
with open median (dimensions
are from wildlife perspective)

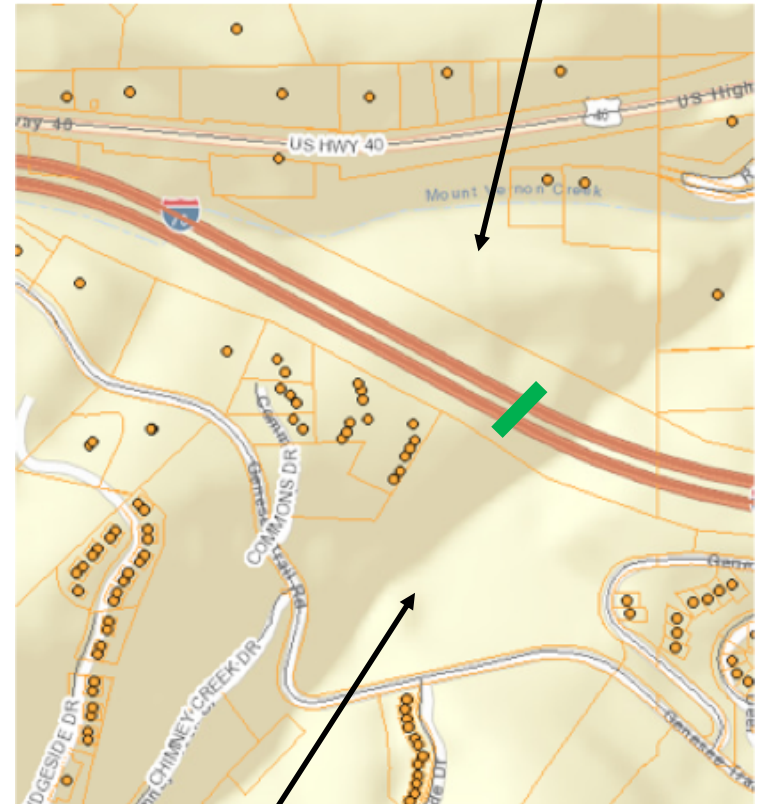
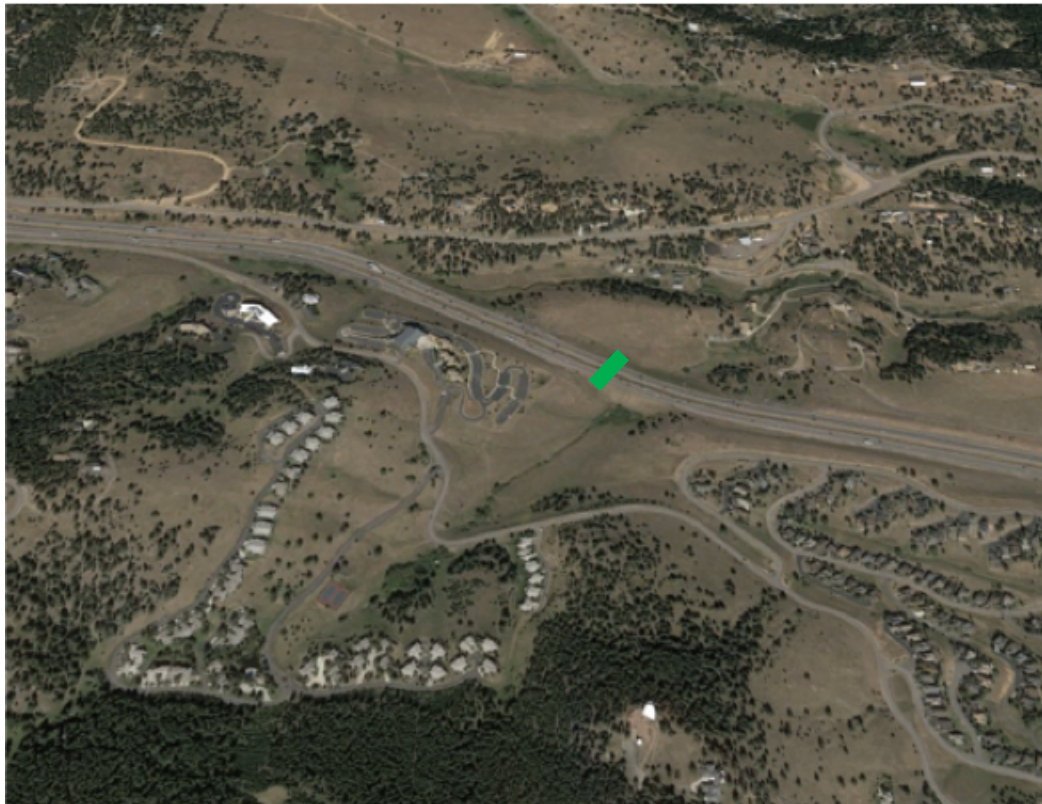




MP 254.5 – Genesee: Habitat Protection

← 1 mile to Genesee Exit

Vacant land for sale \$800,000



HOA (presumed open space)



MP 250 – Ruby Ranch Road: Wildlife Underpass

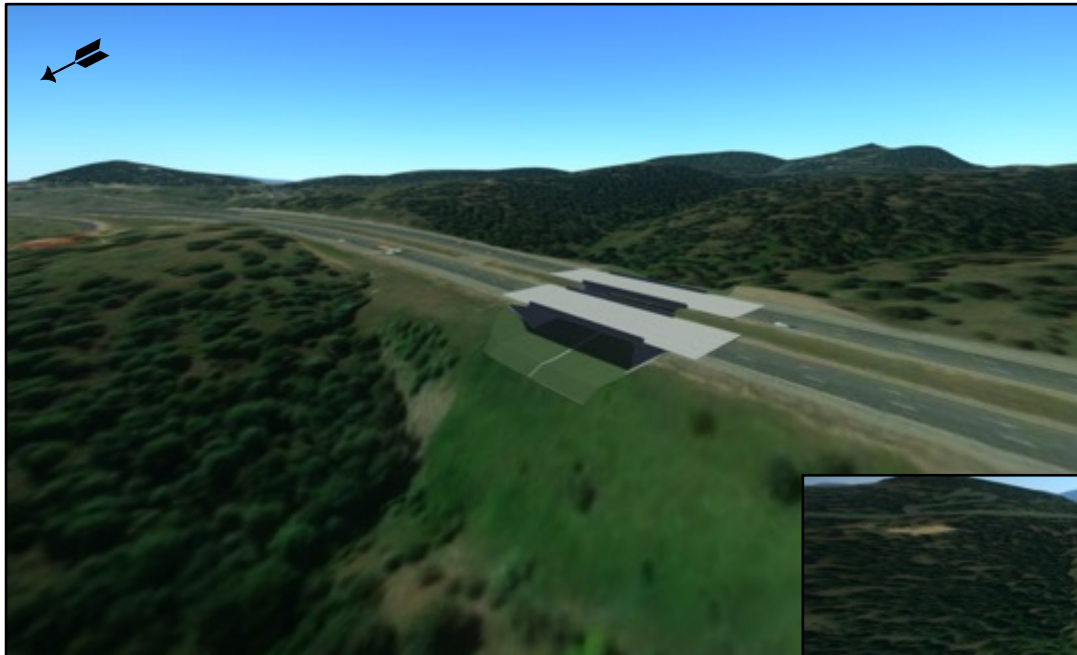


→
½ mile to
El Rancho Exit





MP 250 – Ruby Ranch Road: **Wildlife Underpass**



Estimated Cost:
\$4.5 – 5.5M

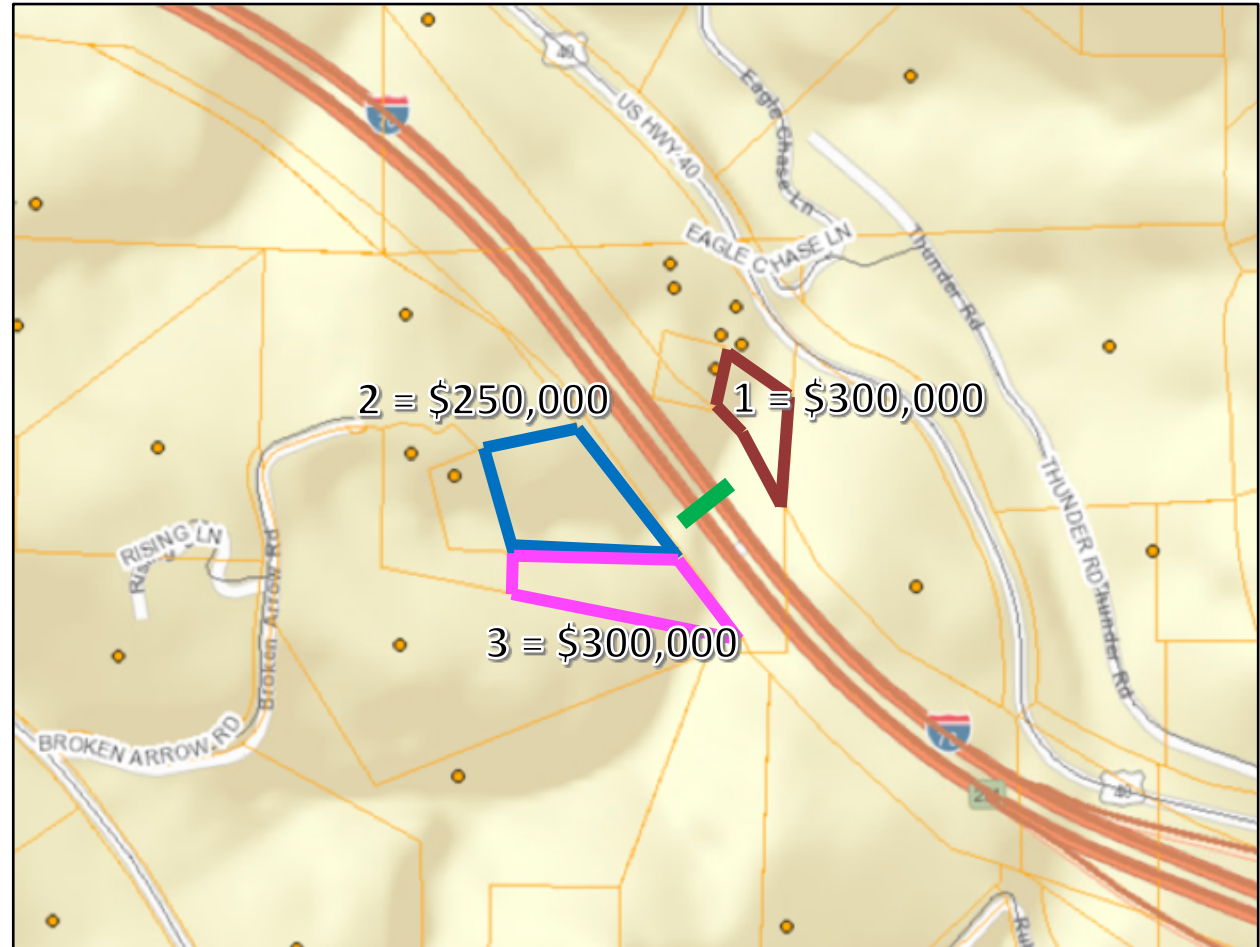
Bridge underpass
16'H x 100'W x 130' L
with open median (dimensions
are from wildlife perspective)





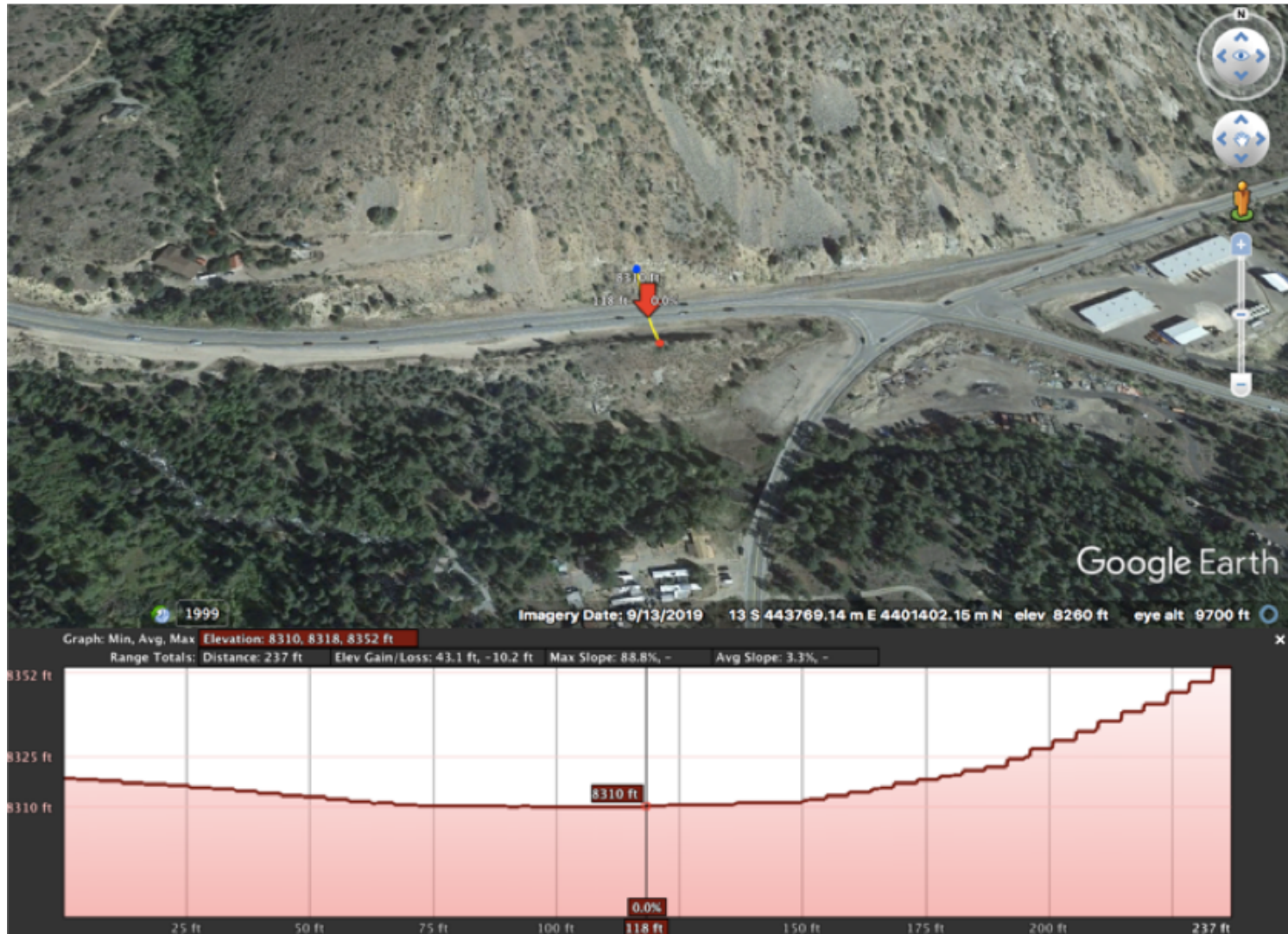
MP 250 – Ruby Ranch Road: Habitat Protection

3 partial parcels
around proposed
wildlife underpass





US 40, MP 257.4 – Empire: Wildlife Overpass





US 40, MP 257.4 – Empire: Wildlife Overpass





US 40, MP 257.4 – Empire: Wildlife Overpass

DOUGLAS MOUNTAIN RANCH AND PRESERVE PROPERTY MAP



Proposed Overpass Location



- Fee Title Boundary
- Georgetown State Wildlife Area
- Clear Creek County Open Space



MP 220.5 – Kearney Gulch



→
½ mile to
Bakerville Exit



MP 220.5 – Kearney Gulch: Wildlife Overpass

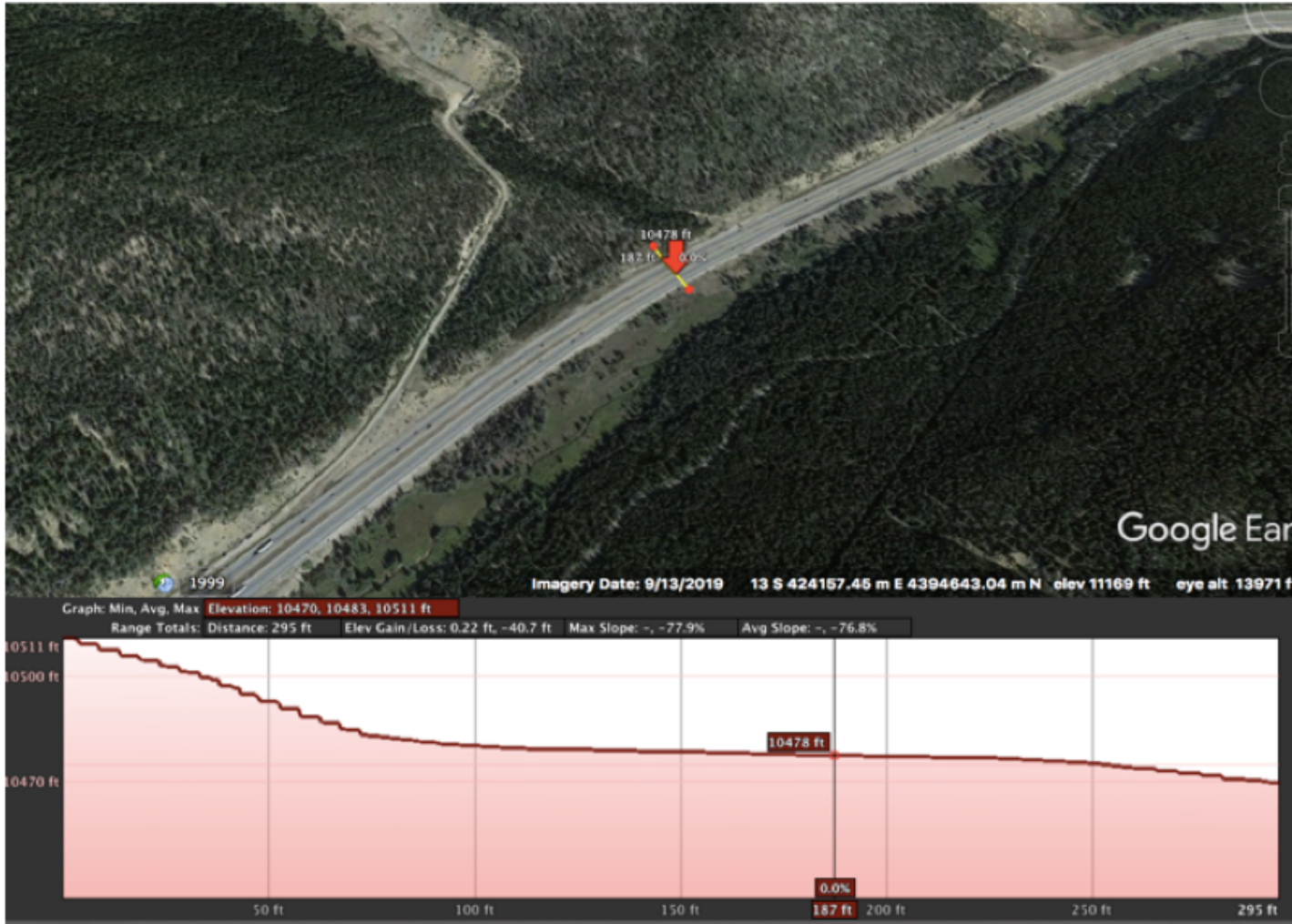


Estimated Cost:
\$13.5-14.5

Wildlife Overpass
200' wide



MP 217.4 – Dry Gulch



→
Herman
Gulch

EJMT
←



MP 217.4 – Dry Gulch: Wildlife Overpass



Estimated Cost:
\$13.5-14.5

Wildlife Overpass
200' wide



Mitigation Options Ranking

Mitigation Option	Ranking Notes	RANK
Floyd Hill (habitat protection)		
Soda Creek		
Genesee		
Ruby Ranch		
US 40 Empire		
Kearney Gulch		
Dry Gulch		



Next Steps

- Document ALIVE agreements
- Incorporate mitigation commitments into EA mitigation
- Reconvene ALIVE Committee during final design of wildlife crossings once construction funding is identified