

Meeting Summary

Date: August 6, 2025

29 Road Interchange at I-70, NEPA/1601 Project

Meeting Name: TAC Meeting #15

Meeting Date: June 24, 2025

Invitees:

Invitee	Organization	Attended?	Invitee	Organization	Attended?
Kevin King	Mesa County	X	Melanie Bishop	FHU	X (virtual)
Scott Mai	Mesa County	X	Rachel Ackermann	FHU	X (virtual)
Ajin Hu	FHWA	X (virtual)	John Dibble	FHU	X (virtual)
Liz Cramer	FHWA	X (virtual)	Cady Dawson	FHU	X
Trent Prall	Grand Junction	X	Alex Pulley	FHU	X
Daniel Larkin	Grand Junction	X	Amanda Cushing	FHU	X
Eric Mocko	Grand Junction	X	Paul Brown	FHU	X
Dave Cesark	CDOT	X	Mark Bunnell	CDOT	X
Dana Brosig	RTPO	X	Jen Klaetsch	CDOT	X (virtual)
Dean Bressler	RTPO	X (virtual)	Rob Beck	CDOT	X (virtual)
Rachel Peterson	RTPO	X			

Note: Not all details that were included in the presentation are shown in this summary, but comments and discussion brought up during the presentation are included; discussion is denoted as **blue** text. Data that was received following the meeting is denoted in **pink** text. Meeting materials can be found at the end of this meeting summary.



Meeting Summary

Meeting Goal

Reach agreement of the data analysis outcomes to reach consensus next month

Agenda

- ▶ Welcome
- ▶ CDOT Workshop Meeting Review
 - ▶▶ Future Volume Forecasts
 - Particularly for braided ramps with slip lane
 - ▶▶ Safety: I-70 Curve
 - ▶▶ Safety: Overall Network
 - ▶▶ Benefit Cost Analysis
- ▶ Overall Project Next Steps
- ▶ Schedule

Discussion

The goal of the meeting is to reach agreement regarding the data analysis to move forward with the proposed 29 Road Interchange westbound ramp configuration.

Various Meetings Since Last TAC

- ▶ FHWA/CDOT Meeting (May 12, 2025)
- ▶ FHWA Coordination Meeting (May 29, 2025)
- ▶ Meeting with CDOT Executive Leadership (June 9, 2025)

FHWA/CDOT Meeting (May 12, 2025)

This meeting discussed the safety results after applying the safety mitigation countermeasures as well as the benefit cost analysis for the proposed 29 Road Interchange and the braided ramp with slip lane configuration.

No questions.



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FHWA Coordination Meeting (May 29, 2025)

This meeting included a review of the discussions, and the decisions made during the previous TAC meetings (TAC Meetings #1-14).

No questions.

Meeting with CDOT Executive Leadership (June 9th)

This meeting went through a status presentation intended for the Transportation Commission (TC) for the July TC workshop. Through that discussion, CDOT stated that they would like to review the current version of the SLS with track changes to complete a status review. FHU had paused addressing the most recent set of comments for the SLS as the configuration of the 29 Road westbound ramp has not yet been determined. However, a status version of the SLS was submitted to CDOT on June 16, 2025 as well as a comment response and the highway safety software modeling files. CDOT requested a 30-day review period for that material.

Action Item: FHU will also submit the edited SLS to the other TAC members.

No questions.

TAC Meeting #15 Discussion

- ▶ Braided Ramp with Slip Lane Forecasts/Westbound I-70 Forecasts
 - ▶▶ Travel demand model background
 - ▶▶ Model is calibrated and approved
 - ▶▶ Modeled freeway capacity is higher between interchanges than within the interchanges
 - ▶▶ Ramp capacities are low when compared to statewide model
 - Effect is muted since ramp links are 'short'
 - ▶▶ No C-D roads, braided ramps, or similar facilities in the Grand Junction area
 - No model approach or calibration for these facilities



Meeting Summary

▶ 29 Road Efforts

- ▶▶ When ramps are lengthened, the effect of the lower capacity is more pronounced
- ▶▶ C-D road or braided ramp scenarios may include longer ramp segments
- ▶▶ No guidance for possible alternate facility types
- ▶▶ After trial and error with other facility types, the team used the “Expressway” link type for C-D roads and braided ramp with slip lane segments.

- ▶ **Question:** Regarding changing the ramp to an “Expressway” is that exclusive to or limited to the change that you made in the model or is that also a change that was made in the highway capacity analysis software?

Response: This is all strictly with respect to the travel demand modeling work that we completed. We did not make any changes in the traffic operations analysis.

- ▶ **Statement:** In other words, you're matching the Expressway link type that was coded into the RTPM model, correct?

Response: That is correct, we're using the Expressway link type to represent a collector-distributor (C-D) road or a braided ramp scenario (see exhibits below).

Meeting Summary

Westbound I-70 Model Results (AM Peak)



Westbound I-70 Model Results (Daily)



Meeting Summary

Observations and Conclusions

- ▶ Modeling C-D roads, braided ramps, etc. is only an approximation
- ▶ WB 29 Road entrance and WB Horizon Drive exit were over capacity
- ▶ Constraints affect the ability of C-D road and braided ramps to perform as anticipated in the model
- ▶ C-D roads and braided ramps are not part of the validated model
- ▶ The freeway volumes for the braided ramps (with slip lane) scenario may be under-reported
- ▶ Similarly, the arterial volumes may be over-reported

Question: In reviewing the graphics, is there a connection from 29 Road to Horizon Drive for the braided ramps?

Response: No. With the braided ramp scenario (without the slip lane), a driver cannot use I-70 to travel from the 29 Road interchange to the Horizon Drive interchange. A driver would need to use Patterson Road or F½ Road.

Question: There is a 1.37 VC ratio for the off ramp and a volume of 8,219 vehicles for the C-D road option. Additionally, it was mentioned that traffic from 29 Road cannot exit here and they would need to take a different route. What is the projected traffic volume for the No Action Alternative scenario? Is it similar to the 8,219 vehicles or much higher or lower?

Response: We do not have those numbers available at this time; however, we can submit them for review. I seem to recall that the No Action Alternative ramp volume here is similarly high as there is a lot of demand for the airport and for Horizon Drive.

Action Item: FHU will submit the No Action Alternative volume and v/c ratio information.

No other questions or comments.

Safety: I-70

- ▶ Added Countermeasures with CMFs
 - ▶▶ Enhanced curve warning signage
 - ▶▶ Widened the inside shoulder



Meeting Summary

- ▶ Other options to improve safety (no CMFs)
 - ▶▶ Lower the speed limit
 - ▶▶ Move the interchange east

Freeway Predicted Crashes (2045)

Scenario	Property Damage Only	Fatal and Injury	Total
No Action Alternative	85	38	123
Build (Base) Alternative	95	38	133
Build (Base) Alternative with a braided ramp and slip lane	83	33	116

Question: Is that serious injury or is it all levels of injury?

Response: These are all levels of injury.

No other questions or comments.

Safety: Overall Network

- ▶ Added Countermeasures
 - ▶▶ 29 Road Arterial Segments:
 - Curb and gutter
 - Sidewalks
 - Bicycle lanes
 - ▶▶ Lighting at 29 Road arterial intersections
 - ▶▶ Reflective backplates at Patterson Road arterial intersections
 - ▶▶ Protected left turn phasing at Patterson Road arterial intersections and at I-70B arterial intersections

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Scenario	Facility	Property Damage Only	Fatal and Injury	Total
No Action Alternative	I-70	85	38	123
	Arterial roadways ¹	62	30	92
	Total Study Area	147	68	215
Build (Base) Alternative	I-70	95	38	133
	Arterial roadways ¹	65	28	93
	Total Study Area	160	66	226
Build (Base) Alternative with a braided ramp and a slip lane	I-70	83	33	116
	Arterial roadways ¹	63	28	91
	Total Study Area	146	60	206

¹ – Arterial roadways included 29 Rd, 30 Rd, Patterson Rd, I-70B, F ½ Rd, and Horizon Dr in the study area

No questions.

Benefit Cost Analysis

- ▶ The BCA monetizes benefits for:
 - ▶▶ Operations and Maintenance
 - ▶▶ Residual Value & Remaining Service Life
 - ▶▶ Safety
 - ▶▶ Travel Time Savings
 - ▶▶ Emission Reductions
- ▶ Updated Variables
 - ▶▶ Project costs were updated to have design start in 2025 and construction extend over three years
 - ▶▶ Applied avoided injuries and fatalities rather than the ratio of fatalities/fatal crashes and injuries/injury crashes

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- ▶▶ Property Damage Only crashes were updated to use the per crash monetization
- ▶▶ Maintenance costs were updated to reflect CDOT-specific data
- ▶▶ Residual value was updated to reflect the changes in maintenance costs for post-analysis maintenance

Alternatives Costs

Alternative	Cost
Build (Base) Alternative	\$81,500,000
Build (Base) Alternative with a braided ramp and slip lane	\$111,700,000
Difference	\$30,200,000

Build (Base) Alternative Benefit Cost Analysis Review (Updated)

Build (Base)	BCA
Total Costs	\$70.9 million – \$71.6 million
Total Benefits	\$108 million – \$162 million
Benefit Cost Ratio	1.5 – 2.3 : 1

Build (Base) Alternative with a Braided Ramp and Slip Lane Benefit Cost Analysis Review (Updated)

Build (Base) Alternative with a Braided Ramp and Slip Lane	BCA
Total Costs	\$97.1 million – \$98.5 million
Total Benefits	\$120 million – \$132 million
Benefit Cost Ratio	1.2 – 1.4 : 1

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Benefit Cost Alternative Comparison (Updated)

Additional Costs of Braided Ramp and Slip Lane	BCA
Total Costs	\$26.2 million
Total Benefits	\$23.5 million
Benefit Cost Ratio	0.89:1

Question: How is the difference in safety metrics captured? Is it directly and explicitly captured in the BCA?

Response: The BCA focused on the difference between the No Action Alternative and the Build (Base) Alternative; capturing the monetized values of the projected delta in predicted crashes, year over year. The Build (Base) Alternative with a Braided Ramp and Slip Lane (Updated) BCA similarly captures the projected delta in predicted crashes between the two alternatives.

For the Build (Base) Alternative with a Braided Ramp and Slip Lane (Updated) BCA, the primary difference between the alternatives are the predicted additional safety benefits associated with the higher number of predicted fatal, injury and property damage only (PDO) crashes in the Build (Base) Alternative as compared to the braided ramp and slip lane; that's where the bulk of the benefits for the braided ramp and slip lane alternative come from.

However, these benefits are nearly offset by the projected increased travel time delays projected under the braided ramp and slip lane. The Build (Base) Alternative with a Braided Ramp and Slip Lane (Updated) BCA is showing the incremental cost difference for additional dollar associated with the braided ramp and slip lane alternative. Based off the data and projections developed to date, it is projected to get \$0.90 on the dollar back.

Statement: Additional considerations are that total and fatal crashes are greater with the Build (Base) Alternative. If we look at that and think of it in terms of choosing by advantages, if safety becomes paramount, then that doesn't completely outstrip this BCA analysis, but should be a consideration. There is a public safety benefit that is being at least slightly overlooked in that view.



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Response: Agree, one of the key things is that using the USDOT BCA guidance is just one way to analyze and build this comparison. I think what you'll also see in the BCA is not just the monetized value, but the net difference in the variables that we use to calculate the BCA.

The net difference over the analysis period in those fatal and injury crashes and PDO crashes as well as the net difference in the vehicle hours of delay and VMT.

The Build (Base) Alternative with a Braided Ramp and Slip Lane (Updated) BCA spreadsheet is set up in a way that should you want to apply some sort of factor to more weigh safety, for example, that could be applied to the monetized values for any of the benefits or costs.

Question: The Build (Base) Alternative has a total benefit of up to \$162 million. However, the Build (Base) Alternative with Braided Ramp and Slip Lane maximum benefit is \$132 million. If I remember correctly, this option has a much lower crash rate, correct? On the next slide, the Braided Ramp with Slip Lane has an additional \$23.5 million; is that more than the Build (Base) Alternative?

Response: The Build (Base) Alternative Benefit Cost Analysis Review (Updated) BCA is showing \$162 million in benefits relative to the No Action Alternative. The Build (Base) Alternative with a Braided Ramp and Slip Lane (Updated) BCA is showing \$23.5 million relative to the Build (Base) Alternative. This does not account for the difference in net benefits which is the difference between the total benefits to the total costs. The updated version of each BCA provides a much more conservative quantification of the benefits and reflects total benefits on the lower end of the range shown and then used the more conservative estimates to compare the two alternatives to each other. What is shown in the tables are the net benefits which is the benefits minus the costs; comparing the two alternatives to each other helps capture the incremental differences in costs and benefits; and is only presented as the benefit cost ratio (BCR). The BCR provides a false sense of precision, but generally, if the BCR is greater than one, it means that for every additional dollar spent, more than \$1 of benefits are generated.

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Referring to the crash table: Not focusing on property damage, as the monetized values and the total benefits sum to a much lower cost, but the difference between the Build (Base) Alternative and the Build (Base) Alternative with the Braided Ramp and Slip Lane is approximately five per year for I-70 fatal and injury.

Statement: The CDOT number is about \$2 million for fatal crash and the lowest injury crash is about \$100,000. If an average is about \$1 million, that's \$5 million a year.

And taking that over a 20–25 year life frame, that's \$25 or 30 million with a braided ramp.

Response: The other nuance of the BCA is that the BCA values a crash avoided tomorrow as having a higher value than a crash avoided 10 years in the future; this is captured with the discount rate. Thus, the benefits get discounted annually and so it is not as simple as multiplying by the number of years. Also, the BCA currently uses the values provided in the USDOT guidance and those monetized values likely differ from CDOT's values. We can also review the spreadsheets based on information shared to validate how the predicted injury/fatal crashes were split in the BCA.

Question: Independent of what's going on in the background with the spreadsheet, it just seems like the difference of five crashes would produce a much greater benefit to the braided ramps. Can you speak to how the BCA distinguished between fatal and injury crashes. Or did it lump those together?

Response: It breaks out fatalities versus injuries as well as distinguishing between the number of fatalities in a fatal crash as well. There are default values given for assumptions; however, we used the historic CDOT crash data for the area to estimate the number of predicted injuries per injury crash and the number of predicted fatalities per fatal crash. We did combine all predicted injury crashes into just injury crashes, so we did not apply the different levels of severity to injury crashes.

Action Item: FHU will break out the crash data.



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Statement: It would be helpful to see the BCA spreadsheet, especially for emission reductions so we can understand the cost differential.

Question: Did you count the travel time saving and operation cost of saving benefit? If purely based on the particular crashes, that's two options. The Build (Base) with a Braided Ramp and Slip Lane must have a higher benefit, but if we include the travel time savings operation cost savings as part of the benefit, then you have an opposite benefit.

Response: That is correct. However, it is not just the safety aspect, it is that that the model numbers, for example, showed a higher delay with the Build (Base) with a Braided Ramp and Slip Lane. Thus, we have monetized that delay. Additionally, maintenance costs were also higher with the braided ramps and that is reflected in the BCA.

Action Item: FHU will submit the BCA calculations spreadsheet. **Please note that the spreadsheet is an FHU-proprietary document; thus, please do not share with other consultants.**

Data Review Summary

- ▶ Operational challenges are not likely as severe as shown in the SLS
 - ▶▶ The draft 2050 travel demand model has lower forecasts
- ▶ Additional safety measures decrease fatal and injury crashes
 - ▶▶ Results for the Build (Base) Alternative and the Build (Base) with a Braided Ramp with Slip Lane are lower than No Action Alternative
- ▶ Both Alternatives show investment value
- ▶ Additional costs for the Build (Base) with a Braided Ramp with Slip Lane result in added benefit

Simplified Comparison and Next Steps

	No Action Alternative	Build (Base) Alternative	Build (Base) Alternative with a Braided Ramp and a Slip Lane
Peak LOS	0	-	+



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	No Action Alternative	Build (Base) Alternative	Build (Base) Alternative with a Braided Ramp and a Slip Lane
Safety	0	+	++
Cost	0	+	-
BCA	0	++	+
Total	0	++++	++++

Question: What are the TAC members' thoughts on moving forward with this project, knowing that there are tradeoffs to costs, safety, and operations?

Response (CDOT): From CDOT's perspective, fatal and injury crashes between the two shows that there is no increase over the No Action Alternative, which CDOT can accept. CDOT has stated that it has not been pushing for an option that drastically increases safety because of the cost. We understand that and both of these options would be acceptable. **However, what will FHWA require for them to approve it despite the fairly significant congestion as compared to the other option?**

It would be difficult for CDOT to support the Build (Base) Alternative because of the congestion that is present. I understand that there is also a 2050 model but that is not included in the analysis that CDOT will have to sign off on and send FHWA. Thus, it is up to FHWA's perspective on those two things. **Will FHWA accept the congestion that is forecasted?**

If CDOT had to choose between 1) decreasing serious injury and fatal crashes on I-70, or 2) mitigating congestion on I-70 created by the 29 Road interchange, CDOT would accept the congestion to reduce crashes. It would be difficult to accept congestion when there are options under consideration that reduce crashes and mitigate the congestion on I-70. Additionally, CDOT would not support a two-lane off ramp in this configuration. As previously mentioned, a two-lane ramp was recently removed in Silverthorne and it is operating better with just a longer off ramp that helps hold the queue that it was backing up. We are also looking at removing the two-lane ramp at Copper Mountain.

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However, if there is an option or something else that can accomplish both then we are not in a position that we have to choose between the two. Thus, it is up to FHWA to weigh in.

Action Item: Compare the 2045 model to the 2050 model and determine the order of magnitude difference.

Response (FHWA): It is difficult for us to make a call. Our standard answer is “it depends.” We do have to evaluate if it is a significant impact to interstate operations and consider all of the factors of operations and safety. I think the difficulty for us is as we've been discussing numbers in comparison and analysis, there are a lot of pieces and it seems to be a little bit of a moving target for us to be able to sit down, review and ask “what are the final apples to apples numbers on these different options?”

Response (RTPO): It would be helpful to have the fatalities and injuries split out. That would help the RTPO make a determination.

Response (Mesa County): I'm thinking of the congestion of Vail, Silverthorne, and Eagle, and I don't see a braided ramp outside the Denver Metro. I think that it is out of place here. For a braided ramp, maybe we're thinking too far in the future for a 15-minute period?

Response (Mesa County): We need to keep in mind that we decided that a 29 Road interchange is needed and appropriate although there is thought that it is not quite needed yet. However, the only thing that happens when we continue to put projects off is that they become more expensive. We also end up trying to build something when congestion has gotten out of control. We are at a point now where the Matchett Rec Center is being constructed and that is going to be a regional, if not bigger, draw to get people to come and use the adjacent fields (i.e., Matchett Park). Thus, there needs to be a place where vehicles can exit the Interstate immediately adjacent to where Matchett Park will be, which is something that we need to address now. Our internal system cannot handle vehicles exiting at Clifton or Horizon and making their way to Matchett Park; that will be an absolute nightmare on Saturdays and Sundays if we don't have this interchange. Thus, doing it now is appropriate. This is an opportunity where the local governments that are involved are willing to come up with and put in significant dollars for improvements that need to be made.



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I will speak for public works at the county; I won't speak for the RTPD.

I feel like we have addressed the safety issue. Would it be better with the braided ramps? Yes. However, the 2045 model shows that the No Build scenario on I-70 will be poor; thus, the proposed interchange does not appear to be a significant impact to I-70. Thus, I don't think that we are making significant impacts to what is going to be happening on the Interstate, especially as things continue to change. There are less people driving, there is more carpooling. We're doing different things to address trips at the ramps. Thus, I feel like when we start looking at the braided ramp, especially when we consider that, the future look across the Valley, is 6 lanes on I-70. That means we're putting \$30 million now that at some point will be "throw away" which is not fiscally responsible.

Life is important. Accidents are going to happen anytime you put in a roadway and for us to be able to get this to the point where we have addressed safety to a point in that we're putting in a four-ramp interchange and not making the situation worse, I think is a testament to what we're willing to do.

If it ends up that FHWA cannot stand behind the project without a braided ramp scenario, I'm not sure that this project will move forward.

\$80 million is a lot of money for the small local community to come up with and to bump up those costs to \$110 million plus is not something that the community can endure.

We have moved the interchange as far to the east as possible to get that weaving out of the curve. We've addressed safety. We will do whatever we can to address any of these capacity issues. And then we just move forward with completing the SLS. We know exactly what we are aiming for; we've been working on this for three years.

We're also coming up against some deadlines too, with the CDS funding that needs to be spent. This helps the City get the 29 Road corridor designed and improved so that we can build it in conjunction with Matchett Park. This allows us to move forward and get to a point where we can figure out the funding. It gets us a shovel ready project or a mostly shovel ready project that we can start looking for federal grants and figure out the best way to pay for it.



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Response (City): In 25 years, we're going to be building and at that point there will be significant improvements at both Horizon Drive and Clifton. We do have \$2 million that we'd like to use to enhance the design.

Statement: We should keep in mind that it will be easy to attack the project if the safest overall alternative is not advanced. It will be easy to attack it with respect to the eventual Transportation Commission approval as well as during the steps before that, CDOT's and FHWA's approval and their mandate. It's going to be very easy to attack the project if something other than the single safest alternative is brought forward. It's something for the local funding partners to keep in mind.

Response (RTPO): I think it's tricky with the \$30 million difference and if we spent \$30 million on safety projects, would that have a greater impact on our injury network? I understand what has been said about safety, but I think it's a large cost for a 10%(ish) reduction in crashes.

Please provide an executive summary of the things that have been done. For example: data, anecdotal information, loss that shows even in this scenario, we're doing this and to here is a painted picture narrative.

Action Item: FHU will provide an executive summary.

Response (FHWA): It is going to be hard for us to give you a thumbs up or a thumbs down on the alternatives right now as it seems like the target keeps changing.

Additionally, it's harder to accept something (i.e., the off-ramp) that has a V/C ratio of 2.8 and an Interstate with a 1.27 V/C ratio. This means we will have congested traffic back up from the off ramp to the Interstate. That will cause safety issues. All those may not be counted in the safety analysis, but a 2.8 V/C ratio and a 1.27 V/C ratio is very high. Thus, I have hard time saying that is an option FHWA can go with. Perhaps there are other things that can be done to minimize the congestion and make improvements? What kind of measurement was proposed that were going to be used to analyze and make conclusions in the Methods and Assumptions document?



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Response: The methods and assumptions document included level of service as the basis for operational evaluations, not V/C ratios. The methods and assumptions document was previously approved by FHWA.

The raw model outputs presented in this meeting were provided to address how the model is processing ramps, which was a specific response to a question that CDOT posed to us the last time we met. It was not intended to be a decision-making metric. As noted earlier, FHU will provide additional No Action Alternative information to make everyone a little more comfortable with the modeling process. However, the level of service evaluation in the SLS should be used as agencies consider possible significant adverse effects to operations.

We will reconvene this group and present the additional information.

Question: Is the SLS going to change?

Response: From what has been submitted, yes.

Question: Is the HSS going to change?

Response: The HSS may change.

The SLS will change based on the decision regarding the proposed 29 Road interchange westbound ramp configuration. The SLS included the proposed 29 Road interchange with the auxiliary lane including data, figures, and charts. The SLS cannot be updated without a decision on the I-70 westbound ramp configuration.

Schedule

- ▶ Select the Preferred Alternative
 - ▶▶ Summer 2025
- ▶ Complete Conceptual Design and NEPA Impact Analysis
 - ▶▶ Late Summer 2025
- ▶ Complete NEPA Decision Document and Preliminary Design



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- ▶▶ Fall 2025
- ▶ Submit System Level Study to CDOT Transportation Commission
 - ▶▶ Including TDM strategies
 - ▶▶ March/April 2026
- ▶ CDOT Transportation Commission Presentation/Vote
 - ▶▶ May/June 2026
- ▶ Initiate Interstate Access Justification Report
 - ▶▶ Late Spring 2026

Decisions Made

A vote and decision on the proposed 29 Road interchange westbound ramp configuration will occur at the next TAC meeting.

Next Steps

- ▶ Submit the ramp volume for the No Action Alternative.
- ▶ Break out the crash data into PDO, fatal injury, suspected serious injury, suspected minor injury, possible injury, no apparent injury.
- ▶ Send the draft version with track changes of the SLS that was previously submitted to the executive team and Region 3 traffic at CDOT to the TAC members.
Completed.
- ▶ Submit the BCA calculation spreadsheet to the TAC members.
- ▶ Develop an executive summary of the things that have been done that shows data, anecdotal information, losses with graphics for additional narrative.
- ▶ Compare the 2045 model to the 2050 model and determine the order of magnitude difference.

I-70 Interchange in Grand Junction – TAC Meeting #15

June 24, 2025

Agenda

- ▶ Welcome
- ▶ CDOT Workshop Meeting Review
 - ▶ Future Volume Forecasts
 - ▶ Particularly for braided ramps with slip lane
 - ▶ Safety: I-70 Curve
 - ▶ Safety: Overall Network
 - ▶ Benefit Cost Analysis
- ▶ Overall Project Next Steps
- ▶ Schedule

Meeting Goal:

Reach agreement of the data analysis outcomes to reach consensus next month



PRE-1601



1601/NEPA

**CURRENT PROCESS****GOAL:**

Is there a need for an interchange?

DETERMINATION OF NEED● **Traffic**

- Straight Model Results
- Freeway Analysis
- Select Limits/Select Grades
- Safety

● **Analysis Tools**

- MPO Model
- HCS (Freeway)

COMPLETED**LEVEL 1****SCREENING GOAL:**

29 Road or 30 Road?

EFFECTIVENESS & IMPACTS● **Traffic**

- Interchange Spacing
- Arterial Volume Changes
- Freeway LOS
- Activity Centers
- Land Use

● **Park-n-Ride/TDM**

- Roadway Plans
- Connectivity
- Planning History
- Activity Centers

● **Impacts**

- Community Context
- Access/Driveways
- Airport
- Historic
- Previous Public Involvement
- Planning History

● **Analysis Tools**

- MPO Model
- HCS (Freeway LOS)

**LEVEL 2****SCREENING GOAL:**Identify and Select Alignment and Interchange Configuration & Key Project Elements *(see next page for details)***IMPACTS**● **Traffic**

- Interchange Type (DDI, SPUI, Diamond)

● **Environmental**

- Noise
- Connectivity
- Air Quality
- Historic
- Air Quality

● **Roadway**

- 29 Road

● **Analysis Tools**

- Field Data
- CAP-X
- Crash Modification Factors (CMFs)

COMPLETED**LEVEL 3 ANALYSIS & REFINEMENT GOAL:**

CDOT 1601 Approval (including SLS) & FHWA IAR Approval

PREFERRED ALTERNATIVE EVALUATION● **Traffic**

- Operations
- Queuing
- Upstream/Downstream Interchange Effects
- Arterial Improvements

● **Safety**

- Safety Performance Functions (SPFs)

● **Multimodal**

- Accessibility

● **Guide Signing**

- Conceptual Plan

SUPPORTING ELEMENTS● **Traffic**

- I-70 Auxiliary Lane
- 29 Road
- Patterson Road

● **TDM**

- Park-n-Rides
- Bike Lanes
- Mobility Hubs

● **Environmental**

- Mitigation Commitments

● **Analysis Tools**

- Field Data
- Synchro / Rodel (arterials)
- HCS (Freeway)

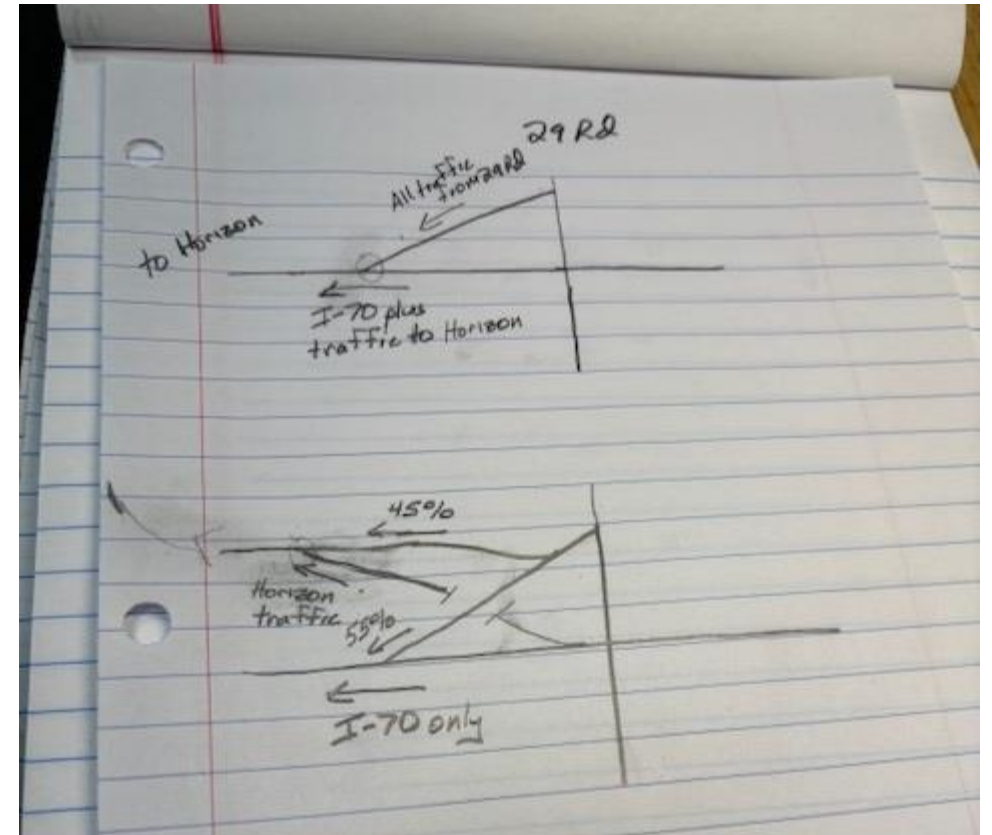
- Level of Service (LOS)
- Diverging Diamond Interchange (DDI)
- Single-Point Urban Interchange (SPUI)

Various Meetings Since Last TAC

- ▶ FHWA/CDOT Meeting (May 12th)
 - ▶ Presented draft results of BCA and updated volumes, etc.
- ▶ FHWA Coordination Meeting (May 29th)
 - ▶ Primarily a 'catch up' meeting for new TAC members
- ▶ Meeting with CDOT Executive Leadership (June 9th)
 - ▶ Provided project status update for TC consideration
 - ▶ Sent current version of SLS (track changes) to CDOT for status review
 - ▶ Sent CDOT Region 3 HSS Modeling Files
 - ▶ CDOT committed to reviewing materials in 30 days

CDOT Question:

- As depicted in the hand-sketch, the base (build) option has one merge point (29 Rd WB on-ramp to I-70) and two lanes WB between 29 Rd and Horizon Dr.
- The braided ramp option has two merge points (29 Rd WB on-ramp to I-70 and Horizon Dr WB off-ramp with 29 Rd to Horizon Dr connector). In addition, there is essentially a third lane WB between 29 Rd and Horizon Dr because of the braided ramps.
- This means the braided ramp option has more WB capacity than the base build option so it would seem that the LOS for the braided ramps option should be at least equal to (but not worse than) the base (build) option.



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Meeting Review

Braided Ramp with Slip Lane Forecasts

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Westbound I-70 Forecasts

- ▶ Travel demand model background:
 - ▶ Model is calibrated and approved
 - ▶ Modeled freeway capacity is higher between interchanges than within the interchanges
 - ▶ Ramp capacities are low when compared to statewide model
 - ▶ Effect is muted since ramp links are 'short'
 - ▶ No C-D roads or similar facilities in the Grand Junction area
 - ▶ No model approach or calibration for these facilities
- ▶ Conclusion:
 - ▶ Modeling C-D roads, braided ramps, etc. is only an approximation
 - ▶ Results need to be applied with care

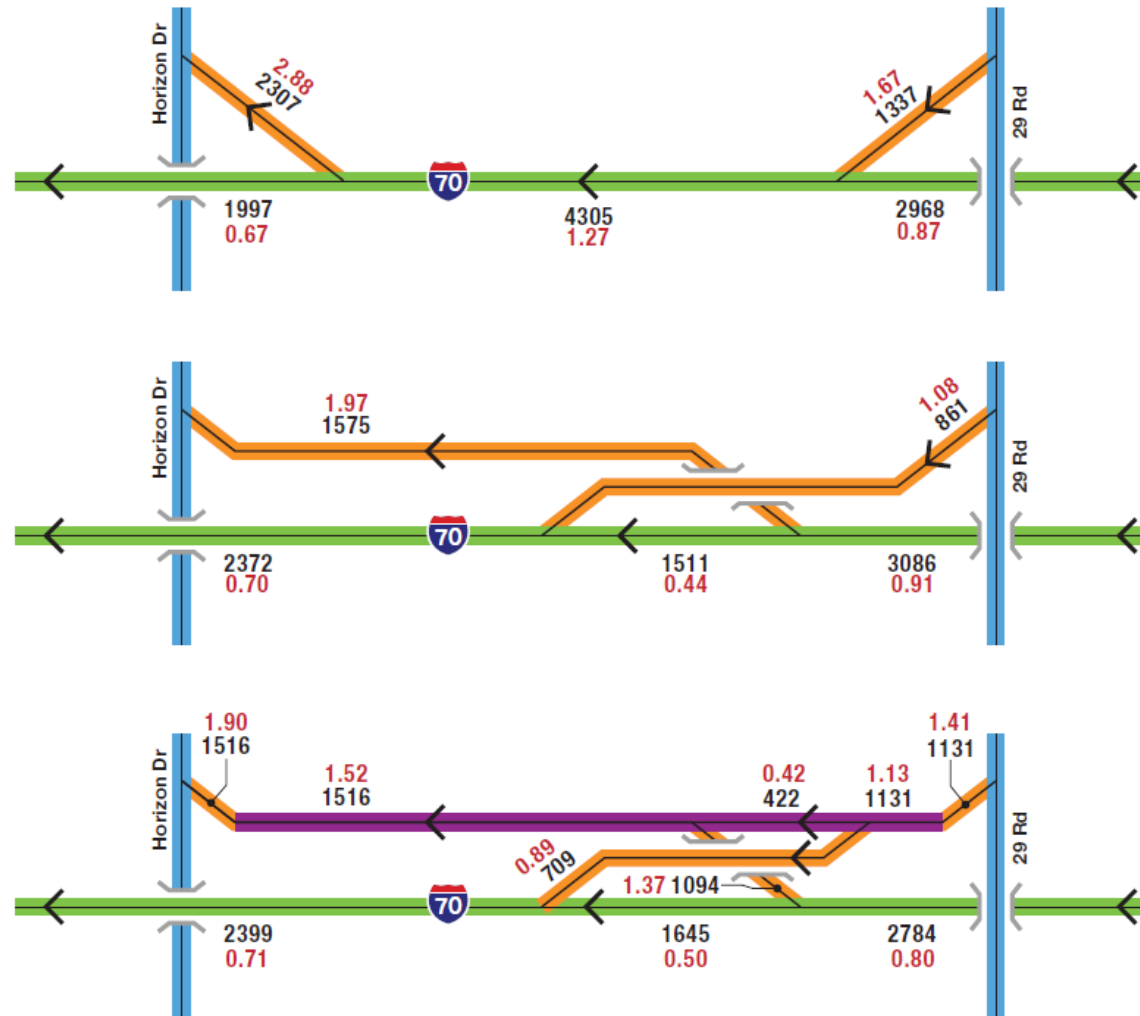
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Westbound
I-70
Forecasts

- ▶ 29 Road Efforts:
 - ▶ When ramps are lengthened, the effect of the lower capacity is more pronounced
 - ▶ C-D road or braided ramp scenarios may include longer ramps
 - ▶ No guidance for possible alternate facility types
 - ▶ After trial and error with other facility types, the team used 'expressway'
- ▶ Observations:
 - ▶ WB 29 Road entrance and WB Horizon Drive exit were over capacity
 - ▶ Constraints affect ability of C-D road and braided ramps to perform as anticipated in the model

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Westbound I-70 Model Results (AM Peak)



LEGEND

- = Ramp
- = Freeway
- = Principal Arterial
- = Expressway
- XXXX = AM Peak Hour Traffic Volumes
- X.X = V/C Ratio

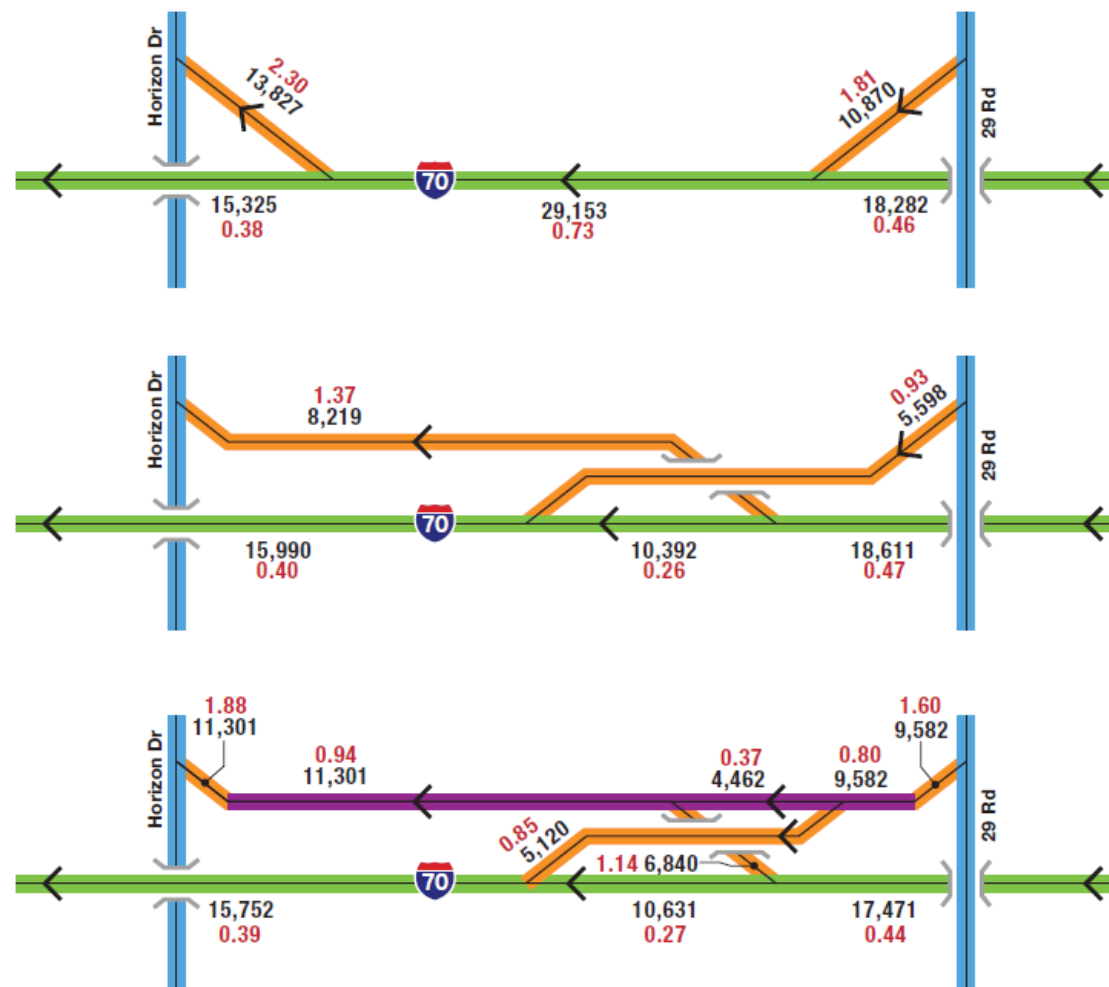


NOTE: Drawing Not to Scale

NOTE:
This scenario represents the braid as expressway segments, which have higher capacities than ramp segments. The change in V/C ratios departing 29 Road and approaching Horizon Drive reflect these differences.

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Westbound I-70 Model Results (Daily)



LEGEND

- = Ramp
- = Freeway
- = Principal Arterial
- = Expressway
- XXXX = Daily Peak Hour Traffic Volumes
- X.X = V/C Ratio



NOTE: Drawing Not to Scale

NOTE:
This scenario represents the braid as expressway segments, which have higher capacities than ramp segments. The change in V/C ratios departing 29 Road and approaching Horizon Drive reflect these differences.

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*Westbound
I-70 Model
Conclusions*

- ▶ C-D roads and braided ramps are not part of the validated model
 - ▶ The freeway volumes for the braided ramps (with slip lane) scenario may be under-reported
 - ▶ Similarly, the arterial volumes may be over-reported
- ▶ The model is internally consistent
- ▶ It is a reasonable basis for alternative comparisons

CDOT May 12th Meeting Review

Safety: I-70 Curve

- ▶ Added Countermeasures with CMFs
 - ▶ Enhanced curve warning signage
 - ▶ Widened the inside shoulder
- ▶ Other options to improve safety (no CMFs)
 - ▶ Lower the speed limit
 - ▶ Move interchange east

Safety: I-70 Predicted Crashes

Freeway Predicted Crashes (2045)

Scenario	Property Damage Only	Fatal and Injury Crashes	Total Crashes
No Action	85	38	123
Build (Base)	95	38	133
Build (Base) Alternative with a braided ramp and slip lane	83	33	116

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Safety: Overall Network

- ▶ Adding interchange increases predicted crashes
 - ▶ More conflict points
 - ▶ Longer / wider 29 Road
- ▶ Project Goals:
 - ▶ No increase in severe crashes (fatal and injury)
 - ▶ Decrease freeway crash rate

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Safety: Overall Network

- ▶ Added Countermeasures
 - ▶ 29 Road Arterial Segments:
 - ▶ Curb and gutter
 - ▶ Sidewalks
 - ▶ Bicycle lanes
 - ▶ Lighting at 29 Road arterial intersections
 - ▶ Reflective backplates at Patterson Road arterial intersections
 - ▶ Protected left turn phasing at Patterson Road arterial intersections and at I-70B arterial intersections

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Safety: Overall Network

Predicted Crashes (2045)

Scenario	Facility	Property Damage Only	Fatal and Injury Crashes	Total Crashes
No Action	I-70	85	38	123
	Arterial roadways ¹	62	30	92
	Total Study Area	147	68	215
Build (Base) Alternative	I-70	95	38	133
	Arterial roadways ¹	65	28	93
	Total Study Area	160	66	226
Build (Base) Alternative with a braided ramp and a slip lane	I-70	83	33	116
	Arterial roadways ¹	63	28	91
	Total Study Area	146	60	206

¹ – Arterial roadways included 29 Road, 30 Road, Patterson Road, I-70B, F ½ Road, and Horizon Drive

CDOT May 12th Meeting Review

Benefit Cost Analysis Review

- ▶ FHU prepared a Benefit Cost Analysis (BCA)
 - ▶ Includes I-70, I-70B, Patterson Rd, 29 Rd, and Horizon Dr
- ▶ BCA timeline assumptions:
 - ▶ Construction in 2030
 - ▶ Maintenance through 2055
- ▶ The BCA monetizes benefits for:
 - ▶ Operations and Maintenance
 - ▶ Residual Value & Remaining Service Life
 - ▶ Safety
 - ▶ Travel Time Savings
 - ▶ Emission Reductions

Updated Variables

- ▶ Project costs were updated to:
 - ▶ have design start in 2025
 - ▶ have construction extend over three years
- ▶ Based on avoided injuries and fatalities
 - ▶ Applied instead of using ratio of fatalities/fatal crash and injuries/injury crash
- ▶ PDO crashes were updated to use the per crash monetization
- ▶ Maintenance costs were updated to reflect CDOT-specific data
 - ▶ Resulted in a greater difference between the two alternatives
- ▶ Residual value was updated to reflect the changes in maintenance costs for post-analysis maintenance

Alternative Costs

	BCA
Build (Base) "Just Interchange"	\$81,500,000
Build (Base) + Braided Ramp & Slip Lane	\$111,700,000
<i>Difference</i>	<i>\$30,200,000</i>

Updated

*Benefit
Cost
Analysis
Review*

Build (Base)	BCA
Total Costs	\$70.9M – \$71.6M
Total Benefits	\$108M – \$162M
Benefit Cost Ratio	1.5 – 2.3 : 1

Build (Base) Alternative with Braided Ramp and Slip Lane	BCA
Total Costs	\$97.1M – \$98.5M
Total Benefits	\$120M – \$132M
Benefit Cost Ratio	1.2 – 1.4 : 1

Updated

*Benefit
Cost—
Alternative
Comparison*

- Build (Base) compared to Additional Costs for Braided Ramp with Slip Lane

Additional Costs of Braided Ramp and Slip Lane	BCA
Total Costs	\$26.2M
Total Benefits	\$23.5M
Benefit Cost Ratio	0.89 : 1

Data Review *Summary*

- ▶ Operational challenges are not likely as severe as shown in the SLS
 - ▶ The draft 2050 travel demand model has lower forecasts
- ▶ Additional safety measures decrease fatal and injury crashes
 - ▶ Results for the Build (base) and the Braided Ramp with slip lane are lower than No Action
- ▶ Both Alternatives show investment value
- ▶ Additional \$ for Braided Ramp result in added benefit

Simplified Comparison & Next Steps

	No Action	Build (Base)	Build (Base) + B.R. & S.L.
Peak LOS	0	-	+
Safety	0	+	++
Cost	0	+	-
BCA	0	++	+
Total	0	++++	++++

Overall Project Next Steps

- ▶ Select the Preferred Alternative
 - ▶ Summer 2025
- ▶ Complete Conceptual Design and NEPA Impact Analysis
 - ▶ Late Summer 2025
- ▶ Complete NEPA Decision Document and Preliminary Design
 - ▶ Fall 2025
- ▶ Submit System Level Study to CDOT Transportation Commission
 - ▶ Including TDM strategies
 - ▶ March/April 2026
- ▶ CDOT Transportation Commission Presentation/Vote
 - ▶ May/June 2026
- ▶ Initiate Interstate Access Justification Report
 - ▶ Late Spring 2026

Thanks!