COLORADO
Department of Transportation

Statewide Transportation Advisory Committee (STAC)
March 13, 2020
9:00 AM – 12:00 PM
Video Conference
Denver, CO
Agenda

9:00-9:05 **Welcome and Introductions – Vince Rogalski, STAC Chair**

9:05-9:10 **Approval of February Meeting Minutes – Vince Rogalski, STAC Chair**

9:10-9:25 **CDOT Update on Current Events (Informational Update) – Herman Stockinger, CDOT Deputy Director**

- Update on recent activities within the department.

9:25-9:35 **Transportation Commission Report (Informational Update) – Vince Rogalski, STAC Chair**

- Summary report of the most recent Transportation Commission meeting.

9:35-9:55 **TPR Representative and Federal Partners Reports (Informational Update)**

- Brief update from STAC members on activities in their TPRs and representatives from federal agencies.

9:55-10:10 **Federal and State Legislative Report (Informational Update) – Herman Stockinger & Andy Karsian, CDOT Office of Policy and Government Relations (OPGR)**

- Update on recent federal and state legislative activity.

10:10-10:30 **Express Lanes Master Plan (Informational Update) – Nick Farber, High Performance Transportation Enterprise (HPTE)**

- Overview of the recently approved Express Lanes Master Plan.

10:30-10:45 **Break**

10:45-11:10 **Statewide Plan Update (Informational Update / Discussion Item) – Rebecca White, Division of Transportation Development (DTD)**

- Update on the status of the 10-Year Strategic Pipeline of Projects.

11:10-11:25 **FY 2020-21 Final Annual Budget (Informational Update) – Jeffrey Sudmeier, Chief Financial Officer**

- Update on the FY 2020-21 Final Budget and next steps.

11:25-11:40 **STAC Bylaws (Informational Update) – Rebecca White, DTD**

- Discuss the formation of a STAC subcommittee to review and update the STAC Bylaws.

11:40-11:50 **Multimodal Options Fund Updates (MMOF) (Informational Update) – STAC Representatives**

- Update on the status of MMOF project selection by STAC representatives.

11:50-12:00 **Other Business- Vince Rogalski**

12:00 **Adjourn**

STAC Web Conference: 252-421-3101 PIN: 924 435#
STAC Website: https://www.codot.gov/programs/planning/planning-partners/stac.html

STAC Meeting Minutes
February 14th, 2020

Location: CDOT Headquarters Auditorium
Date/Time: February 14, 2020, 2019; 9:00 a.m. – 11:30 a.m.
Chairman: Vince Rogalski, STAC Chair
Attendance:

In Person: Vince Rogalski (STAC Chair and Gunnison Valley TPR), Dick Elsner (Central Front Range TPR), Elise Jones (Denver Regional COG), Ron Papsdorf (Denver Regional COG), Suzette Mallette (North Front Range MPO), Dave Clark (North Front Range MPO), Barbara Kirkmeyer (Upper Front Range TPR), Dawn Anderson (Upper Front Range TPR), Tom Jankovsky (Intermountain TPR), Rebecca White (CDOT Division of Transportation Development), Herman Stockinger (CDOT Deputy Directory/Office of Policy & Government Relations), Jeff Sudmeier (CDOT Chief Financial Officer), John Liosatos (Pikes Peak Area COG), Heather Sloop (Northwest TPR), Dana Brosig (Grand Valley MPO), John Cater (FHWA), Walt Boulden (South Central TPR), Michael Yohn (San Luis Valley TPR), Walt Boulden (South Central TPR), Terry Hart (Pueblo Area COG), Holly Williams (Pikes Peak Area COG), Norm Steen (Pikes Peak Area COG), Kris Manguso (Northwest TPR), Jim Baldwin (Southeast TPR), Stephanie Gonzales (Southeast TPR), Roger Partridge (Denver Regional COG), Andy Pico (PPACG)

On the Phone: Chris Richardson (Eastern TPR), Dean Bressler (Grand Valley MPO), Doug McDonald (Southern Ute Tribe), Keith Baker (San Luis Valley, TPR), Katie Sickles (Gunnison Valley TPR)

Agenda Item / Presenter (Affiliation)	Presentation Highlights	Actions
Introductions & STAC Minutes / Vince Rogalski (STAC Chair)	• Motion to approve the January STAC meeting minutes.	Minutes approved
CDOT Update on Current Events / Herman Stockinger (CDOT Deputy Director)	**Presentation:** We've had a heck of a season for snow. Vail Pass rest area is buried in snow. We're getting ready to go back to TC to ask for more from our snow and ice reserve, which we will have to draw from because of the way the season is going and anticipated shortfalls. It is still only February and the heaviest snow usually happens later. Here's a story that we received that I think demonstrates what we're about: Today I was driving to the VA for a surgical procedure and my car had an electrical failure without power for my sister's oxygen. The Uber app finally dispatched drivers, but each one cancelled. An angel of mercy CDOT operations manager came to my rescue.	No action.

	CDOT decided to deliver her safely and on time to Aurora after Uber continued to cancel. We probably don't hear a lot of what happens on the roads, so I think that's pretty cool and appropriate to share with you all. At our last commission meeting we discussed RPP and FASTER safety at length. We have resolutions for all of those. CMAQ will be discussed today. <u>STAC Comments:</u> • Heather Sloop: Is the Commission going to see 2 options? • Herman Stockinger: We are showing them option B only, but advising them that they can choose something else. • Suzette Mallette: What is option B? • Tim Kirby: The Option B formula is 25%VMT, 20%population, 40% lane miles, and 15% truck VMT. • Herman Stockinger: Our thought was that the easiest and best way was to have staff recommend what STAC recommended and they can change it if they want to • Vince Rogalksi: Just to remind everyone DRCOG is against this because RPP formula ends up being used for other fund distributions.	
Transportation Commission Update/ Norm Steen, STAC Vice-Chair	**Presentation** • In your packet is the TC report. As Herman was saying there was a big discussion in the Statewide Plan Committee discussing CMAQ, RPP, and the plan and how we're moving along. • There was also a discussion about wildlife and the interaction with the transportation system. Wildlife is working with CDOT, there will also be a discussion on mobility and what that means, and how we can deal with that in terms of commuter rail and some other things. The budget supplement will be discussed. • There's also a discussion about increasing the amount of money set aside for ice and snow removal. $13M was added to that, $10M was usually the reserve, but we've already gone over what the budget is scheduled for now. We may even need to ask for more money. CDOT is really taking care of roads and keeping them open.	No action

	STAC Comments • Heather Sloop: My only comment is that on page 16, bullet 4, it says there's a potential for developing a new RPP formula. I don't remember having that discussion, and I don't know why that is in there. • Vince Rogalksi: This is the RPP formula that they are putting forward, but they have the option to can change that. • Tim Kirby: It probably sounds weird because it came out of my mouth. We are making sure they are aware that they have the option to develop a new formula, different from what we are presenting to them, if they would like. Staff typically provides the Transportation Commission with all of their options and new formula development is one of those.	
TPR & Federal Partner Reports	**Presentation** • DRCOG: Our next meeting is next Wednesday. We will look at recommendations for the transportation demand management set aside for the 2023 TIP. We will receive briefings from CDOT on the 10 year pipeline and SB 267 urban arterial improvement concepts. We are currently testing multimodal land use concepts for some scenarios for our 2050 Metro Vision LRTP, and are completing draft documents for our regional Vision Zero plan, and last week there was discussion on HB 1151, a robust discussion with lots of questions, and just to let everyone know this is not a DRCOG bill. • GVMPO: We have a board meeting on February 24, 2020, and will adopt the 2045 long range plan and transit plan, and will consider a list of of projects. We have received MMOF applications, and looking to get those approved. Unfortunately, we had to get some IGA issues ironed out, and I'd like to discuss that further today. We have the opening of a connector trail complete that will connect to the National Monument and that was a partner project and working on amending our TIP. o Rebecca White: I assume you mean with turnaround? That will be discussed later. • NFRMPO: January 15, 2020 we met to discuss our list of projects and submitted our priority list to region 4, and the TPR chairs met to work on those. Then the MMOF call closed January 31, 2020, and the scoring committee met this Tuesday, and all	No action.

	projects will be funded. Two council meetings approved safety targets. I-25 work continues up there, and still doing work during winter and progressing along. • PPACG: We approved our TIP. One issue involved a special TIF district for a project on the north end and they requested adding $15M of special district money to the project, and there was good engagement with local business and we appreciate the cooperation, and it was approved and will proceed. Second, we agreed to adopt CDOT's safety targets and we had some discussion about sub-allocating down to the MPO level. Finally, we took up a discussion of our advocacy role. We are having a legislative breakfast next week to advocate for more transportation funding. • PACOG: *No Update* • Central Front Range: We are not dry, and we are having a lot of snow and drifting. We can't do a lot in winter. I follow Cotrip.org a lot, and you have changed how you do things. We appreciate that US 285 is not great, so people don't use it as an alternative. I want to thank whoever is in charge of disseminating that message. • Eastern: TPR: We haven't had a TPR meeting since the last STAC, but did work with the RTD on the 10 year pipeline and we prioritized I-70 and I-76 corridors. Met submission for MMOF, and close those on the 28th. We appreciate all the snow removal. • Gunnison Valley: We are just dealing with the snow and cold. We'll be having a TPR meeting March 26, 2020 to approve the draft RTP. One of the things we discussed at the last meeting was MMOF. We approved 6 or 7 projects, but still have details to work out. • Intermountain: I'm the Vice Chair for the Intermountain TPR, and we approved our 10 year list. Our number one project was a set of improvements to I-70 in Grand Junction, and all of our top projects are interchanges on I 70, and at the intersection with SH 82 is where they are coming to CDOT. Anyways, I'm plugging for Garfield County here. • Northwest: We met yesterday and had a good meeting and looked at the rough draft of the Statewide Plan, and we will make some edits and changes, but we are almost done. All counties are starting chip seal and striping. We have maintenance staff on our passes and a hardship in retaining employees on our passes. There are multiple times on rabbit ears that it's closed because of a shortage of staff. Maybe we should pay people more, so that people can get up there. This is not just rabbit ears it's about everything. INFRA grant we'll be signing letter of support this week.	

	In Steamboat we had the largest fireworks display last Saturday and our transit system broke ridership records, with 18,000 riders in one day in Steamboat. • San Luis Valley: Roads are clear, and very manageable and we like it like that way. I want to thank staff for the treats this morning • Southeast: We have our TPR meeting coming up on February 26, 2020 for STIP amendment to get 287 project Main Street added to the STIP. We have 3 TAP applications and considering 3 MMOF applications and the regional coordinating council continues to meet monthly • Southwest: • South Central: We met on January 23, 2020 and approved the South Central RTP, and that's ready to move forward. We approved 3 MMOF projects and started discussions with Outrider regarding the Trinidad to Pueblo Route. There is a proposal for electric charging along SH 12 and as we come into Las Animas County • Upper Front Range: Upper Front Range hasn't met since December 19, 2019. Our next meeting is March 5, 2020. The PEL on SH52 is getting kicked off, Weld County submitted an HSIP project application off of SH92 and 47th Ave at an intersection with lots of accidents and fatalities. It is designated a high risk rural road so we are excited to submit that application. • Southern Ute Indian Tribe: *No update.* • Ute Mountain Ute Indian Tribe: *No update* • FHWA: : Naitonally, the EPA has started an effort to look at CEQ regulations for broad environmental regulations under NEPA. This is controversial, and could have ramifications for transportation. Federal Highway we are agency that looks at projects and now looking at a more process oriented approach. This is more of a philosophical change. There's a lot of upside to it, and it could become more efficient for us. STAC Comments: • Keith Baker: I just wanted to mention that FHWA held a Federal Lands workshop. We had a workshop with FHWA to look at potential projects for FLAP funding, and others to provide access to public lands and that can even go to roads that are not federally maintained roads. Several counties nominated projects and we are starting to look at those now.	

Federal and State Legislative Report (Informational Update)/ Herman Stockinger and Andy Karsian, CDOT Office of Policy and Government Relations	**Presentation** <u>Federal</u>: • A couple big things to note: 1. House Democrats released a framework for infrastructure spending. The House Ways and Means Committee weighed in. It includes spending $300B representing a 45% increase from the FAST Act, and an increase for transit, and rail. Policy highlights: There would be a pilot for VMT and equity. It prioritizes existing infrastructure and improving that. Looked at modifying HSIP and improving pedestrian safety and work-zone safety. Gives more control to locals to administer funds, and tackles congestion and toll pricing. Addresses airports with an increasing facilities charge indexed to inflation. There is an Energy Commerce piece to build out infrastructure. But it's a political document at this point, and we probably won't see a bill before elections. The Ways and Means committee had 6 witnesses testify. Lots of spending here that likely won't occur, but it's good to know what they are thinking. • The President outlined his thinking in the State of the Union address with a bill that would mean a 27% increase from the FAST Act. However, this conflicts with the budget cuts that would decrease transportation spending by 20.9 %, but also a lot of other cuts that probably won't happen. Long term he did endorse authorization what amounts to a 12% increase over the FAST Act. In terms of public transportation, he focused on modernizing existing infrastructure which contrasts with the democrat's vision that focuses more on maintenance. We will go to DC next week and will report back next month <u>STAC Comments:</u> • Tom Jankovsky: I wanted to go back to CEQ. It's controversial, but it would make things move faster and will reduce the litigation costs associated with projects. • Norm Steen: We have just gotten back from the Transportation NACo Committee, so please let us know if there are things you'd like us to communicate. We have a 50 to 20 minute block on the Committee. • Herman Stockinger: Remind me of some of the successes you've had. • Norm Steen: We had 5 bills. There was a National Resolution for transportation rest areas allowing private public partnerships, and it was well received. The language would direct congress to allow them at rest areas. We have run this through in a number of agencies so hoping it does well.	No action.

	State: • It has been a long week starting off with a large meeting of transportation stakeholders at the Governor's carriage house. All interests were represented. Executive Director Lew presented, and Colorado Concern came to speak to ideas about funding and some folks from Northeast Colorado also came to talk about funding. • A lot of what they discussed is a fee based approach. It's not going to be one specific thing. And we still haven't seen them, and working toward language and talking about a variety of things including EV registration fees and TNC fees and how to establish equity. So you see the theme of road user charge coming out. It's not going to be a massive opportunity for us, but could help us leverage funding in other creative ways. • That was Monday, and during the week we discussed a bill on traffic safety and a hands free mandate bill, mostly centered on how law enforcement can identify distracted driving and enforce it. That passed unanimously in the Senate, but in the House it is more of a problem. • There are ongoing conversations about biodiesel, and that has moved out of the Senate onto the House, and it will be an interesting conversation with interesting impacts to CDOT. They did take into account problems with winter months with the diesel mix. • First EV funding bill died in committee because of how it was drafted and where funds were going. Tesla said they didn't like it because they want it to be more part of a package bill. P3 bill that passed and this allows CDOT to allow more transparency with partnerships and with local governments. STAC Comments: • Norm Steen: SB 44 died. What's your postmortem on that? This was a 10% surcharge for transportation. Why did that fail? • Andy Karsian: Senator Lundeen even spoke a lot to the usual comments on how we need to do something but then on the State Affairs Committee even Democrats said we need a prioritization of General Fund money, and then another democrat said we can't move forward because of the 10% diversion and	

	where it would come out of. Dems said we need to keep going with different rhetoric. • Norm Steen: There was a lot of positive language, so I thought it was moving to a yes vote, but then it blew up.	
PD-14 Scorecard (Informational Update)/ Rebecca White, Division of Transportation Development	**Presentation** This is an important document because this sets out what we will do. We have a lot of new commissioners and so we are walking them through several areas that we measure. We want to bring this to you so you can see how it is evolving. We are going to focus on bridge and pavement measures today. When we look across the portfolio these are the two biggies. Bridges and pavement are the two biggest budgets. It's really the core of our system. When bridges become weight restricted we hear a lot about it. We have the experts here to talk a little bit more about how we are doing. • <u>Bridges</u> (Michael Collins, State Bridge Engineer, Presentation) What we have here is the percentage of bridges that are rated poor. When we reach 10%, is when they start telling us how to spend, so we want ti stay at or below 5%, and that's where we are now. • State owned bridges rated at good is what the Federal standards are now looking at. We are looking at setting a target of 45% for state owned bridges that are rated as good. So I want to get into what that means. • If you look at the bridge inventory, it breaks out how we are currently doing and you can see the historic data back to 2007 and up to 2037, and you can see that this is going to get very concerning and costly to address bridges if we don't address this soon. • This is a lagging metric and our fair bridges have just started to outweighing our good ones. In the past, we focused on poor structures and bringing them up, but then we lost sight of good and fair bridges and asset management along the way. • The problem with focusing on poor bridges is that now we are only working on 12-16 bridges per year, and they are larger dollar projects and as we do that we aren't getting as much bang for our buck, and from the $60M a year we receive for eligible bridges through Bridge Enterprise we are only getting about $35M towards assets, and we are at an extreme deficit in terms of where we should be	No action

	putting our funds and how much to be put towards maintenance. At current levels this shows where we will be by 2037, which is really concerning. • What we are doing now is tracking lag metrics which make us look good, but by other metrics we are in trouble. Based on lead metrics we aren't meeting our metrics. We are not putting enough money towards treatments that have the capacity to maintain bridges longer like with bridge deck treatments. • Bridges are supposed to last 100 years and the average life of our bridges have already exceeded that, and we need to maintain our structures, which we aren't currently keeping up with. Instead of keeping up with replacements, we should be keeping up with maintenance because it is much more cost-effective. <u>STAC Comments</u> o Rebecca White: A bit of good news here is that we have this data, and we can see what's coming at us. We would also like to engage commission about this wave of fair bridges and how we invest the money we have. o Norm Steen: This metric talks about bridge deck, but what is the metric for structural issues? Is that different? o Michael Collins: What qualify as poor bridges involves 3 factors. They look at 3 things: bridge deck, superstructure, and substructure. If there's a 4 or less (on a 10 point scale) on one of those 3 elements that drives for a poor condition rating. So back to the question about the bridge deck. If you maintain the deck you can keep it going indefinitely and extend the life, and the more you don't maintain the deck the more it allows deterioration and structural problems that will require replacement. o Norm Steen: Other issue counties face is where you get erosion to the bridge piers going down to the steel, but if you look at those bridge decks maybe it has overriding factors since it is impacting the structure. o Michael Collins: It's not one of the drivers for the rating. Let me go back to the joint real quick. If you let a joint leak it goes down to the bearings and that's where the downgrade comes and compromises the structure, so similar concept yes	

	• Pavement: We have three target metrics that we look to achieve. The first one is to achieve 80% high/moderate drivability life for interstates, second is 80% drivability life for NHS, and third is 80% for the the state highway system. • 80% is the fiscally constrained target, and the second column is aspirational at 90%. Currently we are meeting those targets, but as we look into the future we have a backlog of our network that is encroaching on that low DL rating and as we look into the future at the current levels we will start to have problems achieving those metrics. • This does not take into consideration the Rural Road Program, which will give a temporary boost to non-interstates, but because it isn't sustained it will drop us right back to the problem we are in. It will not impact interstates. STAC Comments o Rebecca White: I think our recommendation will be to keep the targets where they are because these are not going to be easy to meet. o John Cater: What is DL based on? o Craig Wieden; It's based on condition and how the user interacts with the road. So it does weigh more heavily towads user based assessments o John Cater: so if it's cracking but smooth will it rate better than a rough ride? o Craig Wieden: Yes, but our metric does account for cracking as well. o Rebecca White: I want to also bring you some safety measures. There are many ways to measure safety, but I'll have Manjari walk you through this. • Safety: (Presentation, Manjari Bhat): This is a report card for 2018 data and the model that we're using right now, and we talked to TC about. • We developed some new objectives that combine the department's new to be published strategic safety plan, and new standards from the 2015 FAST Act. The goal of zero deaths is coming out of the plan and one of the metrics we are posing for the current and new fiscal year. • The one thing that this is not reflecting is that the reduction in fatalities and updated definition of vulnerable users to adopt the STSP plan so that we are looking at pedestrians, first responders, bicycles and motorcycles. One other new thing is the lead by example within CDOT and to measure our employee	

	crashes as well within our organization. Some feedback we will get back. Another is do we separate rural and urban crash data? <u>STAC Comments:</u> o Rebecca White: I would love STAC input on that in particular o Heather Sloop: I agree urban vs . rural crash data would be good to have. But there are a zillion crashes where there are 6 deaths on one little road. And 2nd I applaud all of this, but I have strong concern with zero death goal when it isn't attainable. Goals should be attainable. o Vince Rogalski: One comment at TRAC last month was that Oslo, Norway did achieve zero deaths. So it is achievable. o Tom Jankovsky: I look at this and the one thing you can't do is take care of humans who are driving and fix road rage, distracted driving, and just mistakes and that really drives that statistic, and there's a variables out there that are out of our control, and maybe when we go to driverless vehicles it will be more achievable. o Phone attendee: Just for the record Norway driving miles is a lot lower than what we have here o Ron Papsdorf: From our perspective we have been working on Vision Zero and it's important, and I think it's fine to look at urban vs. rural since different crash patterns emerge in the different contexts. We have a different view than Heather. There is no reason that we need to have fatalities on system. There are ways to significantly reduce fatalities. We are taking steps to concretely drive down fatalities. Different designs and solutions. A no deaths goal is acceptable. 600 fatalities a year is like 5-6 airliners going down, and if we had that happening we would be focused on this in a more urgent way, but we've become immune to it, when we should not be accepting these rising fatalities. o Norm Steen: I wonder who we are partnering with. This involves both physical and social factors. All these nonprofits that have an interest, are they at the table?	

	o Rebecca White: Absolutely. And the STSP was built with involvement from all those partners. We are taking that to TC for adoption and Colorado State Patrol. Very good point. o Norm Steen: How is the effort synchronized with Whole System, Whole Safety? I'll look to see what's in the package. o John Liosatos: What do the goals actually mean? When there's the problem we are chasing our tail a bit if the goals aren't achievable. If we are attaching control to these targets then all of a sudden we have a problem if it isn't realistic. Wasting resources on a goal that isn't attainable is counterproductive. o Rebecca White: Good point. The power of this document is to tell us how we are doing. As Ron said we struggle with any number of fatalities being acceptable. So that's why we have reasonable and aspirational goals. Zero is aspirational. Think of it more as a way to let TC know how we are doing so they can make good decisions if we need to change what we are investing in. o John Liosatos: It's not good if we are marking it as a failure even if we reduce fatalities substantially. o Heather Sloop: I look at this more as a mission statement than a goal. And I don't think any death is good, and so maybe we need to change our mission statement to include this. o Herman Stockinger: This is a microcosm of a national conversation around vision zero. I don't think you'll see a stated goal that we are measuring that's zero. We say our future goals are zero. We want reduction but not a number because no number above zero is acceptable, but we still have to recognize what's realistic. Maybe crashes are a better metric because fatalities are more random. o Andy Pico: we are fighting a couple things here. Our target in PPACG is 600 deaths but that doesn't mean we are trying to achieve that. Targets are the realistic numbers to let us know that we are moving toward that goal. I think it's a good idea to track rural vs. urban crashes and patterns. We know the fatality rates are higher in rural than urban areas .	

	o Walt Boulden: I guess I see this and I think this is great, and that they are talking about a lot of people at table addressing that goal. My question is that has there been a conversation where they are setting a more pragmatic goal? Is this a structural problem in a system or behavior problem? Is it also driving funding for social programs like DUI reduction? Is that integrated?	
Multimodal Options Fund Discussion	STAC Comments: • Suzette Mallette: I sent an email to staff. Since we have this MMOF influx for contracting, and we know there's going to be an impact on staff, and wondering if we can get clarification on that • Jeff Sudmeier: I can jump into this. You're right that MMOF will represent a surge from an IGA perspective and we have been working with DTR to make sure that we have the right resources, and if you recall we built in an admin fee to scale up resources if needed. We are looking at bringing on a term limited position as needed to handle the volume and we have 2 different contracting chops, and one handles engineering and one handles everything else and looking at how we distribute those and how to bifurcate that. I think there will be a surge in activity and because we have set aside funding to balance that, and how to tap into the administrative resources. The other thing is the appropriation time. • Suzette Mallette: We know there's a hard deadline and if there is a backlog in contracting that's not a good set up • Jeff Sudmeier: The MMOF portion came with a provision of annual appropriation. The first year of MMOF we got will expire June of 2023, and the 2nd year we have until June of 2024. Herman can guess at whether the legislature would extend that if needed, but if it weren't extended we'd lose access to unspent funds and that's something we have to work through from a contractual perspective. Because if it's on CDOT there's a color of money issues. What other funding can we pull from to back fill if it runs out. Herman, do you have any thoughts? • Herman Stockinger: I would hesitate to do anything to give us a sigh of relief because I think there's a reason for that date. If it happens that it's clear we	No action

	aren't going to make that goal, I'd be hesitant to start a conversation on that. How we and they manage that crush of work needs to be worked out, so we do recognize that we need to work on it. • Jeff Sudmeier: We recognize it's important to not lose time on the front end and don't want to start by using 2 years of the time to just get ready to use the funds. We can report back as we work out the details. • Suzette Mallette: Are the two sets of appropriations ending 2023 and 2024 both accounted for in the call we just did? • Jeff Sudmeier: So I think we have SB 267 funds and MMOF funds going out, and they each have time restrictions around them. The first year of funding FY 19 funding were given 3 year appropriations through 23, the 2nd year is the same 3 year appropriation, but to 2024. We have some flexibility in managing it so that we can pick which projects are using which year of funds. So we will be strategic about that and that can happen on the backend. So you send us those projects, and we will be strategic about how we align those funds. • Herman Stockinger: I think what you got from that is that you don't need to worry so much about the timing of receiving the funds as much as tracking when you spend them by.	
Statewide CMAQ Program (Discussion Item/Action Item) Rebecca White Division of Transportation Development and Sophie Shulman, Office of Innovative Mobility	**Presentation:** • This is a continuation from a conversation we had last month. We would like your recommendation, and if we can hold questions to the end I think we can get through this pretty quickly, and can field questions at that point. Just a reminder here is a list of the air quality non-attainment areas and the dates when they'll end. • The subcommittee had a number of recommendations to keep non-attainment areas harmless as maintenance periods end, rolling them into a Statewide program. And this breakdown shows as we move from FY 20 what the statewide pool looks like. Just to give you order of magnitude here. A significant part of this is going to nonattainment areas still. Roughly 5% would be going to the statewide program by 2024. Beginning in 2021 $1.4M would be going to this pool, and by 2024 it would go up to $2.5M.	Motion approved

	• In 2018, STAC approved a recommendation to TC to create a statewide set aside pool for advanced mobility projects, and we are talking about shifting that to an electrification program, which has a better air quality benefit. We are focused on this because we want to talk about impacting GHG through the statewide program. We touched on this last month. We are reducing emissions in the utility sector and transportation is becoming the biggest contributor to emissions. • Mike King: As we talked about at the last meeting, there's a lot of data showing reduction in GHG with electrification. It also has the potential to become greener along with grid improvements. This map we amended to show all locations that are planned and existing including some that are private. There are 2 types of CMAQ projects that are eligible for Statewide investment. EV charging or ITS. The previous proposal was for ITS. This map shows you the parts of the state where we could spend these funds. I apologize and this is harder to see. It shows the previous map with the PM 10 area boundaries. • We were also asked to run emissions estimates for the program. We have different ways of looking at it. The top number shows you cumulative benefits, the middle converts that to daily emissions per day and the bottom shows that in addition to direct impact if you factor in the broader benefit of meeting the statewide target it has the highest benefit because it accounts for the entire state versus just these locations. • Sophie Shulman: Just to add to this point, it's hard to quantify the impact of the network. Most people charge at home, but they are buying an electric vehicle because they have the security of knowing the infrastructure works for their vehicle, so it is really important piece of the puzzle to enable the electric market to take off and grow, but it's harder to tie to the broader benefit. We would love to ask for your recommendation. **STAC Comments:** • Barbara Kirkmeyer: I'm trying to look at this packet which we got late. How much are you taking off the top? • Mike King: by 2024 it will be 4.9% for 4 years, which is $7.9M over 4 years out of $200M based on the existing coming out, and as that happens it gets bigger.	

	• Barabara Kirkmeyer: $2M a year then? What remains out of the $75M settlement funds? • Mike King: There were $10.3M in the settlement that you can apply to this type of project, and there are about $3M of those left. Of the total 68, 20 have been allocated, but it isn't just for EV charging it also goes to e-buses, and other types of projects. • Barbara Kirkmeyer: Can you change that allocation? • Mike King: The $10.3M can't be changed, that's a cap, but the others could be moved around, but the electric vehicle charging portion is a hard cap. • Sophie Shulman: We are far below where we need to be. We are recommending that we reallocate the statewide pot for advanced mobility to electrification program. • Barbara Kirkmeyer: When did the advanced mobility projects get approved? • Sophie Shulman: That was in 2018. • Barbara Kirkmeyer: Was that a continuing program? • Mike King: It was the same as the maintenance area expiration. • Tim Kirby: I think the implication both with the prior recommendation and this, is that we continue this for this cycle, but can revisit this at which time we can recommend changes this. • Tom Jankovsky: In a county that is feeling or taking a big hit in air quality I'd like to see all cars be electric. • Barabara Kirkmeyer: When we started doing this off of the top it was supposed to be one time, not a continuing thing. We got these numbers really late and I didn't have time to compare them to see if its substantial and I think it should be only one time, so I'm voting against. • Norm Steen: A separate topic, how does the VW settlement interface with this CMAQ proposal. • Mike King: A portion of the VW settlement can go to this type of project is only $10.3M and most of that is already allocated for other projects such as electrifying other network companies hoping to support electrification at airport, so this money would continue that progress, and help to continue those programs beyond what is shown on the map. The remainder of the VW settlement can't be spent on these, but can be spent to support electrification.	

	• Norm Steen: Does that overlay geographically? Are we making optimal use with the two funds together? • Mike King: Yes, both are available statewide so we are always looking to overlay the programs so that we are putting it toward places with the greatest impact. • Norm Steen: Could it be backfilled with the VW program? • Mike King: Any area of the state would be eligible for both funds. • Norm Steen: So the VW funds could be used to hold harmless that which would be harmed by the CMAQ area? Another fund could be used? • Mike King: The VW program is running out. The money wouldn't be available for that. • Ron Papsdorf: No area is getting harmed by this. Some areas are coming off of the maintenance areas, so they wouldn't be eligible for those funds anyways so these funds could be used in those areas. • Motion to approve a recommendation to TC to redirect the statewide pot to EV charging carried with one opposing vote.	
Statewide Plan Update- Rebecca White, DTD	**Presentation:** You've been working on this for almost a year. What we are bringing to you today, you are seeing for the first time a compilation of every TPRs top projects. This is all of it put together. This is draft. We did want to talk through it today. We'll talk through it in a couple ways. Tim will walk you through some of the benefits. We want to focus on explaining to the legislature and public how this will benefit them. So we are focusing on talking about projects from that lens. • Years 5-10: Year 1 to 4 you've deliberated on. That's the $1.6B that's out the door, and years 5-10 is a wish list. We used the target of $500M a year and assumed 10% for transit, and 10% of the 10% we have taken off the top for Bustang expansion, and the cost to the state for operation. We don't have a dedicated source of funding. We apply same philosophical parameters. 25% goes to rural pavement and 75% toes to a mix of projects, and 50% overall to asset condition. One last point, these lists were built from the ground up. We asked you to keep these principles in mind. Just to step back, and we are still developing the SWP and this is just a piece. The broader document is still in progress and coming together. A couple of the TPRs have seen first drafts and	No action.

	hoping to have all complete by the end of April, and late Spring timeframe is when we have a chance for public review. As we enter a more open public process, that's when we want to share this list with the legislature and it will be open for comment and we will close out in June with final adoption. So I'd like to get your feedback on this list now before we move forward with the public process. • Tim Kirby: when we went into developing these lists, it's one thing to have a list and another thing to tell the story. So here I'm going to tell that through these principles. • In the first bucket, we have projects of statewide significance. I'll caveat this that there are others but trying to keep it clean. There are 30 projects that are considered to be of statewide significance. These are intersection improvements, interstate capacity expansion, interstate reconstruction, and bridge replacements that will improve mobility on I-70 and I-25. • In the congestion relief category, we were focused on improving congestion in urban areas. There are 58 projects that enhance urban capacity and include transit facilities and service expansion. The story we want to tell here is that we are providing congestion relief through a mixture of urban transit expansion and highway capacity increases. This doesn't include the 10% of the 10%. Just purely the urban transit in this category, but we will get to the Bustang. • We think Bustang fits into the mobility options bucket. How are we going to provide mobility to the aging population, so how do we get those folks to our central cities to access those services. We had about 96 projects that we feel increase or expand modal options. We're talking about passing lanes, rural transit operating, so the story is increasing mobility for those residents so that vulnerable populations have access to essential services for the foreseeable future. • Safety is the top priority of this department. We found 75 projects that address critical safety needs on corridors with LOSS 3 or 4, so we want to target those locations that target those high risk areas. • Road condition and maintenance: For this I want you to put your mindset into asset management. How can we get at preserving the road condition long	

	term? We had 37 bridges and 105 pavement projects. This category also includes culverts, tunnels, ITS, geohazards, walls, traffic signals, and res areas. • I want to stop and just point something out. It might be sounding like we are double counting, but often these projects impact multiple things. Again the story here is we need to address the backlog of investment going to these assets needing maintenance and identifying priorities to ensure preservation of our system long term. • Rural Paving Projects: We continue to see the intrinsic value of touching those pieces of pavement that would otherwise be missed by our asset management model. There are 64 rural paving projects covering over 700 miles, so there's a significant investment in the rural parts of the state. <u>STAC Comments</u> o Barbara Kirkmeyer: You only listed I-70 and I-25. Why not I-76? o Rebecca White: we are looking for that input and we put those because they go border to border. o Barbara Kirkmeyer: I think we need to include all interstates. o Rebecca White: That'll mean we get some that are only 5 miles. o John Liosatos: For the rural paving, that's by county population? o Tim Kirby: That's correct. We went off of the 50,000 or less in population. o John Liosatos: I don't' know if this is a problem, but when you have a place like El Paso county which is urban within a rural county, the rural parts aren't eligible for the MPO money. So we need to look at pots that they the rural portions would be eligible for in the future. o Norm Steen: From this huge list is there risk for what we aren't going to do? Whenever you set priorities there's also a need to address what you aren't going to do. o Rebecca White: I don't understand question. These aren't the additional that we didn't fund. No, we aren't showing that. o Norm Steen: I'm not suggesting you show that, you don't even write that slide a slide on what we aren't doing. Even in a household you have to make choices and decide what you aren't doing. Maybe that's not	

	something to discuss today, but philosophically, I think leadership should address this. o Tim Kirby: For the purposes of this list, the cutting sits at the TPR and MPO level. So, CDOT didn't decide that. These decisions happened at a grassroots level. o Tom Jankovsky: Under congestion relief, it's all urban and we have rural congestion as well. o Tim Kirby: Great point. We did want to paint two different pictures. So for congestion relief it is urban, but the mobility options addresses the issue in rural areas. o Herman Stockinger: I think the maps you see, and those categories aren't eligibility criteria, and they were already selected and we are just putting them in category for illustrative purposes. o Rebecca White: Overall, we are talking about $3M. We allowed every TPR the most advantageous version of RPP which came to $3.159M and the rest walks you through the number breakdown. We can't go through all projects, so I've asked each region to talk about the projects in each region that demonstrate how each region will benefit. • Region Presentations: Region 1, Jordan Rudel: There are a lot of projects to get through, so I just want to start at a summary level as highlighted here with the total allocations. Our list has been derived to pair with those numbers. We got lots of input from locals, MPO and the public. What isn't on the list are billions of dollars of other needs that are still in consideration if more funding becomes available. I wanted to start with some of the safety focused projects. We have a bottleneck reduction plan in place at 25 locations, and we are able to deliver 1 to 2 per year, and we want to continue identifying opportunities to strategically look at some of these geometric opportunities for congestion relief using these locations. Additionally, there's a lot of conversation about urban arterial safety needs specific to DRCOG's high injury network priorities and CDOT Strategic Transportation Safety Plan needs. We hope to continue progressing in addressing those needs on urban arterials. At I-25 North 84th to 104th we identified early action opportunities. The 84th Ave station is a side load station, and we are looking for opportunities for center loading station. On SH 7 we	

identified various priority intersection improvements at potential locations. Lots of intersections we are looking at widening and potential BRT opportunities. Highlighting one other, US 285 there is a 2004 EA for widening from Richmond to Shaffer's Crossing and at Kings Valley Interchange. Any questions on those?

- Region 2, Tim Kirby: I will do my best to hold the mantle for region 2. The list is a diverse set of projects. So for Central Front Range on SH 115 this is a busy corridor that sees a lot of cyclists. I like this project because one aim was to integrate all modes, and this project demonstrates that well. In South Central these three highways on SH 69, US 160, and US 350 we are experiencing more truck traffic which is good, but there's very narrow shoulders and these 3 projects target those needs. In Southeast, this is the first phase of a Lamar reliever route and this sets the stage for the freight corridors becoming much more significant. Currently, US 287 runs down Lamar, and herds economic activity, and this is a good example of how we are addressing the needs on Main Streets. For PACOG at exit 108 of I-25 to Purcell there's a box culvert there, which won't be able to handle future stress, and this will enable it to accommodate that.

  STAC Comment:

  - John Liosatos: Just a quick comment. Karen Rowe and her staff did a great job in this process, and we noticed after a chapter meeting that there were some things we want to address and tweak, and so we are working with the Transportation Commissioner, Irv Halter to do that. There may be some that don't want to change things, but we think there is leeway to make some improvements. For example, a transit hub off of I-25 that we'd like to see.

- Region 3, Dave Cesark: We have a fantastic list of projects, and are kind of focusing on two corridors, on US 40 where we have 4 different segments and the I-70 corridor. For US 40 we are focusing on safety improvements with passing lanes, and on I-70 we are focusing on West Vail Pass. It's in much need of improvement with a lot of speed differentials with trucks going up Vail Pass, and substandard curves that create safety issues as well, so we will be adding auxiliary lanes, truck parking, truck ramps, ITS improvements and improving curves, and one big one that'll cost $500-700M, but it is a critical project. We

	average over 100 hours of closures here per year and have the highest crash rates, and it's a huge link for inter and intrastate commerce and every time it closes it costs the state $1M an hour in cost to the state, so we are using INFRA and Build grant funds to address that. • Region 4, Heather Paddock: I just want to talk a little about the process briefly. We had targets, but one thing we didn't do is that we didn't take it off the top, and thought it would come organically and it did in the end. We had a lot of discussion about dividing that. So each TPR had more dollars to play with by not taking it off of the top. It was an organic list and there are a lot of projects that didn't make it. We have 3 interstates, so we ended up creating a pool for interstates but we added to the $732M target, so we added another $150M to the list. So I'm happy to say that 49% of the list is going to interstates. Just some highlights, 22% is going to US highways, and 29% is going to state highways and that includes transit as well. So it's no surprise that I-25 is on the list. We have DRCOG and all three TPRs contributing to this section of segment 5. And this isn't even in Upper Front Range's area, but they felt it was important, and that we needed to get it done. Nearly $200M is going to that. SH 119 is a regionally significant route. This is DRCOG's top priority, and it got funded. US 385 and SH71 carries lots of freight and are important regional routes, and there are no shoulders, and pavement is in need of repair, so a lot of funds went to those routes and to match that up with the asset need, so in the breakdown along there are a lot of projects there with pavement, or bridge, and then we have major interstate reconstruction. There are safety and asset projects on I-76 and I-70. We think this will help us get to zero deaths and Vision Zero, so there are some things we can do to reduce that, and these projects are critical to safety. <u>STAC Comment:</u> o Barbara Kirkmeyer: I agree with Heather's comments, and Upper Front Range and we did agree to take funding from our totals to segment 5, but we would like to make changes to that direction of funding and it didn't dawn on me until last night that this project, which has been on the capital development plan, and is no longer in the plan. And I'll point out that this US 85/US 34 interchange project is not even in the Upper Front	

	Range, but we feel this is really important for the network. So, we actually want money directed from SH 71 to help fund phase 1 and 2 of this interchange. It's been on all the plans until now. $33M would ensure signing would be done correctly to eliminate near misses and it would also ensure that poor bridges would get redone or removed and fixed and ensure signalization would be improved. We also were looking at it again last night I think everyone is aware of the CDOT and Union Pacific project on the US Hwy 85 corridor where Weld County agreed to close 11 railroad crossings and that's a $75M project for Weld County and the state to ensure US 85 ROW is available for the state to work out their issues with Union Pacific. We think if there aren't fixes put into those intersections it will exasperate those problems and will delete what we have been working on, so we are asking since this is in draft at redirecting from the SH 71 project that we put $34M to the US 85/US34 interchange. o Heather Paddock: I would support that. It has been a need for a long time. • Region 5, Tony Cady: I'm the RPM for Region 5, so of the $265M total we put $62M toward rural road projects, and that left $191M to go toward capital projects. All three TPRs have projects included in the list, and we are trying to provide equity with 40% of our funds going to San Luis Valley TPR and 40% to Southwest and 20% to Gunnison Valley. 5 highlights: four of the five have been on our planning list for the last 15 years, and are really important projects for each region and area. First, is US Hwy 285, and this has been a priority in San Luis Valley for the last few years where there's a lot of bike traffic. We want to enhance a lot of that. Then bring the road back up to current design standards. In Gunnison Valley we have the Billy Creek project which will mitigate crash patterns of which 60% are wildlife related so we are doing a wildlife underpass and fencing, and another portion are run off the road accidents so we will address that as well. Next, project is Elmore's East, which is too narrow and very unsafe. The project plan is to alter 2 lanes to 5 lanes to address access control issues and we also have wildlife issues that we'll address. In Pagosa Springs there is a dramatic curve right in town and the pavement is deteriorating so we	

	would reconstruct the road taking it from asphalt to concrete while we implement a road diet to incorporate mobility enhancements to provide better line of sight. The next project is an intersection priority study to look at the worst intersections. US 160 at Pike Avenue was the top intersection project. • Tim Kirby: You'll remember at the top of the presentation we gave you this same slide talking about what the targets were. Overall, statewide we were off by 5%, and got very close to our asset target. There's an important caveat. You don't want to try to force something. In Region 1 it didn't make sense for them to devote that much to rural paving, so when I take them out of this we are at a 74% to 26% split and 52% going to asset. So, really and truly, I think we did a good job of hitting those targets. So I just wanted to give you that summary look. • Rebecca White: There is a lot more to come. These were just some questions from you all. I do want to discuss this more with you. We don't want to stop the story at this funding constraint. Next bullet, what does statewide significance mean. Let's touch all interstates. Next, how often do we revisit this. Do we have to experience this pain and suffering again? I have a lot of heartburn about that one. You're the ones that have to go through that. We'll discuss more in the future about what is the use of this list? How does it fit into our role overall? We aren't naïve. We want to take time to make sure you are comfortable with it. This is an important document, so more discussion to come. **STAC Comments:** • Dave Clark: One question on that, is that a hard target? • Tim Kirby: No as we discussed it was really just aspirational, and just generally we wanted to see that as a mix. • Rebecca White: It was at the direction of TC that we applied those targets. • Herman Stockinger: SB 267 funds did say that 25% needed to be spent in rural Colorado, but there was no mandate for all funds like that. There was a logical decision from TC to carry that forward as a soft target. • Dave Clark: If you look through the list we put 90% to our I-25 project because it's so important but we don't want to convey to the legislature that that is all we care about. We have a big long list. We don't want other priorities to go away.	

	• Rebecca White: I couldn't agree more. • Tom Jankovsky: What does highlight mean? • Rebecca White: It's just what each region picked as sample projects to talk about to give STAC a sense of what we are investing in. • Ron Papsdorf: This is a difficult process. Just because Region 1 is all of DRCOG didn't make it less challenging. This is a great conversation point and as DRCOG develops this is a good start to that. Talk about these priorities and the financially constrained plan. • Vince Rogalski: The bylaws will be pushed to our next meeting • Heather sloop: I just want to make sure that all of this gets changed. Today was draft. • John Cater: How can this be amended? • Rebecca White; that's why we are going to ask TC about a refresh and how often to go back and look at the list. • Tim Kirby: Dave I just want to be clear that with the other projects that didn't make list, They will stay in the statewide plan, and we're discussing internally about setting up project websites that we broadcast out that there are all these other projects that are discussed as part of this process, and they aren't going anywhere. • Rebecca White: We touched on safety earlier, but I want to summarize the effort in more detail. • We have $150M that we can use on safety projects, but that's not enough, so we are bringing to Commission this month requests to invest further in safety. A really important program I want you to be aware of.	
Strategic Safety and Urban Arterial Initiative –Rebecca White, DTD and San Lee, Division of Maintenance and Operations (DMO)	Presentation: I'm giving just a quick overview on the Strategic Transportation Safety Plan (STSP), and where we are at with accomplishments and budget. • STSP is one element of Whole System, Whole Safety, and involves working with the safety variables in the built environment including preventing lane departures, reducing crashes, preparing for connected vehciles, and travel time reliability.	

	• The approved strategic initiatives involve rumble strips, 6'' striping, MASH compliance, cable rail, variable speed limits, and higher height of guard rail. • STSP was established in 2019, and we got $11.3M a year. • Mash compliance involves a number of newer treatments. This was mandated in 2016 to move to this higher standard for guardrail. • Accomplishments to date, we are implementing 6'' striping with 20% implemented statewide, and moving to MASH compliance more quickly with our contractor. We have implemented 100 miles of targeted rumble strip improvements, we have variable speed limits implanted in Glenwood Canyon, and 16,000 lf of cable rail. • A snapshot of what we funded: $11.3M was budgeted per year. Our request from the region was for $47M total, and we funded $22M of that, and that will apply in part to employee safety needs with mobile barriers for work zones. This is our $27M one time ask to fill the gap. • Budget snapshot: Considering the $24.4M budget we think a constrained ask is reasonable and will get us to 40% statewide striping needs and 500 targeted MASH end treatments and 200 miles of rumble strips. • Rebecca White: Quickly, the other safety issue is the growing fatality rate with a 78% increase on urban arterials mostly pedestrians and bikes, and $25M expressly devoted to safety and urban arterials. $26M could help address these issues. If you make it easier to access transit and bike lanes, then you make it safer. We would like to overlay where people are getting hurt, and look at other things like readiness of projects and years of NEPA to get things deployed quickly. We want to paint a picture and striping is so important, and bringing all the rest together for TC. <u>STAC Comments</u> • John Liosatos: Is urban just considered in Region 1. • Rebecca White: That reflects the Region 1 pot, and we are asking TC to use STBG to use for the other regions. We got $37M in STBG dollars that was unexpected.	

Other Business/Vince Rogalski, STAC Chair	• STAC Bylaws will be continued to the next STAC agenda • Our next meeting is March 13, 2020 • Adjourn	

STAC ADJOURNS

The Transportation Commission (TC) Workshops were Wednesday, February 19, 2020 and the regular meeting was Thursday, February 20, 2020 at the Colorado Department of Transportation (CDOT) Headquarters at 2829 W. Howard Place, Denver, CO 80204.

Documents are posted at https://www.codot.gov/about/transportation-commission/meeting-agenda.html no less than 24 hours prior to the meeting. The documents are considered to be in draft form and for information only until final action is taken by the Transportation Commission.

Transportation Commission Workshops
Wednesday, February 19, 2020
12:00 pm – 5:45 pm

Attendance: All Commissioners: Bill Thiebaut, Irv Halter, Barbara Vasquez, Kathleen Bracke, Karen Stuart, Donald Stanton, Gary Beedy, Eula Adams, Sidny Zink, Shannon Gifford, and Kathy Hall were present.

Transportation Commission Working Lunch

Colorado Association of Transit Agencies (CASTA) Presentation- Transit Around the State: Working Lunch for Commissioners (Ann Rajewski, Executive Director, Colorado Association of State Transit Agencies)

Ann Rajewski provided an overview of Transit in Colorado based on information from her organization, the Colorado Association of Transit Agencies (CASTA).

- An overview of CASTA with Transit funding sources was presented.
- The Roaring Fork Transit Agency (RFTA) is one of the larger providers of transit in Colorado, but is considered a rural entity. As a result, Colorado has a comparatively large rural transit agency representation due to the mountain resort areas that provide transit service.
- An overview of La Junta Transit was presented (they are going to only offer curb to curb service – no longer any fixed route service).
- Some considerations for electric bus Service in Colorado were outlined that included:
    - The cost of EV buses are a potential obstacle to transition with large buses costing approximately $1 million (with 12-15 year life) and small buses costing double the cost of diesel vehicles with only a five year life.
    - Other considerations are the cost of electricity in terms of electricity production, EVs operation in inclement weather and length of operation, and if energy is from a renewable source.
    - It is anticipated that some agencies may need to replace one bus with two.
    - Generally speaking, it takes 12-17 years to turn over a transit fleet, and there is not much reliable data on vehicle longevity.
    - Agencies don't have the technical knowledge in-house to do an electric bus procurement, especially, the small agencies. For many rural agencies, going electric does not seem practical yet...due to issues described above.

David Averill, Executive Director of SMART, provided an overview of the San Miguel Authority for Regional Transportation (SMART) based in Telluride, Colorado. He expressed his concerns with EV buses regarding their cost, and other characteristics associated with being feasible for operation for smaller rural transit agencies anytime in the near future.

Discussion

- Commissioner Hall noted that transit is particularly important to elderly populations in rural areas of the state
- Commissioner Adams commented to consider seriously the Uber/Lyft type/TNC service as an option for transit providers.
- Commissioner Bracke supported tailored solutions for various rider types is key. But a concern is increased VMT in urban areas of the state. Free Transit is a national trend being discussed.
- Commissioner Beedy commented that federal funding restrictions (all ADA compatible vehicles) for a given transit fleet is a challenge for smaller rural transit agencies. Ann Rajewski explained

that the possibility to dispatch the correct vehicle to on-demand/call for ride services can be an alternative to needing to purchase all American with Disabilities Act (ADA) vehicles. Transit agencies just need to demonstrate they are not discriminating against riders.
    - Commissioner Vasquez suggested considering energy savings when EV buses are not in use to lessen demand on utility companies.

FHWA Presentation on Technology and the Future of Mobility (Automated Vehicle Technology) (Carl Andersen, Technical Director of the Office of Operations Research and Development, FHWA)

John Cater of FHWA kicked-off the presentation and welcomed Carl Anderson to the meeting.
A detailed overview of Infrastructure Investment Implications of Automated Vehicle (AV) Technology was presented to the TC members over their lunch hour. Key takeaways related to transition to Automated Vehicle Technology outlined included:

- The Transition to AVs will be long (20-30 years out)
    - Infrastructure improvements could include high-quality road surfaces, clear lane markings, and connectivity.
- Concepts such as ownership that is individual or public, types (passenger or freight), single occupancy vehicles (SOVs) or shared occupancy, light or heavy-duty vehicles will influence AV adaptation rates and traffic patterns.
- A description of the cooperative research occurring with various entities in the private and public sectors.
    - There are currently 97 connected vehicle (CV) locations in the United States (including 57 operational projects 40 planned projects), all of which rely on the 5.9 GHz Safety Band.
    - CARMA is an FHWA initiative, achieves the benefits of cooperative driving automation (CDA) through collaboration using open-source tools.
- Other research occurring was overviewed and an FHWA Automation Readiness Strategy was described.

Discussion:

- Commissioner Vasquez asked about additional information on infrastructure development and research. More specifically the cost differential for Supreme Concrete. Steve Harelson, CDOT Chief Engineer, responded that Supreme Concrete has a cost factor of 20 times above traditional concrete.
- Concerns arose from Commissioners about the security of data in the event of a cyber incident for AVs.
- Commissioner Thiebaut thanked Carl Andersen for the presentation.

Funding, Finance & Budget Workshop

FY 20 Budget Workshop/Supplements/Amendments (Jeff Sudmeier)

Purpose: To review the seventh amendment to the FY 2019-20 Annual Budget in accordance with Policy Directive (PD) 703.0.

Action: The Division of Accounting and Finance (DAF) is requesting TC review and approval of the seventh amendment to the FY 2019-20 Annual Budget. The seventh amendment includes two items resulting in the increase of Bustang's budget by $1.2 million and a reallocation of $4.6 million funds to the Snow and Ice Control.

Discussion:

- No substantial comments were raised by the TC members.

FY 21 Budget Workshop (Bethany Nicholas)

Purpose: To review the FY 2020-21 Final Annual Budget, set for adoption in March 2020.

Action: The Division of Accounting and Finance (DAF) requested that the TC review the FY 2020-21 Final Annual Budget Allocation Plan, and provide feedback to the Department in preparation for the March 2020 meeting when the FY 2020-21 Final Annual Budget will be presented to the TC for adoption.

Discussion:

- A couple of Commissioners raised the topic of hiring more full-time employees, vs. retaining consultants for tasks. Commissioner Adams requested information regarding the status of consultants currently on-board and how many are working 2,000 hour annually. CDOT staff explained that cases of consultants working full-time are not very common.
- CDOT Staff also explained that no FTE limit is established by state law, but PD 703.0 is where TC establishes policy for number of FTE.
- CDOT Executive Director, Shoshana Lew, commented that the reality is that at times there were policies in place to restrict FTE count growth. We are looking into some of these policies now. We will be coming to you with further updates on this subject in the next few months. In order to conduct more work in-source it would require the FTE number to increase and to change policy. This approach can cut costs if done properly. It is a cost benefit analysis that CDOT should conduct.
- Jeff Sudmeier, CDOT Chief Financial Officer, explained that 3,300 FTE positions is essentially what we have, but normally only about 2,900 people are working at one point in time due to turnover.
- Maintenance Level of Service (MLOS) was discussed in detail.
- CDOT Executive Director Shoshana Lew noted that in terms of context for MLOS, it captures maintenance and maintenance equipment during weather events and other ancillary functions to take care of CDOT property along the roads. Reason for budget issues with maintenance is in the past maintenance projects have been grouped with other types of work when being funded, such as fixing walls, culverts, and technology upkeep as part of asset management. These decisions are made four years in advance. Some assets can be decided to hold off for a year, but snow and ice/avalanche response can't wait. We are correcting that situation now.
- Jeff Sudmeier requested the TC members to look for approving the FY 20 budget amendment and the FY 21 budget next month.

PD 703.0 (Jeff Sudmeier)

Purpose: To provide information and background on Policy Directive (PD) 703.0 and broadly outline essential updates needed to align the directive with current policies, procedures, and requirements.

Action: This review is for informational purposes and no action was requested this month. Staff seeked TC input in order to finalize updates to PD 703 in preparation for an in depth review at the March TC workshop and formal adoption at the April TC meeting.

Discussion:

- The Commission Chair Thiebaut noted this is the opportunity to decide on appropriate monetary ranges for TC approval; staff can provide a redlined version of the PD 703 and highlight options for the TC to consider.
- Jeff Sudmeier requested TC members when reviewing changes to consider clarifications and/or exemptions, as for some budget changes/edits, staff only is required to report them to the TC with no discussion needed.
- Commissioner Gifford suggested discussing in more detail the contract hires vs. more FTE at CDOT when discussing PD 703.
- Commissioner Adams noted that raising the monetary limits for TC approvals is not prudent, while Commissioner Halter stressed the importance of trusting staff to make decisions, where no choice is really an option (and not required by state statute to bring forward to the TC for approval) such as funds for snow/ice removal and avalanche/rockfall response type decisions. Commissioner Beedy expressed comfort with the existing threshold of $1 million and Commissioner Gifford noted that some evolving/new programs need more oversight.

- Commissioner Zink noted that the TC is not intended to go into the weeds, but how we define weeds is an important consideration. We have seen why projects go over budget, and if there are lots of those, that indicates a problem as it suggests the whole process is a problem. TC needs to understand the rationale for budget changes and why they are needed.
- Herman Stockinger, Deputy Executive Director and TC Secretary, noted that PD 703 is the most important policy for TC, and that the proposed changes under consideration are not substantial.

Statewide Plan Committee (Rebecca White)

Statewide Transportation Plan (SWP) Committee Members include: Commissioners Stuart (Chair), Gifford, Zink, Stanton, Bracke, and the STAC Chair, Vince Rogalski. All 11 Commissioners were present.

Purpose: The Division of Transportation Development has several topics to bring before the Statewide Plan Committee this month. Also included on the agenda are items requested by the Chair.

2045 SWP 10-year Pipeline of Projects Update

Discussion

- Commissioner Stuart, the SWP Committee Chair, kicked-off the discussion noting that the 10-year pipeline of projects was developed employing a collaborative method.
- Rebecca White, Director of the Division of Transportation Development, explained that the CDOT Regional Transportation Directors (RTDs) will highlight key projects included on the pipeline of projects for their areas. The TC already approved the first four years of the list based on SB 267 funds. The list discussed today is for the out years 5-10, which are not fiscally constrained and would only be implemented if new funding was identified for the projects. You all confirmed the transit allocation for the pipeline. We also took off 10 percent of transit for Bustang service funding.
- It was assumed $500 million annually for the pipeline out years. This list was developed with public and planning partner input, TC guiding principles, and other funding parameters.
- Tim Kirby, CDOT Multimodal Planning Branch Manager, presented an overview of the types and numbers for the Pipeline of Projects. Projects are 75% interstate and urban, and $25% are in rural areas.
- Commissioner Vasquez asked about the wildlife crossing issues and if any projects on the list include these types of improvements. Region 3 RTD, Mike Goolsby noted staff considered maximizing and leveraging Colorado Parks and Wildlife (CPW) dollars we have. We would incorporate that when money is available.
- Commissioner Beedy commented that all of I-76 East is indicated as a project, which is not correct. Rebecca White responded that I-76 maps still need to be revised to become accurate.
- It was explained that the list includes over 150 projects at a cost of over $2 billion (these are not funded/fiscally constrained yet, but can be implemented only if new money comes in).
- Rebecca White welcomed and introduced the RTDs to provide information on the key projects in the project pipeline for their respective Regions. For more details on the project pipeline, see the TC packet at: https://www.codot.gov/about/transportation-commission/meeting-agenda.html.
- Each Regional Transportation Director provided an overview of the key projects included in the 10-year pipeline for years 5-10 for their Regions.
- Commissioner Bracke asked to see transit projects together in an overlay on a map to have available at a glance a holistic transit and highway project map, and how will the project list be used?
- CDOT Executive Director, Shoshana Lew, explained that CDOT still needs to determine the particulars of how to engage the legislature and use the list. This list achieves definition and describes what we are paying for before we pay for it. If a funding solution is found, CDOT is ready to move forward and spend the funding. The list provides substance for another funding package (from the legislature) and will keep the conversation moving.
- Commissioner Bracke wanted to know what happens to projects that ended up on the cutting room floor. Tim Kirby, CDOT Multimodal Planning Branch Manager, responded that all projects identified from public and stakeholder input will be included and documented in an appendix in the 2045 SWP to

capture all feedback and show project-based strategies to address needs. Executive Director Lew added that we are being clear about what this list is and what it isn't – it is how to prioritize $500 million per year. It still leaves things unfunded. We are making sure we convey it is not everything.

- In terms of getting the pipeline to flow into future years, Commissioner Bracke recognized that it flows with additional funding.
- Executive Director Lew responded regarding how to make pipeline flow by explaining that there is a limit of what we or the market can absorb with staff and contractors to implement projects on the list. CDOT needs to consider the resources available in terms of funding, contractors and construction supplies to deliver the list.
- Vince Rogalski, Chair, Statewide Transportation Advisory Committee (STAC), noted that in years past if surprise money came in, CDOT and planning partners were requested to create a new list each time. This work is being done to avoid repetitive list making.
- CDOT Staff is planning to continue to refine and make maps more visually appealing. The SWP Committee will need to meet monthly through June 2020.

CMAQ Program Distribution Formula

Staff is not proposing any changes to the overall CMAQ formula, which has been in place for several years. However, the Commission is being asked to consider reallocating the small amount of statewide dollars to vehicle electrification programs.

Discussion:

- The key change being requested of the TC is to approve reallocating the small amount of statewide dollars to vehicle electrification, with more details discussed at the Mobility Committee workshop following this SWP Committee meeting.
- It was explained by CDOT staff that a resolution to adopt the CMAQ formula will be voted on by the TC tomorrow.
- Vince Rogalski noted that the STAC recommended moving this CMAQ formula proposal forward.
- No other major comments were raised by the TC members.

Whole System Whole Safety Workshop

State Transportation Safety Plan (STSP) (Charles Meyer)

Purpose: The Colorado TC has made transportation safety a top priority for Colorado. The Colorado 2020-2023 State Transportation Safety Plan (STSP), developed with expertise from safety stakeholders around Colorado, updates the 2014 Colorado Strategic Highway Safety Plan (SHSP). The STSP establishes a collaborative and shared vision and mission for transportation safety, and identifies the key safety needs in Colorado for guiding investment decisions toward strategies and countermeasures with the highest potential to save lives and prevent injuries.

Action: Support for the STSP was sought from the TC, including the prioritization of funding for safety and the reestablishment of the Transportation Commission Safety Subcommittee.

Discussion:

- Charles Meyer, CDOT Traffic Safety Manager, spoke on the State Transportation Safety Plan (STSP) and the stakeholder outreach and data analysis that was conducted in conjunction with development of this plan.
- The project team heard from stakeholders that the goal and target needed to be "zero deaths"- previously the goals was "towards zero deaths". In order to get there, we need cooperation among agencies to make this happen.
- Key issues related to an increase in bicycle and pedestrian fatalities, along with motorcycle fatalities.
- Charles is looking for TC input and for TC support on strategies. There is no resolution for this item in February.
- Commissioner Thiebaut asked to be sure to link the STSP to Rebecca's work to PD 704.0.

- Commissioner Vasquez asked how CDOT will work to modify crash rates and monitor performance. Charles Meyer noted working with non-profits and other entities for enforcement is what is needed. Measures and rates are recorded through surveys and crash data as it becomes available and safety campaigns and programs are conducted to promote better behavior.
- Commissioners were glad to see goal of Vision Zero deaths. It is important for the TC to publically endorse the STSP.
- Commissioner Bracke asked when over time we anticipated getting to zero deaths, and what we need to know how to change the situation, and how to expedite the change. She recommended that any TC Safety Committee should be named Vision Zero.
- It was also noted by Commissioner Adams, that City of Denver's press release for Vision Zero was a big event. It is important to make big events and for Commissioners to attend these types of events. We need to demonstrate that safety is priority number 1.
- Commissioner Zink noted it is important to know why fatalities have increased. Charles Meyer explained that there are a number of factors that influence crash patterns. There is a huge increase in fatalities for bicycles, pedestrians, and motorcycles. Distracted drivers and other behaviors are influencers for this increase.
- Commissioner Vasquez commented that looking at other states for best practices, and what benchmarking has been observed elsewhere is another important piece of information for the TC and CDOT to understand. Charles noted that CDOT is looking into this.
- The TC members supported the concept of drafting a resolution to support this STSP as part of the consent agenda at the February regular TC meeting.

Funding for Strategic Safety and Urban Arterial Initiative (San Lee and Rebecca White)

Purpose: The purpose of this workshop was to summarize and inform the TC of the Statewide Strategic Safety Program, its accomplishments and to provide information on a future focus in the areas of employee safety and improving safety on urban arterials.

Action: Discussion and information only in February. Notice of forthcoming funding request during the March TC meeting for $20 Million in increased funding to advance the Strategic Safety Program, incorporate employee safety initiatives, and consider allocating additional funding to improving safety on urban arterials; which will be presented in March as part of a larger discussion on program reserve and use of additional Surface Treatment Block Grant dollars.

Discussion:

- CDOT established a Strategic Safety Program in March 2019 with $11.3 million of funds for the year.
- Several projects were initiated under this program and included the following types of improvements: Striping, Rumble Strips, MASH Compliance Guard Rails, Variable Speed Limits, and Cable Rail.
- Commissioner Gifford asked about MASH guardrail and if testing of safety hardware for all types and weights of vehicles is occurring. Charles Meyer responded that yes various vehicle types and weights have been tested.
- CDOT staff explained that requests from Regions for safety projects show a funding gap of $ 24.4 million annually, or $27 million annually with attenuator purchase. There is a desire to grow this existing program.
- Attenuators priced out include the cost for an attenuator truck. It was noted that there are opportunities to use these trucks for other purposes.
- The mobile unit cost seems excessively high, per Commissioner Beedy. CDOT staff explained that positive protection results from the mobile unit that is highly effective. This is a huge benefit to maintenance crews. CDOT looking into dual purpose and use for truck as part of the purchase.
- Commissioner Stanton supported putting more money into this type of investment and observed that $10 million is not that much of an expenditure considering the benefits.
- Rebecca White noted that looking at San's data is on State Highways and Interstates, and for urban arterials, the data shows a 78% increase in crashes on urban arterials since 2010. Staff will come back to

discuss this further. SB 267 funds have set aside $25 million for urban arterials safety also. DTR has identified $26 million for transit and bike pedestrian facility improvements along urban arterials also. Another potential funding source is surface transportation block grants to expand this program.

- Commissioner Adams noted this should directly address the increase in bicycle and pedestrian fatalities and tie back to the STSP and Vision Zero.
- Commissioner Beedy noted that to promote human behavior change, consider requiring a 10-15 minute video with questions for each application, when folks are updating their driver licenses – or something like that.

Agenda Change

- Commissioner Thiebaut recommended a tabling of the discussion on PD 14 until next month (March) and the TC members agreed to this.
- Commissioner Thiebaut asked Charles Meyer to answer any questions the TC members have related to the PD 704 workshop. No comments were raised by TC members.

Dashboard of Major Projects & Notification of Developments/Variances (Jane Fisher)

Purpose: The purpose of this workshop was to provide an update regarding calendar year 2019 construction expenditure results, calendar year 2020 construction expenditure baseline, and dashboards for major projects and their application in identification of items that may warrant management attention.

Action: Information only.

Discussion:

- No substantial TC comments were documented regarding the dashboard presentation.

State-of-the-Art Mobility/Mobility Systems (Don Stanton):

Innovative Mobility Implementation Tools FY 20-21 Budget Proposals- Electrification & CMAQ (Sophie Shulman)

Purpose: The purpose of this workshop is to provide an update on possible implementation tools to achieve the goals of the Office of Innovative Mobility, specifically remaining items to help reach the State's goals around zero emission vehicles. Staff has requested input from the Statewide Transportation Advisory Committee on the future use of Statewide Congestion Mitigation and Air Quality (CMAQ) funds to support zero emission vehicle efforts.

Action: Based on TC feedback at the February workshop, staff prepared a resolution for approval at the February TC regular meeting.

Discussion:

- Sophie Shulman, Director of the CDOT office of Innovative Mobility, explained rationale for why Air Quality greenhouse gas emissions concerns are an urgent and are an immediate need to address in Colorado.
- The need for ZEVs was emphasized as important to improve conditions now and in the future. Mike King, CDOT Assistant Director of Electrification and Energy, discussed the relevant budget programs which are: Clean Transportation Planning that is occurring with seven neighboring states, Transit Agencies are to have their own EV Plan, and to meet statewide needs, Colorado would need $60 million of infrastructure now, and if all transit vehicles were to become EVs it could cost roughly $1 billion for infrastructure.
- Commissioner Gifford noted that the private sector may not fully address a transition to ZEVs, and that CDOT will need to fill in the gaps to promote a transition to EVs.

- A map of current DC Fast Charging and 34 more locations from CEO grant was presented.
- Commissioner Bracke recommended to somehow starting along scenic byways and EV corridors. It was noted that the 34 EV charging locations are near or connect to scenic byways. Sophie Shulman stated that CDOT works closely with CEO to make sure funds are used wisely. However, gaps still exist for EV charging.
- Commissioner Beedy asked about if there are any incentives to give to hotels credit for adding EV charging stations on their property. Charge Ahead Colorado grants cover EV chargers, and hotels are eligible applicants.
- Commissioner Adams it would help to build a business case for folks to review. A one-pager or brochure regarding EVs, comparing them to traditional fossil fuel vehicles. Sophie Shulman noted that CDOT has calculated the cost of ownership types.
- Commissioner Zink cautioned against the TC promoting one vehicle type over another. Be careful about stepping into the market place.
- Commissioner Hall concurred with Commissioner Zink. EVs need to pay for their fair share before we invest in supporting EVs.
- Commissioner Stanton concurred with Commissioners Hall and Zink.
- Commissioner Vasquez expressed the importance of helping folks make an informed decision regarding air quality emissions along with their vehicle purchases. Sophie Shulman noted that OIM sees efforts as education, and not promoting EVs. The effort is to educate to support informed decision-making.

Transportation Commission Regular Meeting
Thursday, February 20, 2020, 9:30 am – 11:00 am

Call to Order, Roll Call:

All 11 of the Commissioners were present: Commissioners Bill Thiebaut, Sidny Zink, Eula Adams, Irv Halter, Shannon Gifford, Gary Beedy, Kathleen Bracke, Barbara Vasquez, Donald Stanton, Kathy Hall, and Karen Stuart.

Public Comments

- Craig Cannon of Zone Crew said his company has some signs he thought could be effective in slowing traffic in school zones, and asked for permission to test them in school zones. FHWA does not prohibit such tests.
- Adams County Commissioner, Steve O'Dorisio, spoke about a homeless encampment in the highway public right of way near a constituent's home. He said Adams County is working with CDOT to enforce a ban on trespassing on the highway right of way.
- Travis Madden of the Southwest Energy Efficiency Project (SWEEP) spoke about the benefits of electric vehicles. He said their use improves air quality, gives households the money they would otherwise spend on gas, and helps CDOT in reducing greenhouse gas emissions from transportation.

Comments of Individual Commissioners

- Commissioner Vasquez thanked the Northwest Transportation Planning Region (TPR) for the robust process it went through to determine transportation priorities. Air quality and greenhouse gas emissions from the transportation sector are big concerns.
- Commissioner Zink attended a meeting of the Gunnison Valley TPR, and noted that CDOT had a float at the winter celebration in Durango.
- Commissioner Stuart thanked Adams County Commissioner O'Dorisio for bringing up the issue of homeless people camping on the public right of way. She noted that some CDOT maintenance workers are reluctant to push people out of their camping areas. Transportation (TC) might want to have a workshop regarding this topic. She spoke at a climate change panel before a group of more than 40 people, both young and old, and discussed what CDOT is doing about climate change. She also thanked

Region 4 Regional Transportation Director, Heather Paddock, for her leadership at a regional meeting at which regional transportation priorities were set. She also attended a meeting with Governor Polis about different ways of funding transportation.

- Commissioner Stanton thanked the Adams County commissioner for bringing to the TC's attention the widespread problem of homeless encampments. He and Commissioner Stuart went to see the mayor of Westminster about ways to improve Federal Boulevard. Becoming a more resilient agency is important for CDOT, which is affected by fires and flooding due to weather events.
- Commissioner Gifford spoke about climate change, suggesting that the best thing CDOT can do is support the efforts of others. In the past month, she also spoke on a panel about poverty, focusing on transportation.
- Commissioner Halter, now in his fifth week of being on the Commission, thanked Region 2 Regional Transportation Director, Karen Rowe, for answering his many questions as a new commissioner. On April 17, he will speak about transportation to the El Pomar Forum.
- Commissioner Bracke praised Heather Paddock for her leadership of a Region 4 meeting setting transportation priorities. In addition, she attended coalition meetings on North I-25 and US 85. A regional transit study for northern Colorado is getting under way. She was among those thanking Charles Meyer for his safety discussions around the state, centering on the State Highway Safety Plan. She serves on the Scenic Byway Commission, which has discussed ways to encourage use of electric vehicles on the byways.
- Commissioner Beedy reiterated his concern about the many roads he sees needing improvement in the rural areas in his District 11. He wonders if CDOT might be able to use recycle wind turbine blades – of which there are many in eastern Colorado, for fill or other purposes. He, too, met with Governor Polis about finding new sources to pay for transportation. He is very impressed with the good work snowplow operators do, and the larger and more efficient snowplows they have for the job now.
- Commissioner Hall commented that her son drives the I-25 South gap every day, and wanted CDOT to know how much he appreciated how well CDOT keeps the highway clear of snow. She also said that attendees at a meeting in Grand Junction were pleased to have CDOT Executive Director, Shoshana Lew, join them.
- Commissioner Adams thanked Region 1 Regional Transportation Director, Paul Jesaitis, for his help getting him up to speed. He discussed his work on two TC committees: Small Business and Diversity, and Audit. County commissioners of Arapahoe and Douglas counties in his District, have a strong desire to work with CDOT. Recently he met with the only Regional Transportation District (RTD) board member who is disabled, and they discussed how RTD accommodates disabled persons. Recently he spent 10 days in India, where air pollution in large cities is a concern.
- Commissioner Thiebaut commended his fellow commissioners and staff members who work with the Commission, in particular Herman Stockinger, and Olivia Martinez.

Executive Director's Report (Shoshana Lew)

- The cost of keeping state highways clear of ice and snow is going up, not down.
- She said she would like to see a legislative funding package come together, and believes the 2045 Statewide Transportation Plan, that includes a 10-year Pipeline of Projects, will help prompt action.
- CDOT needs to match consumer education with technological advances such as with electric vehicles.

Chief Engineer's Report (Steve Harelson)

- At a recent meeting of the Colorado Asphalt Paving Association, several state highways received awards for smoothness. One project that Central Federal Lands of FHWA managed on Cottonwood Pass received a perfect score.
- SB 267 projects are rolling out.
- Recently he met with the head of the construction management program at Colorado State University about ways to get students thinking about the possibility of working for CDOT. Having younger people eager to work for CDOT will become more important as current employees retire.
- He had the opportunity to witness a load test of a bridge girder. The instrumentation allowed viewers to see the girder bend under a load and then spring back after the load had passed.

High Performance Transportation Enterprise (HPTE) Director's Report (Nick Farber)

- HPTE sent its annual report to the Legislature, a statutory requirement.
- The HPTE board is considering a more public-friendly name for the organization.
- One of the items before the HPTE board later in the day is a resolution approving a "term sheet" between CDOT and the Union Pacific Railroad Company for CDOT to acquire 59 acres of the Burnham Yard for $50 million. A term sheet serves as a basis for drafting a contract. CDOT would use the land for infrastructure improvements for or adjacent to I-25.

Federal Highway Administration (FHWA) Colorado Division Administrator's Report (John Cater)

- He thanked the TC for having a discussion with Carl Andersen, technical director of the FHWA Office of Operations Research and Development, about technology and the future of mobility on Wednesday. He brought some materials about the topic for those who wanted them.
- He highlighted the Transportation Environmental Resource Council (TERC), comprising high-level management from state and federal resource agencies. The TERC meets periodically about a variety of topics. The TERC is a great opportunity to strengthen relationships. The results of the relationship building were evident after the 2013 floods.
- FHWA has a national goal of teaching incident management techniques to 45 percent of first responders (law enforcement, paramedics, emergency medical technicians, firefighters etc.). In Colorado, about half the first responders have received the training. An answer to a question from Commissioner Beedy regarding the focus of the training, John Cater said the training emphasizes the need to get traffic moving as quickly as possible after an incident.

Statewide Transportation Advisory Committee (STAC) Report (STAC Chair, Vince Rogalski)

- Staff proposed the formula for distribution of Regional Priority Program (RPP) funds and STAC approved it that is before the TC today.
- STAC also approved the formulas for distribution of FASTER Safety and Congestion Mitigation and Air Quality (CMAQ) before the TC today. STAC approved putting CMAQ statewide money toward infrastructure for electric vehicles.
- During the federal and state legislative report, a STAC representative voiced approval of changes to the NEPA process as proposed by the Council on Environmental Quality (CEQ). The representative said the changes would save costs and improve efficiency. Another item mentioned was an effort at the federal level to permit public-private partnerships at rest areas.
- A discussion about CDOT's performance toward the PD 14 targets resulted in a recommendation to separate rural and urban crash data, possibly with different targets for urban and rural areas. CDOT has a safety goal of working toward zero highway deaths; a goal some thought was not attainable. The city of Oslo, Norway, only had one traffic death, indicating that the goal could be within reach.
- The STAC also decided to include I-76 as a corridor of statewide significance in the statewide transportation plan (SWP). It was the only interstate left off the list of corridors of statewide significance.

Act on Consent Agenda – Passed unanimously on February 20, 2020.

1. Temporary Resolution #1: Approve the Regular Meeting Minutes of January 16, 2020 (Herman Stockinger).
2. Temporary Resolution #2: Approve PD 704.0 FASTER Safety (Charles Meyer)
   - Charles showed a DRCOG video about how people feel about zero deaths as a whole and for members of their families. One in four highway fatalities involve bicyclists or pedestrians.

Discuss and Act on Temporary Resolution #3, 8th Budget Supplement of FY 2020 (Jeff Sudmeier) – Passed on February 20, 2020 with a split vote (see details below).

Temporary Resolution #3 was severed into a Split Vote:

- Section 1 Vote was for clean transportation planning ($500K), support consumer adoption of electric vehicles ($1.5 million), and electrification of the CDOT fleet ($800K) **– Passed unanimously on February 20, 2020.**
- Section 2 Vote was to approve the $1.5 million for electric vehicle charging stations **–Passed on February 20, 2020 with eight (8) for and three (3) against.**
    - Commissioners Hall, Zink, and Beedy voted against the funding of the EV charging stations.

Discuss and Act on Temporary Resolution #4, 7th Budget Amendment of FY2020 (Jeff Sudmeier) – Passed unanimously on February 20, 2020.

Discuss and Act on Temporary Resolution #5, Match Funds for INFRA Grant (Jeff Sudmeier) – Passed unanimously on February 20, 2020.

Regional Priority Program Formula Discussion (Rebecca White)

- The recommended allocation formula (Option B) for a total of $47 million each year is 25 percent vehicle miles traveled (VMT), 20 percent population, 40 percent state highway lane miles, and 15 percent truck VMT. (The STAC approved this staff-recommended formula in a 12-3 vote.)

Discuss and Act on Regional Priority Program Resolution Amendment (not supporting use of RPP Formula for distribution of other funds) - **Failed on September 20, 2020 with three for and eight against.**

- Regional Priority Formula Programming Amendment failed on three (3) for to eight (8) against
    - Adams Y
    - Beedy N
    - Bracke Y
    - Gifford N
    - Hall Y
    - Halter N
    - Stanton N
    - Stuart N
    - Vasquez N
    - Zink N
    - Thiebaut N

Discuss and Act on: RPP Formula Resolution # 6 (Option B Formula) –Failed on February 20, 2020 with five (5) for and six (6) against

- Passage of the RPP formula resolution as presented also failed by five (5) for and six (6) against vote.
    - Adams N
    - Beedy Y
    - Bracke Y
    - Gifford N
    - Hall Y
    - Halter N
    - Stanton N
    - Stuart N
    - Vasquez Y
    - Zink Y
    - Thiebaut N

Discuss and Act on Temporary Resolution #7, FASTER Safety Formula (Rebecca White) – Passed unanimously on February 20, 2020.

Discuss and Act on Temporary Resolution #8, CMAQ Formula (Rebecca White) – Passed unanimously on February 20, 2020.

Discuss and Act on Temporary Resolution #9, CDOT/HPTE Intra-Agency Agreement for I-270 (Nick Farber) – Passed unanimously on February 20, 2020.

Central 70 Quarterly Status Report (Keith Stefanik)

- For this informational item about the quarterly report, the Central 70 Project Manager, Keith Stefanik, showed a video of progress on Central 70 shot from the air.
- Keith said he often hears that nothing is happening on the project, but the fact is that most of the work now is taking place below ground, not visible to motorists on I-70.
- He said the project is about 90 days behind schedule, but hopes that time can be reduced on work on the east side of the project.

- Shoshana Lew, CDOT Executive Director, said the railroads are working with CDOT, and she is cautiously optimistic about negotiations. Documents for the project protect CDOT.

Other Matters: Report of the Vice-Chairman Nominating Committee and Discuss and Act on Election of Vice-Chair (Shannon Gifford, Bill Thiebaut)

- The Nominating Committee recommended Commissioner Stuart as Vice-Chair of the TC.
- The TC approved Karen Stuart's nomination.

COLORADO
HPTE
PARTNER. INNOVATE. ACCELERATE.

Colorado Express Lanes Master Plan

Workshop #3

AGENDA

Colorado Express Lanes
Master Plan Workshop #3

Section 1
Background & Selection of Phase II Corridors

Section 2
Design Alternatives

Section 3
Financial Feasibility

Section 4
Mobility Analysis

Section 5
Breakout Group Activity

Section 6
Next Steps

Outreach

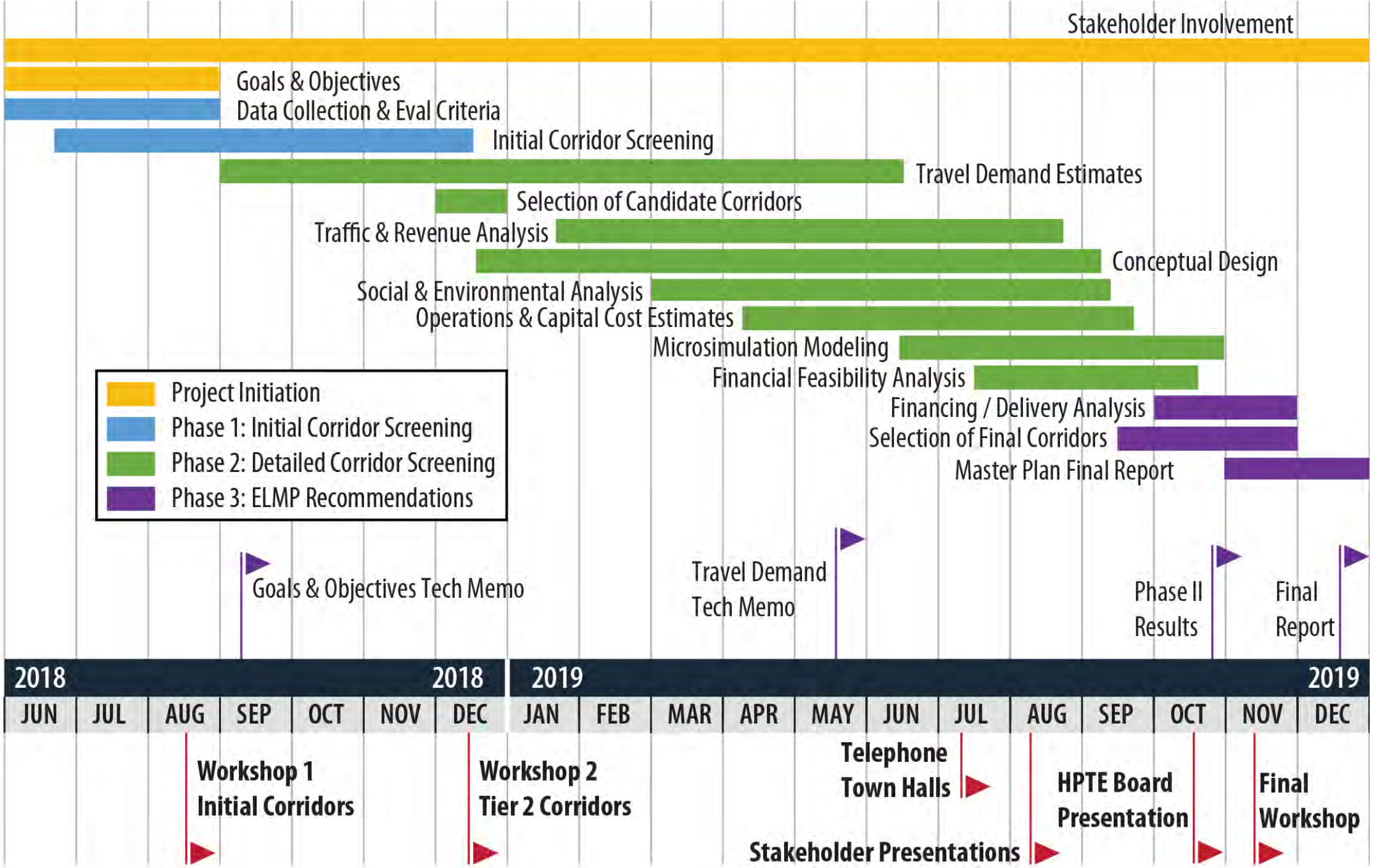
Stakeholder & Public Outreach - Workshops

- Thank you for participating in our workshops – your inputs have guided the development of the Master Plan!
- Workshop #1 – goals & objectives, initial corridor list and evaluation criteria
- Workshop #2 – initial screening results and corridors for for more detailed analysis
- Workshop #3 – weighing the results of technical analyses and proving inputs on ranking corridors

Outreach

Stakeholder & Public Outreach

- Conducted four Telephone Town Halls – more than 5,100 participants
- Presented to eight, geographically diverse Chambers of Commerce, partner agencies and industry associations
- Coordinating with agency partners, Public Information Officers, etc. to distribute information through various channels – including social media
- Developing communication best practices/lessons learned from existing Express Lanes projects and research to inform future outreach for new projects


Stakeholder Involvement
Goals & Objectives
Data Collection & Eval Criteria
Initial Corridor Screening
Travel Demand Estimates
Selection of Candidate Corridors
Traffic & Revenue Analysis
Conceptual Design
Social & Environmental Analysis
Operations & Capital Cost Estimates
Microsimulation Modeling
Financial Feasibility Analysis
Financing / Delivery Analysis
Selection of Final Corridors
Master Plan Final Report
Project Initiation
Phase 1: Initial Corridor Screening
Phase 2: Detailed Corridor Screening
Phase 3: ELMP Recommendations
Goals & Objectives Tech Memo
Travel Demand Tech Memo
Phase II Results
Final Report
2018
2018
2019
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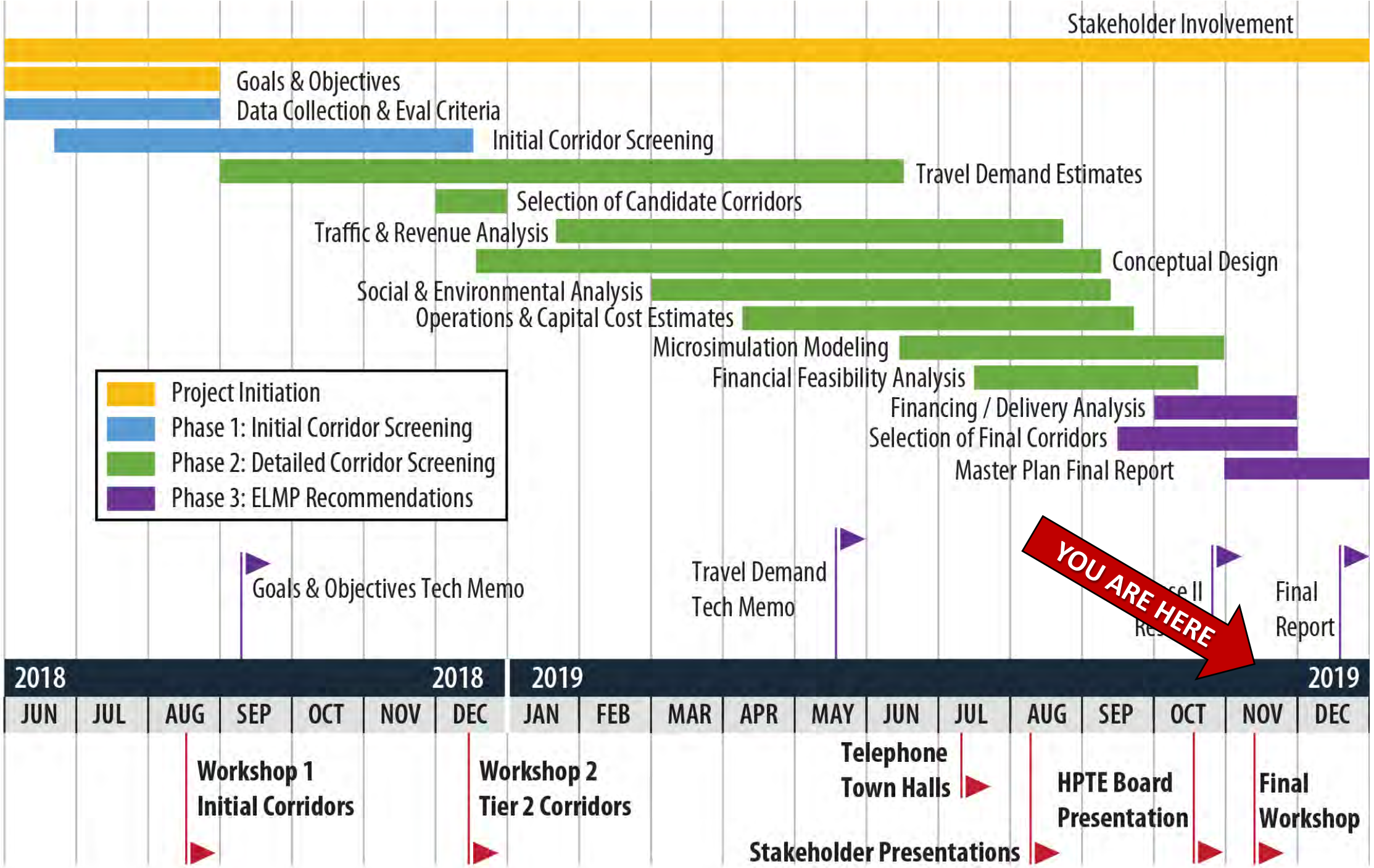
Workshop 1 Initial Corridors
Workshop 2 Tier 2 Corridors
Telephone Town Halls
Stakeholder Presentations
HPTE Board Presentation
Final Workshop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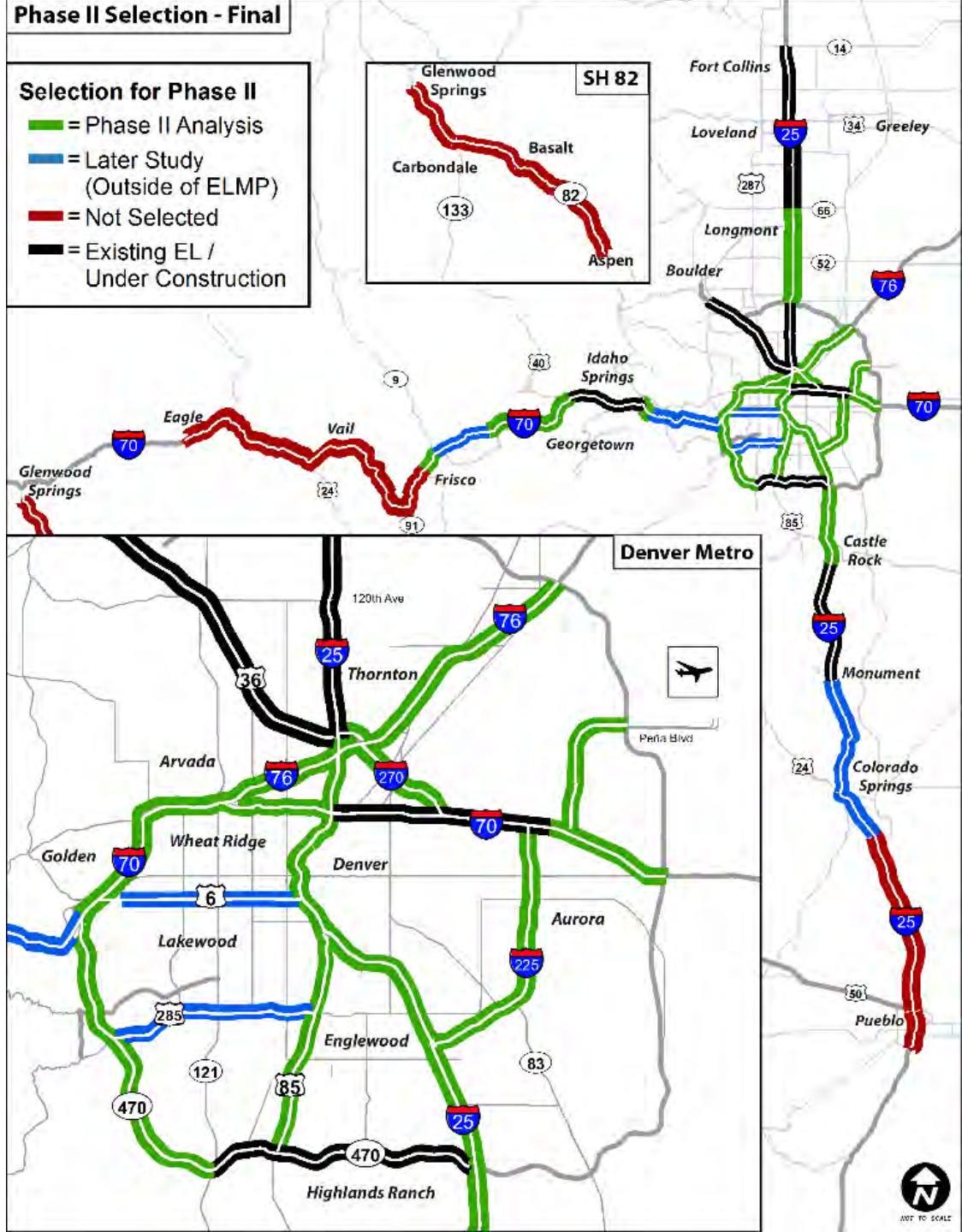
Project Initiation
Phase 1: Initial Corridor Screening
Phase 2: Detailed Corridor Screening
Phase 3: ELMP Recommendations
Goals & Objectives Tech Memo
Travel Demand Tech Memo
YOU ARE HERE
Final Report
2018
2019
JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Workshop 1 Initial Corridors
Workshop 2 Tier 2 Corridors
Telephone Town Halls
Stakeholder Presentations
HPTE Board Presentation
Final Workshop

Phase II Corridors

Selection of Corridors for Further Analysis

- ***Congestion was #1 Consideration***
- ***Red Corridors* NOT selected** for Phase II
- ***Blue Corridors*** selected for ***later study*** outside of ELMP
- ***Green Corridors* selected** for Phase II
  - ***Denver Metro*** *Corridors*
  - ***I-25*** Loveland to Castle Rock
  - ***I-25 Central*** *Bi-directional Lanes*
  - *US 85 - Santa Fe*
  - ***I-70 Mountain Corridor***
  - *Potential Direct Connections*



Express Lanes Master Plan

2

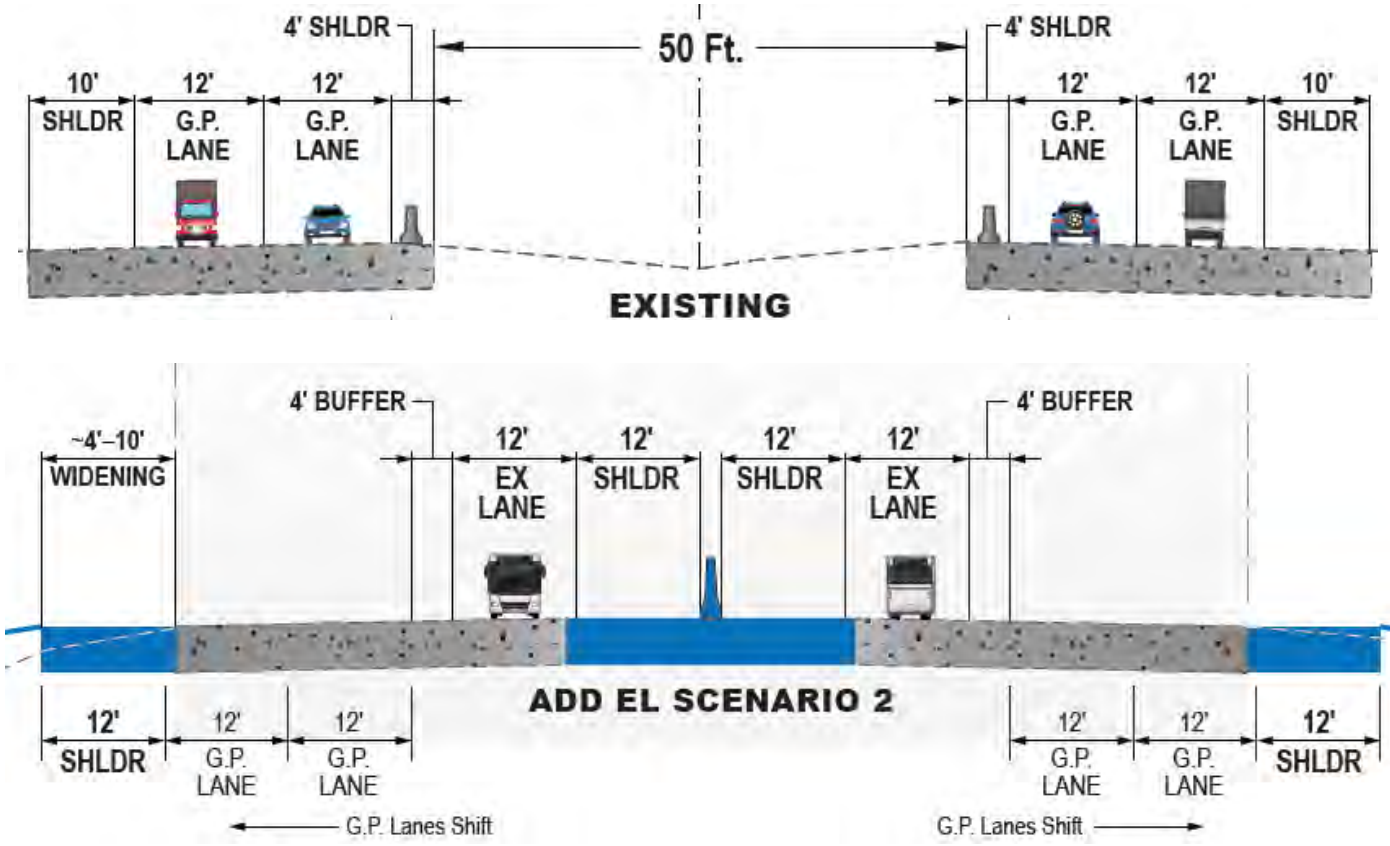
Design Alternatives

Phase II Corridors

Range of Design Alternatives

Planning Level Design

- Developed range of design alternatives & policy assumptions for potential EL corridors
- Defined discrete project locations & lane configurations
- Calculated planning level capital & operational cost estimates



Phase II Corridors

Range of Design Alternatives

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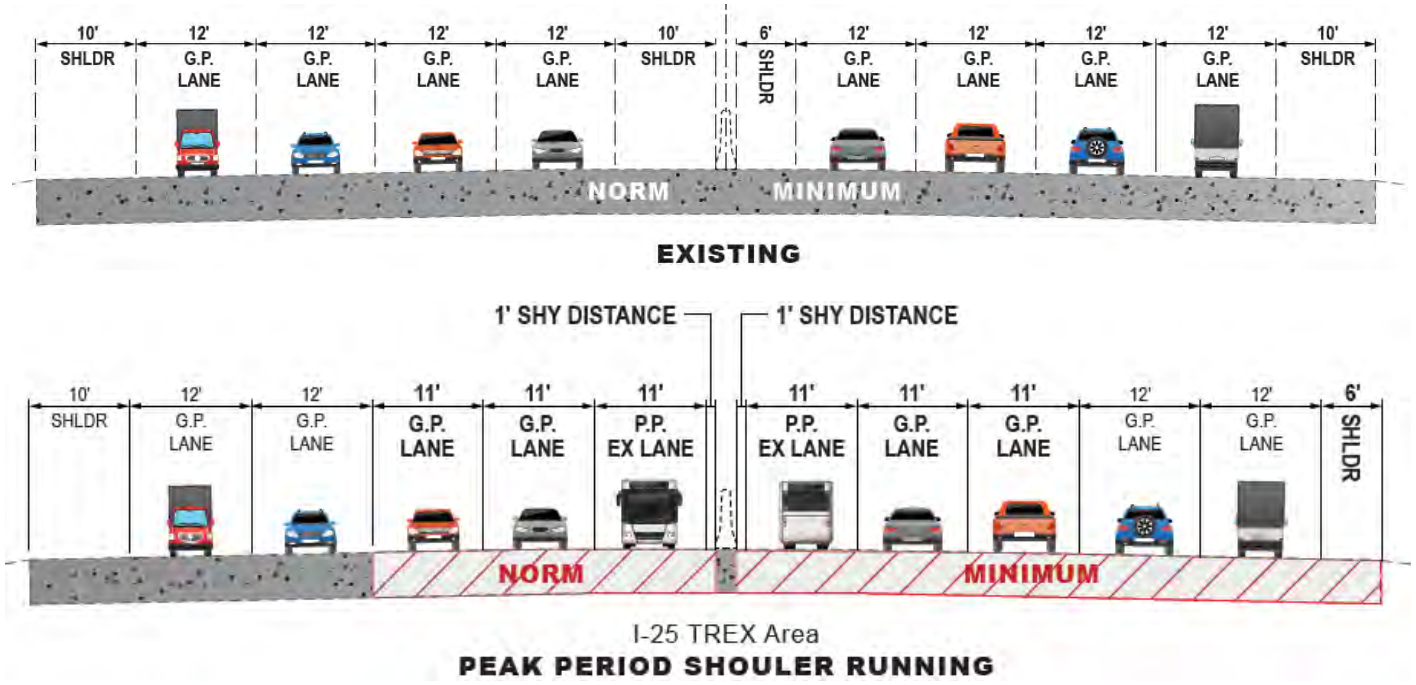

Phase II Corridors

Range of Design Alternatives

Planning Level Design

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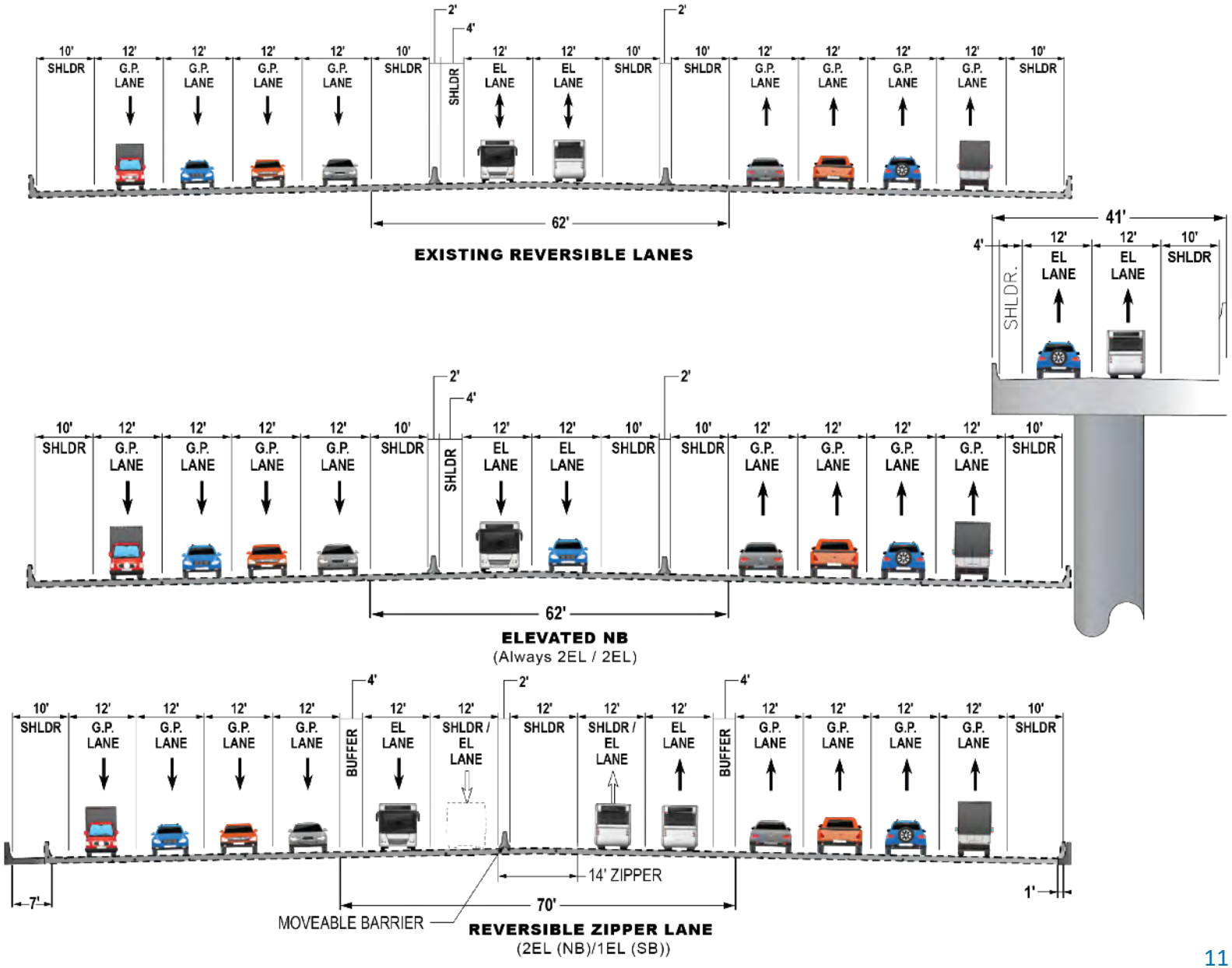


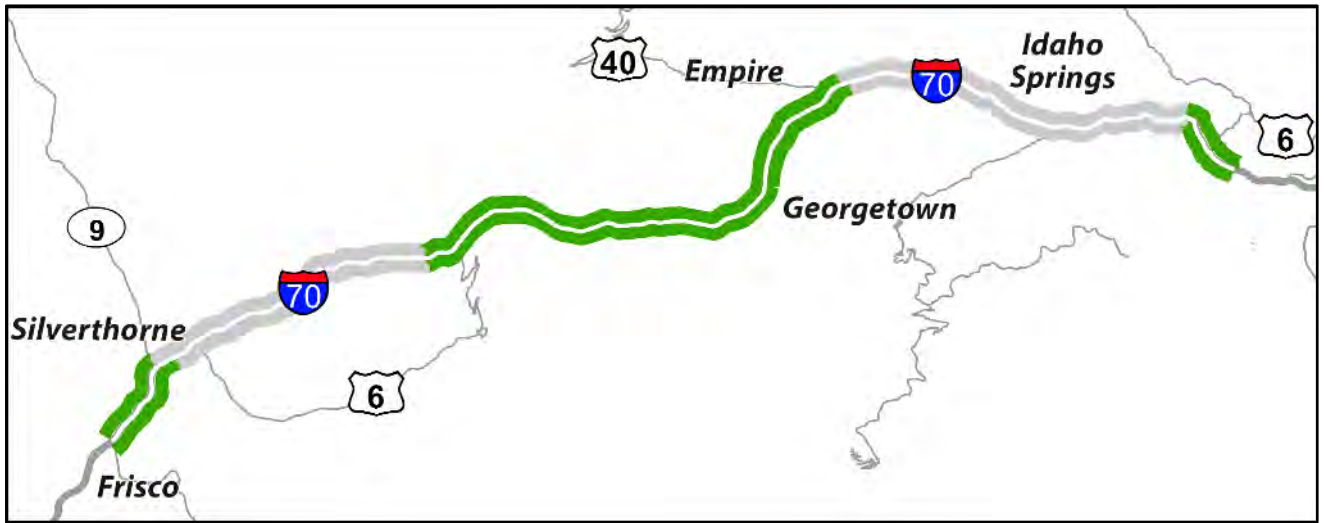
Phase II Corridors

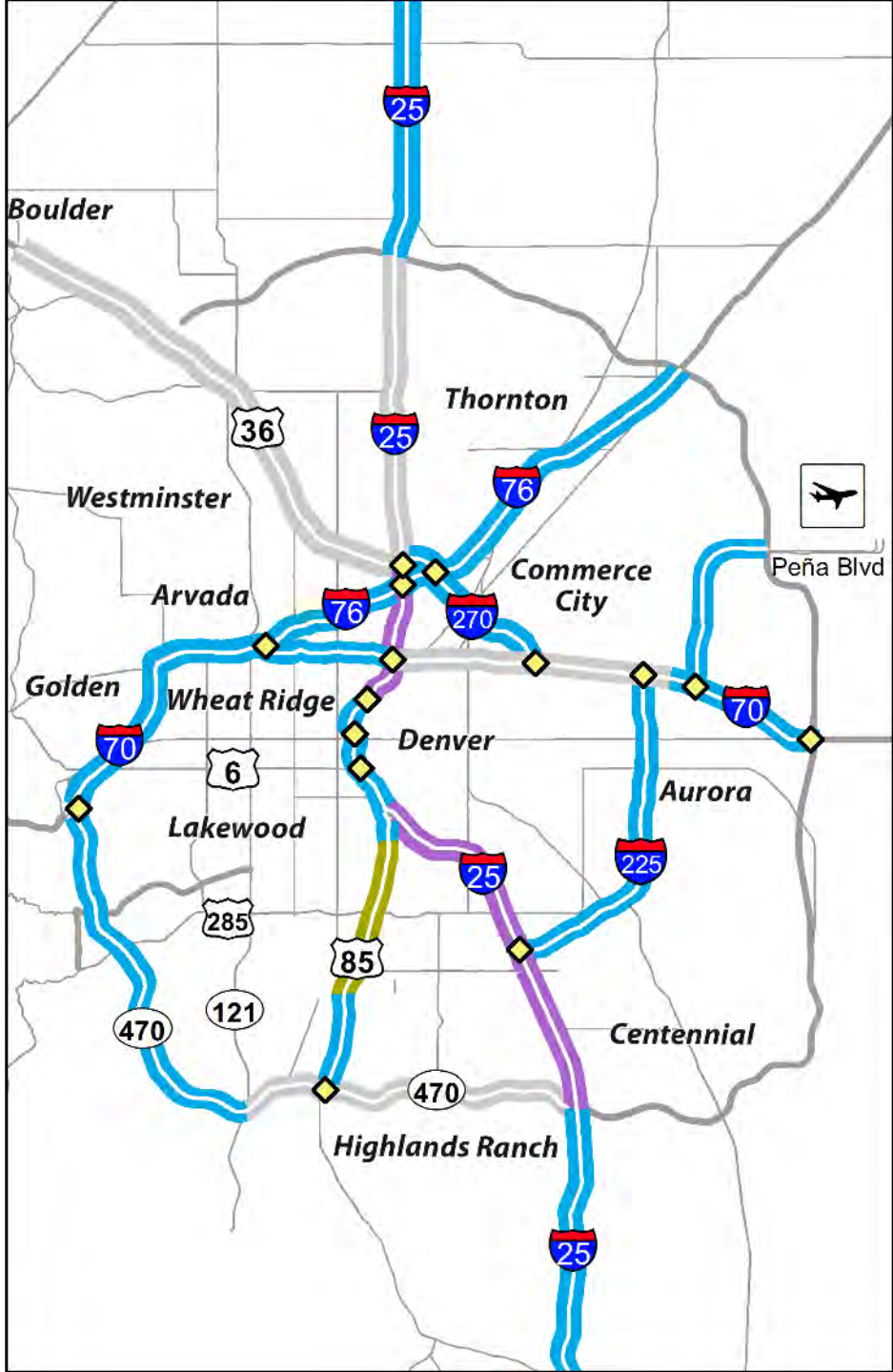
Design - Alternative 1

Design Alternatives

- 1 New Express Lane
- Elevated & Reversible Options
- Peak-Period Shoulder Lane
- HOV Conversion

Design Concept
Corridor Alternative
- EL (New Capacity)
- Elevated EL
- Shoulder Lane
- HOV Conversion
- Direct Connect





Phase II Corridors

Design - Alternative 2

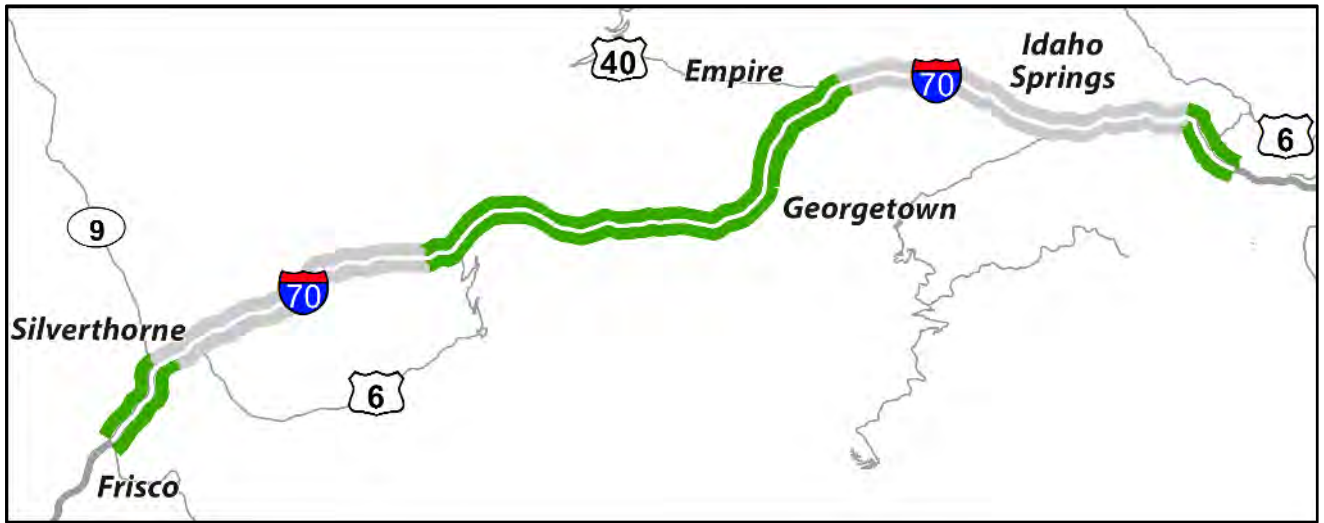
Design Alternatives

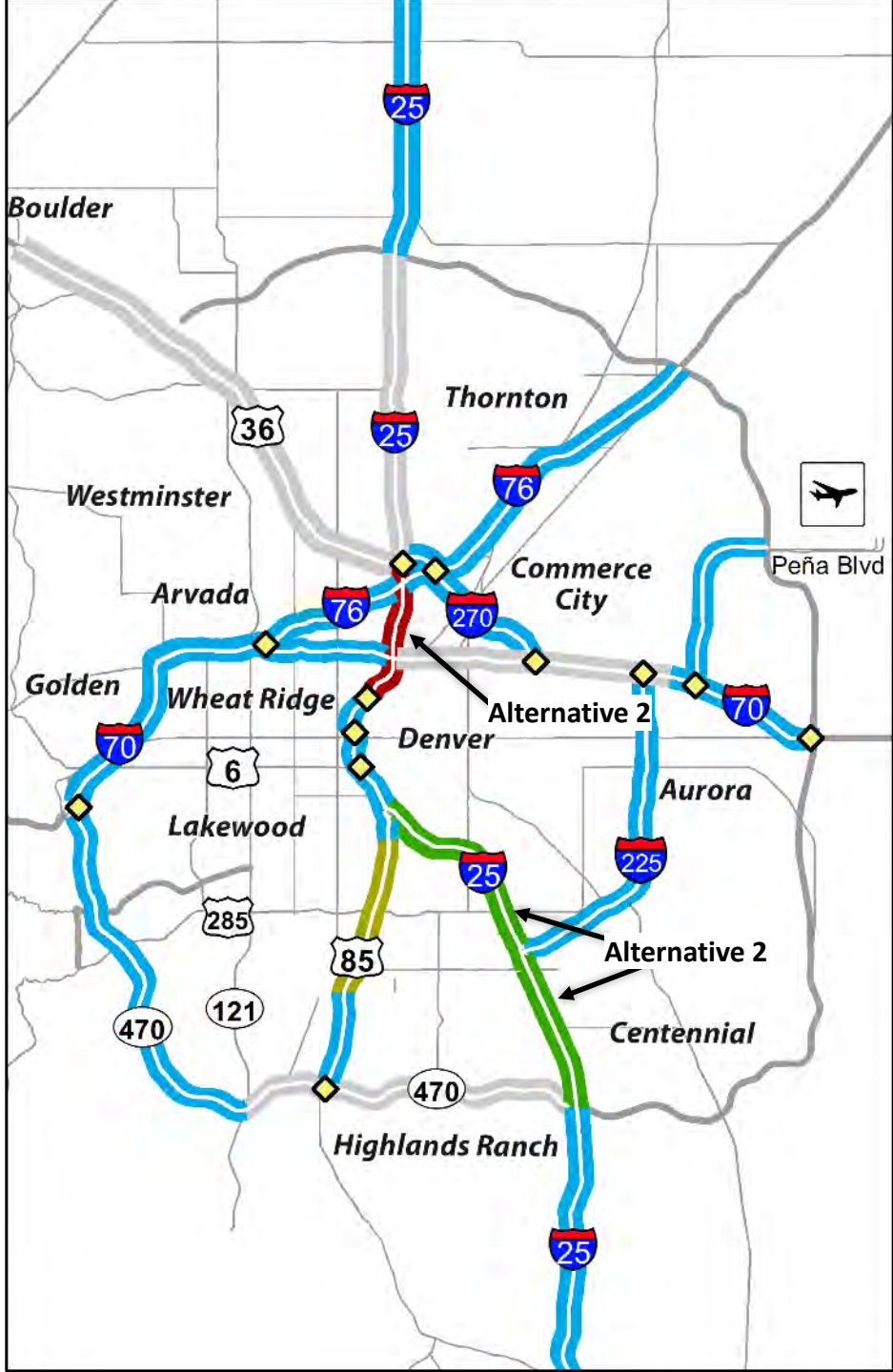
- 1 New Express Lane
- Elevated & Reversible Options
- Peak-Period Shoulder Lane
- HOV Conversion

Design Concept

Corridor Alternative

- EL (New Capacity)
- Reversible 2EL/1EL
- Shoulder Lane
- HOV Conversion
- Direct Connect





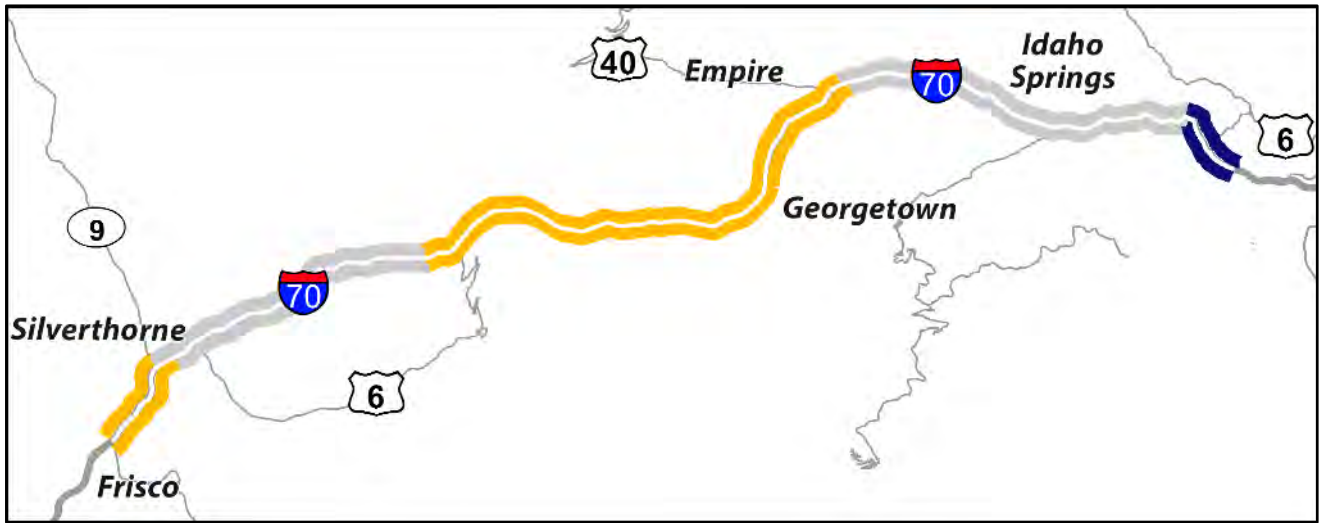
Impact Analysis

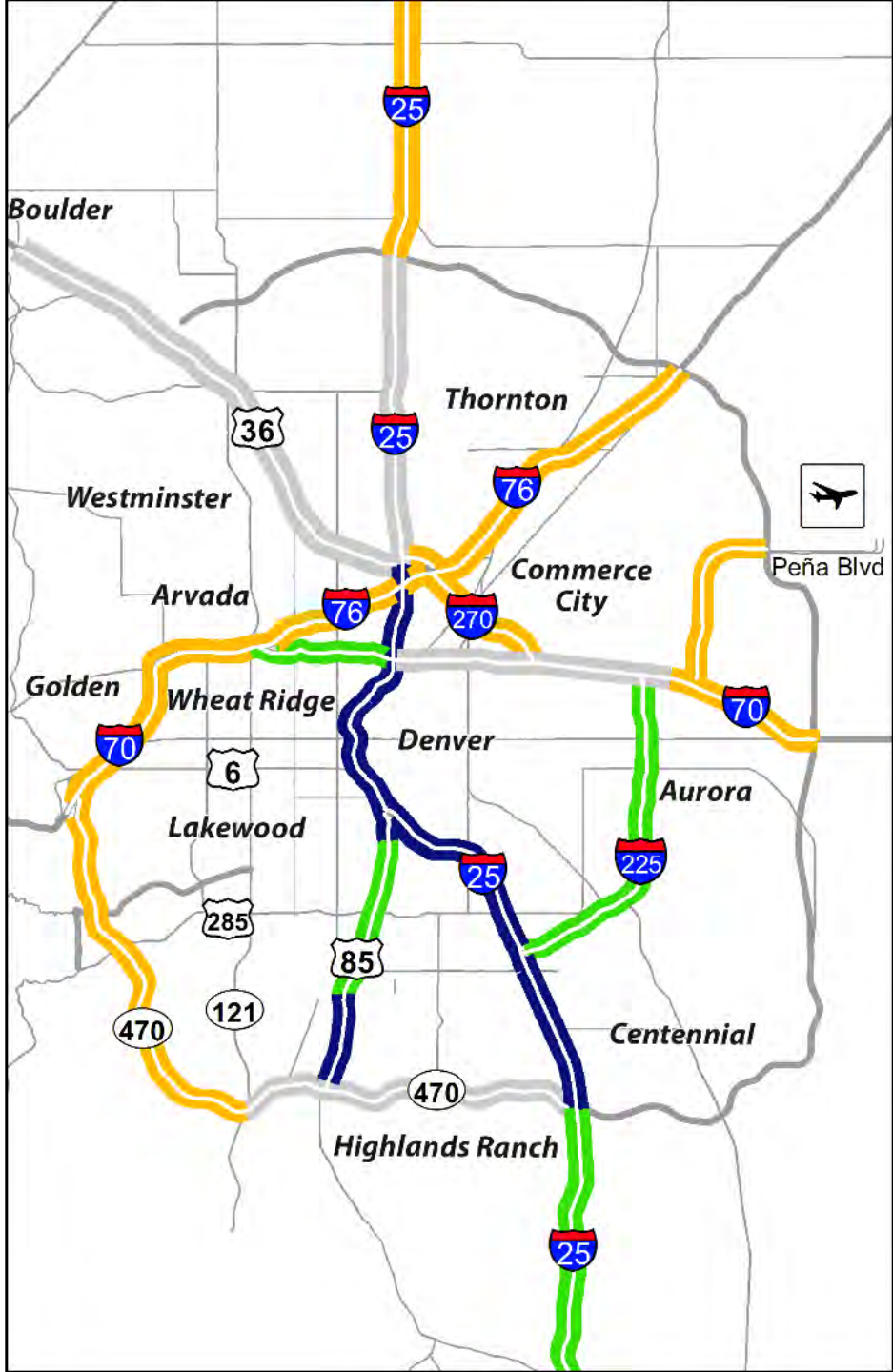
Alternative 1

Level of Construction Impacts

- Minor vs. Major ROW
- Bridge Widening & Replacement
- Earthwork & Retaining Walls
- Major Grade Separations

Construction Impact
(ROW, Bridges, etc)
Significant
Moderate
Minor





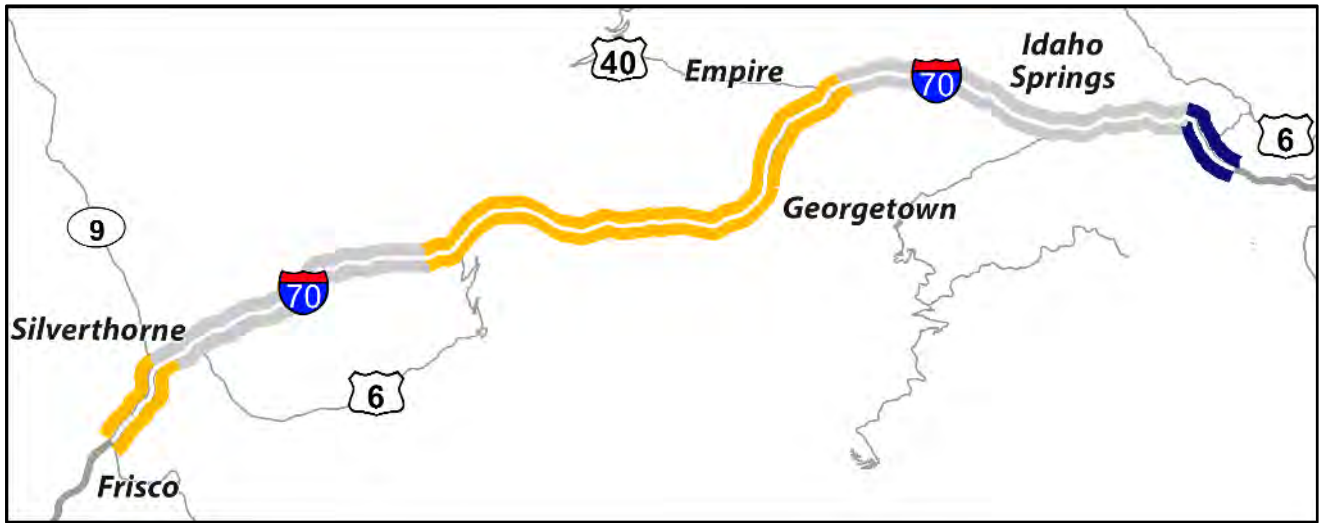
Impact Analysis

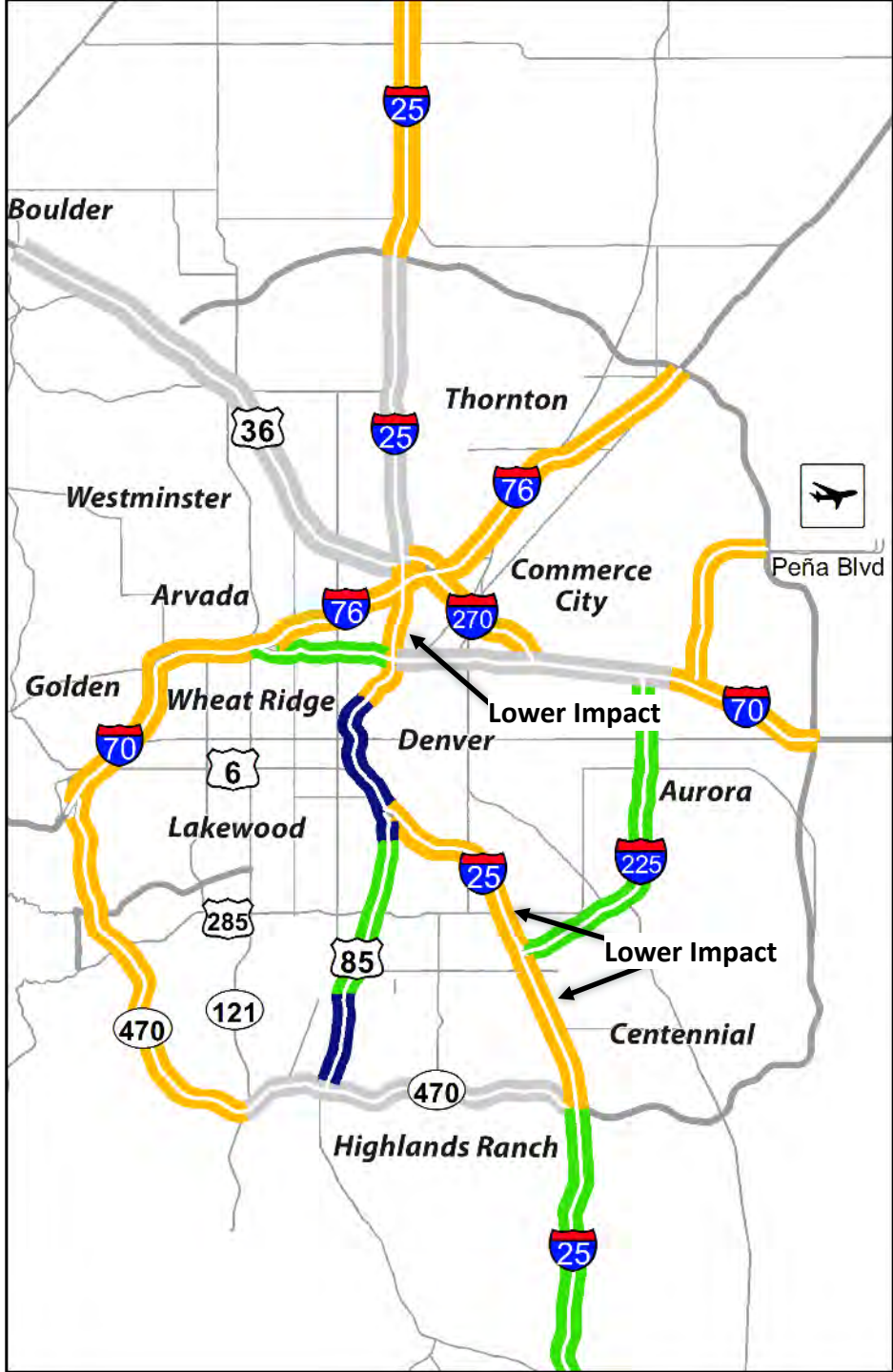
Alternative 2

Level of Construction Impacts

- Minor vs. Major ROW
- Bridge Widening & Replacement
- Earthwork & Retaining Walls
- Major Grade Separations

Construction Impact
(ROW, Bridges, etc)
Significant
Moderate
Minor





Express Lanes Master Plan

3

Financial Feasibility

Financial Feasibility & Corridor Profiles

Process of Corridor Prioritization

1

Travel Demand and Traffic & Revenue Modeling

- Toll Revenue Estimates
- Managed Lane Volumes

2

Capital and O&M Cost Estimates

- Facility Construction
- Roadway Maintenance
- Tolling Operations

3

Financial Feasibility Analysis

- Gross Revenue Potential
- Net Revenue Potential
- Net Present Value (Relative to Capex)

Financial Feasibility

Travel Demand and T&R Modeling

Statewide Travel Demand Model

- CDOT Data Inputs and Network Changes

Revenue Estimates Developed in Two Scenarios

- Cost Minimum: Low toll rates / Higher volumes in EL / Greater overall time savings
- Revenue Maximization: High toll rates / Lower volumes in the EL / Greater EL user time savings

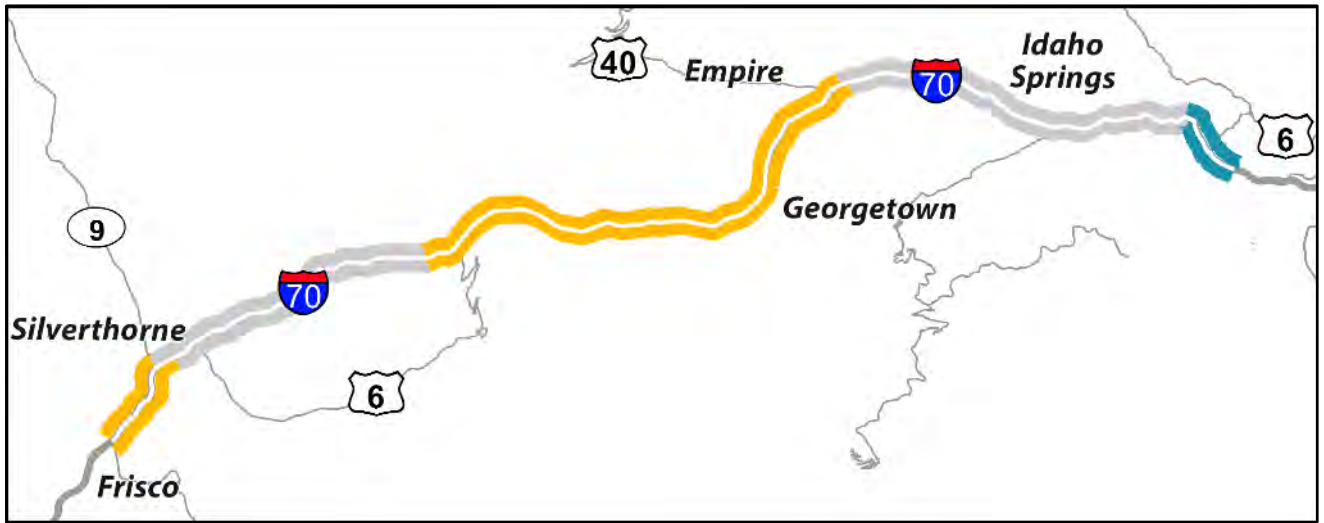
Financial Feasibility

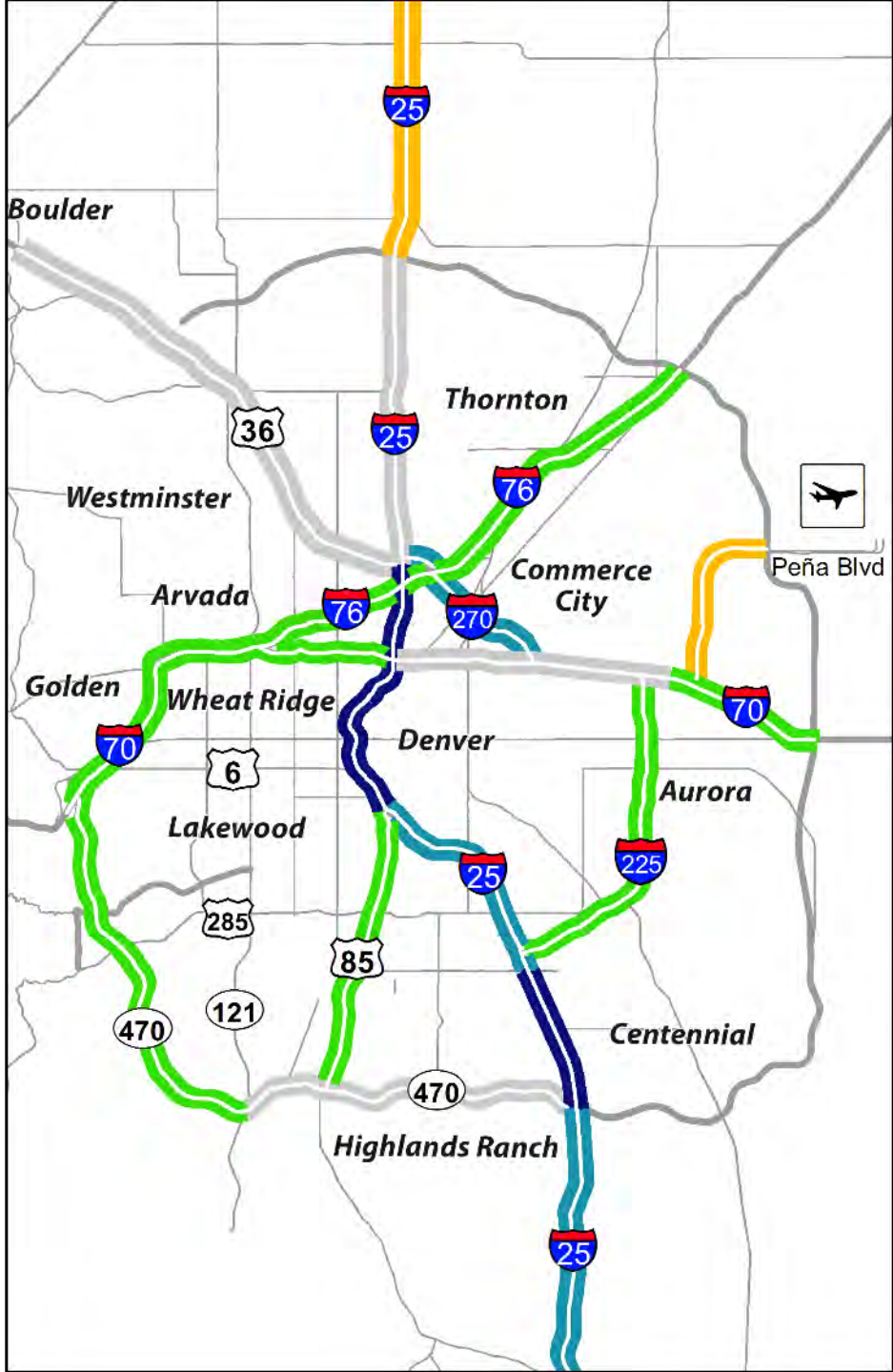
Capital Cost Estimates
Alternative 1

Planning Level Capital Cost Estimates

- Roadway Hard & Soft Costs
- Interchange Modifications
- Tolling Equipment
- ROW costs

Capital Expenditure
(Per Mile)
- > $125 M
- $75-124 M
- $25-74 M
- < $25 M





Financial Feasibility

Capital Cost Estimates
Alternative 2

Planning Level Capital Cost Estimates

- Roadway Hard & Soft Costs
- Interchange Modifications
- Tolling Equipment
- ROW costs

Capital Expenditure
(Per Mile)
- > $125 M
- $75-124 M
- $25-74 M
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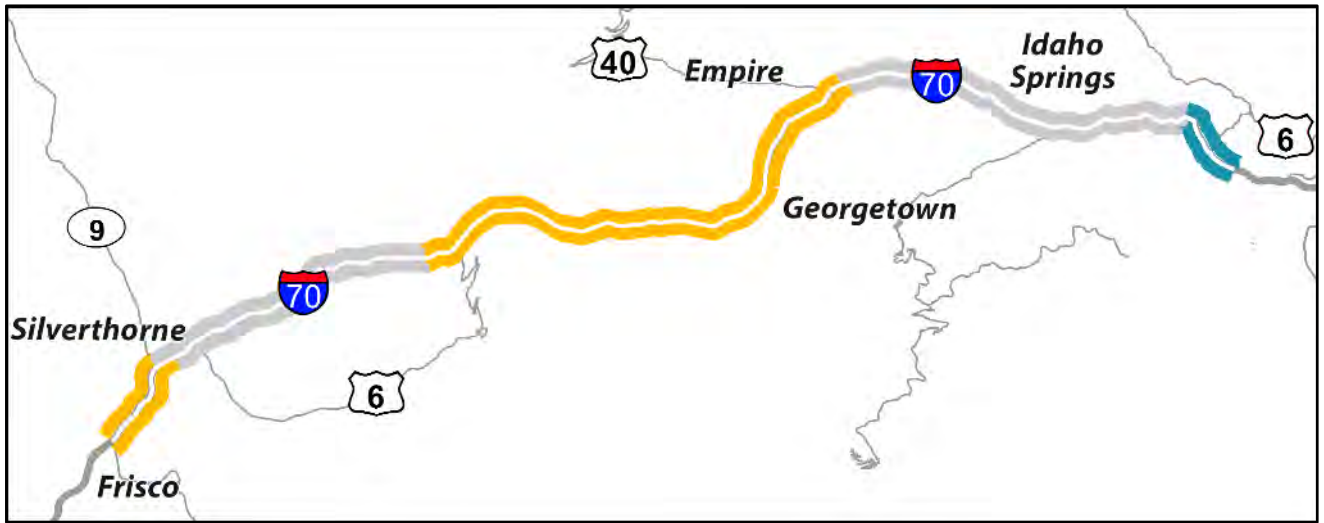
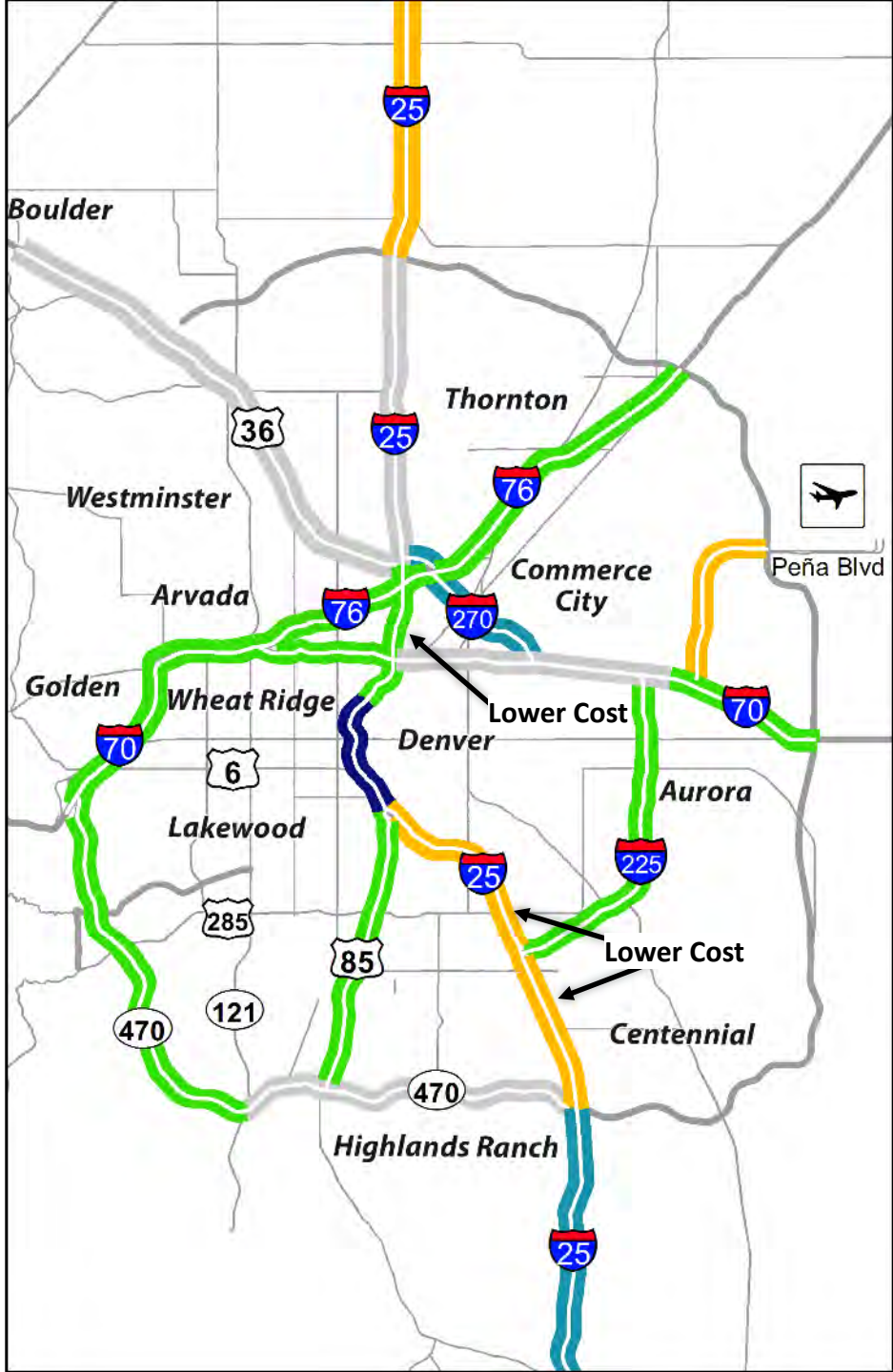


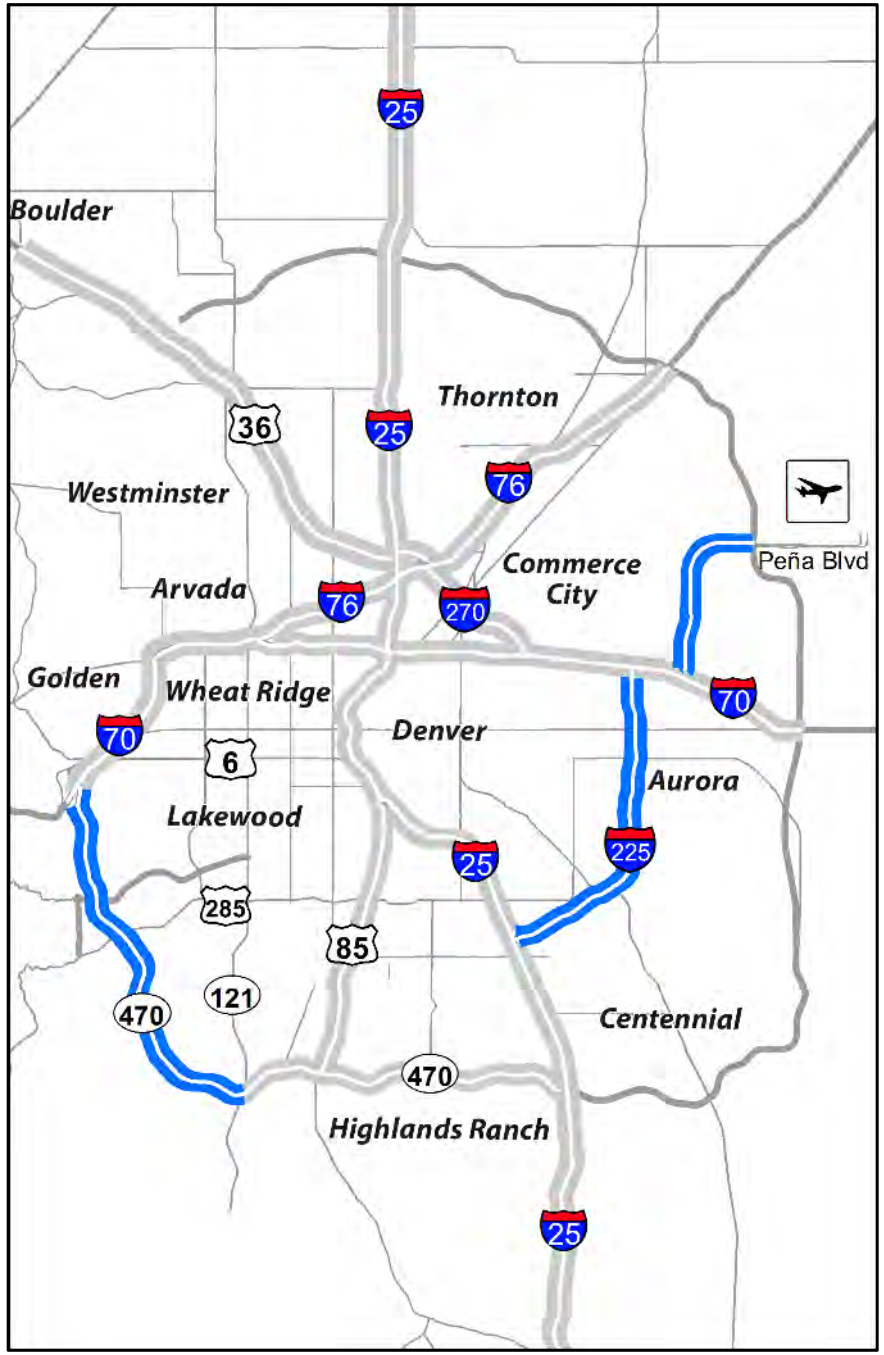


Financial Profiles

Beltway Corridors (C-470, I-225, & Pena)

	Alternative 1		
	PV of Net Revenue (2025)	Capital Cost (2025)	Financial Index
C-470 (I-70 to Wadsworth)	$154.7	$709.2	1.12
I-225 (I-70 to I-25)	$360.2	$725.5	1.28
Pena Boulevard	($14.6)	$209.5	0.96

- C-470 Level 2 T&R moving forward
- I-225 performance dependent on I-25 cross-sections



Financial Profiles

East / West Corridors (I-70, I-76, & I-270)

	Alternative 1		
	PV of Net Revenue (2025)	Capital Cost (2025)	Financial Index
I-70 (C-470 to Wadsworth)	$99.8	$547.6	1.10
I-70 (Wadsworth to I-25)	$135.4	$320.0	1.24
I-76 (I-70 to I-270)	$97.3	$477.8	1.11
I-76 (I-270 to E-470)	$27.5	$439.1	1.04
I-270 (I-25 to I-70)	$808.9	$455.3	2.00
I-70 East	$39.0	$228.4	1.10

- I-270 EA moving forward

Financial Profiles

I-25 Corridors (North, Central, & South)

	Alternative 1		
	PV of Net Revenue (2025)	Capital Cost (2025)	Financial Index
I-25 North (Longmont to E-470)	$159.8	$142.3	1.63
I-25 Central (US-36 to 20th St.)	$384.3	$739.1	1.29
I-25 Central (20th St. to Santa Fe)	$150.8	$1,134.2	1.07
I-25 Central (Santa Fe to I-225)	$379.2	$957.3	1.22
I-25 South (I-225 to C-470)	$159.4	$672.0	1.13
I-25 South (C-470 to Castle Rock)	$298.5	$1,063.1	1.16

Financial Profiles

I-25 Corridors (North, Central, & South)

	Alternative 1		Alternative 2	
	PV of Net Revenue (2025)	Capital Cost (2025)	PV of Net Revenue (2025)	Capital Cost (2025)
I-25 North (Longmont to E-470)	$159.8	$142.3	NA	NA
I-25 Central (US-36 to 20th St.)	$384.3	$739.1	**$392.5 (+$8.2)**	**$185.1 (-$554.0)**
I-25 Central (20th St. to Santa Fe)	$150.8	$1,134.2	$144.7 (-$6.1)	$1,134.2 ($0.0)
I-25 Central (Santa Fe to I-225)	$379.2	$957.3	**$299.7 (-$79.5)**	**$19.8 (-$937.5)**
I-25 South (I-225 to C-470)	$159.4	$672.0	**$112.2 (-$47.2)**	**$54.4 (-$617.6)**
I-25 South (C-470 to Castle Rock)	$298.5	$1,063.1	$282.3 (-$16.2)	$1,063.1 ($0.0)

Financial Profiles

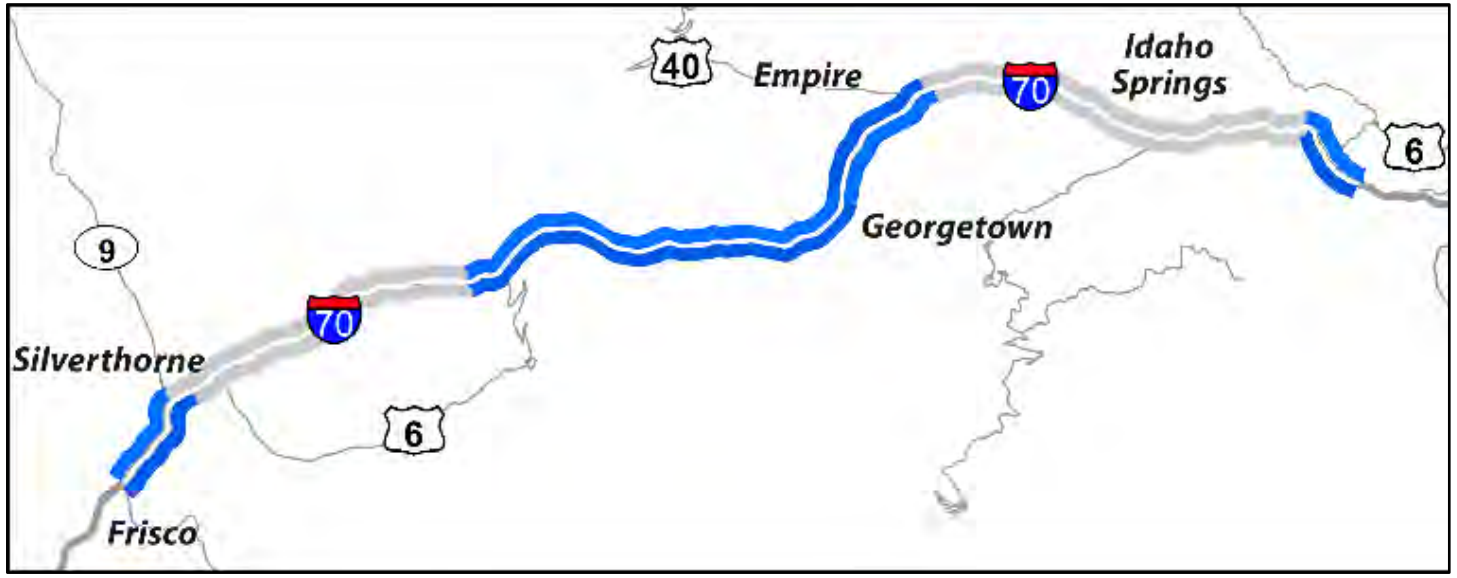
I-225 Alternative 2 Impacts

	Alternative 1		Alternative 2	
	PV of Net Revenue (2025)	Capital Cost (2025)	PV of Net Revenue (2025)	Capital Cost (2025)
I-225 (I-70 to I-25)	$360.2	$725.5	$219.2 (-$141.0)	$725.5 ($0)

- I-225 revenue potential reduced without direct connect from I-25 EL

Financial Profiles

I-70 Mountain Corridor



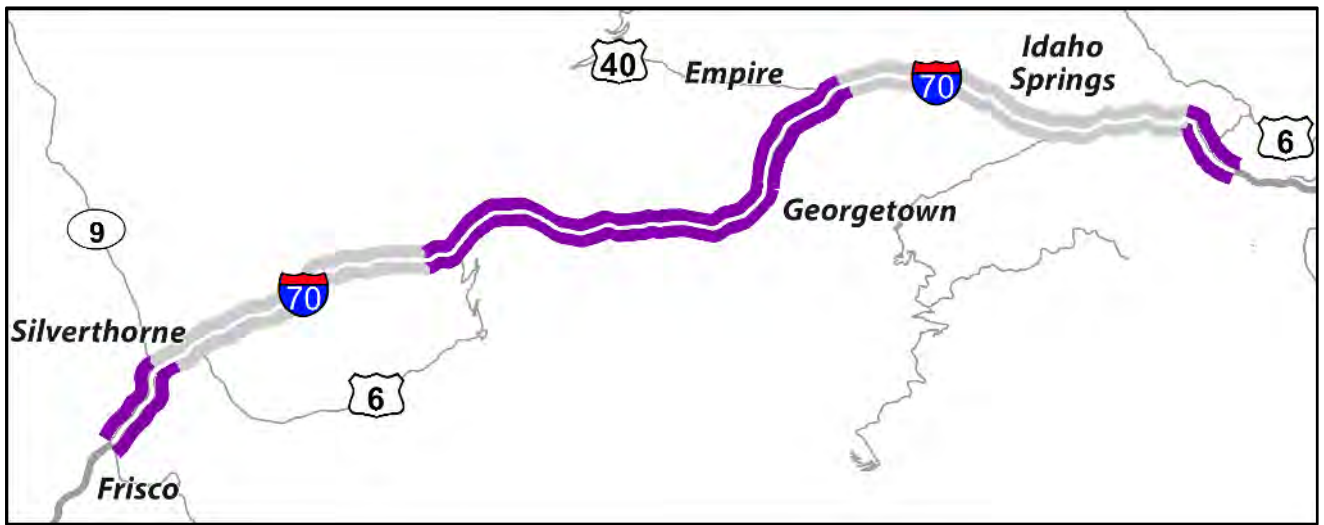
	PV of Net Revenue (2025)	Capital Cost (2025)	Financial Index
Floyd Hill	-$6.7	$615.5	0.99
Empire to Georgetown	-$6.2	$43.6	0.92
Georgetown to EJMT	-$19.3	$130.3	0.92
Silverthorne to Frisco	$0.0	$77.6	1.00

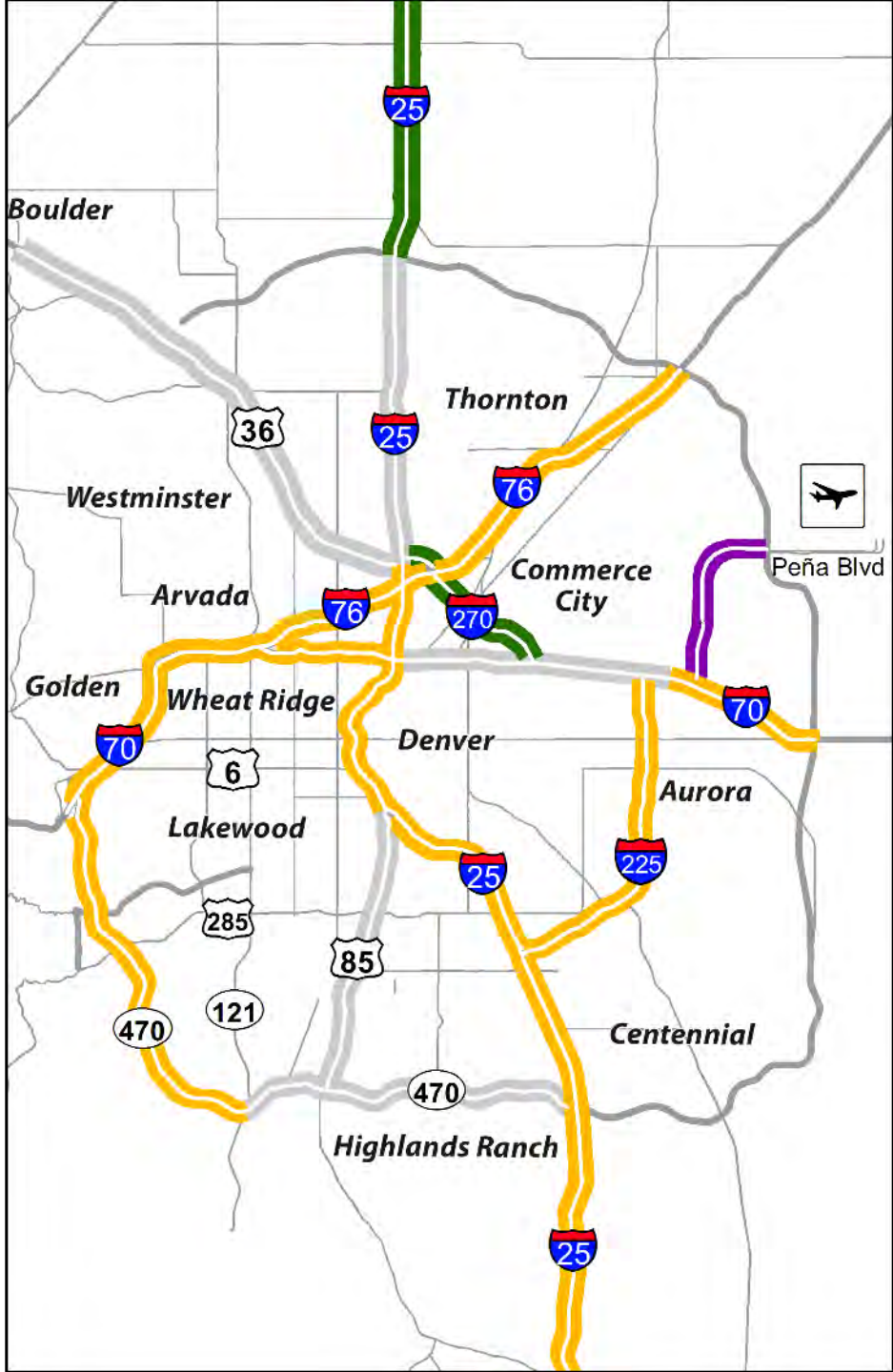
Financial Feasibility

Financial Index Alternative 1

Financial Index Measure

- Percentage of Costs Covered by Lifecycle Revenue
- Indicator of Relative Financial Feasibility



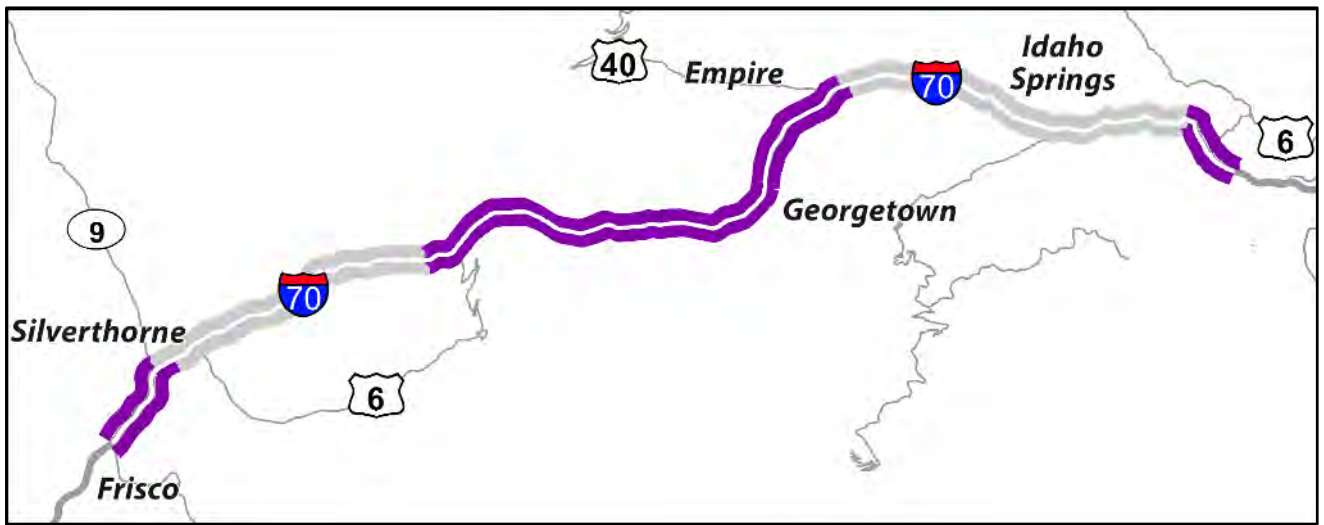


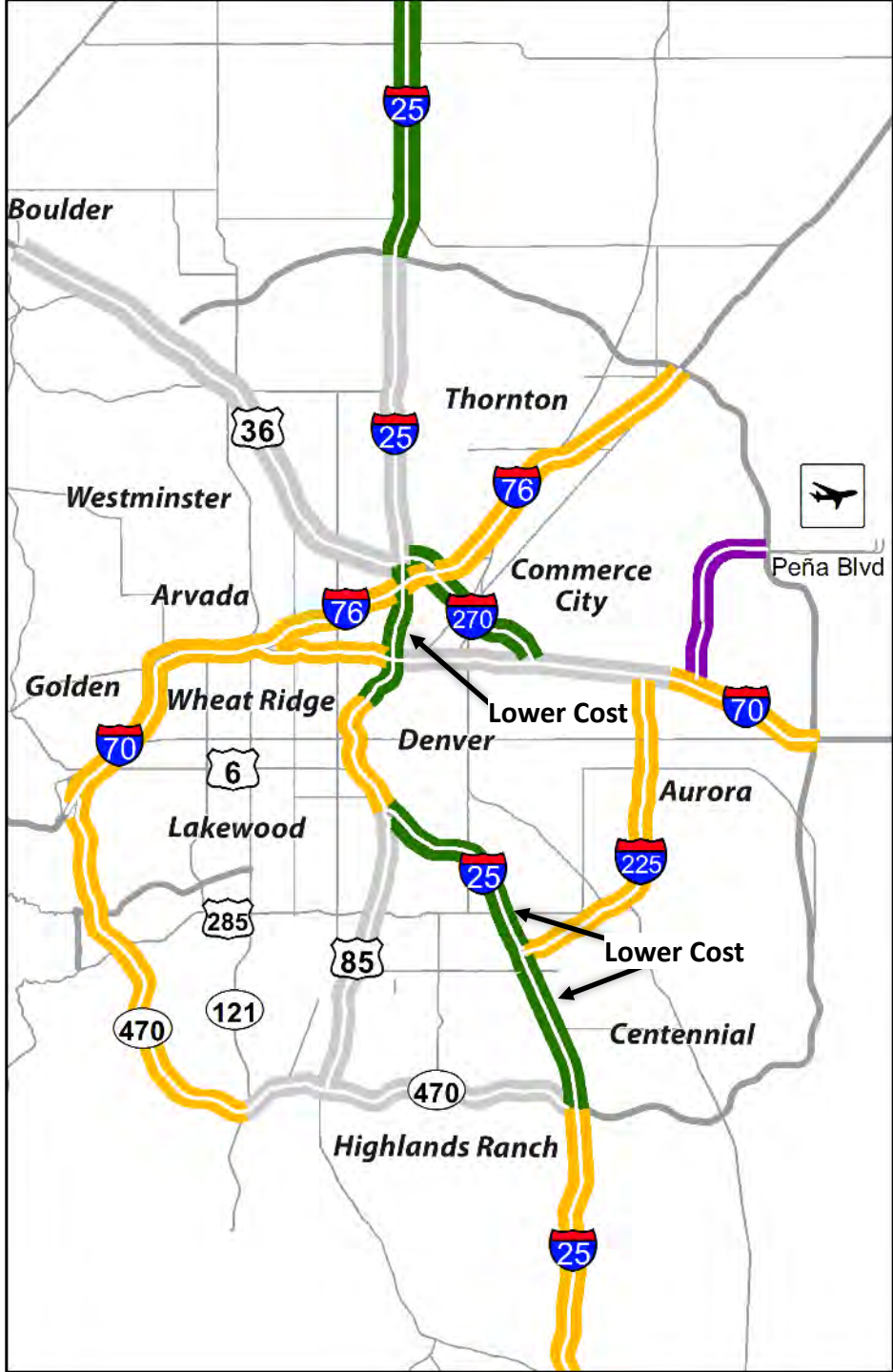
Financial Feasibility

Financial Index Alternative 2

Financial Index Measure

- Percentage of Costs Covered by Lifecycle Revenue
- Indicator of Relative Financial Feasibility





Financial Feasibility

Financial Results Summary

Financial Index Measure

Corridor	Segment	Financial Index	Corridor	Segment	Financial Index
I-270	I-25 to I-70	2.00	I-70	C-470 to Wadsworth	1.10
I-25 North	Longmont to E-470	1.63	I-70 East	Pena to E-470	1.10
I-25 Central	US 36 to 20th St	1.29	I-25 Central	20th St to Santa Fe	1.07
I-225	I-70 to I-25	1.28	I-76	I-270 to E-470	1.04
I-70	Wadsworth to I-25	1.24	I-70	Silverthorne to Frisco	1.00
I-25 South	Santa Fe to I-225	1.22	I-70	Floyd Hill	0.99
I-25 South	C-470 to Castle Rock	1.16	Pena Blvd	I-70 to E-470	0.96
I-25 South	I-225 to C-470	1.13	I-70	Empire to Georgetown	0.92
C-470	I-70 to Wadsworth	1.12	I-70	Georgetown to EJMT	0.92
I-76	I-70 to I-270	1.11			

Financial Feasibility

Financial Results Summary

Financial Index Measure

Corridor	Segment	Financial Index	Corridor	Segment	Financial Index
I-270	I-25 to I-70	2.00	I-70	C-470 to Wadsworth	1.10
I-25 North	Longmont to E-470	1.63	I-70 East	Pena to E-470	1.10
I-25 Central	US 36 to 20th St	1.29	I-25 Central	20th St to Santa Fe	1.07
I-225	I-70 to I-25	1.28	I-76	I-270 to E-470	1.04
I-70	Wadsworth to I-25	1.24	I-70	Silverthorne to Frisco	1.00
I-25 South	Santa Fe to I-225	1.22	I-70	Floyd Hill	0.99
I-25 South	C-470 to Castle Rock	1.16	Pena Blvd	I-70 to E-470	0.96
I-25 South	I-225 to C-470	1.13	I-70	Empire to Georgetown	0.92
C-470	I-70 to Wadsworth	1.12	I-70	Georgetown to EJMT	0.92
I-76	I-70 to I-270	1.11			

Express Lanes Master Plan

4

Mobility Analysis

Mobility Analysis

Traffic Impact Evaluation

Statewide Travel Demand Model

- CDOT Data Inputs and Network Changes
- Comparison of 2045 **NO BUILD** & **Express Lane BUILD Alternatives**
- Focus on Weekday **AM & PM Peak-Periods**
- **Weekend Peaks** for I-70 Mountain Corridor

Mobility & Reliability Metrics

- Changes in General Purpose & Express Lane **Travel Times**
- Express Lane **Trip Reliability (85th Percentile Travel Time vs. Average)**
- Improvement in **Person Throughput**

Mobility Analysis

Beltway Corridors (C-470, I-225, & Pena Blvd)

	GP Travel Time Change	Express Lane Travel Time Change	Express Lane Reliability 85th Percentile Travel Time	Corridor Person Throughput	Overall Mobility Score
C-470 (I-70 to Wadsworth)	-16% AM -11% PM	-27% AM -29% PM	2% AM 3% PM	+11% AM +26% PM	**4.75**
I-225 (I-70 to I-25)	0% AM 0% PM	-11% AM -16% PM	3% AM 5% PM	+25% AM +31% PM	**3.50**
Pena Blvd (I-70 to E-470)	0% AM 0% PM	0% AM 0% PM	0% AM 0% PM	+8% AM +8% PM	**2.30**

Mobility Analysis

East / West Corridors (I-70, I-76, & I-270)

	GP Travel Time Change	Express Lane Travel Time Change	Express Lane Reliability 85th Percentile Travel Time	Corridor Person Throughput	Overall Mobility Score
I-70 (C-470 to Wadsworth)	0% AM 0% PM	-2% AM -9% PM	2% AM 5% PM	+16% AM +24% PM	**2.75**
I-70 (Wadsworth to I-25)	-9% AM -10% PM	-19% AM -25% PM	3% AM 4% PM	+11% AM +18% PM	**4.25**
I-70 (Chambers to E-470)	0% AM 0% PM	-11% AM -11% PM	2% AM 2% PM	+21% AM +25% PM	**3.20**
I-76 (I-70 to I-270)	0% AM 0% PM	-16% AM -22% PM	2% AM 4% PM	+25% AM +35% PM	**3.75**
I-76 (I-270 to E-470)	0% AM 0% PM	-6% AM -5% PM	1% AM 2% PM	+19% AM +19% PM	**2.75**
I-270 (I-25 to I-70)*	-6% AM -6% PM	-19% AM -25% PM	6% AM 5% PM	+7% AM +11% PM	**3.25**

Mobility Analysis

I-25 Corridors (North, Central, & South)

	GP Travel Time Change	Express Lane Travel Time Change	Express Lane Reliability 85th Percentile Travel Time	Corridor Person Throughput	Overall Mobility Score
I-25 North (Longmont to E-470)	-3% AM -5% PM	-11% AM -19% PM	2% AM 3% PM	+12% AM +20% PM	**3.75**
I-25 Central (US-36 to 20th St.)	-24% AM -17% PM	-33% AM -35% PM	2% AM 4% PM	+10% AM +16% PM	**4.50**
I-25 Central (20th St. to Santa Fe)	0% AM 0% PM	-11% AM -19% PM	4% AM 6% PM	+15% AM +20% PM	**3.25**
I-25 South (Santa Fe to I-225)	0% AM 0% PM	-16% AM -23% PM	5% AM 6% PM	+17% AM +21% PM	**3.00**
I-25 South (I-225 to C-470)	0% AM 0% PM	-12% AM -15% PM	4% AM 5% PM	+16% AM +17% PM	**3.25**
I-25 South (C-470 to Castle Rock)	0% AM 0% PM	-12% AM -16% PM	3% AM 4% PM	+19% AM +17% PM	**3.25**

Mobility Analysis

I-25 Corridors
Alternative 2

	GP Travel Time Change	Express Lane Travel Time Change	Express Lane Reliability 85th Percentile Travel Time	Corridor Person Throughput	Overall Mobility Score (Alt 1)
I-25 Central (US-36 to 20th St.)	-32% AM -21% PM	-40% AM -37% PM	2% AM 5% PM	+17% AM +17% PM	**(4.50)** **5.00**
I-25 South (Santa Fe to I-225)	0% AM 0% PM	-15% AM -22% PM	5% AM 7% PM	+19% AM +21% PM	**(3.00)** **3.25**
I-25 South (I-225 to C-470)	0% AM 0% PM	-13% AM -12% PM	3% AM 5% PM	+10% AM +19% PM	**(3.25)** **3.00**

- I-25 Central - Alternative 2: Reversible Zipper (2EL / 1EL)
- I-25 TREX – Shoulder Express Lane

Mobility Analysis

I-70 Mountain Corridor

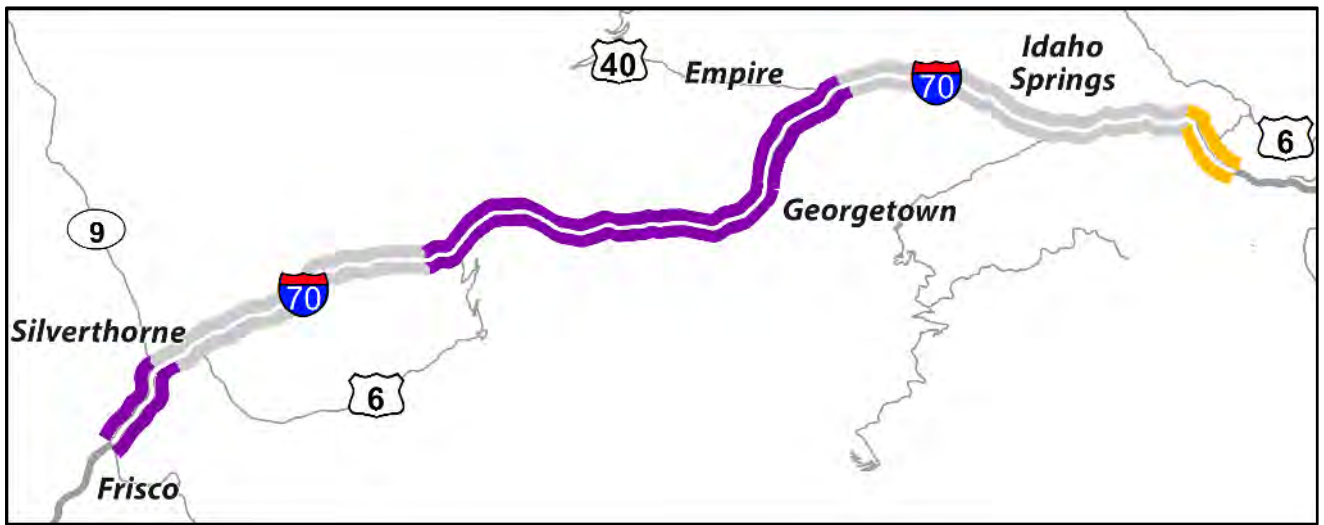
	GP Travel Time Change	Express Lane Travel Time Change	Express Lane Reliability 85th Percentile Travel Time	Corridor Person Throughput	Overall Mobility Score
Floyd Hill	-13% AM -2% PM	-22% AM -3% PM	2% AM 0% PM	+17% AM +1% PM	**3.25**
Empire to Georgetown	-8% AM -3% PM	-13% AM -5% PM	0% AM 0% PM	0% AM 0% PM	**3.00**
Georgetown to EJMT	-7% AM -3% PM	-11% AM -4% PM	0% AM 0% PM	2% AM 0% PM	**2.75**
Silverthorne to Frisco	-10% AM -3% PM	-15% AM -4% PM	0% AM 0% PM	4% AM 0% PM	**2.88**

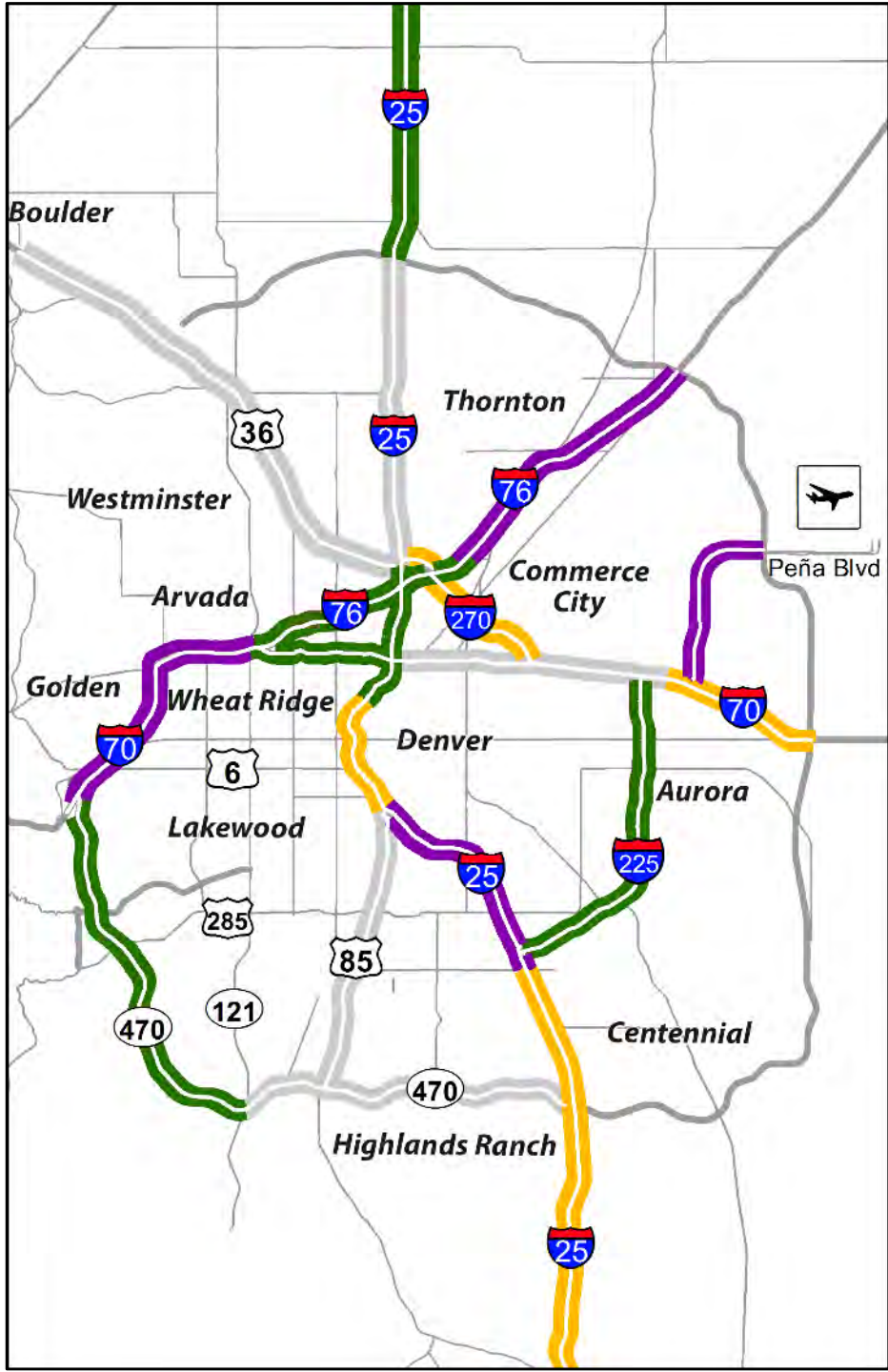
Mobility Analysis

Mobility Analysis Summary

Overall Mobility Score

- Average of Individual Metric Scores
- Both AM & PM Peaks





Mobility Analysis

Mobility Analysis Summary

Overall Mobility Score

Corridor	Segment	Mobility Score	Corridor	Segment	Mobility Score
C-470	I-70 to Wadsworth	4.75	I-270	I-25 to I-70	3.25
I-25 Central	US 36 to 20th St	4.50	I-70 East	Chambers to E-470	3.20
I-70	Wadsworth to I-25	4.25	I-25 South	Santa Fe to I-225	3.00
I-25 North	Longmont to E-470	3.75	I-70 MTN	Empire to Georgetown	3.00
I-76	I-70 to I-270	3.75	I-70 MTN	Silverthorne to Frisco	2.88
I-225	I-70 to I-25	3.50	I-70	C-470 to Wadsworth	2.75
I-25 Central	20th St to Santa Fe	3.25	I-76	I-270 to E-470	2.75
I-25 South	I-225 to C-470	3.25	I-70 MTN	Georgetown to EJMT	2.75
I-25 South	C-470 to Castle Rock	3.25	Pena Blvd	I-70 to E-470	2.30
I-70 MTN	Floyd Hill	3.25			

Mobility Analysis

Elements Still Under Evaluation

Unique Corridors

- US 85 / Santa Fe

Additional Mobility Analysis

- Microsimulation Model
- US 85 / Signalized Intersections
- Express Lane Direct-Connect Prioritization

Connected & Automated Vehicles

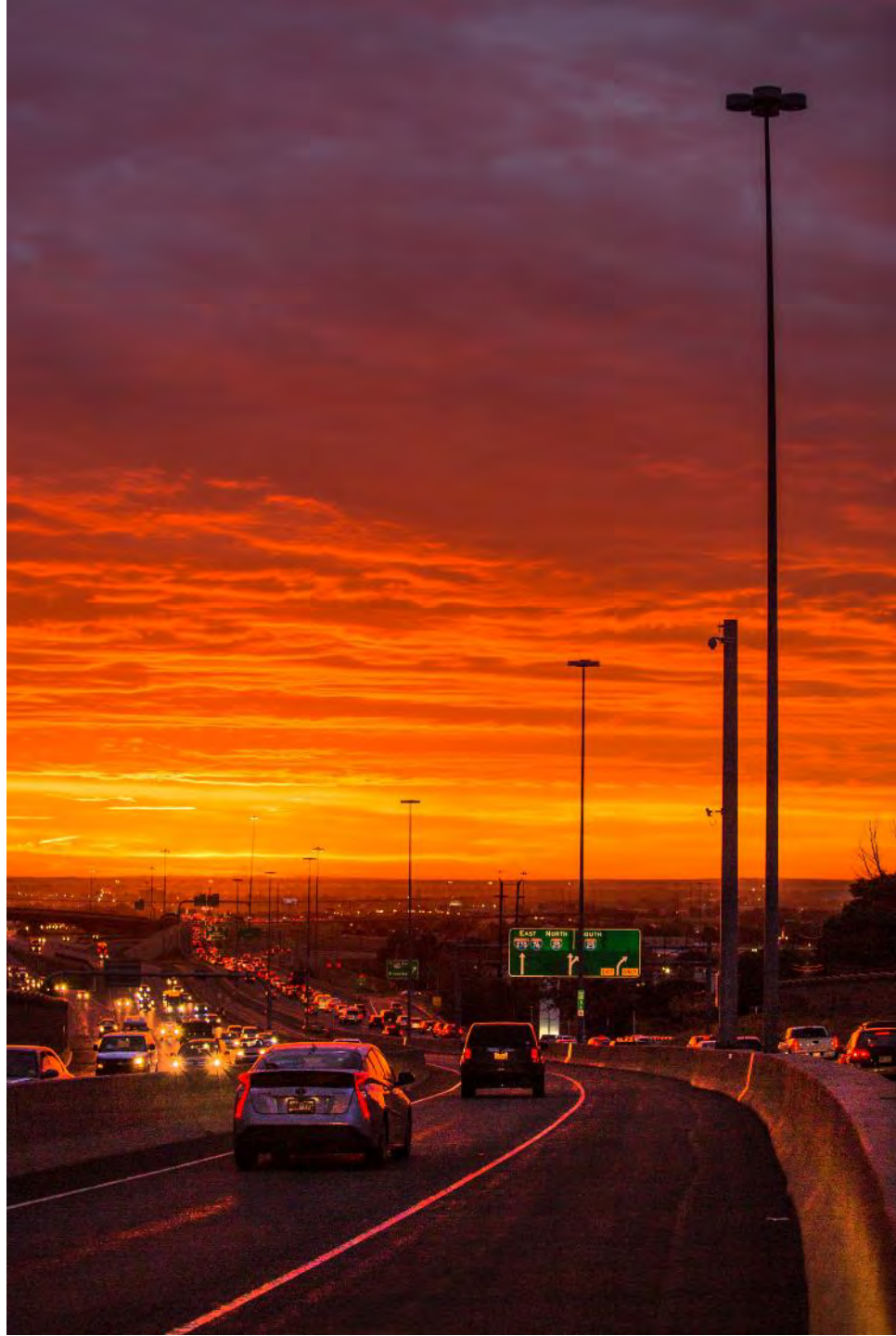
- Best Practice Guidance

Next Steps

Final Recommendations

Express Lane Network Recommendations

- Prioritized List of Express Lane Corridors & Connections
- Develop financing program strategy for high-performing Express Lane corridors
- Final Report Document & Summary Map
- Research and best practices to inform future stakeholder and community outreach efforts



THE LATEST ON TRANSPORTATION PLANNING

YOUR TRANSPORTATION PRIORITIES POWERED BY YOU

COLORADO
Department of Transportation

VISION FOR COLORADO'S TRANSPORTATION SYSTEM

10-YEAR STRATEGIC PROJECT PIPELINE

Grand Avenue Bridge ribbon-cutting ceremony in Glenwood Springs

In May 2019, the Colorado Department of Transportation (CDOT) embarked on an effort to refresh our transportation plan and priorities based on firsthand input from residents across the state.

Our goals were simple: to hear directly from Coloradans about what they need from our transportation system; to ensure that we are prioritizing precious taxpayer dollars in ways that best deliver on those needs; and to energize an ongoing statewide conversation about the vitality of transportation in connecting our daily lives.

—continued on page 2

BUILDING A 10-YEAR VISION

—continued from page 1

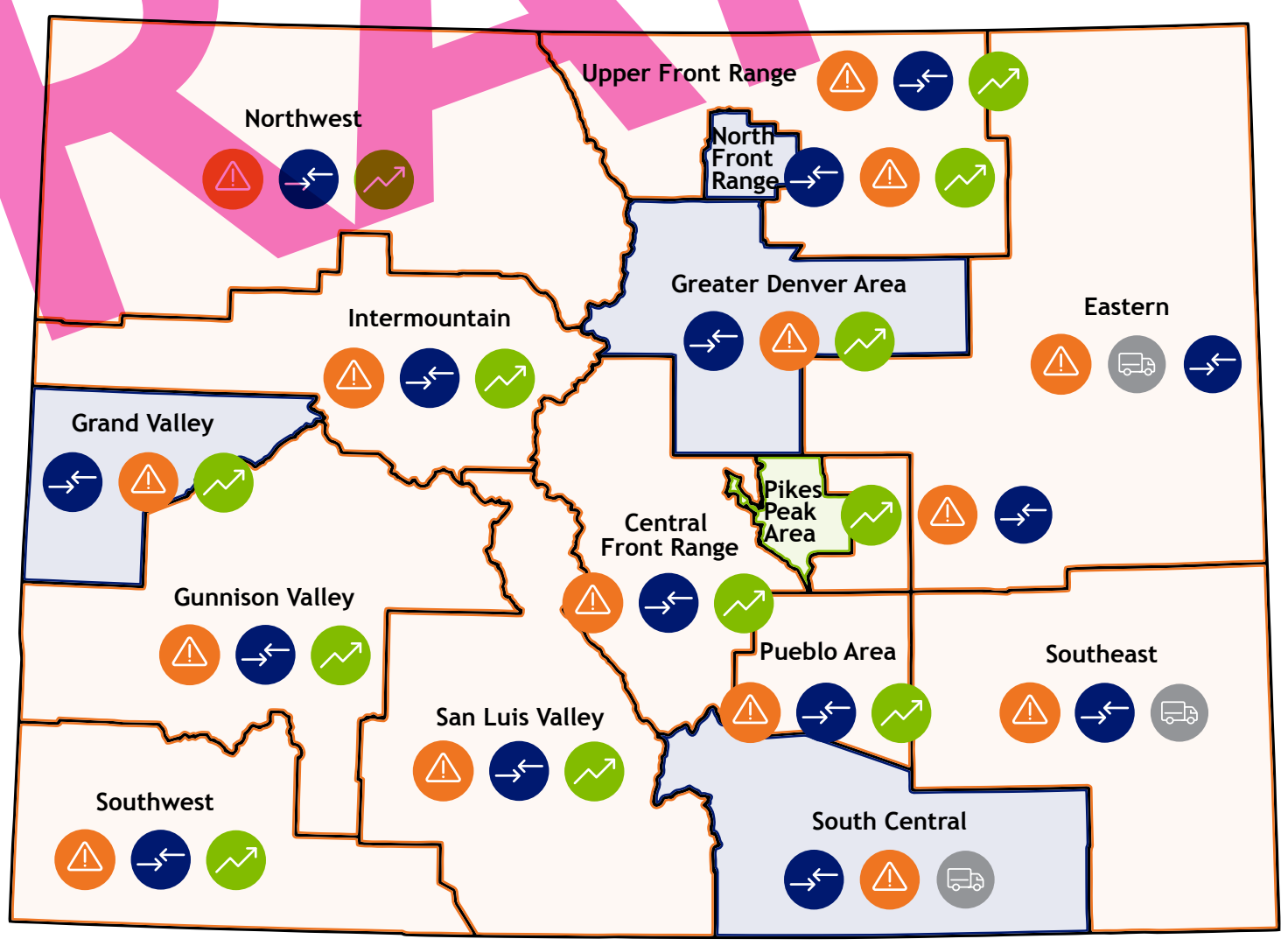
CDOT's outreach efforts — the most expansive in the history of the Department — revealed a compelling vision about the future of transportation in Colorado. This vision was conceived in the chambers of county commissions from Cortez to Julesburg, outside of public libraries in Gunnison, grocery stores in Fort Morgan, recreation centers in Salida, and on the sidewalks of main streets across Colorado. Throughout these conversations, CDOT's team has been struck both by the uniqueness of each community, and by the common themes that emerge when talking about our transportation challenges.

Transportation Planning:

- Identifies future needs for our transportation system
- Establishes a transportation vision and goals for the state and the types of projects and investments that will help achieve these goals
- Connects current and future funding realities to deliver an effective and efficient transportation system that works for Colorado today and in the future.

Altogether, CDOT received thousands of comments that collectively point to three compelling needs:

- Improving the **condition** and **safety** of our roads
- **Reducing congestion**
- Providing more **travel options**



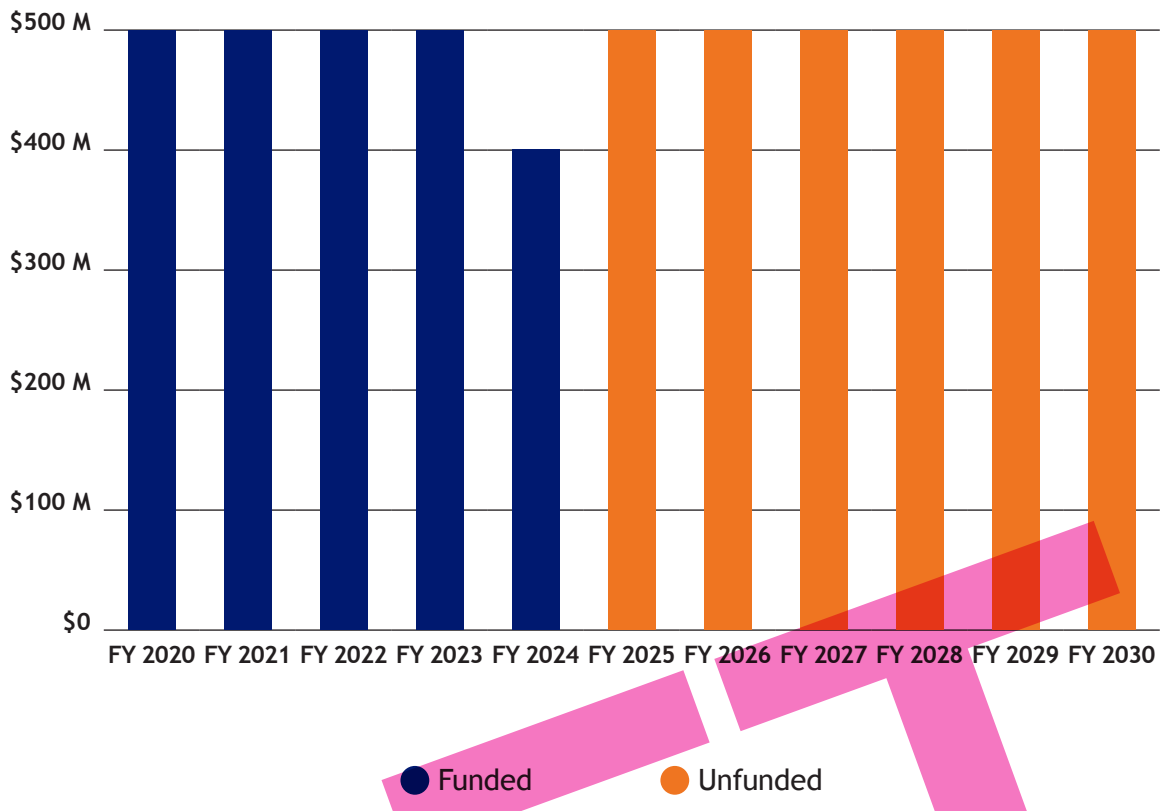
Source: 2019 Your Transportation Plan MetroQuest Online Survey, County Meetings,Transportation Planning Region Meetings, Stakeholder Meetings, Telephone Town Halls

Through the infusion of SB 262, SB 1, and SB 267, CDOT revenues for capital construction will remain elevated until 2024. These funding infusions allow the department to make critical investments across the state.

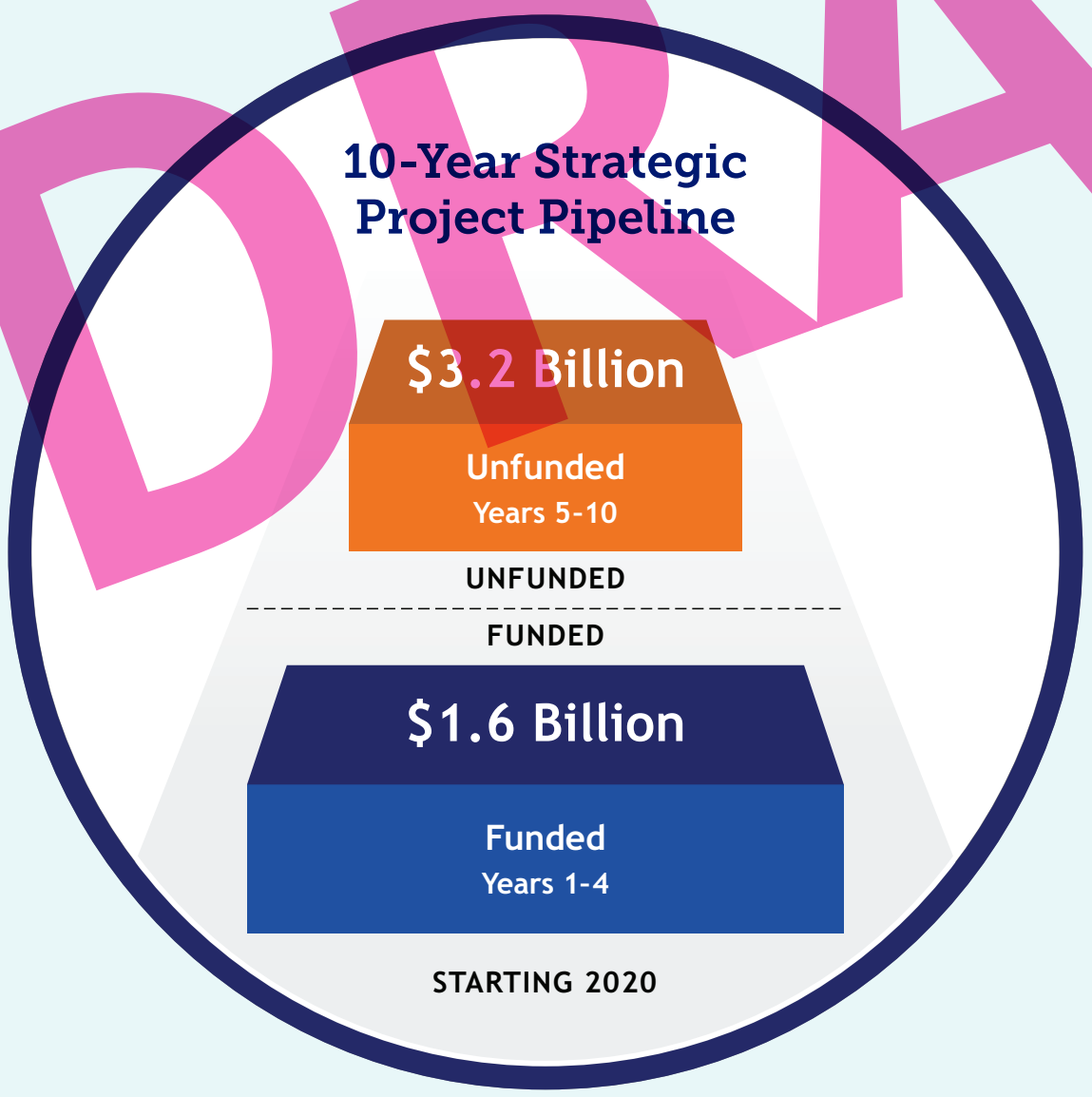
However, these legislative measures are temporary and will eventually run out. If future funding is available, CDOT has a plan — a plan developed from the voices of everyday Coloradans, local elected officials, and key stakeholder groups.

After the additional legislative funding runs out, CDOT will be forced to return to focusing on maintaining the system we have rather than pursuing much needed expansion and improvement projects.

CDOT's Use of Additional Legislative Funding



10-Year Strategic Project Pipeline



This first set of funded projects provide the initial steps toward delivering a better, safer transportation system for Colorado — but there is more that needs to be done.

The following pages complete this journey with a 10-year vision of achievable projects. Each section describes what projects are funded with new legislative dollars and which are currently unfunded and require additional dollars to achieve.

Funding and project timing are subject to change — this graphic is for illustrative purposes only.

WE HEARD YOU

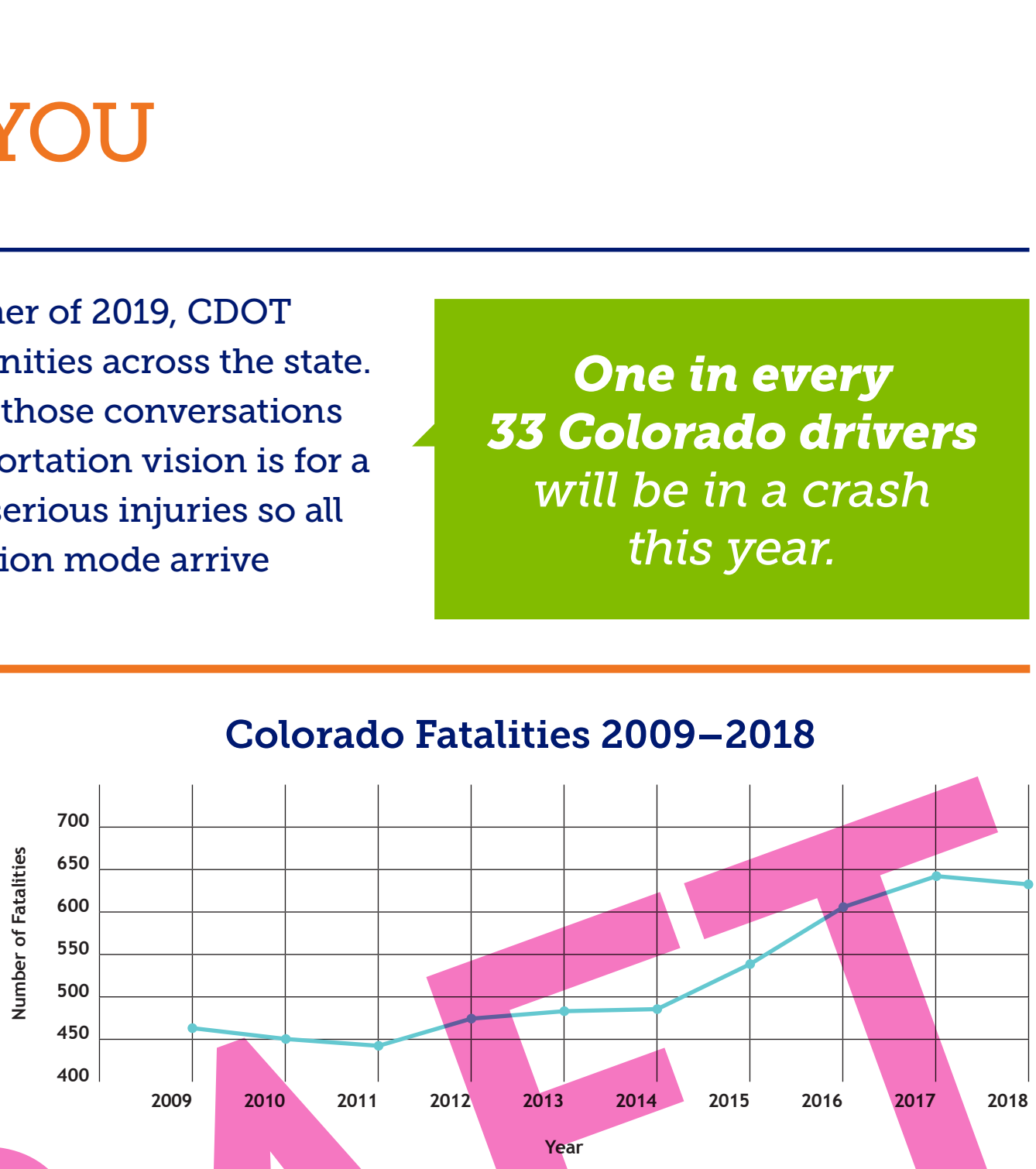
During the spring and summer of 2019, CDOT spoke to residents in communities across the state. The common thread in all of those conversations was safety. Colorado's transportation vision is for a future with zero deaths and serious injuries so all people using any transportation mode arrive at their destination safely.

One in every 33 Colorado drivers *will be in a crash this year.*

However, crash rates and traffic fatalities are at concerning levels. A number of factors contribute to this, including:

- Colorado's population has grown rapidly, adding several hundred thousand people to our roads
- Speeding, impaired driving and distracted driving
- Lack of seat belt use

Colorado Fatalities 2009–2018



No number of fatalities can ever be OK. CDOT works to integrate safety into everything we do, focusing on both driver behavior and the built environment. The 10-Year Strategic Project Pipeline will focus on safety improvements both large and small such as installing new guardrails, rebuilding intersections, and constructing new sections of passing lanes.

Types of Safety Improvements:

- Intersection improvements
- Passing lanes
- Highway widening
- Shoulder widening
- Wildlife fencing
- Slow vehicle / truck pullouts
- Roundabouts
- Signal improvements
- Bottleneck reductions
- Pedestrian, bicycle, and bus stop safety improvements

Along with safety improvements throughout Colorado, the 10-Year Strategic Project Pipeline will pursue projects that align with what we heard from Coloradans. CDOT has placed the projects in the following categories:

IMPROVING OUR INTERSTATES

This category includes any highway or transit improvements located on a Colorado interstate.

These projects address:

- Growth & Congestion

RELIEVING TRAFFIC

This category includes any highway or transit projects that contribute to the alleviation of congestion in Colorado's metropolitan areas.

These projects address:

- Growth & Congestion
- Lack of Travel Options

IMPROVING RURAL ACCESS STATEWIDE

This category includes any highway or transit projects that provide travel access within and between Colorado's rural areas.

These projects address:

- Growth & Congestion
- Lack of Travel Options
- Freight

RURAL PAVING

This category includes any highway or transit projects that improve the quality of rural roads.

These projects address:

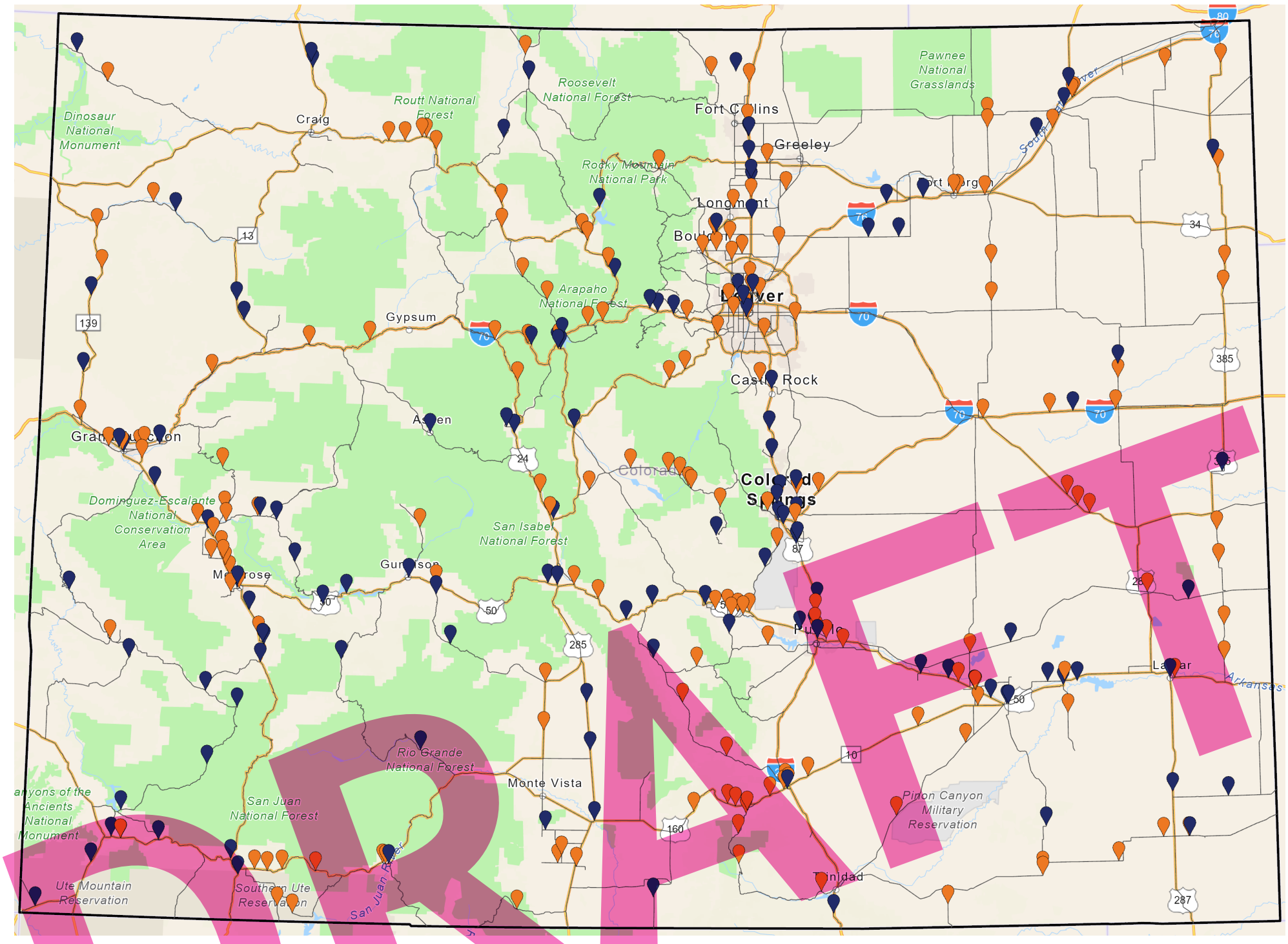
- Road Condition & Safety
- Freight

ROAD CONDITION AND MAINTENANCE

This category includes any highway or transit projects that will return our system to a "state of good repair."

These projects address:

- Road Condition & Safety
- Freight



Funded or partially-funded project

Unfunded project

Projects have multiple benefits. A complete listing of projects is included on pages 18-24.

Funded Projects Highlight

X number of projects totaling $1.65 billion — based on four years of new revenue provided by the state legislature.

Includes largest investment in rural pavement in CDOT history.

Leverages other CDOT funding sources to accomplish large projects like rebuilding I-270 and the first phase of Floyd Hill on I-70. First set of projects will go to construction in Spring of 2020.

Unfunded Projects Highlight

X number of projects totaling approximately **$3.2 billion**.

Includes six years of projects, completing CDOT's 10-year plan.

Projects selected based on public input and prioritized by local government officials, transportation planning experts across the state, and CDOT.

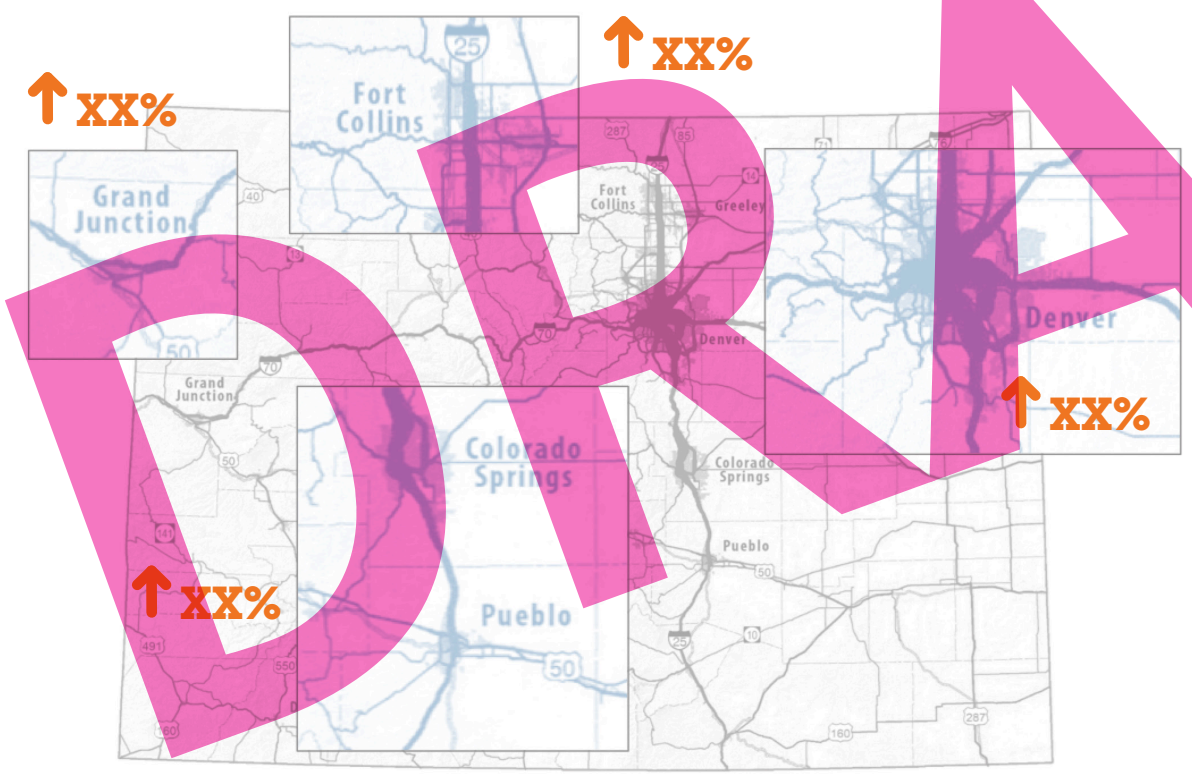
IMPROVING OUR INTERSTATES

Colorado's interstates are the backbone of our transportation system. They are key to Colorado's economy — connecting goods and people across our state and region.

However, as Colorado's population and economy continue to grow, our interstates are feeling the pinch. I-25 and I-270 are crippled by congestion for long stretches of the day. Along I-70 West, worsening traffic — especially on the weekends — aligns with a host of concerns about extreme weather and accommodating passenger vehicles, freight, bicyclists and wildlife safely amidst geologically tough conditions. I-70 East and I-76 — key freight routes for the state — are in need of major pavement improvements due to years of deferred maintenance.

The 10-Year Strategic Project Pipeline invests $1.2 billion (37.5 percent of all funding) into improving the condition and efficiency of these corridors. That means rebuilding pavement on I-70 East and I-76, delivering extra capacity and options on I-25 North, and tackling congestion bottlenecks across I-70 West.

I-70 at Floyd Hill



Every year, the average commuter in Colorado:

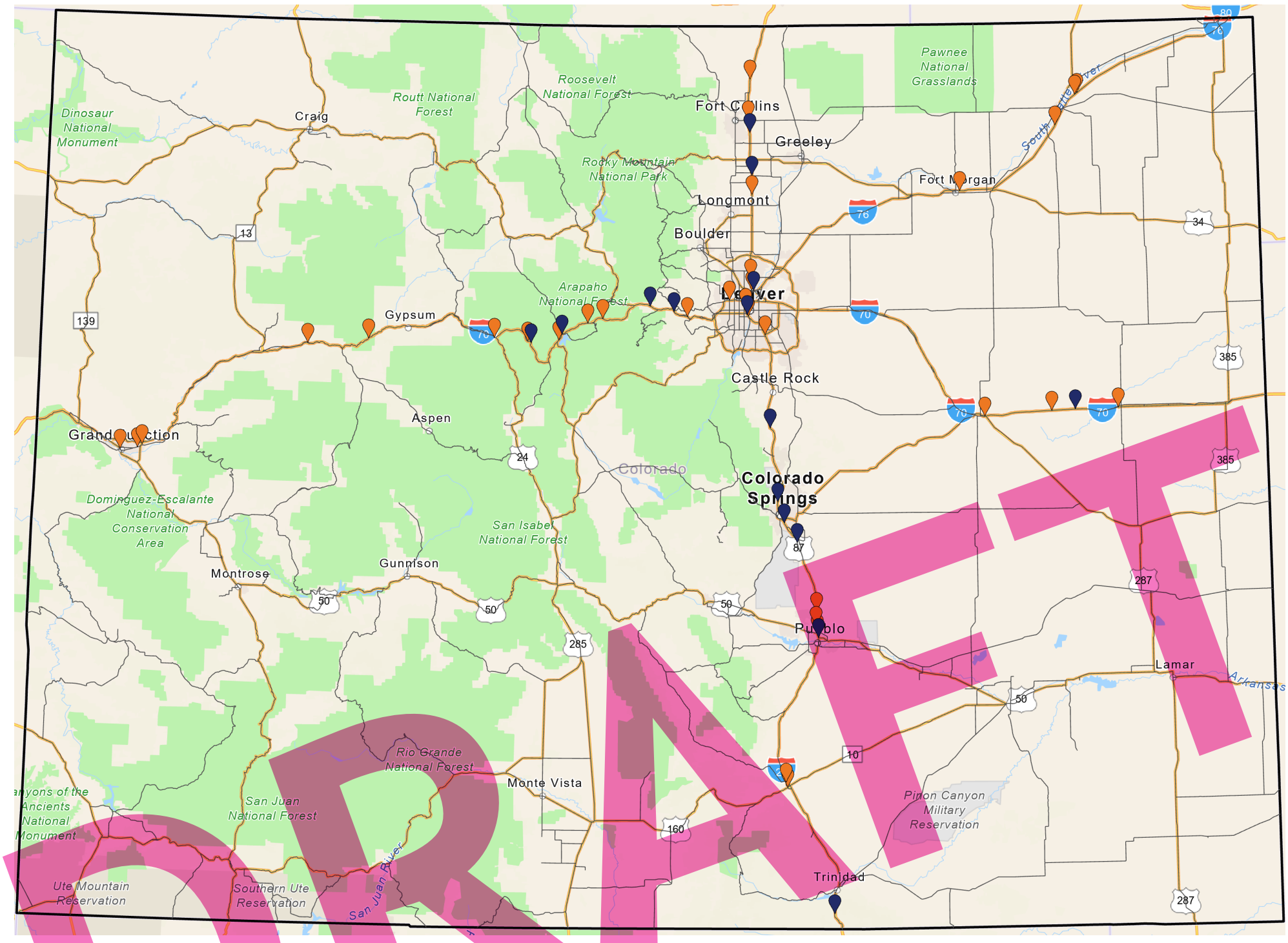
- Spends **2 days** sitting in traffic
- Loses **$900** due to delays
- Burns an extra **19 gallons of gas**

25 percent
of Colorado's greenhouse gas emissions come from the transportation sector.

188 million hours
of lost time for commuters and travelers and delivery delays for businesses and shipping companies.

38 million gallons
of fuel wasted that represent direct costs to travelers and the environment.

Traffic congestion — just the extra travel time and wasted fuel in slow conditions — costs Colorado ***$3.6 billion*** each year.



Funded or partially-funded project

Unfunded project

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Funded Projects Highlight

Nearly 40 percent of funds targeted toward corridor-wide modernization of I-25, which carries roughly 85 percent of the state's population.

Other major capacity projects include a down payment towards fixing Floyd Hill, a well-known choke-point on I-70, a long overdue rebuild and widening of I-270, and a first phase of reconstruction along I-25 in Pueblo.

Unfunded Projects Highlight

$1.2 billion (or 38 percent) of the total unfunded project list dedicated to the improvement of Colorado interstates.

Continues work on our most congested corridors while also reconstructing pavement along rural stretches of I-70, I-25 and I-76. Many sections of these interstates haven't seen significant work since they were first opened to the public decades ago.

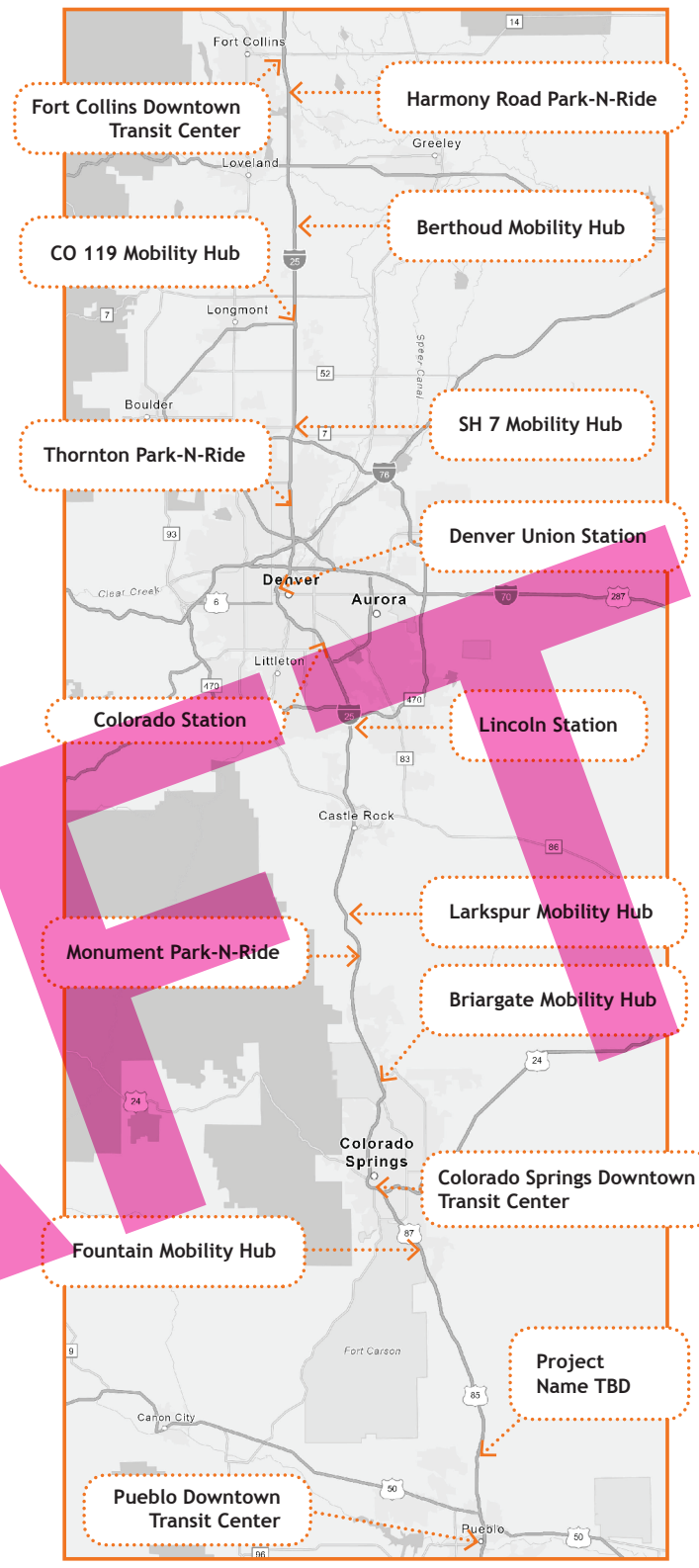
RELIEVING TRAFFIC

More people are using our transportation system than ever before and the number is projected to keep rising.

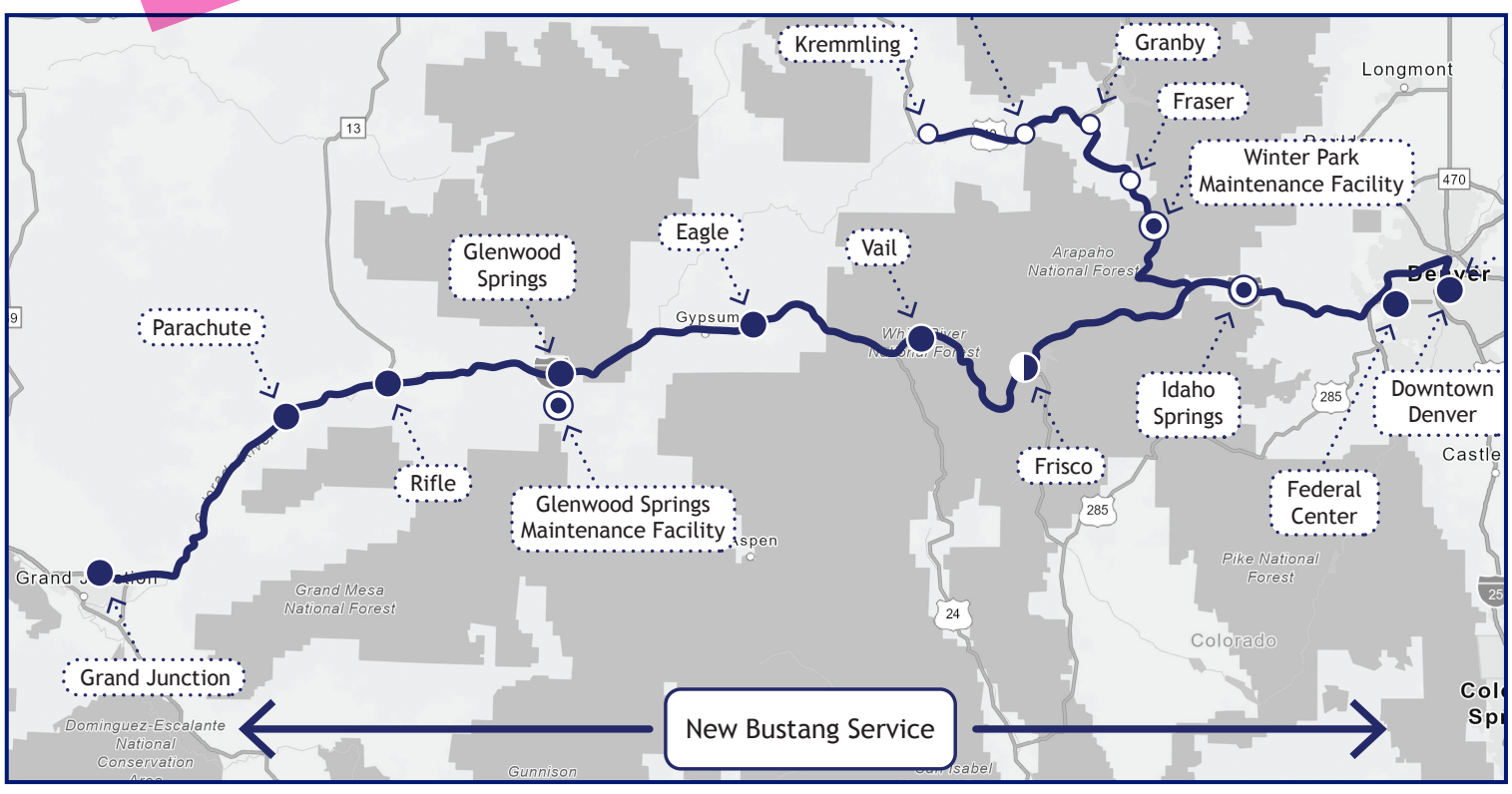
Our state population grew by 1.59 million over the last 20 years and is on track to grow another 1.69 million over the next 20 years. As the population increases, so to does the distance many Coloradans need to travel between home and work — resulting in more vehicle travel. Today, Colorado ranks 37th in the nation for traffic congestion, approaching the status of states commonly associated with the worst delays in the nation. At the same time, there is growing recognition that Colorado cannot simply build its way out of congestion.

The solutions in this plan include a mixture of highway capacity improvement and transit expansion projects in urban areas. This includes projects that would improve intersections and expand highway capacity at strategic locations along with investments in new mobility hubs that increase access to transit and carpooling.

Unfunded Mobility Hubs



Funded Microtransit



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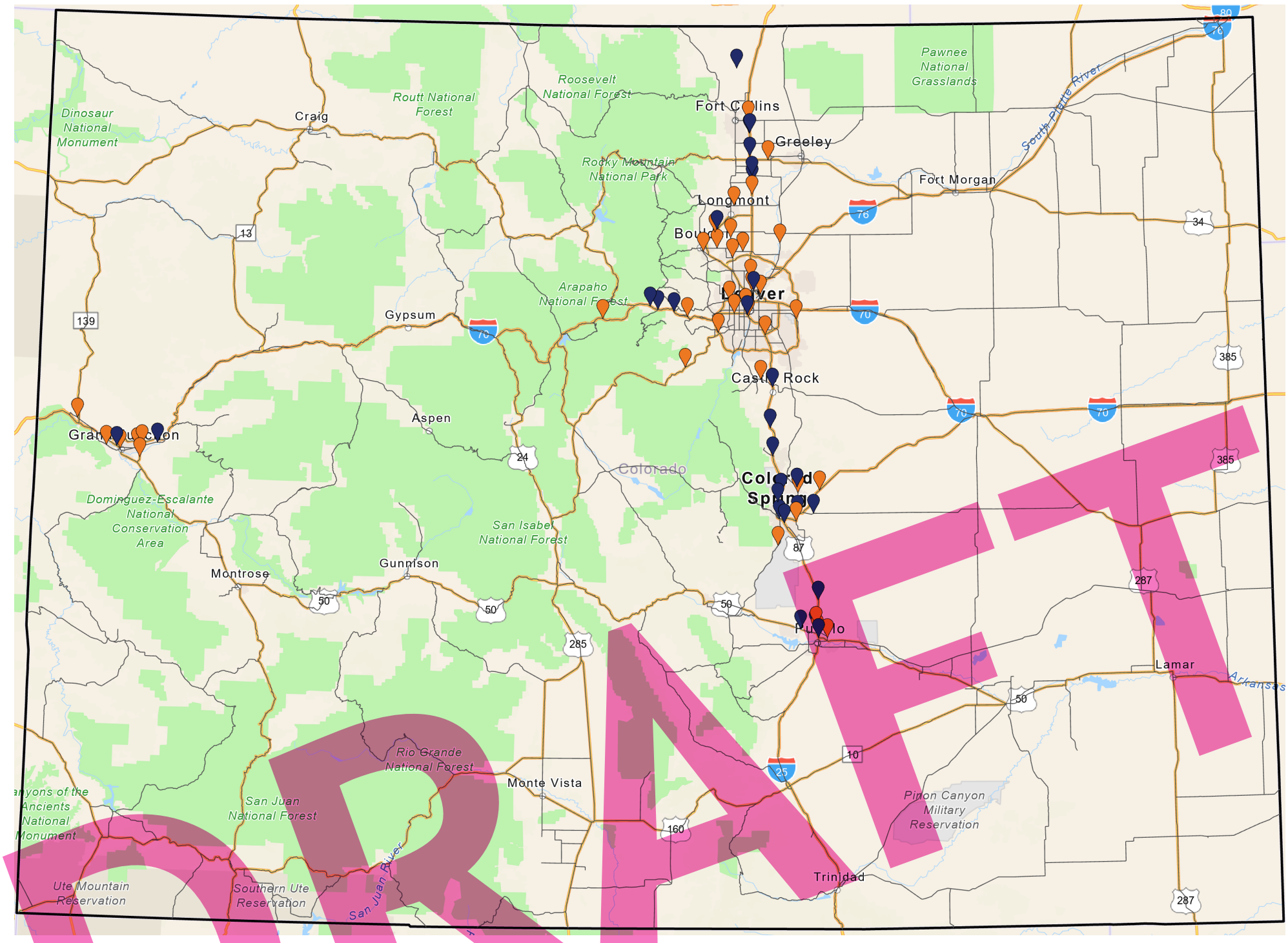


Funded or partially-funded project

Unfunded project

Projects have multiple benefits. A complete listing of projects is included on pages 18-24.

Funded Projects Highlight

Mix of projects that help move vehicles while helping improve access to options beyond the single occupant trip.

Rebuilds a number of interchanges known to back-up traffic and lead to accidents and widens our interstates along most congested segments.

Includes new buses for Bustang (CDOT's transit service), and new mobility "hubs" where commuters can catch the bus or connect with a carpool.

Unfunded Projects Highlight

$1.65 billion (or 53 percent) of the unfunded project list would be dedicated to providing needed congestion relief.

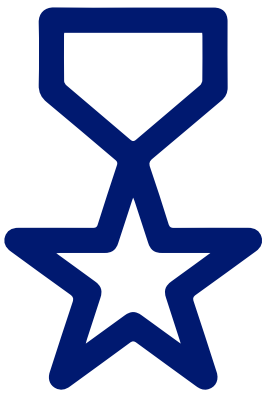
Continues the strategic investment in both road and transit infrastructure along the interstates while addressing roads like US285 that are feeling the impact of overflow congestion from I-70.

IMPROVING RURAL ACCESS STATEWIDE

Rural Colorado might not have population density, but it does face significant transportation challenges.

Whether it is freight movements on the Eastern Plains or recreation tourism in the Rocky Mountains, Colorado's rural highways are in need of improvement. Throughout the outreach process CDOT consistently heard about the importance of adding passing lanes to provide safe passage in mountainous terrain; particularly along corridors with high numbers of freight trucks. We also heard a lot about the need for more options for senior citizens and veterans to reach basic amenities and medical care.

To address these issues, the 10-Year Strategic Project Pipeline proposes an investment of roughly $600 million in projects that would add passing lanes, improve intersections, expand CDOT's Bustang and Bustang Outrider services and provide more revenue to local transit operators.



66,000

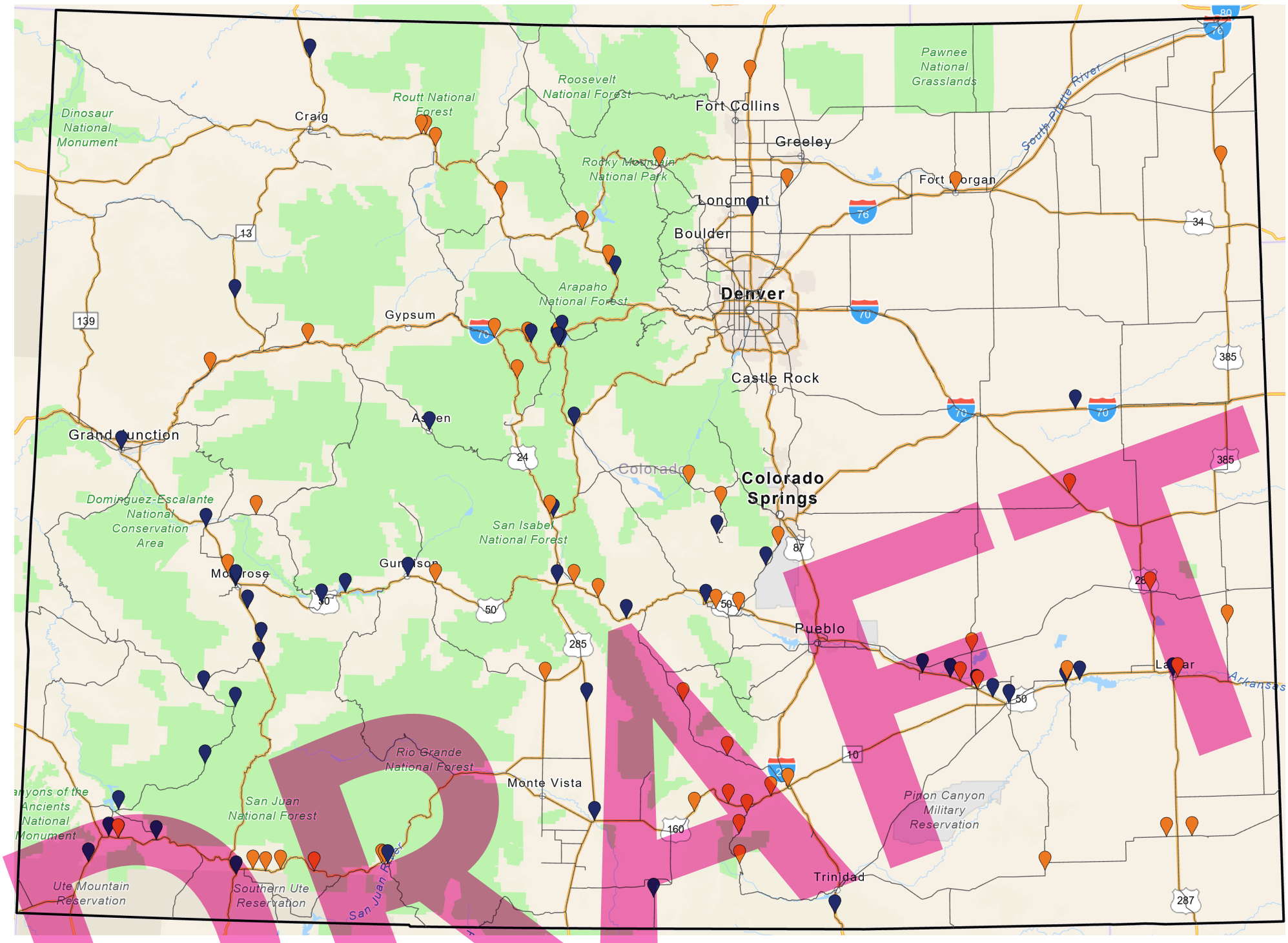
The number of veterans who live in rural Colorado.

Roadways in Colorado's rural communities carried **309.7 million tons** of critical products and parcels valued at **$150.3 billion** in 2019.

30 percent of all freight tonnage in the state and **19 percent** of freight by value traveled on roadways in Colorado's rural communities in 2019.

Photo caption

By 2045, the number of those 65 and older ***will increase by 29 percent.*** *That means the need for mobility services — such as local transit and regional/statewide transit such as Bustang — will increase.*



Funded or partially-funded project

Unfunded project

Projects have multiple benefits. A complete listing of projects is included on pages 18-24.

Funded Projects Highlight

Expands CDOT's Outrider service to include communities of Lamar, Fort Lyon, Las Animas, La Junta, Swink, Rocky Ford, Manazanola, and Fowler.

Improves Outrider connections in Durango, Mancos, Cortez, Dolores, and Rico.

Adds new sections of passing lanes in high priority areas.

Completes reconstruction of SH13 and SH9.

Unfunded Projects Highlight

$619 million (or 20 percent) of the unfunded project list would be dedicated to providing mobility options to rural Coloradans, including seniors and veterans.

Dozens of new passing lanes and intersection improvements.

ADA and pedestrian improvements and construction of the Southern Mountain Loop Trail in SE Colorado.

FIXING RURAL ROADS

Over the course of CDOT's outreach effort we heard from rural communities across Colorado about the need to improve the condition of rural roads, and about the importance of freight routes to take products from farm to market.

We also heard frustration that, because their roads carry less volume than urban areas, CDOT's pavement models rarely direct scarce resources towards lasting rural road repairs. Recent data indicates that those frustrations are valid. In August 2019, a report by the Reason Foundation showed that Colorado has slipped to 47th in the nation when it comes to the condition of our rural pavement.

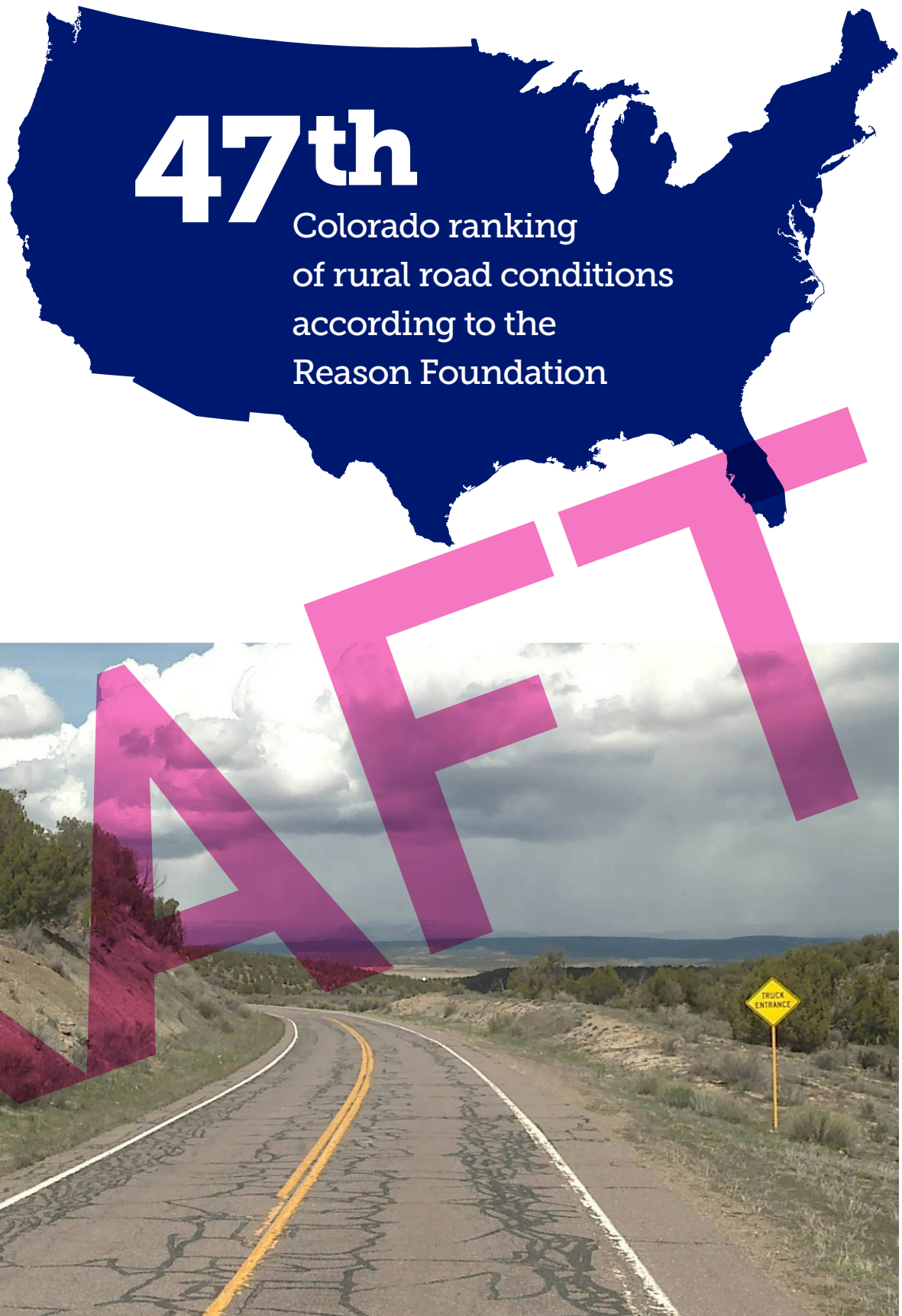
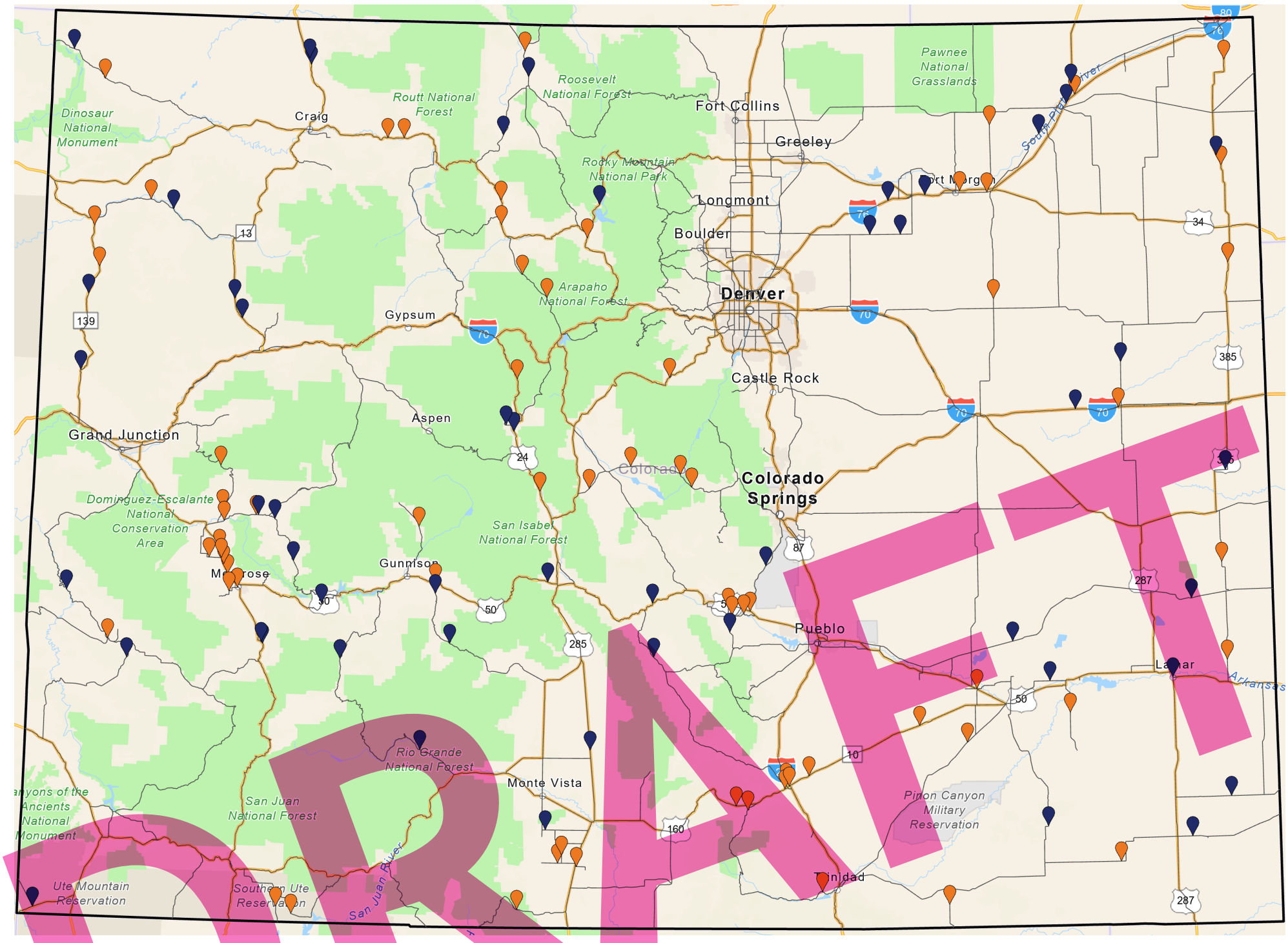


Photo caption

The first four years of this plan allocates 25 percent of all dollars (over $300 million) — to rural pavement condition — the largest single investment in CDOT's recent history. CDOT proposes maintaining this focus throughout the decade, with a total of $1.3 billion going toward rural roads between 2020 and 2030. This would repair 1,300 miles of rural pavement across the state. Many of these roads haven't been repaved since the 1970s.

*Between 2020 and 2030, approximately **$1.3 billion** will go towards rural roads.*



Funded or partially-funded project

Unfunded project

Projects have multiple benefits. A complete listing of projects is included on pages 18-24.

Funded Projects Highlight

Largest investment in Colorado's rural road network in recent history.

41 rural road projects totaling $337 million will make investments in more than 500 miles of Colorado's rural roads, some of which have not been comprehensively treated since the 1970s.

Unfunded Projects Highlight

$646 million (or 20 percent) of the unfunded project list would be dedicated to improving crumbling rural roads.

IMPROVING THE CONDITION OF OUR ROADWAY SYSTEM

Colorado's infrastructure is as diverse as the state. Bridges span majestic canyons and rivers. Miles of pavement traverse our expansive plains and tunnels bore through the Rocky Mountains connecting east to west. Hundreds of thousands of culverts, retaining walls, rockfall fences, traffic signals, and cameras make the whole system work.

Even though the majority of CDOT's typical budget is devoted to maintaining these resources, the state has an extensive backlog of repair needs. Returning our system to a "state of good repair" would require an additional $200 - $300 million per year.

*CDOT's 10-year plan would devote approximately **50 percent** of new funding received toward improving the condition of our roads, bridges and other assets.*

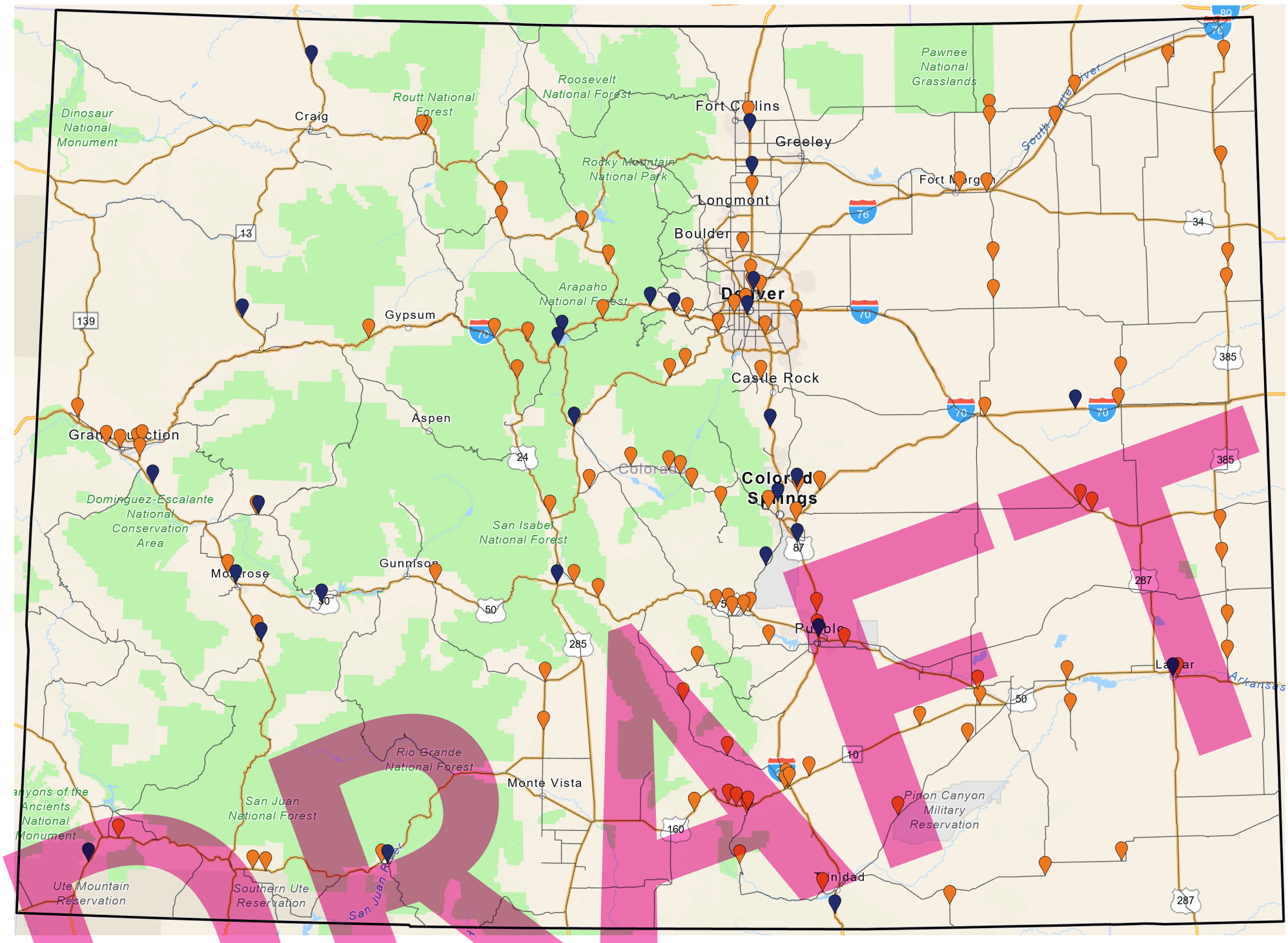
Similar to a home, it is much less expensive to maintain a transportation system in good condition than one in a state of decline. CDOT's 10-year plan would devote approximately 50 percent of new funding received toward improving the condition of our roads, bridges and other assets. These investments would return hundreds of miles of pavement to good condition, extend the life of bridges around the state and bring culverts, guardrail, and walls up to standard.

$148 million

Amount invested in other assets such as culverts, tunnels, and traffic signs

$209 million

Amount invested in critical bridge repairs statewide



Funded or partially-funded project

Unfunded project

Projects have multiple benefits. A complete listing of projects is included on pages 18-24.

Funded Projects Highlight

CDOT will restore the department's focus on fixing the basics. CDOT heard clearly from residents that we need to do a better job taking care of the roads across our expansive system. More than half of the funds will help fix roads in both urban and rural areas.

Unfunded Projects Highlight

$2.15 billion (or 70 percent) of the unfunded project list would be dedicated to preserving and improving roadway assets.

Includes reconstruction of segments of rural interstates for the first time in decades.

ACCOUNTABILITY

Just as important as establishing a pipeline of projects is creating transparency and accountability structures that let the public see the progress on these projects and how dollars are being spent.

These measures include:

- An online dashboard that tracks spending and timelines for every project in this plan.
- New spending targets capping overhead costs so that more money is spent on the road — where the public can see and feel our work.
- Making CDOT's budget more transparent and our internal management controls as strong as possible.
- Spending every dollar — across the Department — as wisely as possible by cutting discretionary costs within CDOT.

TRANSPARENCY

Insert text about website and PMO project tacking

WEBSITE IMAGE

FUNDED PROJECTS (YEARS 1–4)

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		STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
	Highway						
CENTRAL	I-25 Gap	$252 M	✓	✓			✓
	I-70 WB PPSL	$45 M	✓	✓			✓
	I-25 South Gap Package 3	$26 M	✓	✓			✓
	I-270: Widening from I-76 to I-70	$200 M	✓	✓			✓
	I-25 Valley Highway Phases 3 & 4	$60 M	✓	✓			✓
	I-70 West: Floyd Hill	$100 M	✓	✓			✓
	I-70 Peak Period Shoulder Lanes (PPSL) - Year Two 267 Commitment	$35 M	✓	✓			✓
	Urban Arterial Safety Improvements (Urban Arterial Safety Improvements in Region 1)	$25 M					
SOUTHEAST	US50A Pueblo West Purcell Interchange	$1.6 M		✓			
	US 50 and Purcell Drive Interchange	$37 M		✓			
	SH 21 and Research Parkway Interchange	$44 M		✓			✓
	I-25 and SH 94 Safety and Mobility Improvements	$34 M	✓	✓			✓
	US 287 (A-Park Street South) - Lamar Downtown Concrete Paving	$18 M				✓	✓
	I-25 Raton Pass Safety and Interchange Improvements	$13 M	✓		✓		✓
	SH 115 – Safety and Paving improvements from MM 20-39	$42 M			✓	✓	✓
	US 285/CO 9 Intersection Improvement with Bridge Widening	$7 M			✓		✓
	I-25 Colorado Springs Ramp Metering Phase 2	$6 M	✓	✓			
	I-25 Paving and Mobility- Fillmore to Garden of the Gods	$43 M	✓	✓			✓
	I-25 through Pueblo New Freeway	$60 M	✓	✓			✓
	US 287 Bridge Preventative Maintenance Phases 1 & 2	$5 M					✓
	M-22-AY Bridge Repair on CO 109 over US 50B in La Junta	$3 M					✓
	Bridge Preventative Maintenance: CO 12, CO 194, and I-25 C	$2.5 M					✓
	Bridge Preventative Maintenance on I-25, CO 16 & CO 24 in Colorado Springs (4 bridges)	$5.5 M					✓
NORTHWEST	SH 9 Frisco North	$9.5 M			✓		✓
	SH 13 Rio Blanco	$18.3 M			✓	✓	
	SH 13 Wyoming South	$32.2 M			✓	✓	
	US 50 Windy Point/Blue Creek Canyon	$18.5 M			✓	✓	✓
	SH 9 Iron Springs to Main Street	$6 M			✓		
	SH 13 Fortification Creek	$10.8 M				✓	✓
	US 6 Fruita to Palisade Safety Improvements	$36 M		✓			
	SH 13 Garfield County MP 11.3 to 16.2	$16.5 M				✓	✓
	US 550 Montrose to Ouray County Line Safety Improvements	$6 M			✓		
	I-70 Auxiliary Lane East Frisco to Silverthorne	$24 M	✓		✓		✓
	US 50 Grand Junction to Delta Repairs	$15 M					✓
	SH 92 Rogers Mesa to Hotchkiss	$8 M				✓	✓
	I-70B East of 1st to 15th Street	$16 M		✓			
	I-70 West Vail Pass Safety Improvements - Phase 1	$13.5 M	✓		✓		
	Intersection Improvements at SH 50/550	$3.5 M			✓		✓
	US 50 Passing Lanes Blue Mesa	$6 M			✓		
NORTHEAST	I-70 Replacing Failing Pavement	$58.1 M	✓		✓	✓	✓
	I-25 Seg. 5 & 6	$115.2 M	✓	✓			✓
	I-25 North: Segment 7 & 8 - Express Lanes on permanent EIS alignment (CO 402 to CO 14)	$230 M	✓	✓			✓
	I-25 North: Segment 5 & 6: BUILD Grant Funding Commitment Express Lanes on permanent EIS alignment (CO 56 to CO 402)	$50 M	✓	✓			✓
	CO 119: Safety / Mobility Improvements	$30 M		✓			
SOUTHWEST	US 550/160 Connection	$60.7 M			✓		
	US 160 Towaoc Passing Lanes	$9 M			✓		✓
	US 50/285 Intersection Reconstruction (Round-a-bout)	$5.4 M			✓		✓
	US 550 Pacochupuk South Roadway Mobility and Safety Improvements	$1.7 M			✓	✓	✓
	US 160 McCabe Creek Major Structure Replacement	$5 M			✓		✓
	US 550/160 Connection (Interchange Completion)	$7.9 M			✓		✓
	Transit						
CENTRAL	Denver Area Arterial Street Pre-BRT and BRT Elements	$26 M		✓			
	Castle Rock and/or Ridgegate Transit Station(s)	$22.5 M		✓			
	Denver Heavy Maintenance Facility	$7 M		✓			
	Burnham Yard	$5 M		✓			
	Idaho Springs Park-n-Ride	$2 M		✓			
	Bustang Fleet Purchases (DRCOG)	$5 M		✓			
SOUTHEAST	Bijou Street Storage and Maintenance Facility	$3 M		✓			
	Colorado Springs Transit Center	$8 M		✓			
	Woodmen Road Mobility Hub	$6 M		✓			
	Monument Park-n-Ride	$500 K		✓			
	Bustang Improvements at Tejon Park-n-Ride	$80 K		✓			
	North Pueblo Mobility Hub	$3.5 M		✓			

		STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
SOUTHEAST	Outrider Improvements at Pueblo West	$80 K					
	CRISI Grant Match (PACOG)	$50 K					
	Outrider Improvements at Lamar, Fort Lyon, Las Animas, La Junta, Swink, Rocky Ford, Manazanola, and Fowler	$600 K			✓		
	Cripple Creek Administration and Operations Facility	$120 K			✓		
	Fairplay Mobility Hub	$4 M			✓		
	Outrider Improvements at Canon City and Cotopaxi	$160 K			✓		
	South Central Storage and Maintenance Facility	$2.6 M			✓		
	CRISI Grant Match (SCCOG)	$300 K			✓		
	Potential Bus Stop Improvements at Colorado City Corners, Walsenburg and Aguilar	$200 K			✓		
NORTHWEST	Arterial Transit and Bike/Pedestrian Improvements on I-70 Business/US 6 Corridor	$1.5 M			✓		
	Outrider Improvements at Grand Junction	$80 K			✓		
	Winter Park Maintenance Facility	$200 K			✓		
	Outrider Improvements at Fraser, Granby, Kremmling and Hot Sulphur Springs	$300 K			✓		
	Western Slope Storage and Maintenance Facility	$2.7 M			✓		
	Crested Butte Storage Facility	$1.5 M			✓		
	Outrider Improvements at Montrose, Delta and Gunnison	$250 K			✓		
	Outrider Improvements at Placerville, Ridgway and Telluride	$250 K			✓		
	RFTA Aspen Maintenance Facility Fuel Tanks	$1 M			✓		
	Summit County Transit Operations Center	$425 K			✓		
	Frisco Transit Center - Phase 2	$4.2 M			✓		
NORTHEAST	Longmont/Firestone/Weld County Mobility Hub (interim configuration)	$6 M			✓		
	SH 119 BRT Elements	$10 M			✓		
	Bus stop Improvements at Lochbuie	$80 K		✓			
	Bustang and Outrider Fleet Purchases	$2.5 M		✓			
	Centerra-Loveland Mobility Hub	$6 M		✓			
	Berthoud Mobility Hub	$5 M		✓			
	Northern Colorado Maintenance Facility	$3 M		✓			
	Harmony Road Park-n-Ride Expansion	$500 K		✓			
	Bus Stop Improvements at Sterling	$80 K			✓		
	Bus Stop Improvements at Brush, Fort Morgan and Hudson	$240 K			✓		
SW	Outrider Improvements at Durango, Mancos, Cortez, Dolores, and Rico	$400 K			✓		
	Poncha Springs Welcome Center	$502.4 K			✓		
	Outrider Improvements at 3 locations between Alamosa and Buena Vista	$250 K			✓		
Rural Paving							
SOUTHEAST	SH 116 - US 287 to Kansas Border	$13.8 M				✓	
	SH 69A Westcliffe to Fremont County	$6.5 M				✓	
	US 50 Texas Creek East	$9 M				✓	
	SH 96 East of Ordway to Arlington	$10 M				✓	
	SH 109 - SH 160 to Otero County Line	$15 M				✓	
	US 160 from Springfield to SH 100 and SH 100	$6.56 M				✓	
	SH 96 near Eads to Sheridan Lake	$11.58 M				✓	
	SH 67 from SH 96 to Florence	$5.77 M				✓	
	SH 194A Surface Treatment and Drainage Improvements	$5.77 M				✓	
NORTHWEST	SH 92 Crawford East	$7.8 M				✓	
	SH 64 Meeker West	$8.8 M				✓	
	SH 34 Grand Lake	$11.5 M				✓	
	SH 139 Douglas Pass North	$8.4 M				✓	
	SH 149 Lake City North	$12.1 M				✓	
	SH 300 Leadville West	$2.5 M				✓	
	SH 24 Leadville South	$5.8 M				✓	
	SH 318 Browns Park East	$9.5 M				✓	
	SH 114 Parlin West	$4.5 M				✓	
	SH 125 Walden North	$1 M				✓	
	SH 14 Grizzly Ranch North	$7 M				✓	
	SH 139 Dinosaur Diamond	$2.2 M				✓	
	SH 92 Hotchkiss to Crawford	$3.5 M				✓	
NORTHEAST	US 6 Merino to Atwood	$6.13 M				✓	
	CO 59 Seibert to Cope	$17.12 M				✓	
	CO 138: Sterling North (Part 2)	$2 M				✓	
	SH 385: Phillips/Yuma County Line South	$7.1 M				✓	
	SH 52 Resurfacing Prospect Valley (Phase 1)	$4.15 M				✓	
	I-76: Highway 144 West Westbound Diamond Grind & Slabs	$8.24 M				✓	
	I-76: US 34 East Both Directions	$11.47 M				✓	
	US 385 North of Cheyenne Wells	$14.83 M				✓	
	CO 52 Resurfacing Prospect Valley (Phase 2)	$5.11 M				✓	
	I-76: East of Sterling	$8.24 M				✓	
SOUTHWEST	SH 141&145 Slickrock & Redvale	$16 M				✓	
	SH 17 MP 84.5 to 118.5	$12 M				✓	
	SH 149 Paving and Shoulders North of Creede	$16 M				✓	
	SH 114 Paving and Shoulders	$12 M				✓	
	SH 141 North of Naturita	$12 M				✓	
	US 50 North of 285 Resurfacing	$3.5 M				✓	
	US 550 Billy Creek Resurfacing	$6.5 M				✓	
	SH 370 Resurfacing	$2 M				✓	
	US 160 Aztec Creek MP 0-8	$4 M				✓	

NOTE: Safety is fundamental to every project, so while a specific category has been hidden from the table, safety always applies.

UNFUNDED PROJECTS (YEARS 5–10)

CENTRAL PROJECTS

	STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
Highway – Region 1						
Speer and 23rd Construction	$25 M	✓	✓			✓
Valley Highway Phases 3 and 4 (Burnham)	$200 M	✓	✓			
I-25 North: 84th - 104th Early Action	$70 M	✓	✓			✓
SH7/I-25 Interchange Mobility Hub (Early Transit Infrastructure -Parking/Slip Ramps)	$5 M	✓	✓			✓
I-25 & Belleview Phase I	$22 M	✓	✓			✓
Floyd Hill WB	$100 M	✓	✓			✓
I-70 & Kipling ROW	$30 M	✓	✓			
I-70 Bakerville to EJMT Climbing Lane	$25 M	✓	✓			✓
EJMT Prioritized Maintenance	$50 M	✓				
Escape Ramp Improvements Along I-70	$5 M	✓				
Vasquez Early Action Items	$10 M		✓			✓
US 6 & Wadsworth	$70 M		✓			✓
US 85: Sedalia to Meadows	$37 M		✓			✓
US 285 to Pine Junction/Bailey	$60 M		✓			✓
SH 7 Priority Intersection Improvements	$15 M		✓			✓
C-470: Wadsworth to I-70 Phase I	$56 M		✓			✓
SH 30 Improvements: Quincy to Airport Rd	$25 M		✓			✓
Urban Arterial unfunded list/ DRCOG Vision Zero High Injury Network priorities	$10 M					
Bottleneck Reduction	$25 M		✓			✓
Regionwide Signal Cabinet Upgrades	$5 M					✓
Regionwide Signal Upgrades	$12 M					✓
Noise Wall Maintenance	$10 M	✓				✓
Grade Separating Trail Improvements/Crossings	$10 M					✓
Regionwide bridge rehabilitation and maintenance	$45 M					✓
Transit – Region 1						
I-25 North 84th - 104th: Early Action	$40 M	✓	✓			✓
SH7/I-25 Interchange Design/ROW	$5 M	✓	✓			✓
SH 7 Priority Intersection Improvements	$5 M		✓			✓
Region 1 Arterial Transit	$70 M		✓			
DTC Mobility Hub	$10 M	✓	✓			
Morrison / Dinosaur Parking Lot Mobility Hub	$20 M		✓			✓

NOTE: Safety is fundamental to every project, so while a specific category has been hidden from the table, safety always applies.

SOUTHEAST PROJECTS

	STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
Highway – Region 2						
US 24 Shoulder Widening	$10 M					✓
US 50 Passing Lanes East of Salida	$8.5 M			✓		✓
SH 67 Passing Lanes	$10.5 M			✓		✓
SH 69 Improvements	$10 M			✓		✓
SH 96 Shoulder Widening	$10.5 M					✓
SH 115 Widening and Passing Lanes, Shoulder and Intersection Improvements between Cañon City and Florence	$10.5 M			✓		✓
I25C & US160 Intersection Improvements	$4 M	✓		✓		✓
US 160 Freight and Safety Improvements	$18 M			✓		✓
Proposed US350 shoulder widening	$5.5 M					✓
Bike/Pedestrian: Southern Mountain Loop Trail	$10 M			✓		✓
ADA ramps & Sidewalk Improvements in La Veta and Trinidad	$1 M			✓		✓
SH 69 Improvements	$6.2 M			✓		✓
More US50B Passing Lanes	$15 M			✓		✓
Realign US50B as a part of US287 Relieve Route project	$34.2 M			✓		✓
CO 160 Curve Alignment	$1 M					✓
Passing lanes on US 385	$5 M			✓		✓
Proposed SH 10 Shoulder Widening project	$10 M					✓
SH 71 Passing Lanes	$4 M			✓		✓
Intersection Improvements at CO 96/CO 71 & CO96/CO71/CR G	$800 K			✓		
US 24 East Widening from Garrett Rd to Stapleton Rd	$50 M		✓			✓
US 24 West (Pedestrian Crossing over Ridge Road)	$16 M					✓
SH 21 and Airport Rd DDI Interchange construction	$45 M		✓			✓
SH 21 and Dublin Blvd (Construct a grade separated Interchange)	$45 M		✓			✓
Corridor Studies (SH 94, SH 83, SH 115, and US 24 between Manitou and Divide)	$4 M		✓			
High-Capacity Corridor Improvements (NEPA/Design/Engineering)	$850 K		✓			

	STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
BNSF Corridor Purchase (For multimodal corridor, non-motorized transportation, or BRT)	$1.1 M		✓			
I-25 Improvements (Phase of NPF -13th Street to US 50 B)	$28 M	✓	✓			✓
I-25 Exit 108 (Replace Single Box Culvert Crossing Under I-25)	$11 M	✓				✓
Dillion Drive E. of I-25 Frontage Road (Construct a new 2-lane facility in addition to constructing a Round-about at Exit 104)	$3 M	✓	✓			
US 50C Drainage Improvements (drainage improvements at 36th lane)	$5.5 M					✓
SH 45 North Extension Study	$1 M		✓			
SH 47 (four lane extension to US 50 B)	$8 M		✓			
SH 96A West of Pueblo (shoulder widening, bridge rail replacement, bike lane and other safety improvements)	$11.5 M					✓
Transit – Region 2						
Transit Transfer Facilities For Regional Services (Cripple Creek, Cañon City, Woodland Park)	$390 K			✓		
New Regional Fixed-Route Transit Service in Teller County (including Lake George, Florissant, Evergreen Station, and others)	$600 K			✓		
New Golden Shuttle Fixed-Route Service in Fremont County (Cotopaxi and outlying areas)	$1.33 M			✓		
Expanded Local Fixed-Route Service between Florence-Penrose- Cañon City	$760 K			✓		
Cripple Creek Administration & Operations Facility	$2.05 M			✓		
Westcliffe Vehicle Housing	$460 K			✓		
Mobility Management and Expansion of UAACOG	$100 K			✓		
New Inter-regional Transit Service between Cañon City-Florence-Colorado Springs	$840 K		✓	✓		
Kim Transit Garage	$500 K			✓		
Expanded Regional Transit Service between Kim-Branson-Baca County	$600 K			✓		
Expanded Regional Transit Service between Walsenburg-La Veta-Gardener-Cuchara	$1.4 M			✓		
Expanded Regional Transit Service between Trinidad and SH 12 Communities	$2 M			✓		
La Junta Multimodal Transit Center	$4 M			✓		
La Junta to Fowler Fixed-Route Service	$600 K			✓		
City of La Junta Bus Barn Rehabilitation	$200 K			✓		
Expand Deviated Fixed Route Services in La Junta	$400 K			✓		
Prowers Area Transit Bus Barn Expansion	$150 K			✓		
Baca County Bus Facility	$400 K			✓		
Kiowa County Bus Storage Facility	$200 K			✓		
Expand Crowley County Transit Service in Crowley County and Sugar City	$400 K			✓		
Expanded Regional Kiowa County Transit Service	$400 K			✓		
New Regional Transit Service between Campo and Lamar; Expanded Baca County Demand Response Services	$500 K			✓		
Need-Based Transit Sidewalks and Bus Stop Improvements (Bus stop improvements made in response to customer need and request.)	$2.8 K		✓			
Academy Boulevard/Hancock Expressway Transfer Center (Multimodal improvements such as: new transit transfer center, roadway reconfigurations, installing a full-movement traffic signal that will aid transit operations and traffic circulation, and curb, gutter, sidewalk, trail, and median improvements)	$3 M		✓			
Fixed-Route Service Increase - Stage 1 (Weekday headway improvements, full weekday evening and Saturday service, etc.)	$7.8 M		✓			
Systematic Bus Stop Access Improvements (Systematic Bus Stop Access Improvements - Routes 1, 6, 7, 8, 9, 12, 16)	$1.4 M		✓			
Bus Stop Amenity Program (Ddd benches, shelters and bike lockers at bus stops that don't currently have them, enhancing the customers riding experience and other improvements)	$1 M		✓			
Fixed Route Bus/Vehicle Replacement	$7.24 M		✓			
Rural Paving – Region 2						
RRST US50A -MP 289.8-296.2	$9.14 M				✓	✓
RRST 115A - MP- 0-14.1	$8 M				✓	✓
RRST 285 - MP 220-228.8	$6.84 M				✓	✓
RRST 24A - MP 225.6-239	$7.14 M				✓	✓
RRST 24A - MP 239-258.6	$9.82 M				✓	✓
RRST 24A - MP 258.6-264.4	$3.29				✓	✓
RRST 24A - MP 264.4-275.1	$5.13 M				✓	✓
RRST 67B - MP 11.5-15.7	$1.99 M				✓	✓
RRST 120A - MP 0-7.2	$2.89 M				✓	✓
RRST I-25C - MP 0-4	$2.83 M	✓			✓	✓
RRST US 160 - MP302.7-305.4	$1.92 M				✓	✓
RRST SH 10 - MP 0-18	$7.84 M				✓	✓
RRST SH 12 - MP 0-5.7	$2.81 M				✓	✓
RRST SH 12 - MP 60.6-70.8	$6.26 M				✓	✓
RRST US 160 -MP 285.4-290.4	$3.54 M				✓	✓
RRST US 160 - MP 305.5-306.4	$638.9 K				✓	✓
RRST SH 389 - MP 0-12.8	$5.28 M				✓	✓
RRST 10A - MP 43-46.5	$1.56 M				✓	✓
RRST 101A - MP 0-21.4	$9.82 M				✓	✓
RRST 160C - MP 423.3-450.6	$11.72 M				✓	✓
RRST 350A - MP 46.7-63.3	$7.54 M				✓	✓
RRST 385 - MP 127.7-135.4	$4.96 M				✓	✓
RRST 385A - MP 95-122.9	$13.19 M				✓	✓

UNFUNDED PROJECTS (YEARS 5–10)

NORTHWEST PROJECTS

	STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
Highway – Region 3						
US 50 North of Montrose	$15 M			✓	✓	✓
US 50 East of Gunnison Safety	$15 M			✓	✓	✓
SH 92: Safety Improvements	$25 M			✓	✓	✓
GVTPR Shoulder Impv	$13.6 M					✓
I-70: Glenwood Canyon Critical Asset Repair	$11 M	✓				✓
I-70 West: Dowd Canyon Interchange	$14 M	✓		✓		✓
I-70 West: Exit 203 Interchange Improvements	$30 M	✓		✓		
I-70 West Vail Pass Auxiliary Lanes, NHPP 0701-240	$50 M	✓		✓		✓
I-70 Exit 105	$15 M	✓		✓		
SH 24 Minturn to Leadville Safety Improvements	$9.6 M			✓	✓	✓
US 40 Fraser to Winter Park	$20 M			✓		✓
US 40 West. of Kremling Shoulder Improvements	$21 M				✓	✓
Hwy 34 and Hwy 40 Roundabout	$5 M			✓		✓
US 40 Passing Lanes W. of Kremling	$8.7 M			✓	✓	✓
US 40 Passing Lanes Craig to Stmbt	$8 M			✓		✓
Downhill Drive / US40 Intersection	$6.5 M			✓		✓
I-70B First to 15th	$18 M	✓	✓			✓
I-70B 32Rd to I-70	$5 M	✓	✓			✓
I-70B East of Main	$14 M	✓	✓			✓
US 6 Mesa County	$13 M		✓			✓
SH 141B Mesa County	$15 M		✓			✓
SH 340 Redlands	$9 M		✓			✓
Mesa County Shoulder Improvements	$1.5 M				✓	
Transit – Region 3						
New Regional Transit Service between Montrose and Telluride	$1.2 M			✓		
New Regional Transit Service between Montrose and Delta	$200 K			✓		
New Inter-regional Service between Montrose and Grand Junction	$200 K			✓		
New Hinsdale County Demand Response Human Services Transportation	$150 K			✓		
Vail Intermodal Site	$15 M			✓		
Snowmass Transit Center ($11)	$4 M			✓		
Bustang Outrider Program Frisco/GJ through NWTPR	$400 K			✓		
Expand Steamboat Springs Transit Fleet - 4 hybrid buses	$2.4 M			✓		
Steamboat Gondola Transportation Center redesign and build - Phase I	$2.3 M			✓		
BRT Routes and Remote lots - Planning Study	$250 K			✓		
Bus replacement	$2 M		✓			
Transit System Enhancements (ie transit- related infrastructure, ITS)	$1.24 M		✓			
Maintenance Facility (potential to partner with CDOT for Bustang Maintenance Facility)	$1.5 M		✓			
CNG Storage/Production	$540 K		✓			
Rural Paving – Region 3						
US 50 Delta South	$5.16 M				✓	
US 50 Olathe South	$4.06 M				✓	
US 50 Olathe Business Loop	$1.12 M				✓	
SH 65 to Eckert	$5.67 M				✓	
SH 65 Grand Mesa	$6.63 M				✓	
SH 90B Montrose	$3.63 M				✓	
SH 90B Montrose	$775.7 K				✓	
SH 92 Austin	$2.4 M				✓	
SH 135 South of Crested Butte	$6.81 M				✓	
SH 348 Olathe	$802.5 K				✓	
SH 348 West of Olathe	$1.76 M				✓	
SH 9 South of Green Mtn Reservoir	$7.64 M				✓	
SH 9 Green Mtn Reservoir Ph 1	$7.17 M				✓	
SH 9 Green Mtn Reservoir Ph 2	$5.74 M				✓	
US 40 East of Hayden Ph 1	$5.71 M				✓	
US 40 East of Hayden Ph 2	$4.86 M				✓	
US 40 Tabernash West	$7.14 M				✓	
SH 64 East of Rangely	$4.5 M				✓	
SH 125 Walden North	$5.54 M				✓	
SH 139 Douglas Creek	$6.78 M				✓	
SH 139 South of Rangely	$7.09 M				✓	
SH 125 Cowdrey	$6.42 M				✓	
SH 318 (Far) West of Maybell	$6.74 M				✓	

NORTHEAST PROJECTS

	STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
Highway – Region 4						
I70: Arriba Rest Area	$2 M	✓				
I70 Bridges near Limon	$4.28 M	✓				✓
I70 Sibert to Stratton	$28.72 M	✓			✓	✓
I76: Morgan County Line to Neb	$26.48 M	✓				
I76: Sterling East Part 2 Slabs and Diamond Grind	$8.25 M	✓			✓	✓
I76 - Atwood	$270 K	✓				✓
US40/US287	$2 M			✓		
US40 Wild Horse	$820 K					✓
287 / 40/ 94	$1.68 M					✓
US385: Burlington	$170 K					✓
US385: Idalia North	$10 K					✓
SH59 Bridges	$1.29 M					✓
SH59: Siebert to Cope	$1.18 M					✓
SH71: Limon Structures	$620 K					✓
SH86: I25 to I70	$2 M			✓		
Sandy Creek Bridge	$5.42 M					✓
Six Mile Creek	$380 K					✓
I76: Fort Morgan to Brush Ph 4	$45 M	✓			✓	✓
US85 Frontage Rd	$10 M			✓		
US287 Ted's Place to WY	$20 M			✓		
SH71- Stoneham	$140 K					✓
Big Beaver Creek	$4.78 M					✓
North I25 Segment 5 - Express Lanes	$196.4 M	✓	✓			✓
US36/28th St & SH93/Broadway	$10.12 M		✓			
US85 Corridor Improvements	$6.1 M		✓			
US287: US36 to SH66	$25 M		✓			
SH7 Boulder to Brighton	$9 M		✓			
SH42 Safety & Intersections	$14 M		✓			
SH66: Corridor Improvements	$10 M		✓			
SH119 BRT / Managed Lanes	$20 M		✓			
I25 Interchange at SH14	$30.5 M	✓	✓			✓
US 85 and US 34 Interchange	$33 M		✓			✓
Transit – Region 4						
Essential Bus service Limon to Denver -2 days a week	$1.08 M	✓		✓		
Essential Bus service Burlington to Denver - 3 days a week	$2.42 M	✓		✓		
North I25 Transit- Fort Collins to Cheyenne	$1.55 M	✓		✓		
Local Fixed Route Service - Fort Morgan	$1.55 M			✓		
Trolley Barn - Estes Park	$320 K			✓		
Trolley Electric Charging Station - Estes Park	$10 K			✓		
Estes Park Transit Stops Installation	$150 K			✓		
Public Restrooms at Manford P & R in Estes Park to attract transit riders	$400 K			✓		
Design Visitors' Center / Transit Center Parking Lot	$1.04 M			✓		
SH7 Boulder to Brighton	$6.3 M		✓			
US36/28th St & SH93/Broadway	$5 M		✓			
US287: US36 to SH66	$5 M		✓			
SH119 BRT / Managed Lanes	$4.88 M		✓			
Front Range Mobility Hubs R4	$6 M		✓			
Bustang (off the top)	$5.4 M	✓	✓			
Loveland to Greeley Service	$13.2 M		✓			
Rural Paving – Region 4						
US385: Cheyenne CL to Neb	$35.28 M			✓	✓	✓
US385: Sand Creek to Near CR 29	$14.69 M				✓	✓
US385: South of Cheyenne Wells	$12.32 M				✓	✓
US385: Julesburg South	$11.55 M				✓	✓
SH59 Safety Improvements & Assets	$29.26 M				✓	✓
SH71 Limon to Nebraska	$27.38 M				✓	✓
SH71- SH14 South	$24.13 M				✓	✓
SH71- Brush North	$3.48 M				✓	✓

UNFUNDED PROJECTS (YEARS 5–10)

SOUTHWEST PROJECTS

	STIP Allocation	Statewide Significance	Congestion Relief	Mobility Options	Rural Paving	Road Conditions & Maintenance
Highway – Region 5						
US 550: Shoulder Improvements, Deer Fencing and Animal Underpasses between Uncompahgre River and Colona (Billy Creek)	$30.57 M					✓
Multi-modal project. Sawpit/Placerville, Norwood, Rico.	$5 M			✓		✓
US 24 Buena Vista Intersection Improvements	$8 M			✓		✓
US 50 and SH 291 Intersection and Ped Improvements	$2.5 M			✓		✓
US 50/285 improvements in Poncha Springs	$2 M			✓		
US 160: Trinchera Safety Mitigation	$15.95 M			✓		✓
US 160 Rio Grande River Bridge to SH 17 Improvements	$8.8 M			✓		✓
US 160 / Pike Avenue, Alamosa County	$3 M			✓		
US 285: Safety and Mobility Improvements between Center to Saguache (Widen Shoulders)	$33.68 M					✓
US 285 Town of Saguache Multi-modal Improvements	$750 K			✓		✓
SH 112 Pedestrian Crossing in Center	$750 K			✓		
US 160 Intelligent Transportation Systems (ITS) Infrastructure (La Plata, Archuletta, and Mineral counties)	$3.56 M			✓		
US 160: Elmore's East	$34.53 M			✓		✓
US 160/Main Street Pagosa Reconstruction and Multi-Modal Improvements	$13.67 M			✓		✓
US160 and CR 30.1 Intersection at Phil's World	$1.5 M			✓		✓
US160 Wildlife Mitigation	$2.88 M			✓		
US 160/ CR225 Intersection Improvements	$5 M			✓		✓
US160 /Piedra Road	$300 K			✓		
R5 Shoulder Projects	$18.72 M			✓		
Transit – Region 5						
New Regional Transit Service between Montrose and Telluride	$2.12 M			✓		
Alamosa Transit Center	$2.8 M			✓		
One-Stop Shop for Transportation for San Luis Valley (One-Call/One-Click - call center/website/app)	$1 M			✓		
Northeast San Luis Valley Transit Service	$560 K			✓		
Pagosa Springs Transportation Center	$1.35 M			✓		
Pagosa Springs to Durango (Proposed Outrider Service)	$2.69 M			✓		
Rural Paving – Region 5						
SH 141 Naturita North and SH 97 (DEVOLUTION)	$10.38 M				✓	
US 24 Buena Vista to R3	$10.38 M				✓	
SH 15 La Jara West	$6 M				✓	
SH 17 West of Antonito	$10.38 M				✓	
SH 136 La Jara East	$2 M				✓	
SH 371 Entire Length	$2.38 M				✓	
SH 151 Ignacio to Arboles	$10.38 M				✓	
SH 172 New Mexico to Ignacio	$10.38 M				✓	

Closing statement and for more information...

COLORADO
Department of Transportation
Division of Accounting and Finance

MEMORANDUM

TO: THE TRANSPORTATION COMMISSION
FROM: JEFF SUDMEIER, CHIEF FINANCIAL OFFICER
DATE: MARCH 18, 2020
SUBJECT: FY 2020-21 FINAL ANNUAL BUDGET

Purpose
To present the FY 2020-21 Final Annual Budget Allocation Plan for Transportation Commission (TC) adoption.

Action
The Division of Accounting and Finance (DAF) is requesting that the TC adopt the FY 2020-21 Final Annual Budget Allocation Plan.

FY 2020-21 Final Annual Budget Allocation Plan
The FY 2020-21 Final Annual Budget Allocation Plan is available on the Department's website: https://www.codot.gov/business/budget/cdot-budget/draft-budget-documents/fy-2020-21-budget-allocation-plan. The Plan includes a Budget Narrative, Revenue Allocation Plan, Spending Plan, and other appendices. The total revenue available for allocation in the Final Budget is $1,983.9 million, which is allocated as follows:

- $973.6 M to capital construction programs
- $368.9 M to maintenance and operations programs
- $224.1 M to suballocated programs
- $70.1 M to multimodal services
- $120.9 M to Colorado Bridge Enterprise
- $22.6 M to High Performance Transportation Enterprise

The FY 2020-21 Final Revenue Allocation Plan is balanced, with all flexible revenue allocated. Revenues specific to a program that are considered inflexible (i.e., Fast Act and State mandated programs such as safety education and Aeronautics) have been automatically adjusted based on the FY 2020-21 Revenue Forecast. Asset Management and Maintenance programs are funded according to the FY 2020-21 Asset Management Planning Totals, approved by the TC in August 2017. All other program revenues are flexible and are initially set based on the FY 2019-20 budget amounts as adopted by the TC in March 2019 (and subsequently amended), and then modified through the work plan budget and decision item processes.

Changes to FY 2020-21 Revenue Allocation Plan
The Department made several minor modifications to the Final Revenue Allocation Plan since February, briefly described below.

Projected FY 2019-20 roll forwards were further refined from the original estimates provided in February. The roll forward budget from FY 2019-20 that is available in FY 2020-21 is estimated at approximately $1.1 billion. Of this amount, the majority of the funds have been programmed which means the Department has planned projects to use this funding. Roll forwards will be updated after the end of the fiscal year to reflect final year-end amounts.

Additionally, the Department added footnotes to provide clarification with regard to allocations for Snow and Ice Control and Multimodal Services:

- **Snow and Ice Control (Line 28)** - The Maintenance Reserve Fund (Line 35) under Maintenance and Operations, Asset Management includes an additional $10 million in contingency for Snow and Ice removal. This funding is set aside in addition to the $78.7 million allocation for Snow and Ice Control.
- **Strategic Transit and Multimodal Projects (Line 44) -** SB 17-267 directed the State Treasurer to execute lease-purchase agreements on existing state facilities to generate revenue for priority transportation projects. At least 10 percent of these proceeds must be used for transit projects. Of the $50 million in estimated revenue for transit projects, the department anticipates spending $2.4 million on Administration, $27.6 million on the construction of bus and pedestrian facilities, and $20.0 million on rolling stock.
- **Rail Commission (Line 45) -** SB 18-001 appropriated $2.5 million to the Southwest Chief and Front Range Rail Commission in FY 2018-19. Pursuant to SB 19-125, this funding is available until the close of FY 2020-21.
- **Multimodal Options Program (Line 60) -** SB 18-001 created the Multimodal Transportation Options Fund, and allocated $71.75 million to the fund in FY 2018-19 and $22.5 million to the fund in FY 2019-20. This funding is annually appropriated by the General Assembly. The FY 2018-19 appropriation is available until the close of FY 2022-23 pursuant to SB 19-125, and the FY 2019-20 appropriation is available until the close of FY 2023-24 pursuant to SB 19-207. Of the total funding, the department will spend approximately $6 million on administration and operating costs, approximately $14 million for CDOT bus purchase and facility construction, and approximately $74 million will be passed through to local agencies for rolling stock purchases.

Options and Recommendation

Pursuant to Section 43-1-113 (9)(c), C.R.S., the TC is required to adopt a Final Annual Budget Allocation Plan for the upcoming fiscal year by April 15. DAF requests TC adoption of the FY 2020-21 Final Annual Budget Allocation Plan. Options include:

1. Adopt the FY 2020-21 Final Annual Budget Allocation Plan by resolution. (Staff Recommendation)
2. Request additional changes to the FY 2020-21 Final Annual Budget Allocation Plan prior to April 15, 2020.

Next Steps

Upon Adoption, the FY 2019-20 Final Annual Budget Allocation Plan will be delivered to the Governor on or before April 15, 2019. The TC has the authority to amend the budget after this date. The budget may also be changed according to revised Common Policy or other legislatively approved changes.

Attachments

Attachment A – FY 2020-21 Revenue Allocation Plan
Attachment B – FY 2020-21 Spending Plan
Attachment C – Personnel Report
Attachment D – FY 2019-20 Estimated Rollforwards for Capital Construction Programs

Attachment A: FY 2020-21 Revenue Allocation Plan

Line	Budget Category / Program	Rollforward from FY19-20 *Estimated	FY 2020-21 Proposed Allocation Plan	FY 2020-21 Final Allocation Plan	Directed By	Funding Source
1	**COLORADO DEPARTMENT OF TRANSPORTATION**	**Draft Estimates**				
2	**Capital Construction**	**$518.8 M**	**$976.4 M**	**$973.6 M**		
3	**Asset Management**	**$69.3 M**	**$327.3 M**	**$325.2 M**		
4	Surface Treatment	$2.0 M	$223.2 M	$223.2 M	TC	FHWA / SH / SB 09-108
5	Structures	$0.8 M	$51.8 M	$51.8 M	TC	FHWA / SH / SB 09-108
6	System Operations	$0.0 M	$33.5 M	$31.4 M	TC	FHWA / SH
7	Geohazards Mitigation	$0.5 M	$12.3 M	$12.3 M	TC	SB 09-108
8	Permanent Water Quality Mitigation	$2.0 M	$6.5 M	$6.5 M	TC	FHWA / SH
9	Emergency Relief	$64.0 M	$0.0 M	$0.0 M	FR	FHWA
10	**Safety**	**$26.5 M**	**$128.3 M**	**$127.6 M**		
11	Highway Safety Improvement Program	$10.0 M	$32.8 M	$32.8 M	FR	FHWA / SH
12	Railway-Highway Crossings Program	$5.0 M	$3.6 M	$3.6 M	FR	FHWA / SH
13	Hot Spots	$0.0 M	$2.2 M	$2.2 M	TC	FHWA / SH
14	FASTER Safety	$7.5 M	$68.3 M	$67.6 M	TC	SB 09-108
15	ADA Compliance	$4.0 M	$21.4 M	$21.4 M	TC	FHWA / SH
16	**Mobility**	**$423.0 M**	**$520.8 M**	**$520.8 M**		
17	Regional Priority Program	$14.0 M	$48.4 M	$48.4 M	TC	FHWA / SH
18	Strategic Projects	$379.0 M	$450.0 M	$450.0 M	SL	SB 17-267 / SB 19-262
19	National Highway Freight Program	$30.0 M	$22.4 M	$22.4 M	FR	FHWA / SH
20	**Maintenance and Operations**	**$21.5 M**	**$349.2 M**	**$368.8 M**		
21	**Asset Management**	**$18.0 M**	**$315.3 M**	**$332.9 M**		
22	Maintenance Program Areas	$0.0 M	$260.7 M	$265.2 M		
23	Roadway Surface	$0.0 M	$36.1 M	$41.4 M	TC	SH
24	Roadside Facilities	$0.0 M	$24.1 M	$21.8 M	TC	SH
25	Roadside Appearance	$0.0 M	$10.6 M	$10.7 M	TC	SH
26	Structure Maintenance	$0.0 M	$6.1 M	$4.5 M	TC	SH
27	Tunnel Activities	$0.0 M	$5.9 M	$3.4 M	TC	SH
28	Snow and Ice Control	$0.0 M	$78.4 M	$78.7 M	TC	SH
29	Traffic Services	$0.0 M	$64.8 M	$70.3 M	TC	SH
30	Materials, Equipment, and Buildings	$0.0 M	$17.1 M	$16.4 M	TC	SH
31	Planning and Scheduling	$0.0 M	$17.6 M	$18.1 M	TC	SH
32	Toll Corridor General Purpose Lanes	$0.0 M	$2.9 M	$2.9 M	TC	SH
33	Property	$6.0 M	$18.1 M	$29.3 M	TC	SH
34	Capital Equipment	$12.0 M	$21.6 M	$23.5 M	TC	SH
**35	Maintenance Reserve Fund	$0.0 M	$12.0 M	$12.0 M	TC	SH
36	**Safety**	**$0.0 M**	**$11.4 M**	**$11.4 M**		
37	Strategic Safety Program	$0.0 M	$11.4 M	$11.4 M	TC	FHWA / SH
38	**Mobility**	**$3.5 M**	**$22.6 M**	**$24.6 M**		
39	Real-Time Traffic Operations	$1.0 M	$12.6 M	$14.6 M	TC	SH
40	ITS Investments	$2.5 M	$10.0 M	$10.0 M	TC	FHWA / SH
41	**Multimodal Services**	**$107.0 M**	**$68.9 M**	**$70.1 M**		
42	**Mobility**	**$107.0 M**	**$68.9 M**	**$70.1 M**		
43	Innovative Mobility Programs	$6.0 M	$11.1 M	$11.1 M	TC	FHWA / SH
***44	Strategic Transit and Multimodal Projects	$94.0 M	$50.0 M	$50.0 M	SL	SB 17-267
****45	Rail Commission	$0.0 M	$0.1 M	$0.1 M	SL	SL
46	Bustang	$7.0 M	$7.7 M	$8.9 M	TC	SB 09-108 / Fare Rev.
47	**Suballocated Programs**	**$344.5 M**	**$226.2 M**	**$224.1 M**		
48	**Aeronautics**	**$13.0 M**	**$33.3 M**	**$31.8 M**		
49	Aviation System Programs	$13.0 M	$33.3 M	$31.8 M	AB	SA
50	**Highway**	**$206.0 M**	**$125.8 M**	**$125.7 M**		
51	STP-Metro	$140.0 M	$55.7 M	$55.7 M	FR	FHWA / LOC
52	Congestion Mitigation and Air Quality	$50.0 M	$50.5 M	$50.5 M	FR	FHWA / LOC
53	Metropolitan Planning	$1.0 M	$9.2 M	$9.1 M	FR	FHWA / FTA / LOC
54	Off-System Bridge Program	$15.0 M	$10.5 M	$10.5 M	TC / FR	FHWA / SH / LOC
55	**Transit and Multimodal**	**$125.5 M**	**$67.1 M**	**$66.6 M**		
56	Recreational Trails	$0.5 M	$1.6 M	$1.6 M	FR	FHWA
57	Safe Routes to School	$5.0 M	$3.1 M	$3.1 M	TC	FHWA
58	Transportation Alternatives Program	$20.0 M	$12.3 M	$12.3 M	FR	FHWA / LOC
59	Transit Grant Programs	$20.0 M	$50.1 M	$49.6 M	FR / SL / TC	FTA / LOC / SB 09-108
*****60	Multimodal Options Program	$80.0 M	$0.0 M	$0.0 M	TC/SL	SB 19-125
61	**Administration & Agency Operations**	**$12.2 M**	**$93.9 M**	**$100.9 M**		
62	Agency Operations	$12.2 M	$58.3 M	$62.6 M	TC / AB	FHWA / SH / SA / SB 09-108
63	Administration	$0.0 M	$35.7 M	$35.7 M	SL	SH
64	Project Initiatives	$0.0 M	$0.0 M	$2.6 M	TC	SH
65	**Debt Service**	**$0.0 M**	**$62.8 M**	**$62.8 M**		
66	Debt Service	$0.0 M	$62.8 M	$62.8 M	DS	FHWA / SH
67	**Contingency Reserve**	**$40.0 M**	**$51.0 M**	**$15.0 M**		
68	Contingency Fund	$20.0 M	$15.0 M	$15.0 M	TC	FHWA / SH
69	Reserve Fund	$20.0 M	$36.0 M	$0.0 M	TC	FHWA / SH
70	**Other Programs**	**$13.4 M**	**$24.0 M**	**$25.1 M**		
71	Safety Education	$8.0 M	$11.9 M	$13.0 M	TC/FR	NHTSA / SSE
72	Planning and Research	$5.0 M	$11.7 M	$11.7 M	FR	FHWA / SH
73	State Infrastructure Bank	$0.4 M	$0.4 M	$0.4 M	TC	SIB
74	**TOTAL - CDOT**	**$1,057.4 M**	**$1,852.5 M**	**$1,840.3 M**		

Draft Estimates

Key to Acronyms:

TC = Transportation Commission
FR = Federal
SL = State Legislature
AB = Aeronautics Board
SH = State Highway
SIB = State Infrastructure Bank
LOC = Local
SB = Senate Bill
SA = State Aviation

75	**COLORADO BRIDGE ENTERPRISE**						
76	**Construction**		**$45.0 M**	**$100.2 M**	**$100.2 M**		
77	**Asset Management**		**$45.0 M**	**$100.2 M**	**$100.2 M**		
78	Bridge Enterprise Projects	Draft Estimates	$45.0 M	$100.2 M	$100.2 M	BEB	SB 09-108
79	**Maintenance and Operations**		**$0.8 M**	**$0.5 M**	**$0.5 M**		
80	**Asset Management**		**$0.8 M**	**$0.5 M**	**$0.5 M**		
81	Maintenance and Preservation		$0.8 M	$0.5 M	$0.5 M	BEB	SB 09-108
82	**Administration & Agency Operations**		**$2.9 M**	**$2.0 M**	**$2.0 M**		
83	Agency Operations		$2.9 M	$2.0 M	$2.0 M	BEB	SB 09-108
84	**Debt Service**		**$0.0 M**	**$18.2 M**	**$18.2 M**		
85	Debt Service		$0.0 M	$18.2 M	$18.2 M	BEB	FHWA / SH
86	**TOTAL - BRIDGE ENTERPRISE**		**$48.7 M**	**$120.9 M**	**$120.9 M**		

87	**HIGH PERFORMANCE TRANSPORTATION ENTERPRISE**						
88	**Maintenance and Operations**		**$55.0 M**	**$11.0 M**	**$17.0 M**		
89	Express Lanes Operations	Draft Estimates	$55.0 M	$11.0 M	$17.0 M	HPTEB	Tolls / Managed Lanes Revenue
90	**Administration & Agency Operations**		**$1.0 M**	**$5.6 M**	**$5.6 M**		
91	Agency Operations		$1.0 M	$5.6 M	$5.6 M	HPTEB	Fee for Service
92	**Debt Service**		**$0.0 M**	**$0.0 M**	**$0.0 M**		
93	Debt Service		$0.0 M	$0.0 M	$0.0 M	HPTEB	Fee for Service
94	**TOTAL - HIGH PERFORMANCE TRANSPORTATION ENTERPRISE**		**$56.0 M**	**$16.6 M**	**$22.6 M**		
95	**TOTAL - CDOT AND ENTERPRISES**		**$1,162.1 M**	**$1,990.0 M**	**$1,983.9 M**		

*Roll forward budget is budget from a prior year that hasn't been committed to a project or expended from a cost center prior to the close of the fiscal year. Estimated Roll forward budget will be incorporated prior to finalizing the FY 2021 budget, and updated after the close of FY 2020.

** $10M of the FY21 Maintenance Reserve Final Allocation Plan budget is specifically allocated for Snow and Ice Control.

***SB 17-267 directed the State Treasurer to execute lease-purchase agreements on existing state facilities to generate revenue for priority transportation projects. At least 10 percent of these proceeds must be used for transit projects. Of the $50 million in estimated revenue for transit projects, the department anticipates spending $2.4 million on Administration, $27.6 million on the construction of bus and pedestrian facilities, and $20.0 million on rolling stock.

****SB 18-001 appropriated $2.5 million to the Southwest Chief and Front Range Rail Commission. Pursuant to SB 19-125, this funding is available until the close of FY 2020-21.
*****SB 18-001 created the Multimodal Transportation Options Fund, and allocated $71.75 million to the fund in FY 2018-19 and $22.5 million to the fund in FY 2019-20. This funding is annually appropriated by the General Assembly. The FY 2018-19 appropriation is available until the close of FY 2022-23 pursuant to SB 19-125, and the FY 2019-20 appropriation is available until the close of FY 2023-24 pursuant to SB 19-207. Of the total funding, the department will spend approximately $6 million on administration and operating costs, approximately $14 million for CDOT bus purchase and facility construction, and approximately $74 million will be passed through to local agencies for rolling stock purchases.

Department of Transportation - FY 2020-21 Spending Plan
Last updated February 2020

Projected Cash Balance	$1,111.8M	
Projected FY21 Revenue	$1,840.3M	
Projected FY21 Receivables	$150M	
TOTAL Projected - CDOT	**$3,102.1M**	

Line	Budget Category / Program	FY 2020-21 Projected Expenditures	FY 2020-21 Actual Expenditures	% Spent
1	**COLORADO DEPARTMENT OF TRANSPORTATION**			
2	**Capital Construction**			
3	**Pre-Construction Activities**			
4	**Right of Way**			
5	Acquisitions	$ 43.2M		
6	Personal Services	$ 1.2M		
7	Professional Services	$ 4.8M		
8	Other	$ .6M		
9	**Design and Other Pre-Construction Activities**			
10	Professional Services	$ 113.6M		
11	Personal Services	$ 18.0M		
12	Other	$ 6.6M		
13	**Construction Activities**			
14	Contractor Payments	$ 1,016M		
15	Professional Services	$ 30.8M		
16	Personal Services	$ 2.5M		
17	Other	$ 2.0M		
18	**Other Capital Project Activities**			
19	Indirect Allocations	$ 104.0M		
20	Construction Engineering Allocations	$ 69.0M		
21	**Maintenance and Operations**			
22	Personal Services	$ 169.6M		
23	Operating	$ 122.6M		
24	Capital	$ 21.6M		
25	Property	$ 18.1M		
26	Road Equipment	$ 21.6M		
27	**Multimodal Services, Non Construction**			
28	Personal Services	$ 7.8M		
29	Operating	$ 28.3M		
30	Capital	$ 9.6M		
31	**Suballocated Programs**			
32	Aeronautics	$ 36.5M		
33	Payments to Local Governments	$ 161.8M		
34	**Administration & Agency Operations**			
35	Personal Services	$ 36.6M		
36	Operating	$ 47.3M		
37	Capital	$ 4.6M		
38	**Debt Service**			
39	Debt Service	$ 62.8M		
40	**Other Programs, Non Construction**			
41	Personal Services	$ 2.9M		
42	Operating	$ 9.0M		
43	Capital	$ .4M		
44	Studies (Non-construction Activities) (DTD)	$ 6.4M		
45	**TOTAL - CDOT**	**$ 2,180M**		

46	**COLORADO BRIDGE ENTERPRISE**			
	Projected Cash Balance	$302.3M		
	Projected FY21 Revenue	$120.9M		
	TOTAL Projected - BRIDGE ENTERPRISE	**$423.2M**		
47	**Capital Construction**			
48	**Asset Management**			
49	Bridge Enterprise Projects-CBE	$ 234.1M		
50	**Maintenance and Operations**			
51	**Asset Management**			
52	Maintenance and Preservation-CBE	$ .5M		
53	**Administration & Agency Operations**			
54	Agency Operations-CBE	$ 2.0M		
55	**Debt Service**			
56	Debt Service-CBE	$ 18.2M		
57	**TOTAL - BRIDGE ENTERPRISE**	**$ 254.8M**		
58	**HIGH PERFORMANCE TRANSPORTATION ENTERPRISE**			
	Projected Cash Balance	$44.5M		
	Projected FY21 Revenue	$22.6M		
	TOTAL Projected - HPTE	**$67.1M**		
59	**Maintenance and Operations**			
60	Express Lanes Operations-HPTE	$ 1.6M		
61	**Administration & Agency Operations**			
62	Agency Operations-HPTE	$ 5.6M		
63	**Debt Service**			
64	Debt Service-HPTE	$ 16.9M		
65	**TOTAL - HIGH PERFORMANCE TRANSPORTATION ENTERPRISE**	**$ 24.0M**		
66	**TOTAL - CDOT AND ENTERPRISES**	**$ 2,459M**		

Appendix C: CDOT Personnel Report

Budget Category / Program	FY 2019-20 Positions	FY 2019-20 Projected Salary and Benefits	FY 2020-21 Positions	FY 2020-21 Projected Salary and Benefits
Capital Construction	1146.0	$122,340,970	1137.0	$122,268,081
Asset Management	0.0	$0	0.0	$0
Safety	0.0	$0	0.0	$0
Mobility	0.0	$0	0.0	$0
Construction Program Direct Indirect Staff Expenditures	1146.0	$122,340,970	1137.0	$122,268,081
Maintenance and Operations	1874.0	$141,390,359	1881.0	$143,336,264
Asset Management	1852.0	$139,231,554	1860.0	$141,257,692.8
Safety	0.0	$0	0.0	$0
Mobility	22.0	$2,158,805	21.0	$2,078,571
Multimodal Services	5.0	$541,982	9.0	$1,132,487
Mobility	5.0	$541,982	9.0	$1,132,487
Suballocated Programs	0.0	$0	0.0	$0
Aeronautics	0.0	$0	0.0	$0
Highway	0.0	$0	0.0	$0
Transit and Multimodal	0.0	$0	0.0	$0
Administration & Agency Operations	287.0	$30,908,070	285.0	$31,176,326
Debt Service	0.0	$0	0.0	$0
Contingency Reserve	0.0	$0	0.0	$0
Other Programs	2.0	$245,985	2.0	$251,822
TOTAL - CDOT	3314.0	$295,427,367	3314.0	$298,164,981

COLORADO BRIDGE ENTERPRISE				
Construction	0.0	$0	0.0	$0
Asset Management	0.0	$0	0.0	$0
Maintenance and Operations	0.0	$0	0.0	$0
Asset Management	0.0	$0	0.0	$0
Administration & Agency Operations	1.0	$114,646	1.0	$117,486
Debt Service	0.0	$0	0.0	$0
TOTAL - BRIDGE ENTERPRISE	1.0	$114,646	1.0	$117,486

HIGH PERFORMANCE TRANSPORTATION ENTERPRISE				
Maintenance and Operations	0.0	$0	0.0	$0
Administration & Agency Operations	9.0	$1,135,356	9.0	$1,147,054
Debt Service	0.0	$0	0.0	$0
Total - HPTE	9.0	$1,135,356	9.0	$1,147,054
TOTAL - CDOT AND ENTERPRISES	3324.0	$296,677,369	3324.0	$299,429,521

Attachment D: Programming Status of Capital Construction Budget

Line	Budget Category / Program	Rollforward from FY19-20 *Estimated	FY 2020-21 Final Allocation Plan	Approved TC Amendments
1	**COLORADO DEPARTMENT OF TRANSPORTATION**			
2	**Capital Construction**	**$518.8 M**	**$973.6 M**	
3	**Asset Management**	**$69.3 M**	**$325.2 M**	
4	Surface Treatment	$2.0 M	$223.2 M	Planned through FY24
5	Structures	$0.8 M	$51.8 M	Planned through FY 24
6	System Operations	$0.0 M	$31.4 M	Planned through FY 24 for Traffic Signals, FY 21 for ITS Investments
7	Geohazards Mitigation	$0.5 M	$12.3 M	Planned through FY 24
8	Permanent Water Quality Mitigation	$2.0 M	$6.5 M	Planned through FY 21
9	Emergency Relief	$64.0 M	$0.0 M	Planned through FY 21
10	**Safety**	**$26.5 M**	**$127.6 M**	
11	Highway Safety Improvement Program	$10.0 M	$32.8 M	Planned through FY 22
12	Railway-Highway Crossings Program	$5.0 M	$3.6 M	Planned through FY 22
13	Hot Spots	$0.0 M	$2.2 M	Planned through FY 21
14	FASTER Safety	$7.5 M	$67.6 M	Planned through FY 22
15	ADA Compliance	$4.0 M	$21.4 M	Planned through FY 23
16	**Mobility**	**$423.0 M**	**$520.8 M**	
17	Regional Priority Program	$14.0 M	$48.4 M	Planned through FY 24
18	Strategic Projects	$379.0 M	$450.0 M	Planned through FY 23
19	National Highway Freight Program	$30.0 M	$22.4 M	Planned through FY 20

BYLAWS OF THE
STATEWIDE TRANSPORTATION ADVISORY COMMITTEE

ARTICLE 1 – Name

The name of this committee shall be the Statewide Transportation Advisory Committee (STAC)

ARTICLE II – Object

The object of the Statewide Transportation Advisory Committee is to provide advice to the Colorado Department of Transportation (CDOT) on the needs of the transportation system in Colorado and to review and comment on all regional and statewide transportation plans submitted by the transportation planning regions and/or the Colorado Department of Transportation. The activities of the committee shall not be construed to constrain or replace the Project Priority Programming Process (4P), formerly known as the county hearing process.

ARTICLE III – Members

Section 1. Each Transportation Planning Region (TPR) shall select a representative to the STAC pursuant to §43-1-1104 C. R. S. (1991).

Section 2. Each Transportation Planning Region shall select an alternate to provide representation, in the case of the absence of the STAC representative.

Section 3. The Ute Mountain Ute and Southern Ute Indian Tribes may each appoint a non-voting member to the STAC.

Section 4. The TPR must notify the Director of the Division of Transportation Development (DTD) in writing the name, title, mailing address, telephone number, FAX number and electronic mail address (if available) of any change in STAC representation within 30 days.

ARTICLE IV – Officers

Section 1. The Offices of the STAC shall consist of a chairperson and a Vice-Chairperson.

Section 2. The Chairperson shall preside at all meetings of the STAC. The Chairperson shall be a member of the STAC and shall hold office until successor is elected.

Section 3. The Vice-Chairperson shall, in the case of the absence or disability of the Chairperson, perform the duties of the Chairperson. The Vice-Chairperson shall be a member of the STAC. The term of office as the Vice-Chairperson shall be until a successor is elected. In the absence of both the Chairperson and the Vice-Chairperson selection by those present shall preside.

Section 4. The officers shall perform the duties described in the parliamentary authority (e.g. Roberts Rules of Order) and these bylaws.

Section 5. The officers shall be elected by vote at a regularly scheduled STAC meeting to serve a term of 2 years or until their successors are elected. Their term of office shall begin upon adjournment of the regular meeting during which the election took place.

Section 6. Elections shall be held at the first STAC meeting of the state's fiscal year.

Section 7. In the event the Chairperson should resign from the STAC, the Vice-Chairperson shall assume the position until the end of the term.

Section 8. In the event the Vice-Chairperson also resigns, a special election will take place at the next scheduled STAC meeting.

Section 9. No person shall hold office if he/she is not a member, and no member shall hold more than one office at one time.

ARTICLE V – Meetings

Section 1. A regular meeting of the STAC shall be held at least quarterly.

Section 2. A notice will be sent to each STAC member by the DTD for regular meetings at least two weeks in advance.

Section 3. All meetings of the STAC shall be open to the public.

Section 4. The majority of the membership shall constitute a quorum. A majority vote of the members present shall be required to carry any motion.

ARTICLE VII – Records

The records of the STAC shall be public records and shall be open for public inspection. Minutes shall be made in all STAC meetings and shall be approved by the STAC. After approval by the STAC, minutes shall be made a part of the STAC record.

ARTICLE VIII – Amendment

These bylaws may be amended at any regular or special meeting of the STAC by a two-thirds vote of the membership, provided that previous notice of the amendment was given to all members at least two weeks in advance.

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NATIONAL RENEWABLE ENERGY LABORATORY

Navajo Generating Station and Clean-Energy Alternatives: Options for Renewables

D.J. Hurlbut, S. Haase, C.S. Turchi, and K. Burman
National Renewable Energy Laboratory

Produced under direction of the U.S. Department of the Interior by the National Renewable Energy Laboratory (NREL) under Interagency Agreement R11PG30024 and Task No WFJ5.1000.

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NREL/TP-6A20-54706
June 2012

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1 Introduction

In January 2012, the National Renewable Energy Laboratory delivered to the Department of the Interior the first part of a study on Navajo Generating Station (Navajo GS) and the likely impacts of best available retrofit technology (BART) compliance options under the Clean Air Act's regional haze provisions. That document establishes a comprehensive baseline for the analysis of clean energy alternatives, and their ability to achieve benefits similar to those that Navajo GS currently provides.

This analysis is a supplement to NREL's January 2012 study. It provides a high level examination of several clean energy alternatives, using background established by the previous analysis. To be clear, this analysis is not intended to justify any particular BART outcome, nor is its purpose to support arguments for or against retiring Navajo GS. The factors addressed here are not likely to drive those threshold decisions in any case. However, if the ultimate outcome is retirement, then the task would be to identify a portfolio of generation resources that could provide the benefits Navajo GS is providing today. This analysis is an initial characterization of renewable energy options that would be available for a replacement portfolio, under a conceptual scenario in which the decision to retire the coal plant has already been made based on factors outside the ones addressed here.

None of the alternatives discussed in this analysis can happen quickly. It is assumed here that, if there were a decision to replace Navajo GS, the development of any alternative resource (or portfolio of resources) would occur at the end of a staged transition plan designed to reduce economic disruption. This glide path necessarily would most likely take several years and would need to take into account changes to the Navajo GS site lease, tribal development plans, coal supply contracts, the value of utility partners' investments in the coal plant that are not yet depreciated, and the outcomes of EPA rulemakings relating to air emissions. We assume that replacing the federal government's 24.3% ownership share of Navajo GS would be a cooperative responsibility of both the U.S. Bureau of Reclamation (USBR) and the Central Arizona Water Conservation District (CAWCD), and that at a minimum the replacement strategy must be sufficient to ensure that the Central Arizona Project (CAP) can economically meet all of its water delivery obligations.

1.1 Benefits

The January 2012 study described a wide and complex array of benefits provided by Navajo GS. Figure 1 provides a visual summary of those benefits. The aim of this supplement is to provide an initial assessment of alternative generating technologies, and to describe how each alternative's benefits are likely to qualitatively map to the array of benefits currently provided by Navajo GS.

Two types of benefits are unaffected by the choice of generating alternative, because they relate directly to retiring Navajo GS and not to the choice of alternatives. The first benefit involves health and other environmental factors that may be associated with shutting down the mine that supplies coal to Navajo GS. As discussed in the January 2012 study, there has been no detailed epidemiological study of the health impacts on the nearby

Navajo and Hopi communities. Nevertheless, the potential health and environmental improvements that may result from closing Navajo GS and the coal mine would not depend on whether the replacement power came from wind, solar, or any other non-coal resource.

Another type of benefit not shown in Figure 1 relates to the cost of power. No alternative—renewable or conventional—would cost less than Navajo GS as it currently operates. As detailed in the January 2012 report, most of the plant's capital costs have been depreciated, and its operating costs are among the lowest in the region. Therefore, the decision to seek alternatives would be driven by BART compliance, not by lower generating costs alone.

The task of screening alternatives on the basis of cost is reserved for Phase 2. Reliable cost estimates would require more specific guidance from the Department of the Interior with respect to siting constraints, timing, and other policy objectives. Independent determinations on such factors are beyond the scope of this analysis.

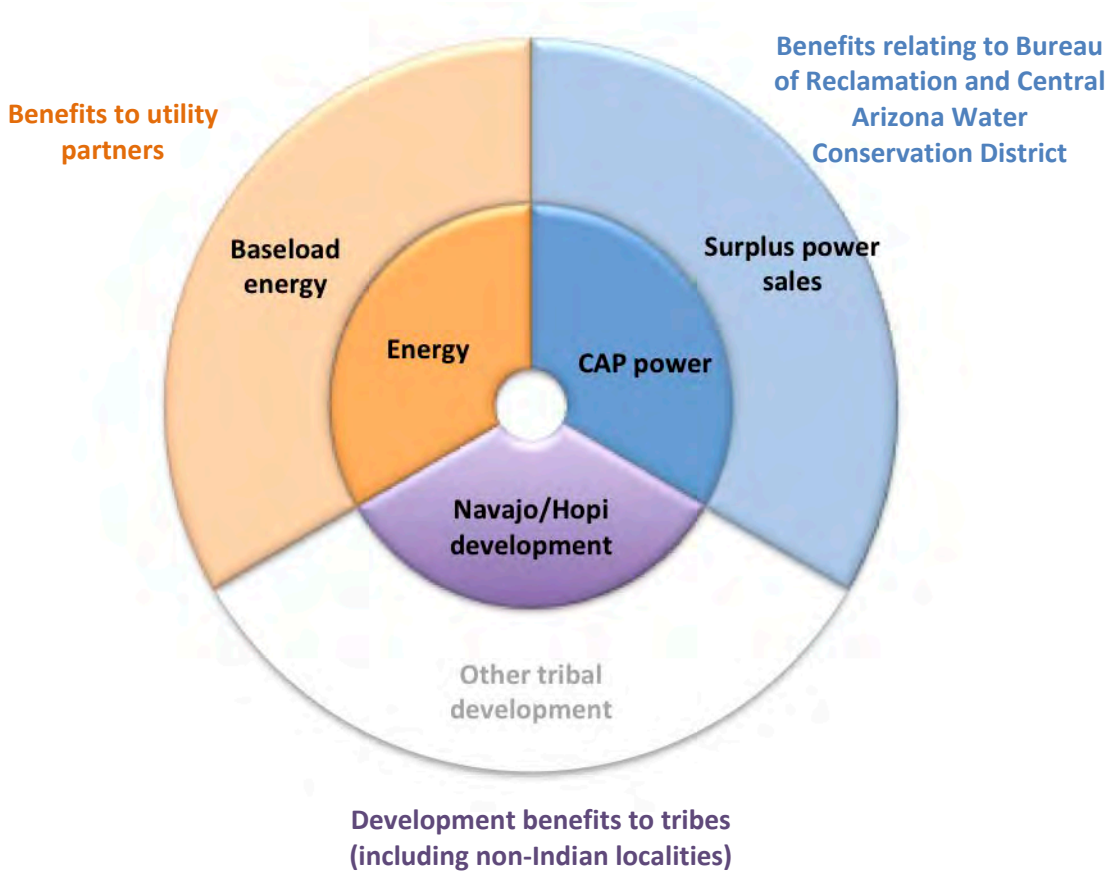


Figure 1. Qualitative relationship of major benefits currently provided by Navajo GS

Figure 1 is a qualitative depiction of the types of benefits currently provided by Navajo GS. They are grouped by beneficiary type, as described in the January 2012 report: USBR and CAWCD, the power plant's five utility partners, and tribes and localities who enjoy the development benefits of having the plant as part of their local economies. Note that the figure is not intended to imply any quantitative comparison of the benefits; that detailed analysis is reserved for Phase 2. The intent here is to identify the types of benefits provided by Navajo GS, and how alternatives would most likely map to that array of benefits.

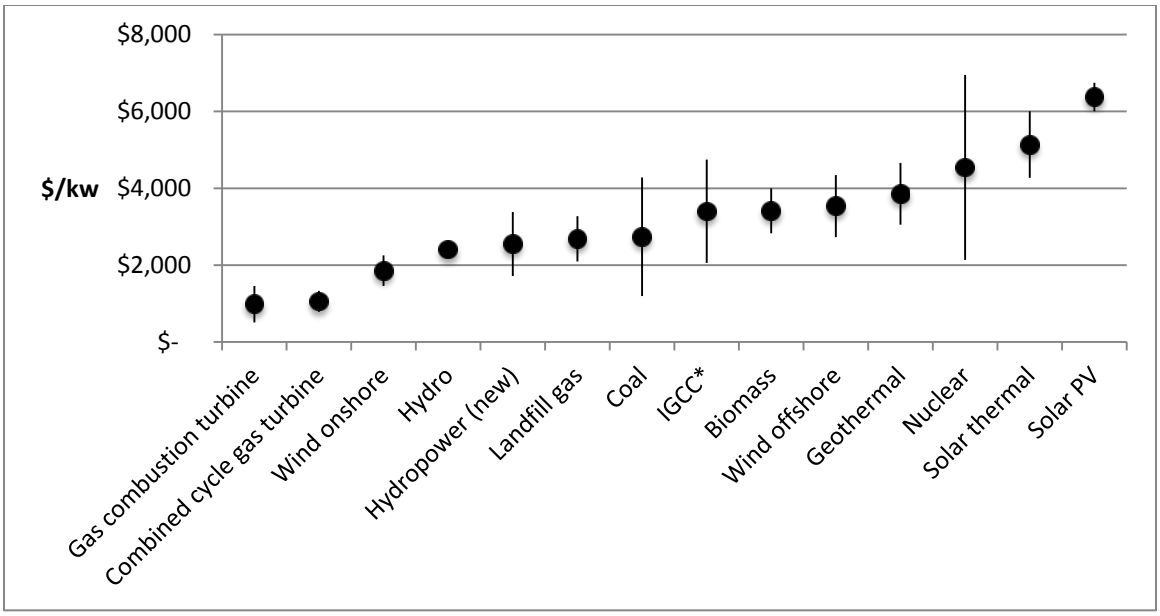
- For USBR and CAWCD, the primary benefit is providing power for the Central Arizona Project; related is the sale of surplus power to others as a source of revenue for the Lower Colorado River Basin Development Fund. We include in this type of benefit any tribal infrastructure project that is financed through the fund.
- For the utilities, the primary benefit is a supply of electricity to serve their retail customers. An added benefit to these utilities is the fact that Navajo GS is one of several sources of baseload power.
- Tribal and local development benefits primarily accrue to the Navajo and Hopi tribes, as well as to the city of Page, AZ. Some of the alternatives described here are found on other reservations. However, for this analysis we distinguish between benefits that historically have been limited to the Navajo and Hopi tribes, and future benefits that may extend to other Arizona tribes.

1.2 Cost

While a more precise analysis of cost is reserved for Phase 2, some elements affecting cost can be compared generally based on current data. Three primary factors shape an alternative's all-in cost: the fixed cost of the capital equipment and its installation (sometimes referred to as overnight costs), the variable cost of operating the plant (mostly the cost of fuel), and plant's productivity (commonly represented as the plant's capacity factor).[1] The perfect resource would have low capital costs, low variable costs, and a high capacity factor. Practically, any alternative involves a tradeoff with respect to at least one of these primary cost factors.

- Coal and nuclear plants have high capital and other fixed costs, but they also generate relatively more electricity over which those fixed costs can be spread. Per unit of electricity generated, the cost of coal is normally lower than the cost of natural gas.
- Natural gas plants have relatively low fixed costs, but their operating costs are affected by the price of natural gas, which can be volatile. Currently natural gas fuel costs are low—as of this writing, near $3 per mmBtu—but as recently as 2008 they were four times that level.

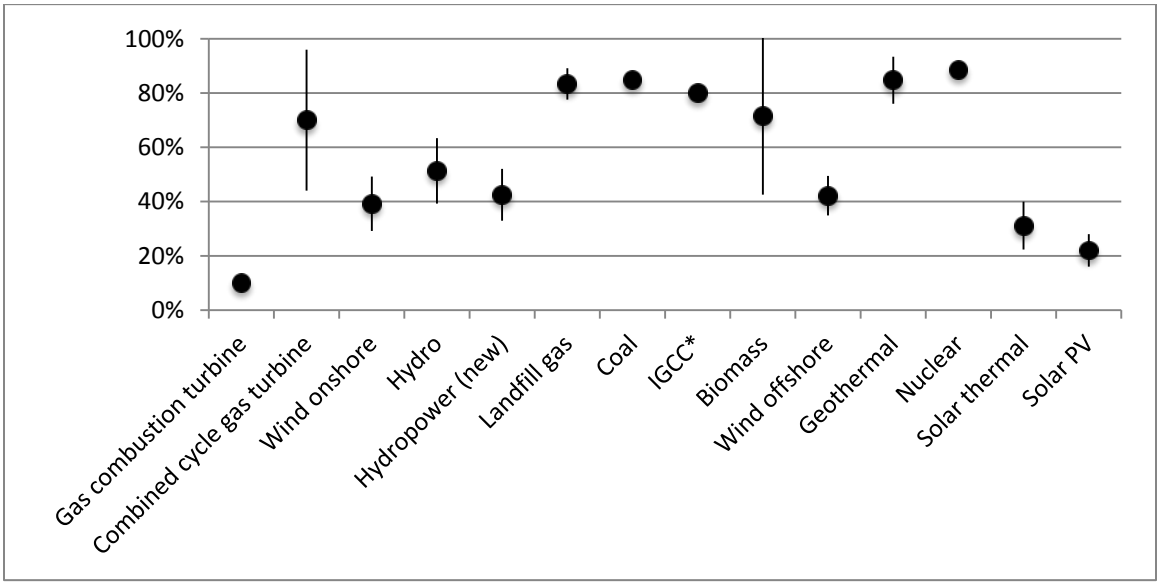
[1] A unit's capacity factor indicates how much of its capacity is used over a given period of time. A unit running at full capacity all the time has a capacity factor of 100%. It would have a 50% capacity factor if it ran at half capacity all the time, or if it ran at full capacity half the time and was idle half the time.



*Integrated gasification combined cycle

Figure 2. Comparison of capital costs in 2010 for various types of new generating units

(Compiled by NREL from various sources. Circles indicate average values; bars indicate averages plus and minus one standard deviation. For supporting data, see http://www.nrel.gov/analysis/tech_costs.html.)



*Integrated gasification combined cycle

Figure 3. Comparison of capacity factors for various types of new generating units

(Compiled by NREL from various sources. Circles indicate average values; bars indicate averages plus and minus one standard deviation. For supporting data, see http://www.nrel.gov/analysis/tech_costs.html.)

- Solar and wind power have negligible variable costs, but their capacity factors are low due to the variability of sunshine and wind. Capital costs for wind are relatively low. Capital costs for solar are higher, but have declined significantly in recent years due to technological improvements and excess supply in the world market.

Figure 2 provides a generic comparison of capital costs for various types of new generating units—renewable as well as nuclear and fossil fuels. The data are based on information as of 2010, and represent the plausible range of costs for each technology (adjusted for inflation to 2012 equivalent values). Since the time the numbers in this table were compiled, solar photovoltaic (PV) plant costs have continued to decline.

Capacity factors can significantly affect how the all-in cost of one alternative compares to another. Figure 3 compares the capacity factors of the technologies shown in Figure 2. Note, however, that capacity factors for renewable technologies are very site-specific even within Arizona, which is why a full comparative analysis of the all-in cost of alternatives is reserved for Phase 2.

1.3 Alternatives Other Than Renewables

Due to time and budget constraints, this overview sets aside for Phase 2 three potential alternatives: advanced coal with carbon capture and sequestration, modular nuclear, and natural gas. Their exclusion from this analysis is intended to be without prejudice to the merits of those options. All three can and should be examined in the next phase of this project. Focusing the present analysis on renewable energy alternatives enabled the study team to leverage off other work currently being done at NREL.

2 Framework and Analytical Assumptions

NREL's January 2012 report suggests a number of threshold issues that frame how to approach the question of alternatives.

- Is it necessary to find one single alternative that provides all the benefits that Navajo GS currently provides by itself?
- Should the federal government differentiate between the public interests (power for CAP, tribal economic development) and the utility interests that would be at stake in a post-Navajo GS world?
- Should the federal government continue to provide CAP with nearly all of its electricity from a single source?

More simply, solving the puzzle of Navajo GS alternatives begins by asking "alternatives to do what?" Without first deconstructing what a generating alternative (or a portfolio of alternatives) would need to accomplish, the analysis can quickly find itself on a circular path, such that the only "alternative" to Navajo GS is Navajo GS itself.

2.1 Size of the Puzzle

The January 2012 report supports the conclusion that finding alternatives to Navajo GS is not one single puzzle, but several overlapping puzzles. One is a 2,250-megawatt puzzle in which a large amount of generating capacity is centrally located. Navajo GS is the largest-capacity coal plant operating in the Western Interconnection, and it ranks fourth—behind only the Palo Verde and Diablo Canyon nuclear plants and the Grand Coulee hydroelectric plant—in terms of total electricity generated during a typical year.[2] Transmission infrastructure supporting it is commensurately large and designed to accommodate one single injection point on the grid. Operating such a large plant means significant local economic benefits in terms of employment, direct payments to local governments, and secondary economic impacts, in this case focused on the Navajo Nation, the Hopi Tribe, and the nearby community of Page, AZ.

At the same time, a Navajo GS alternative is also a 547-megawatt puzzle. This is the size of the federal government's share of the plant, which is dedicated to the operation of CAP. USBR is charged with managing this share of the plant in a manner consistent with federal policy. This share of the power is provided at cost to CAWCD, which was created to manage the delivery of CAP water to tribes, municipalities, agricultural users, and others. What CAP does not need out of this share is sold to other utilities. Revenues from surplus power sales flow into the Lower Colorado River Basin Development Fund, which among other things helps facilitate the terms of water rights settlements with several Arizona Indian tribes.

[2] Market data used in this analysis are compiled by the energy information service of SNL Financial LC. SNL Energy. http://www.snl.com

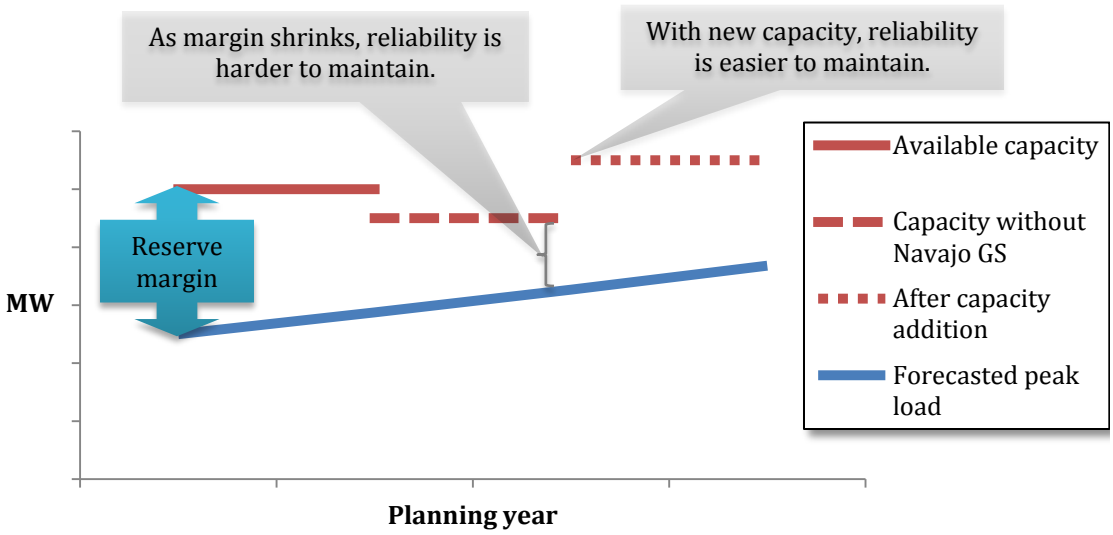


Figure 4. Conceptual illustration of reserve margin in utility planning

The 1,703 megawatts owned by the five utility partners constitute five separate reserve margin puzzles. For each utility, losing its share of Navajo GS will have some impact on its reserve margin and (depending on what it uses for replacement) its overall supply costs.

A utility's reserve margin is the total amount of capacity it has at its disposal in excess of its forecasted annual peak demand, as illustrated in Figure 4. A reserve margin that is too small means unexpected events such as a line outage or a generator failure are more likely to lead to a blackout or some other disturbance to service. Utilities in the West routinely project how they expect their reserve margins to change over time by forecasting load growth and factoring in planned retirements of old generators. The addition of new capacity is usually timed to prevent the utility's projected reserve margin from dwindling to a critical benchmark level.

Navajo GS constitutes between 3.5% and 7.6% of its utility partners' generation fleets. This is the amount of capacity each utility would need to replace with some alternative or another in the event that Navajo GS were no longer available. The timing would depend on when the utility's reserve margin (without Navajo GS) might fall below the minimum benchmark level.

2.2 Separating the Puzzles

The three types of benefits described above—benefits related to USBR and CAWCD, benefits related to tribal and local economic development, and benefits to the coal plant's utility partners—are not fundamentally linked, apart from the fact that one large facility currently provides them all. The value of baseload capacity depends on usage patterns where the electricity is consumed, not on where the power is generated. Similarly, the fact that Navajo GS is a baseload plant is not a necessary condition of the employment and economic benefits that accrue to the Navajo and Hopi tribes.

USBR and CAWCD do not require 2,250 megawatts of generating capacity for CAP and the Development Fund; they now meet those needs with only 547 megawatts. The Arizona Water Settlements Act does not restrict revenues from surplus power sales to baseload power only.

Utilities need baseload capacity, but they have operational flexibility with regard to where it is located; it need not be on the Navajo reservation. Indeed, Navajo GS came into existence because by the 1970s baseload generators no longer had to be geographically near the load they served. Technological advances in supercritical steam technologies in the 1960s enabled utilities to partner on large projects, such as Navajo GS, that could be optimally located anywhere in the region, and not necessarily on a utility's own network.

This analysis of alternatives will unbundle the array of current benefits and examine the alternatives with respect to:

- Options for clean energy generation on the Navajo or Hopi reservations (as well as on other Arizona tribal lands), but not constrained to 2,250 megawatts of baseload capacity
- Clean energy baseload options for the five partner utilities, but not constrained to 2,250 megawatts in one location and not limited geographically to the Navajo or Hopi reservations
- Clean energy options for operating CAP and providing revenues for the Development Fund, but not constrained to 2,250 megawatts of capacity and not limited geographically to the Navajo or Hopi reservations.

3 Assessment of Resource Options

This section provides a high-level overview of the renewable energy options relevant to the benefits currently provided by Navajo GS. The assessments that follow indicate where a given clean energy technology can be most productive; i.e, where a developer is likely to find the sunniest and windiest areas with the fewest physical obstacles to development.

Ownership structures are outside the scope of the factors assessed here. While we include assessments of how much solar power or wind power might be found on a reservation, the analysis does not consider whether the tribe itself owns the project. We assume here that the question of who owns a project will not appreciably change its cost or productivity.

Similarly, we make no assumption about whether the resource might be dedicated to providing CAP power, or how ownership might be structured to provide revenues into the Lower Colorado River Basin Development Fund. Those questions are more appropriately addressed once a preferred technological path has been identified.

State-level resource assessments draw on previous work conducted by NREL for the Western Renewable Energy Zone (WREZ) Initiative. The Western Governors' Association began the WREZ Initiative in 2008 with support from the Department of Energy.[3] In the first phase of the initiative, NREL conducted detailed screenings of wind, solar and geothermal resource potential across the entire Western Interconnection.

In addition, NREL conducted a geographic information system (GIS) analysis of renewable energy potential on all U.S. Indian reservations for DOE. This analysis draws on that work for its estimation of renewable potential available on tribal lands in Arizona.[4]

There are a number of other on-going planning efforts related to renewable energy development that may impact the siting, viability, and suitability of potential NGS generating alternatives. These efforts need to be considered in any Phase 2 analyses.

- The Bureau of Land Management's (BLM) is conducting a Programmatic Environmental Impact Statement (PEIS) for solar energy development in Arizona, California, Colorado, New Mexico, and Nevada. Included in the PEIS is BLM's plan to create up to 18 solar energy zones across the region, including three proposed zones in Arizona, two in California, and four in Nevada.
- The BLM is conducting a focused analysis for solar energy development in Arizona entitled the Restoration Design Energy Project (RDEP). The RDEP seeks to identify the best location for solar energy development in Arizona. This process is on-going,

[3] "Western Renewable Energy Zones – Phase 1 Report." (June 2009). Western Governors' Association. Accessed March 6, 2012 (WREZ Phase 1): http://www.westgov.org/component/joomdoc/doc_download/5-western-renewable-energy-zones--phase-1-report

[4] NREL. Unpublished analysis conducted for the DOE Tribal Energy Program.

and the draft EIS was released on February 17, 2012. USBR has successfully worked with BLM to include five potential solar energy sites located along the CAP for inclusion in the RDEP draft EIS.

- USBR is actively working to identify land it owns that is suitable for renewable energy development. Other potential USBR locations which could play into future NGS scenarios include several sites near Yuma, Arizona, as well as several potential locations along the All American Canal in Imperial County, CA.
- The Desert Renewable Energy Conservation Plan (DRECP) is a multi-agency, multi-year effort focused on identifying the best sites for renewable development in the Mohave Desert.
- The BLM Renewable Energy Program has more than 200 applications, totaling over 60,000 MW of potential projects in BLM lands in the west. As of December 2011, BLM has issued permit approvals for over 6,600 MW of renewable energy projects in the West. Several of these projects are already under construction. There are multiple proposed projects in Arizona, Nevada, and California.

3.1 Renewable Energy Credits

A renewable energy credit (REC) is an accounting device associated with one megawatt-hour (MWh) of electricity produced from renewable resources. It represents the value of the electricity's renewable energy attributes, separate from the electricity's work value. Unlike physical electricity that must be used in real time, RECs may be banked for use at a later time. A REC's economic value comes from its usefulness as a compliance mechanism for state renewable energy requirements, and from direct voluntary consumer demand for green power.

The generation alternatives examined here would have the ability to earn RECs.[5] How this would affect an alternative generation scenario would depend on the project's ownership structure, but in any case, RECs add a new element to potential scenarios for CAP power.

For example, a 100-megawatt PV installation near the Mark Willmer pumping station would generate in excess of 200,000 megawatt-hours per year, along with a corresponding number of RECs. If the project were structured so that the pumping station received the power and the RECs were sold separately to someone other than CAWCD, the revenues could amount to between $200,000 and $300,000 per year.[6]

[5] The Western Renewable Energy Generation Information System tracks and issues RECs for the electricity produced by wind, solar, and other eligible resources that have registered. More than 2,500 generators were registered with WREGIS as of March 2012: http://www.wregis.org

[6] In March 2012, the market price of RECs in California was between $0.98 and $1.50 per REC (SNL Energy). Although solar RECs trade at much higher prices in New England and the mid-Atlantic Coast area, currently the West has no separate market for solar RECs.

3.2 Solar

Arizona has some of the most productive solar potential in the United States. Because solar power increases in the morning and tapers off in the evening, it is generally better suited as a daily load following resource than as an around-the-clock baseload resource. Capital costs tend to be high—$5 to $6 per watt for dry-cooled concentrated solar power (CSP) systems and $3 to $5 per watt for PV, compared to $1 to $4 per watt for a new coal plant.[7] Since 2006, however, total installation costs for PV in Arizona have fallen by 14%.[8]

A standard measure of the quality of an area's solar potential is direct normal insolation (DNI), which indicates the average amount of sunlight falling on a typical square meter of ground during a given period of time. Higher DNI means more electricity can come from the same equipment. Figure 5 shows the degree to which more sunshine (as measured in DNI) translates into more energy generated. An area with an average annual DNI of 7.5 kilowatt-hours per square meter per day will yield about 7% more electricity than an area with DNI of 6.5.

Variable costs for solar are negligible, whereas fuel and other variable costs for Navajo GS are around $19 per MWh.[9] On the other hand, solar capacity factors are much lower than for Navajo GS. A CSP plant near Tucson can achieve a capacity factor of 30% (and up to 41% with thermal storage), as can a PV installation with single-axis tracking located near Tucson. By comparison, the Navajo GS capacity factor is typically 89%. A more precise comparison of overall costs (taking into account differences in capital costs, variable costs, and capacity factors) is not possible without knowing the specific options for siting, due to how differences in the quality of solar resources might affect a project's financial *pro forma*.

NREL has performed a number of screening analyses for solar resource in Arizona and other western states. The estimates of solar resource potential used here are taken from some of those prior screening analyses. Typically, the screening excludes uneven terrain such as hills and mountains. Solar collector fields typically require large, flat areas to keep development costs low. National parks, wilderness areas, and other areas where development is precluded by law are also screened out.

For this discussion, we distinguish between solar *capability* and solar *potential*. "Capability" refers to the land area capable of siting solar power. However, solar projects actually built within an expansive area of capability would likely not cover the entire area. A single project tends to be geographically dense within a limited footprint, and a larger area of capability would mean more choices for siting a project. "Potential" refers to the amount of capacity likely to be developed within a given area of capability.

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[7] "Utility-Scale Energy Technology Capital Costs." National Renewable Energy Laboratory. Accessed February 29, 2012: http://www.nrel.gov/analysis/tech_costs.html),

[8] State-specific summary data on PV costs are available via NREL's interactive Open PV tool. Accessed February 29, 2012: http://openpv.nrel.gov/visualization/index.php

[9] SNL Financial. Accessed February 29, 2012: http://www.snl.com

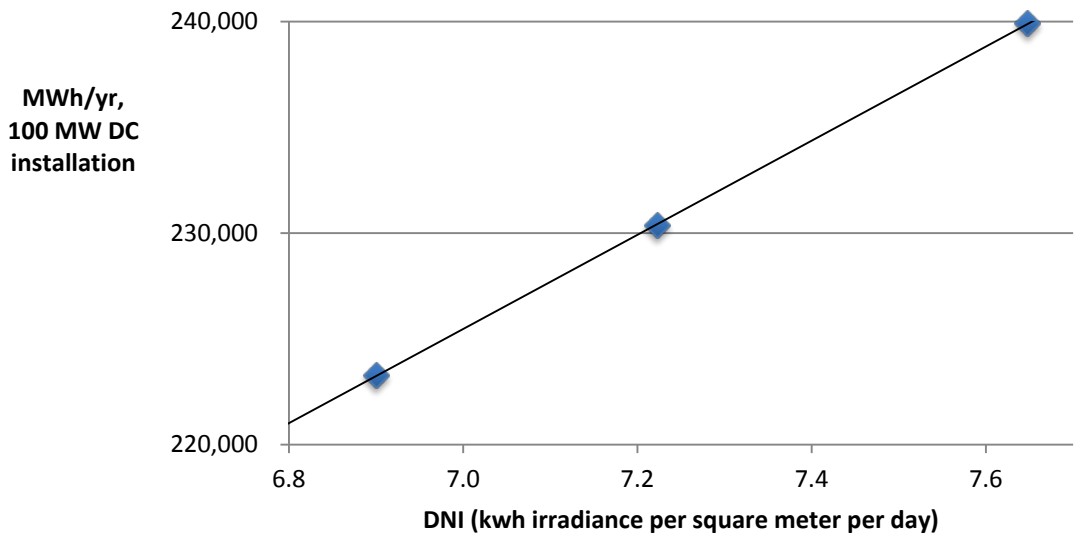

Figure 5. Relationship between DNI and electricity generated

[Line plot calculated using NREL's System Advisor Model (https://sam.nrel.gov/). Reference points are based on 100-megawatt PV systems near Phoenix (DNI 6.9), Tucson (DNI 7.2), and Daggett CA (DNI 7.6).]

3.2.1 Solar Energy Capability on Tribal Land

Nearly every Indian reservation in Arizona has areas with very high DNI. Some have conditions more suited to development, however, and these "best of the best" areas may hold a competitive edge with respect to siting a solar facility that can be cost effective.

Table 1 shows the quality and quantity of screened solar capability on Arizona reservations, ranked by DNI. The table suggests that a utility-scale PV installation would be about as productive on the Tohono O'odham Reservation as it would be on the Colorado River Reservation, but that the Tohono O'odham Reservation might offer roughly 10 times as many technically feasible siting options. The table indicates gross solar capability and does not take into account wildlife habitat or uniquely local constraints such as cultural resources, proximity to sacred sites, availability of roads, transmission access, or proximity to water. The estimates also do not reflect non-technical considerations that could affect the ability to find a purchaser for the power.

Table 1. Estimated Solar Capability on Arizona Indian Reservations

Reservation	Average annual DNI (kwh irradiance per square meter per day)	Estimated utility-scale capability (MW)[a]
Yavapai	7.30	4
Tohono O'odham	7.28	389,043
Colorado River	7.25	36,251
Hualapai	7.24	28,018
San Carlos	7.20	36,640
Maricopa (Ak-Chin)	7.19	3,747
Gila Bend	7.19	46
Hopi	7.17	142,607
Fort Mojave	7.17	4,100
San Xavier	7.14	10,211
Pascua Yaqui	7.13	125
Payson (Yavapai-Apache) Community	7.13	-
Gila River	7.11	53,573
Fort Yuma (Quechan)	7.10	5,847
Cocopah	7.07	1,038
Fort Apache	7.04	13,125
Havasupai	7.01	5,439
Fort McDowell	7.01	2,919
Camp Verde	6.99	49
Navajo	6.99	1,235,874
Salt River	6.98	7,090
Kaibab	6.92	9,564

[a] Areas with a terrain slope greater than 3% were screened out, as were areas such as wetlands, urban areas, water features, and protected federal lands. Remaining areas smaller than 1 km^2 were also screened out.

The Tohono O'odham Reservation has an estimated 389 gigawatts of solar capability with very high DNI. Currently Tucson Electric Power, one of the Navajo GS partners, plans to purchase power from a 35-megawatt PV facility on a site yet to be determined.[10] The reservation is also close to the CAP pumping stations upstream from Tucson. This proximity could reduce the cost of transmission upgrades for projects built to serve CAP directly. The Tohono O'odham Nation is also close to transmission connecting to the Palo Verde Hub, which would provide a path to the California market.

The Gila River Reservation has almost 54 gigawatts of capability close to the CAP pumping stations near Phoenix. The productivity potential of these resources is only

[10] Tilghman, C., UniSource Energy Director of Renewable Resources and Programs (29 March 2012). Email correspondence on file with author.

slightly less than those on the Tohono O'odham Reservation. DOE has awarded $210,000 to the Gila River Indian Communities to study the feasibility of commercial-scale solar and biomass generation for export.[11]

The Colorado River Reservation has some of the most productive solar capability and is just 10 miles from the largest CAP pumping station near Lake Havasu.

The Hopi and Navajo reservations also have significant solar capability. The Navajo Tribal Utility Authority (NTUA) is exploring the feasibility of large-scale solar, including possible development on a reclaimed portion of the Black Mesa coal mining complex.[12] One factor that might affect the cost of a project is the distance from the site to a transmission tie-in near the current Navajo GS site.

The San Carlos Apache Tribe has also received DOE funding to study the feasibility of solar generation on its reservation.[13]

3.2.2 State Potential

The WREZ Initiative estimated Arizona's developable export-quality solar potential to be around 20 gigawatts.[14] This estimate of potential is the result of significantly more rigorous screening than was applied to the estimates of solar capability on Indian reservations, however.

First, the WREZ analysis used a higher resource quality threshold, excluding areas where the DNI was less than 7.25 kwh irradiance per square meter per day. Second, the maximum slope screen was 2%, which was flatter and more restrictive than the 3% slope screen applied to the analysis of the reservations. The WREZ analysis applied the same land use exclusions, but then applied a density screen to the remaining areas to eliminate small, isolated resource pockets. This resulted in the solar resource areas shown in Figure 6, equivalent to 565 gigawatts of capability. Finally, the WREZ analysis mathematically discounted these remaining areas by 96.5% to approximate unknown development limitations and the amount of solar capacity that might actually happen.

Two solar energy zones (SEZs) under study by the Bureau of Land Management (BLM) are located in the Arizona West renewable energy zone hub (AZ_WE). One SEZ is located 40 miles from the largest CAP pumping station; the other is 30 miles from a pumping station west of Phoenix. These SEZs are on federally-owned land and are part of an initiative by the U.S. Department of the Interior to accelerate the development of renewable energy resources.

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[11] DOE Tribal Energy Program, http://energy.gov/downloads/tribal-energy-program-february-2012-award-project-descriptions.

[12] "Four Corners Sustainable Futures Initiative: Phase 1 Preliminary Report." (2011). Northern Arizona University. Accessed October 2011: http://www.fourcorners.nau.edu/docs/4Corners-WhitePaper.pdf

[13] DOE Tribal Energy Program.

[14] WREZ Phase 1, p. 23.

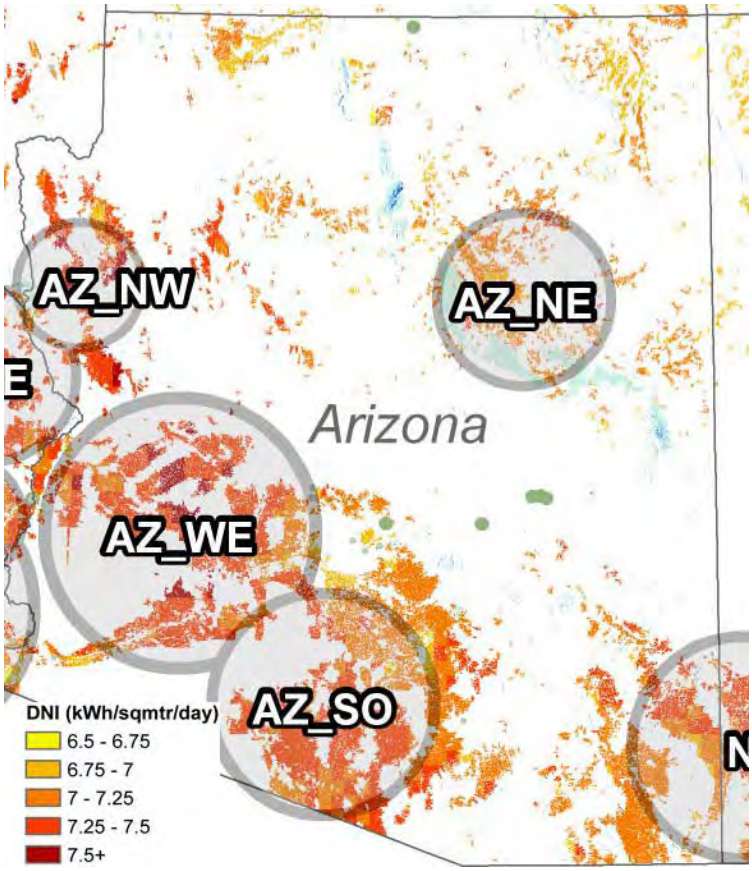


Figure 6. Renewable resources after WREZ screening

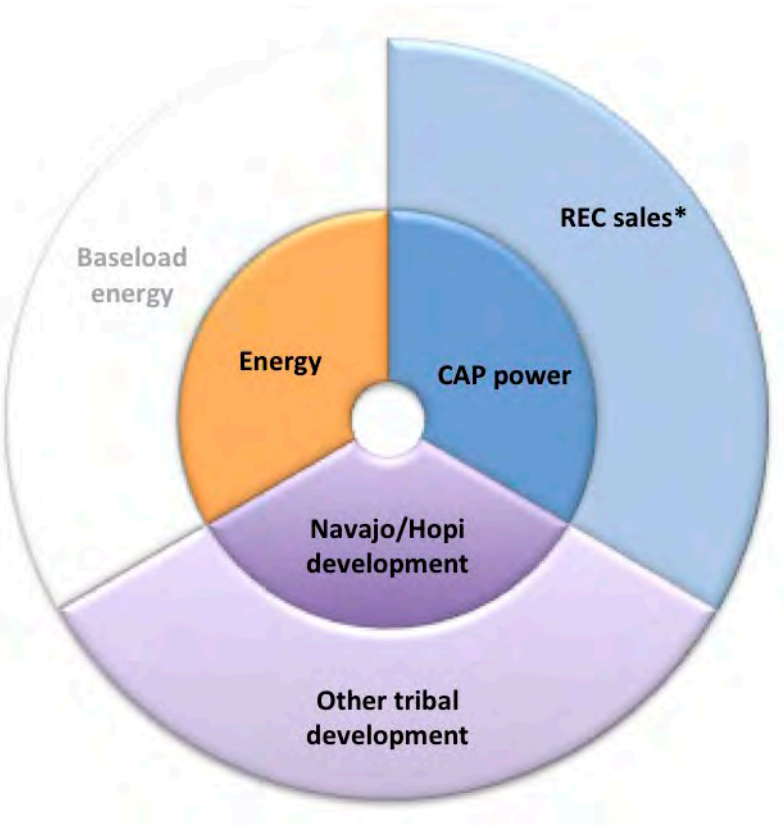
(Source: WREZ Phase 1 report. Circles indicate relative amount of a zone's potential energy; they do not indicate the zone's boundary.)

The southern Arizona WREZ hub (AZ_SO) includes significant portions of the Tohono O'odham Reservation. The northeast hub (AZ_NE) includes solar resources on the Hopi Reservation and the Navajo Reservation.

3.2.3 Summary

Solar power is Arizona's most abundant renewable energy alternative to Navajo GS. Most types of benefits currently provided by the coal plant can be met to some extent by solar power, specifically:

- Tribal economic development benefits related to siting projects on Indian reservations, possibly including but not limited to the Navajo Nation and Hopi Tribe
- Electricity to power CAP pumping stations
- Peak-period energy for the Navajo GS utility partners (although most of them can and are pursuing similar options independently).



*Depending on project ownership structure

Figure 7. Most likely benefit opportunities for solar

A benefit solar cannot easily provide is baseload capacity. While it is technically possible for CSP to provide some baseload energy with the addition of on-site thermal storage, doing so would entail significant additional cost. Solar Reserve's Crescent Dune project, for example, which is under construction near Tonopah, NV, will be the first commercial application of CSP with molten salt in the United States. Developers anticipate that this plant will be able to store energy for 10 to 15 hours and significantly reduce generation intermittency.[15]

Surplus power sales to others might also be difficult, unless project costs continue to decline significantly. At current costs, the purchase price that would be needed to recover a solar project's capital costs might be too high to attract buyers. Unbundling RECs and selling them separately from the power generated could potentially provide a revenue stream for the Development Fund.

3.3 Wind

While Arizona has some commercial-quality wind resource areas, they tend to be less productive than wind areas in neighboring New Mexico. Of the 3.7 gigawatts of screened wind potential that the WREZ initiative identified in Arizona, only 5% was Class 4 or

[15] SolarReserve, project developer. Press release. February 8, 2012: http://www.solarreserve.com/who-we-are/newsroom/

better. In comparison, New Mexico had an estimated 13 gigawatts that was Class 4 or better.[16]

Wind power is generally lower in cost than any other utility-scale renewable energy source. Capital costs are currently $1 to $2 per watt, somewhat lower than for coal but somewhat higher than for a natural gas unit. Wind power has no fuel cost, which reduces its overall cost relative to coal and natural gas even further.

Unlike coal, however, wind power is variable, and its output is generally uncontrollable. Forecasting can reduce the cost and the difficulty of managing wind's variability, and utilities have begun to incorporate wind forecasts into their day-ahead and real-time operations.[17]

Also unlike coal, wind power in most cases can earn RECs, which enhance project revenues.

3.3.1 Wind Energy Potential on Tribal Land

Of all the Arizona tribes, Navajo Nation has the largest and the most productive developable wind resource areas. NTUA is currently assessing major wind projects that, in all, could amount to more than 600 megawatts of wind power.

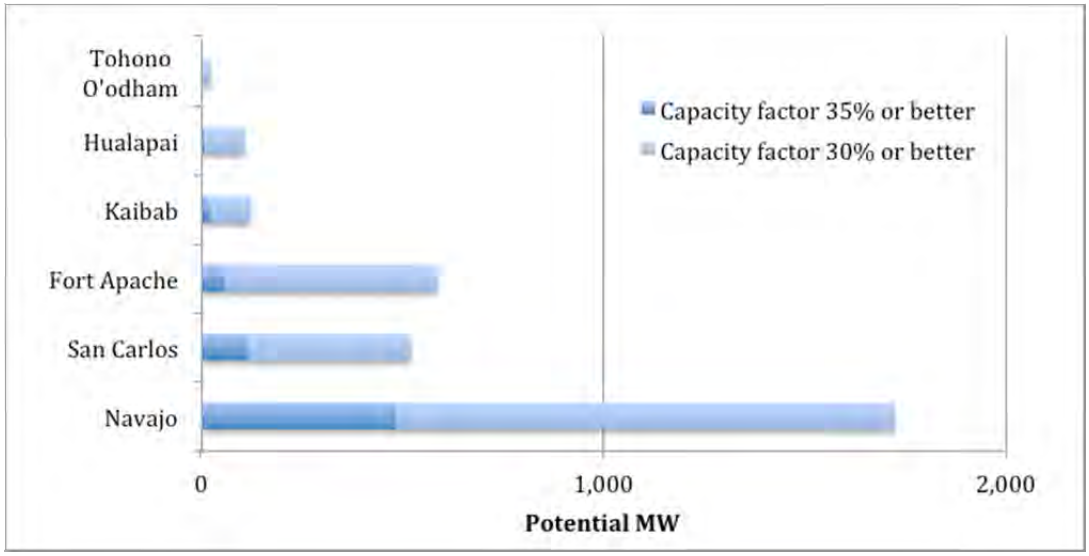


Figure 8. Screened wind resource potential on Arizona Indian reservations

Figure 8 shows the six reservations in Arizona with the largest amount of wind potential. The Navajo Reservation leads both in terms of quantity and quality. It has nearly 1.8 gigawatts of wind potential, 500 megawatts of which NREL estimates to have a potential capacity factor of 35% or higher.

[16] WREZ. The WREZ analysis estimated capacity factors of 32% and 36% for Class 3 and Class 4 wind areas.

[17] Rogers, J.; Porter, K. (March 2011). *Central Wind Power Forecasting Programs in North America By Regional Transmission Organizations and Electric Utilities: Revised Edition*, NREL/SR-5500-51263. Golden, CO: National Renewable Energy Laboratory.

A number of wind projects currently under development or study would provide some development benefits to Arizona tribes. On the Navajo Reservation, NTUA and Edison Mission Energy have partnered to build the 85-megawatt Boquillas Ranch wind farm.[18] The project is currently in the permitting phase. Navajo Nation is also studying a possible multi-resource site on a reclaimed portion of the Black Mesa coal mining complex. The Black Mesa project would include up to 250 megawatts of wind and solar power.

On the western side of the Grand Canyon, the Hualapai Tribe is conducting a feasibility study for a wind project of up to 150 megawatts.[19]

3.3.2 State Potential

In contrast to the rigorous screening used for Arizona's abundant and highly productive solar potential, the WREZ analysis applied more liberal criteria to assess the state's relatively limited wind resources. Most of the capability is in the north central part of the state, either near or on the Navajo reservation. Some wind capability exists in northwest Arizona.

The WREZ analysis estimates Arizona's export-quality wind resources at around 3.7 gigawatts.[20] Wind speed models based on turbines at a hub height of 50 meters estimate that most of this amount has a capacity factor of around 28%. Recent models of productivity for turbines at 80 meters and 100 meters hub height estimate annual capacity factors in northeast Arizona around 35%.

Arizona currently has about 230 megawatts of wind power operating in the northern part of the state. Eight other projects in planning or permitting would add another 1,800 megawatts, including a 500-megawatt project near Lake Mead in northwest Arizona.

[18] Salt River Project, *Navajo Tribal Utility Authority, Edison Mission Energy selected by SRP for new wind project in Coconino County*. Press release. July 27, 2011.
[19] DOE Tribal Energy Program. Presentation. October 2010. http://apps1.eere.energy.gov/tribalenergy/pdfs/17_hualapai.pdf
[20] The area that passed all the WREZ screens amounted to about 15 gigawatts. This amount was discounted by 75% to account for unknown limitations to development, and to estimate the amount that might actually be developed.

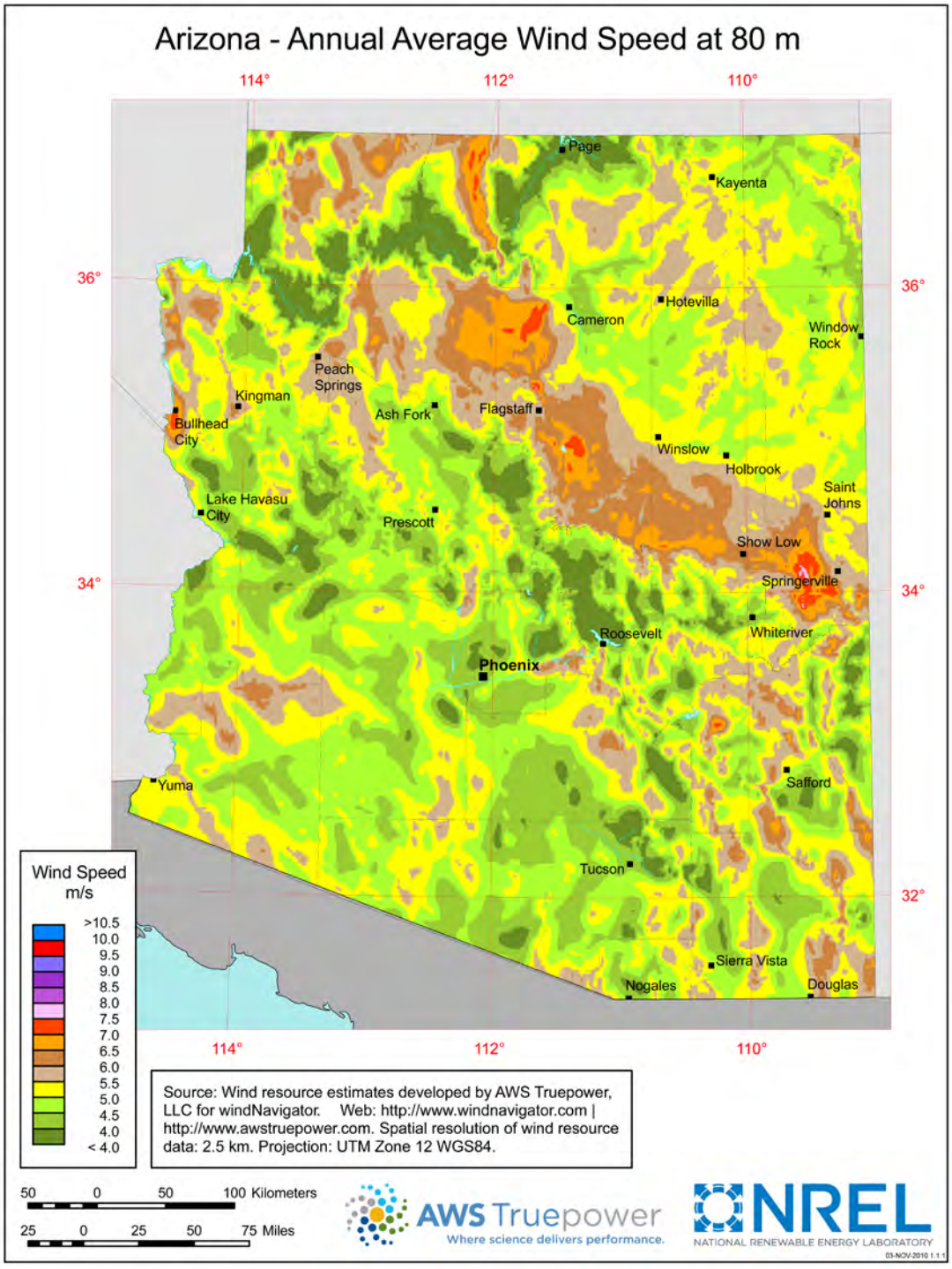


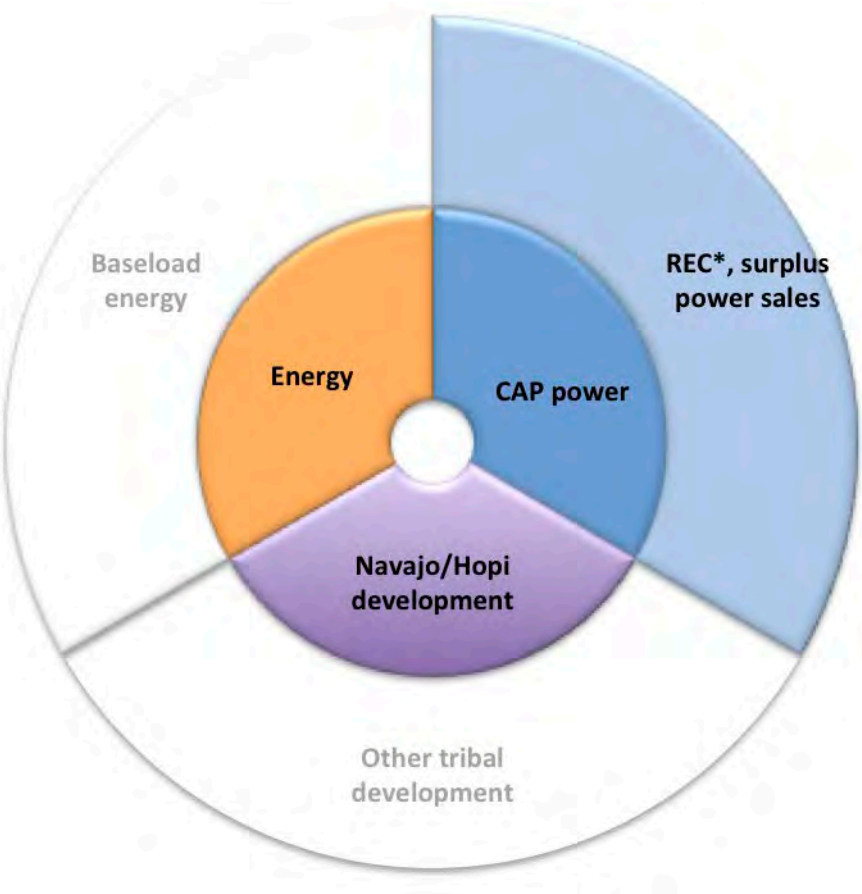
Figure 9. Average annual wind speed areas in Arizona at 80 meters hub height

3.3.3 Summary

Arizona wind power can provide a low-cost alternative to some power currently provided by Navajo GS. Because most of the state's best resources are in the northern part of the state, it is unlikely that wind could be developed economically near CAP pumping stations. Wind projects near the current site of Navajo GS could move power to CAP via transmission currently used to carry power from the coal plant.

Therefore, the type of benefits wind power could provide include:

- Economic development benefits to Navajo Nation (and possibly the Hopi Tribe) related to siting projects on tribal lands near Navajo GS, and some benefits for the Hualapi Tribe, but very little potential for similar benefits by other tribes
- Electricity to power CAP pumping stations via lines currently serving Navajo GS
- Low-cost renewable energy for sale to others
- Low-cost renewable energy for the Navajo GS utility partners (although most of them can and are pursuing similar options independently).



*Depending on project ownership structure

Figure 10. Most likely benefit opportunities for wind

3.4 Geothermal

Of all the Navajo GS owners, NV Energy has the greatest potential for using geothermal power as a baseload alternative. NV Energy is the utility serving most of Nevada, and the nation's most expansive geothermal resource play covers a large portion its network in northern Nevada, including some potential sites on tribal lands. Figure 11 shows the areas that are particularly favorable to geothermal power—areas where subsurface heat is relatively high at relatively shallow depth.

NV Energy's ownership position in Navajo GS is equivalent to 250 MW of baseload capacity, which historically has served Las Vegas and the rest of southern Nevada. A major transmission line currently under construction would, for the first time, provide southern Nevada access to northern Nevada's rich geothermal resources. With the new line, NV Energy could replace all of the baseload capacity it currently has at Navajo GS with geothermal power from northern Nevada.

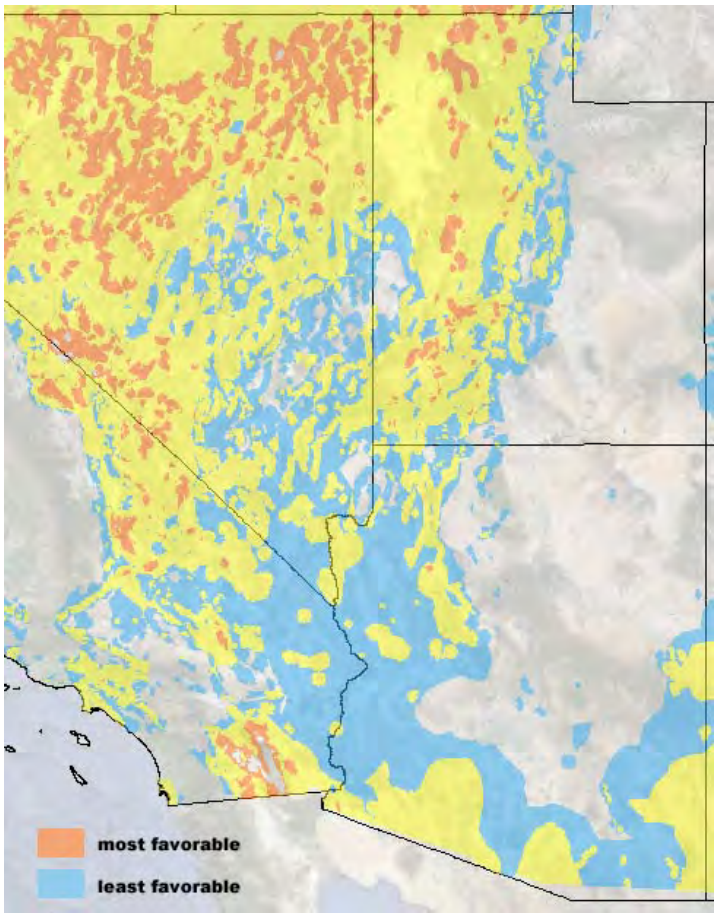


Figure 11. Geothermal favorability in the Southwest

(Source: U.S. Geological Survey, "Assessment of Moderate- and High-Temperature Geothermal Resources of the United States," 2008.)

Unlike wind or solar, geothermal power is well suited to be a baseload power resource. Many plants operating in northern Nevada and in California's Imperial Valley (another area with significant geothermal development) have capacity factors comparable to that of Navajo GS.[21]

Units tend to be small, however. Most operating in Nevada and California today are between 20 and 100 megawatts in nameplate capacity. NV Energy, for example, would need five 50-megawatt geothermal plants to replace the baseload power it currently gets from Navajo GS.

Currently Sierra Pacific Power (NV Energy's northern network) has about 346 megawatts of geothermal power operating, spread among more than a dozen individual plants. On a nameplate basis, this amounts to one-third of Sierra Pacific's baseload of about 1 gigawatt.[22] NV Energy's southern network (Nevada Power) has a baseload of around 2 gigawatts. The company has plans to retire by 2025 a coal plant of which it owns 50%, equivalent to 261 megawatts of baseload capacity.[23] NV Energy included 474 megawatts of geothermal capacity in Sierra Pacific's 2010 integrated resource plan, and by 2011 nearly three-quarters of that was in operation. Going beyond NV Energy's own resource planning, the Sierra Pacific transmission queue for interconnection requests includes 15 proposed geothermal projects, constituting more than 730 megawatts of capacity.

3.4.1 Geothermal Energy Potential in Arizona

Arizona itself lacks a significant base of proven geothermal resource potential. Geothermal favorability maps even suggest a "cool spot" below the Navajo and Hopi reservations that would limit development in the vicinity of Navajo GS and its transmission substation.

Nevertheless, Arizona utilities are currently seeking geothermal resources in California to complement the solar resources connecting to their own networks. The Imperial Valley, which already has transmission interconnections with Arizona near Yuma, has been an area of particular commercial interest. Salt River Project (SRP), the managing partner of Navajo GS, already purchases some geothermal power generated in the Imperial Valley.[24]

[21] SNL Energy, database of electric generating units.
[22] Hurlbut, D., *Geothermal Energy and Interconnection: The Economics of Getting to Market*, NREL/TP-6A20-54192. Golden, CO: National Renewable Energy Laboratory.
[23] NV Energy. *Sierra Pacific Power Company Integrated Resource Plan*. (2010). Filing before the Public Utilities Commission of Nevada.
[24] Salt River Project, *SRP to purchase 49 MW of geothermal energy*. News release. Dec. 12, 2011. http://www.srpnet.com/newsroom/releases

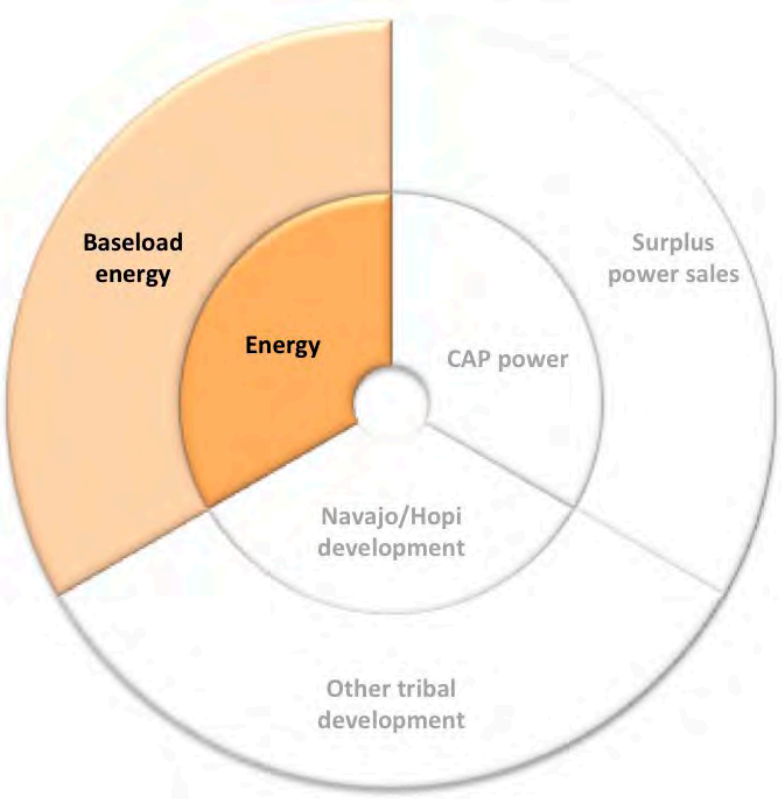


Figure 12. Most likely benefit opportunities for geothermal

3.4.2 Summary

Geothermal power could provide some of the baseload energy benefits that Navajo GS currently provides (Figure 12). NV Energy has sufficient geothermal resources in its own service territory to make up for the loss of its share of the coal plant. Knowing whether Nevada's geothermal resources could also serve load in Arizona, however, would require more detailed studies of network power flows that take into account the major transmission lines due to be completed in 2013.

Aside from NV Energy, other Navajo GS utility partners are independently pursuing deals to secure baseload geothermal power. For any partner, completely replacing its share of the coal plant with geothermal would require deals with many geothermal plants.

Because geothermal within the borders of Arizona is limited, it would not be able to provide the economic development benefits for Arizona tribes that Navajo GS currently provides.

3.5 Biomass and Small Hydro

Arizona's potential for generating electricity from biomass resources and small hydroelectric resources is limited, both statewide and on tribal lands. Table 2 shows the resource estimates for Arizona reservations based on NREL's GIS analysis. Note that the

grand total for all reservations for biopower and hydropower is still just 7% of what Navajo GS generated in 2010.

The WREZ analysis estimated that Arizona could generate up to 2.4 million MWh per year through biopower. It also identified about 72 megawatts of small hydroelectric potential, which would produce about 347,000 MWh per year assuming a 55% capacity factor.

The interconnection-wide WREZ analysis treated biopower and small hydro as local rather than regional electric generating resources. Stakeholder discussions concluded that because these resources tend to be small and highly dispersed, they generally would not be competitive with larger wind and solar projects in a regional market for renewable power. Nevertheless, these resources could be a source of electricity for the communities in which they may be located. Those benefits are different from those provided by Navajo GS, however.

3.5.1 Summary

Biopower and small hydroelectric power cannot provide the same benefits as Navajo GS. They provide different types of benefits that are local rather than regional in nature.

Table 2. Biopower and Small Hydro Potential on Arizona Indian Reservations

	Biopower from Solid Residues[a] (MWh/yr)	Biopower from Gaseous Residues[b] (MWh/yr)	Hydropower Generation Potential (MWh/yr)
Camp Verde	26	1	-
Cocopah	1,161	25,403	-
Colorado River	17,814	34	106,505
Fort Apache	14,148	182	115,435
Fort McDowell	190	74,323	14,108
Fort Mojave	565	50	3,050
Gila Bend	1	-	-
Gila River	26,922	459	47,987
Havasupai	153	4	5,692
Hopi	745	62	1,860
Hualapai	580	16	897
Kaibab	14	4	452
Maricopa (Ak-Chin)	11,100	9	313
Navajo	103,018	1,755	369,000
Pascua Yaqui	415	10	-
Payson (Yavapai-Apache) Community	-	-	-
Salt River	3,495	59,395	17,910
San Carlos	12,211	76	49,442
San Xavier	575	293	2,638
Tohono O'odham	7,512	296	-
Yavapai	639	8	-
All Arizona reservations	201,284	162,382	735,289
Navajo GS net generation (2010)		16,429,593	

[a] Forest, crop, primary mill, and urban wood residues. Generation estimated assuming 1.1 MWh/bone dry ton of residue.

[b] Landfill and domestic wastewater residues. Generation estimated assuming 4.7 MWh/tonne of CH_4 produced by the residues.

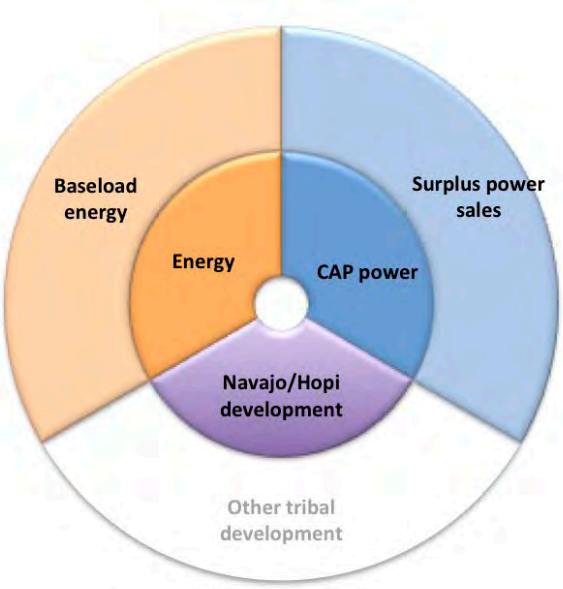
3.6 The Renewable Portfolio

The foregoing discussion indicates that neither solar, wind, nor geothermal power alone can replace all the types benefits currently provided by Navajo GS. They might in aggregate, however. Figure 13 juxtaposes the resource-specific benefit graphics from Figure 7, Figure 10, and Figure 12. When considered together, they have the technical capability to cover the entire spectrum of current benefits, plus some tribal economic development benefits that the coal plant does not provide. A diversified renewable portfolio to provide some of CAP's power needs could expand tribal economic development benefits beyond the Navajo Nation and the Hopi Tribe to include tribes nearer to CAP pumping stations.

Whether a diversified renewable portfolio could match the amount of benefits in each category would depend on the number of projects developed, the economics of various options compared to other factors, and on the business arrangements linking them to the CAP and to the Development Fund.

With regard to the utility partners' benefits in particular, renewable energy alternatives to replace some or all of their Navajo GS shares might not require federal leadership. The utilities are already evaluating solar, wind, and geothermal resources that could address their portion of the puzzle at least in part.

What is unclear is whether a utility partner would respond to the retirement of Navajo GS—and, consequently, to the end of the partnership agreement—by incrementally increasing its renewable energy procurements by the amount of its ownership share. A utility's typical path forward would be to regard future capacity loss as an anticipated change in its reserve margin and to add new capacity on a least-cost basis. The factors guiding its procurement of renewable resources would probably not change. Therefore the total amount of renewables needed probably would not change if Navajo GS were no longer part of the generation fleet.



Solar:

- Energy (but not baseload energy)
- CAP power (possible REC sales to others)
- Tribal development, including tribes in addition to Navajo and Hopi

Wind:

- Energy (but not baseload energy)
- CAP power and possible market sales to others
- Tribal development, mostly Navajo

Geothermal (Nevada, Imperial Valley):

- Energy, including baseload energy
- Unlikely for CAP, market sales to others
- Unlikely for Arizona tribal development

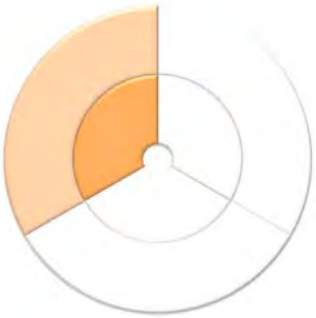


Figure 13. Comparison of likely benefits from solar, wind, and geothermal

4 Special Cases for Solar Alternatives

NREL has been engaged in separate analyses that relate to the question of clean energy alternatives to Navajo GS. Two of these analyses are summarized here as additional information. These are not necessarily recommended technologies, because such a recommendation would require more detailed analysis. They are included here for reference and for the reader's convenience, and include:

- Installation of concentrating solar power augmentation at one of the existing Navajo GS units
- On-site PVs to provide some of the power for CAP pumps.

4.1 Solar Augmentation at an Existing Navajo GS Unit

Concentrating solar power (CSP) differs from PV solar power in that CSP uses the sun's heat to drive a thermal power cycle. This reliance on thermal energy means CSP plants can be backed up with natural gas and can supply steam to augment fossil-fired power plants. Such "solar-augment" allows CSP to be combined with existing or new fossil power plants.

Solar-augment of a fossil power plant offers several advantages:

- It takes advantage of a pre-existing steam power block, electrical substation, and other ancillary equipment
- It takes advantage of pre-existing transmission and grid interconnection
- Location next to an existing power plant likely minimizes environmental and view-shed concerns
- Solar variability is mitigated by fossil fuel use.

These features combine to reduce some of the cost and risk associated with the solar project, and also may shorten project development timelines. As risk is reduced, indirect costs associated with financing costs and project contingencies may also decrease.

In 2009, the Electric Power Research Institute (EPRI) completed studies examining the best ways to integrate CSP steam into coal-fired and natural gas combined cycle (NGCC) power plants.[25] This work was followed by a joint NREL/EPRI study that examined the solar-augment potential of coal and gas plants in the United States.[26] Navajo GS was one of the plants included in the study.

[25] Libby, C. Project Manager (April 2010). *Solar Augmented Steam Cycles for Coal Plants: Conceptual Design Study*. Report 1018648. Work performed by Electric Power Research Institute, Palo Alto, CA. Libby, C. Project Manager (July 2009). *Solar Augmented Steam Cycles for Natural Gas Plant: Conceptual Design Study*. Report 1018645. Work performed by Electric Power Research Institute, Palo Alto, CA.
[26] Turchi, C.; Langle, N.; Bedilion, R.; Libby, C. (2011). *Solar-Augment Potential of U.S. Fossil-Fired Power Plants*. NREL/TP-5500-50597. Golden, CO: National Renewable Energy Laboratory. February 2011.

The potential to hybridize Navajo GS by augmenting the plant with solar-generated steam was evaluated following a procedure developed by NREL and EPRI. Qualitatively the plant is a good candidate for solar augment because of its attractive solar resource and the proximity of flat, vacant land. The protocol developed by NREL and EPRI seeks to maximize solar integration while maintaining high solar-use efficiency and the ability to run the power cycle with and without solar input. The best case integration of solar thermal energy utilizes power tower technology because of its better match to coal plant steam conditions.

For Navajo GS, developing the largest contiguous plot of suitable land near the plant would allow for a solar-augment potential of approximately 8% of annual energy generation of one of the 750 MW coal units, assuming the coal plant runs at a 90% capacity factor. The design-point solar contribution is as high as 26%. That is, a power tower with thermal storage could achieve up to 26% solar contribution, although this system would require roughly three times more land area than this analysis assumed would be available. The 8% annual and 26% design-point values are based on the use of molten salt power tower CSP technology. Parabolic troughs would have a lower solar-augment due to the lesser steam conditions provided by troughs.

This analysis was a high-level assessment based on properties that are typical for coal and CSP plants. A more detailed, site-specific analysis is necessary if development is to be considered.

Figure 14. Solar power tower

Source: NREL/PIX 02183

Figure 15. Solar parabolic trough

Source: NREL/PIX 16604

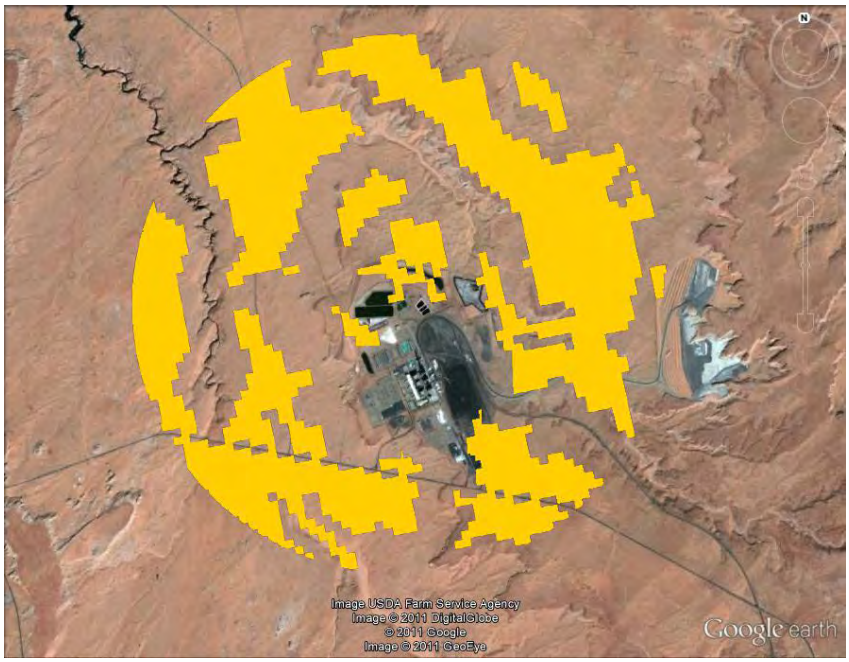


Figure 16. Satellite image of Navajo GS showing land potentially suitable for CSP development

4.1.1 Solar-Augment Results for Navajo GS

The limiting factor for the amount of solar-augment at Navajo GS depended on the CSP technology employed. For parabolic troughs, the maximum augment was limited by the ability of the steam cycle to accept relatively low-temperature steam. Turbine pressure rises as one incorporates lower quality steam and tries to offset the steam quality by increasing mass flow through the turbine to maintain plant output. This restriction limited the amount of solar steam that could be accepted by each unit. By the time the third unit was brought into play, the land area was exhausted, but it had nearly reached its steam turbine limit as well.

For power towers the limiting factor was land. The analysis only used the largest land parcel (1,220 acres). Integrating all solar energy from this land parcel into Unit 1 at Navajo GS would yield a 7.6% solar contribution to Unit 1 on an annual basis. The design point solar-energy contribution is as high as 26%; that is, when the solar field is a full power it can represent 26% of the energy output from Unit 1. The annual contribution is much lower because the capacity factor for the CSP plant is less than 30%, compared to the assumed coal capacity factor of 90%. The addition of thermal storage would increase the CSP capacity factor, but would also require additional land. Additional power tower solar could be integrated into Navajo GS if one chooses to construct multiple solar fields on different parcels of land. The solar plant could include thermal energy storage to increase the solar contribution of one coal unit or distribute the augment across all three coal units. Ultimately the amount of solar that could be integrated will be limited by the estimated 3,232 acres of suitable land within 3 km of the plant.

Table 3. Solar-Augment Results for Power Tower Technologies

Unit	Nameplate Capacity (MW)	Augment Potential (MWe)	Annual Solar Generation Contribution	Solar Use Efficiency	Limiting Factor
1	750	198.5	7.6%	35.4%	steam turbine
2	750	0	0.0%	-	land*
3	750	0	0.0%	-	land*

*Only the largest contiguous land parcel is used.
Values assume 90% fossil capacity factor and 26% CSP capacity factor.
Source: Turchi et al., 2011.

Table 4. Solar-Augment Results for Parabolic Trough Technologies

Unit	Nameplate Capacity (MW)	Augment Potential (MWe)	Annual Solar Generation Contribution	Solar Use Efficiency	Limiting Factor
1	750	55.8	2.1%	26.9%	steam turbine
2	750	55.8	2.1%	26.9%	steam turbine
3	750	46.7	1.8%	30.9%	land*

*Only the largest contiguous land parcel is used.
Values assume 90% fossil capacity factor and 26% CSP capacity factor.
Source: Turchi et al., 2011.

4.1.2 Summary

Adding solar-augment to one of the three units, while continuing to operate the other two as usual, would potentially preserve the same types of benefits currently provided by Navajo GS, all other factors held the same. Land availability may limit the relative degree to which solar-augment could contribute to a plant as large as Navajo GS.

An alternative scenario is that the other two units are retired, with USBR and CAWCD retaining a majority share of the remaining solar-augmented unit. In this case, the remaining benefits would include:

- Economic development benefits to Navajo Nation and the Hopi Tribe (but at a reduced level)
- Electricity to power CAP pumping stations
- Energy for sale to others, and possibly the additional sale of RECs
- Baseload power for any utility partner retaining a minority share of the solar-augmented unit.

It is possible that a solar-augmented coal unit could earn RECs calculated from the amount of solar energy used to generate power. Whether these RECs would have value would depend on state policies governing the types of resources eligible to meet renewable energy requirements.

4.2 On-Site Distributed Solar Power

NREL is currently conducting a study for USBR that examines the potential for using distributed PV to offset some of the power needed for water pumping stations along the CAP aqueduct. Distributed (or on-site) generation reduces the amount of power supplied from the transmission system, thereby eliminating long-distance line losses and reducing transmission-related costs. The methodology here assumes excess solar power would be sold, and that current electricity supplies would balance out variations in PV production so that pumping schedules were unchanged.

The pumping loads at Mark Willmer and Hassayampa Pumping Stations were selected for the analysis. Figure 17 shows the two stations in relation to the screened solar potential areas identified in the WREZ analysis. The Mark Willmer station is the largest on the CAP system, and is the point of withdrawal from the Colorado River. BLM's proposed Brenda solar energy zone is located 40 miles southeast of the station's withdrawal point. The much smaller Hassayampa station is about 30 miles northwest of Phoenix, and about 30 miles north of BLM's proposed Gillespie solar energy zone.

Figure 18 shows the average daily load profiles of the two stations. The average load in 2010 for Mark Willmer was around 180 megawatts, with a peak load of 287 megawatts. The total annual energy consumption is 1,572,621 MWh per year. Hassayampa's average load in 2010 was around 33 megawatts, with a peak load of 55 megawatts. The total annual energy consumption is 288,272 MWh per year.

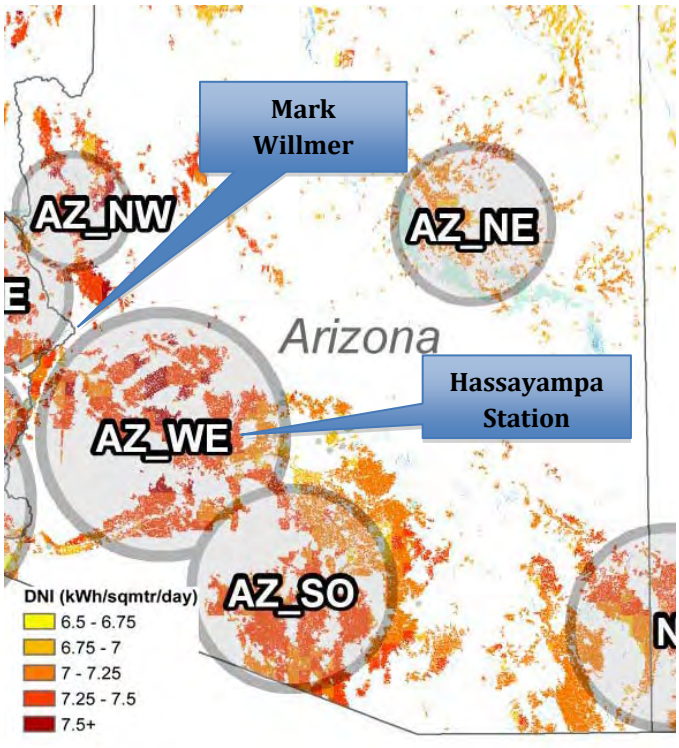


Figure 17. CAP pumping stations included in PV analysis

4.2.1 Methodology, Tools, and Assumptions

NREL used the software optimization tool HOMER[27] to model three different PV system sizes: 20, 50, and 100 megawatts. HOMER contemporaneously matched the hourly production of a solar PV system with the hourly demand of the pumping plant. The PV system is modeled as a horizontal continuous adjustment tracking system with a lifetime of 25 years. The HOMER model evaluates the opportunities from the perspective of the Bureau of Reclamation owning and operating the PV plant with capital and operating and maintenance (O&M) costs.

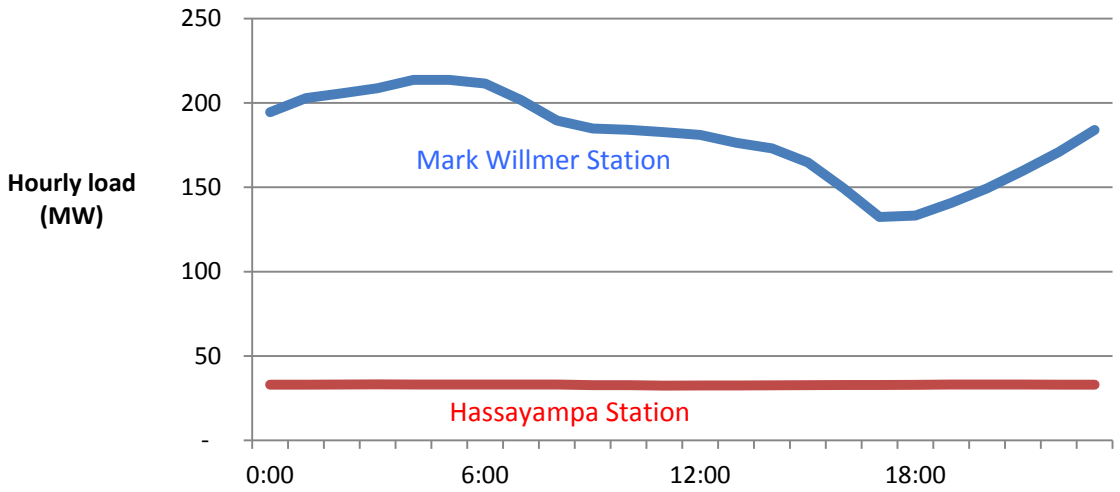


Figure 18. Average daily load profiles for Mark Willmer and Hassayampa pumping stations

The model used PV capital costs of $3 per watt and replacement costs of $2.50 per watt. O&M costs were assumed to be 0.1% of the capital cost every year. Economic calculations used a 6% annual real discount rate and a project lifetime of 25 years.

In the model, energy from the PV system offset the use of power from Navajo GS to meet pumping loads. We used CAP's cost of power from Navajo GS—$0.03 per kilowatt-hour—as the value of offset power. Excess production from the PV system that would be sold on the market as green power was valued at $0.10 per kilowatt-hour.

4.2.2 Results

A 100-megawatt PV system would provide 13% of Mark Willmer's annual energy needs and about 54% of Hassayampa's. A system of that size would yield some excess power at Hassayampa during the summer months. The estimated value of this excess, based on the assumptions used in the model, was around $3.2 million.

[27] HOMER Energy LLC, Version 2.81. http://www.homerenergy.com/

However, the effective cost of a 100-megawatt PV system (levelizing capital and O&M costs to an equivalent cost per kilowatt-hour value) would have increased energy costs at both pumping stations. The model indicated that levelized costs would increase 23% at Mark Willmer and 41% at Hassayampa.

The analysis indicated that the economics are not favorable for PV as long as the cost of energy at the pumping stations is only $0.03/kWh. Power costs would have to increase to around $0.12/kWh before PV would be economical (assuming PV's capital costs were spread out over 25 years). Other factors that could affect economic viability in the future include further reductions in PV system costs, and an increase in the cost of power from Navajo GS.

The economics of integrating PV into the pumping stations located to the east of Hassayampa may be more favorable. Additional opportunities may be available for using PV during peak hours, thereby freeing up additional excess NGS power for possible sale during summer peak hours, when excess NGS power will have the highest market value.

4.2.3 Summary

On-site PV could provide power directly to CAP pumping stations. Near-site PV located on tribal lands would also provide economic development benefits to the tribe. The Mark Willmer station, for example, is just a few miles outside the Colorado River Reservation. However, the economics of a project probably would not be favorable under the conditions modeled in this analysis.

Benefits not addressed by this alternative would include:

- Economic development benefits to Navajo Nation and the Hopi Tribe
- Baseload power for any of the current utility partners.

5 Summary and Next Steps

Based on this preliminary screening, the following options should be evaluated in additional detail in Phase 2:

- Distributed wind and solar generation potential located across the Navajo and Hopi reservations, as well as the reservations of CAP water-using tribes
- Distributed wind and solar on non-tribal lands located throughout Arizona, Nevada, and California, including on lands owned by USBR, BLM, the Department of Defense, and private landowners
- Solar-augment at NGS, with possible tribal ownership or partial ownership of the CSP plant
- Geothermal from northern Nevada and from California's Imperial Valley
- Additional analysis of PV integration at CAP's pumping plants located east of Hassayampa, with an analysis of the potential to optimize PV use during summer peak hours, thereby freeing up additional NGS excess power for sale on the open market during peak hours
- Clean coal and CCS located on the Navajo/Hopi reservation
- Small, modular nuclear
- Natural gas generation.

The Phase 2 analysis should evaluate and compare the costs, benefits, and impacts of the various alternative generation scenarios against several alternative scenarios for Navajo GS, including:

- Baseline (business as usual) conditions
- Resulting plant operating and production costs from potential additional required control technologies from BART and MATS
- Shutdown scenario
- Intermediate solutions such as scaling back generation in one unit and/or shutting down one unit.

For each of the scenario comparisons, the Phase 2 analysis should compare impacts on jobs, emissions, CAP water costs, tribal benefits, visibility, public health, and other impacts and benefits associated with Navajo GS.