State Highway 71 Truck Freight Diversion Feasibility Study

CDOT Freight Advisory Council

January 23, 2018

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CDOT COLORADO Department of Transportation

Purpose and Objectives

- Analyze freight movement and the impact of SH 71 improvements on truck traffic
- Identify the types and cost of improvements to SH 71 that will draw additional truck traffic
- Determine the potential economic benefit to the trucking industry and local economies
- Develop funding options and implementation scenarios

State Highway 71

- High priority designation as part of the Heartland Expressway Corridor
- Part of the Ports to Plains Alliance (P2P)
- Surrounding states have made significant improvements to their segments
- **SH 71 is the only segment of the P2P corridor in Colorado that remains unimproved**

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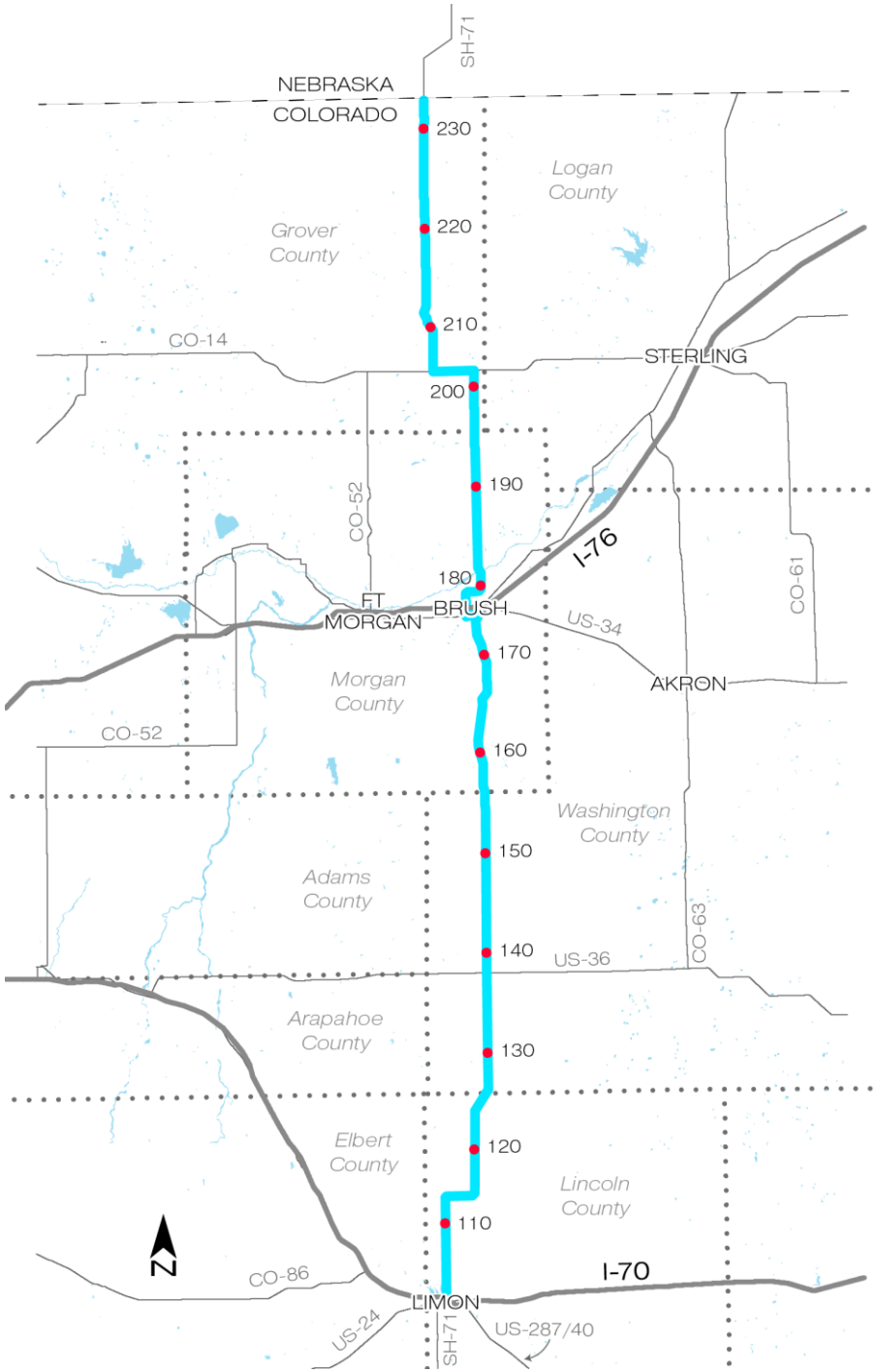

Project Limits

- SH 71 from Milepost 102 to Milepost 232
- Limon, CO to the Colorado/Nebraska state line
- Regional connections for freight traffic
  - *Northern Texas to Nebraska/Wyoming*

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Project Schedule

TASK	2017						2018					
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Project Mgmt				X					X			
Existing Conditions												
Modeling & Improvements Evaluation												
Implementation Plan												
Final Report												

X = Stakeholder Meeting

Opportunities for Improvements

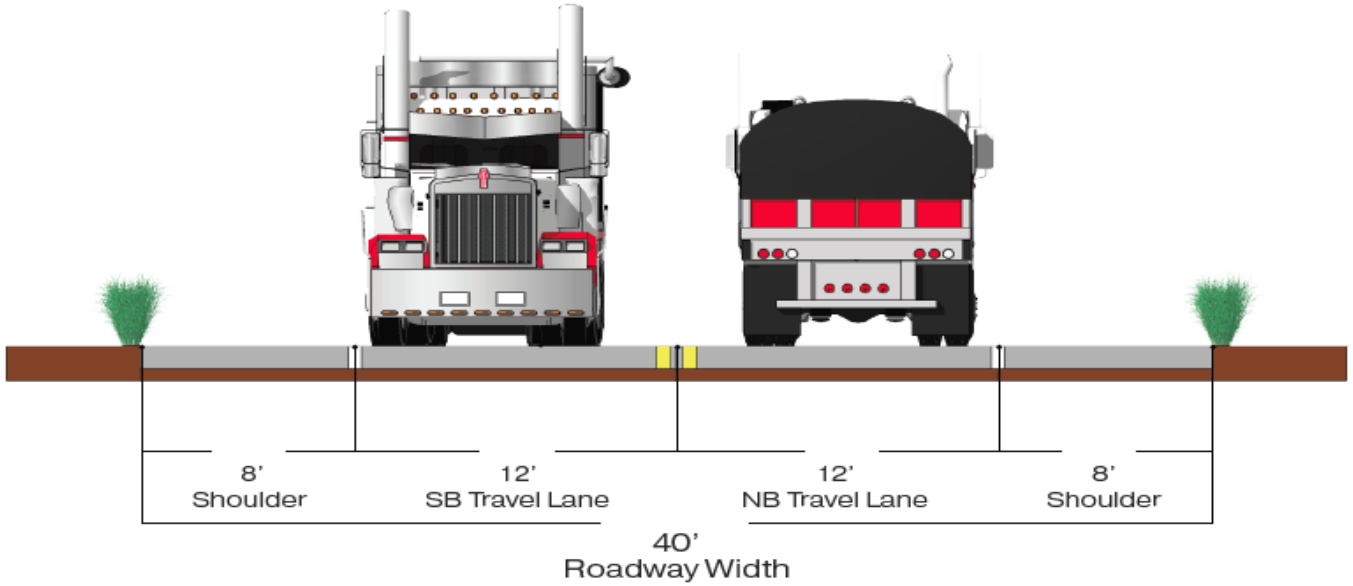
- Major or Minor Widening
- Passing Lanes
- Climbing Lanes
- Safety Improvements

- Roadway Improvements
  - *Shoulders*
  - *Geometry*
  - *Sight Distance*

Super 2 Alternative

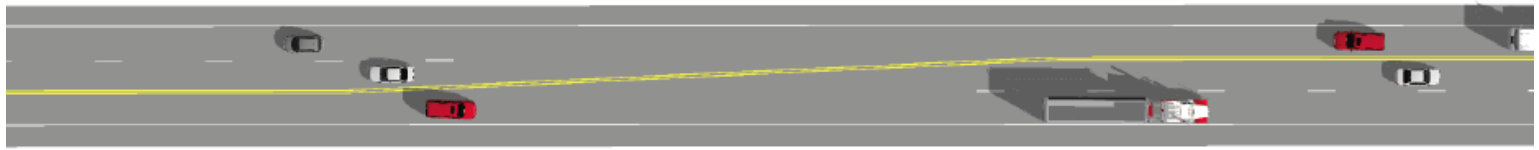
Aerial View

Cross Section



Super 2 with Passing Lanes Alternative

Aerial View



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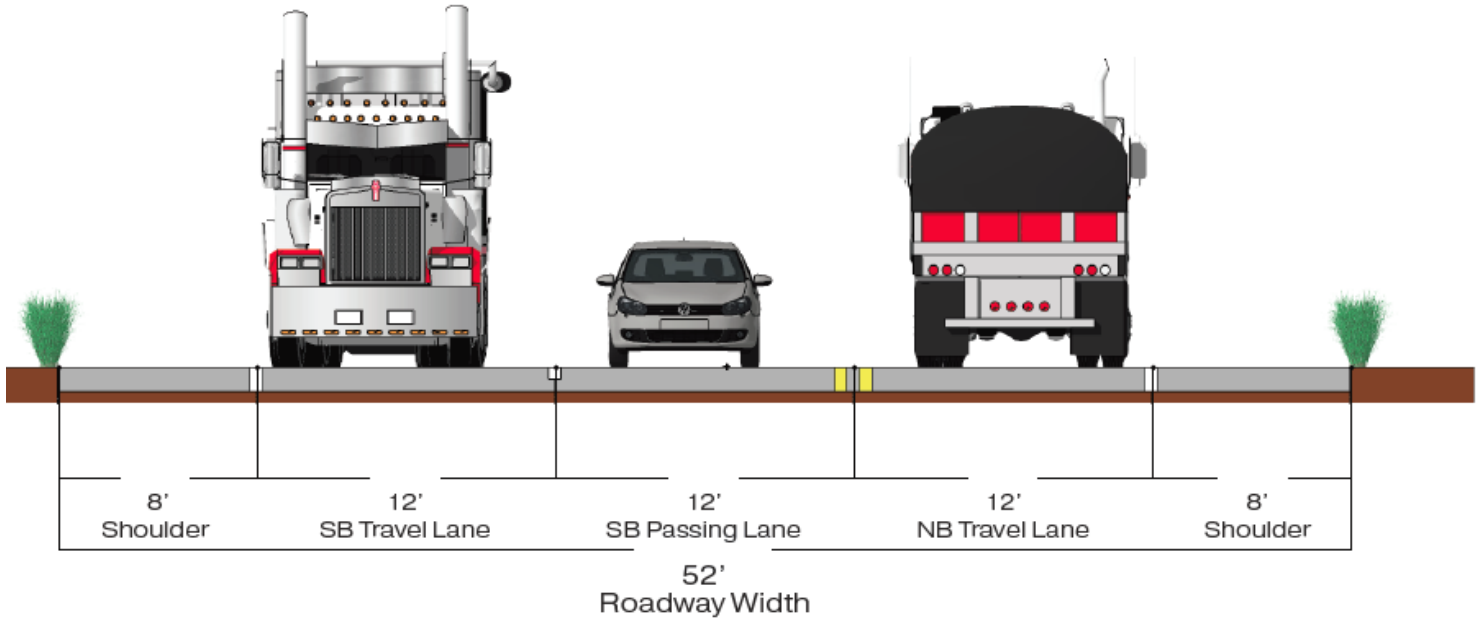
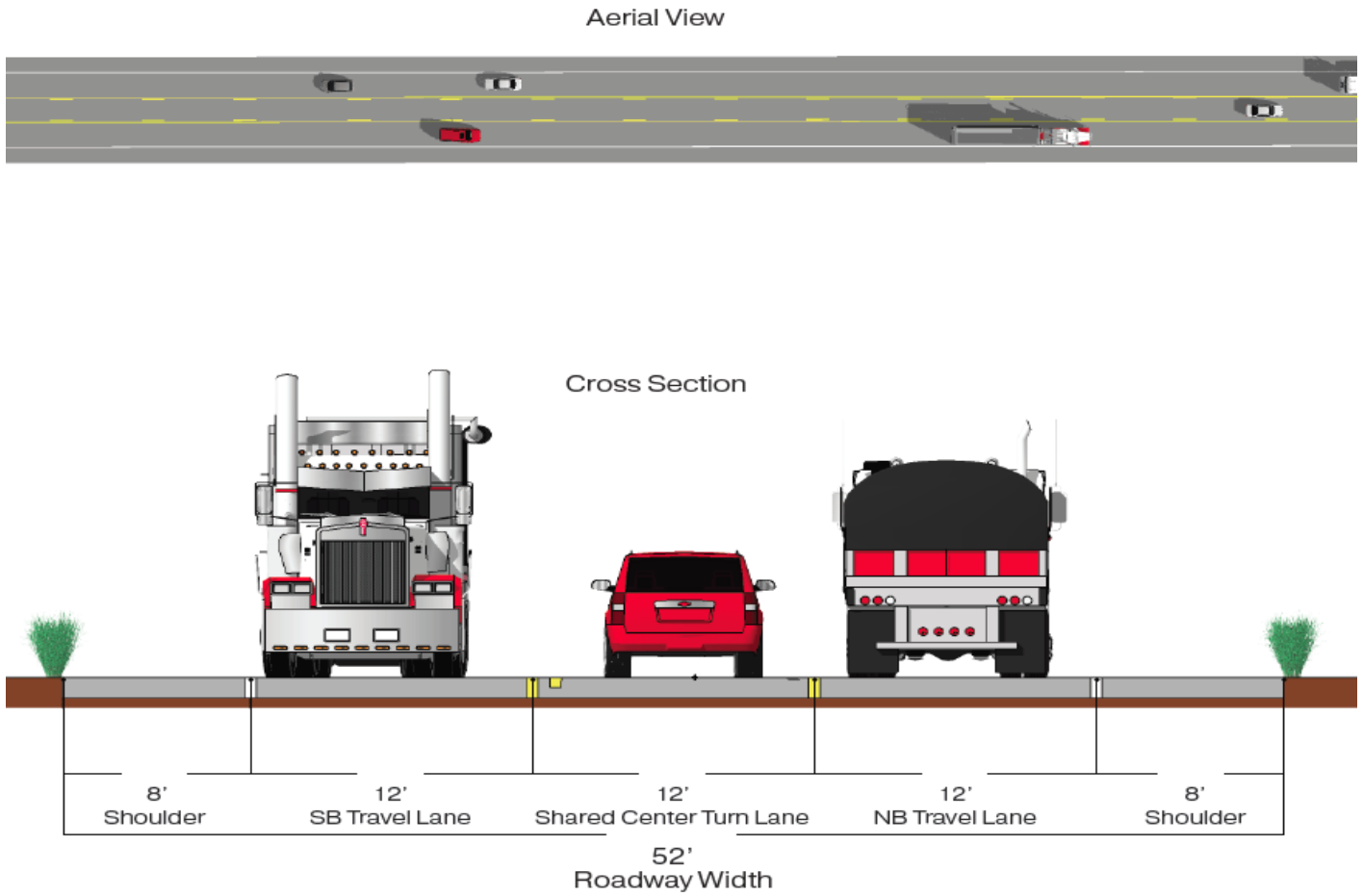
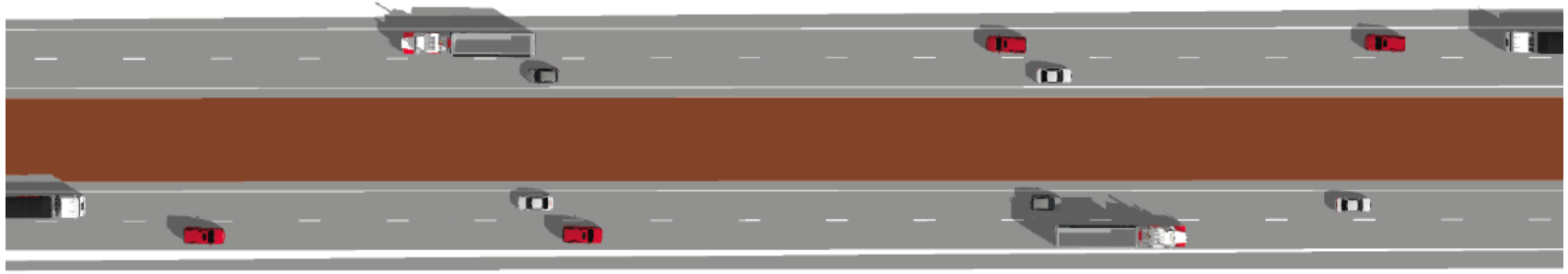


Super 2 with Center Turn Lane Alternative

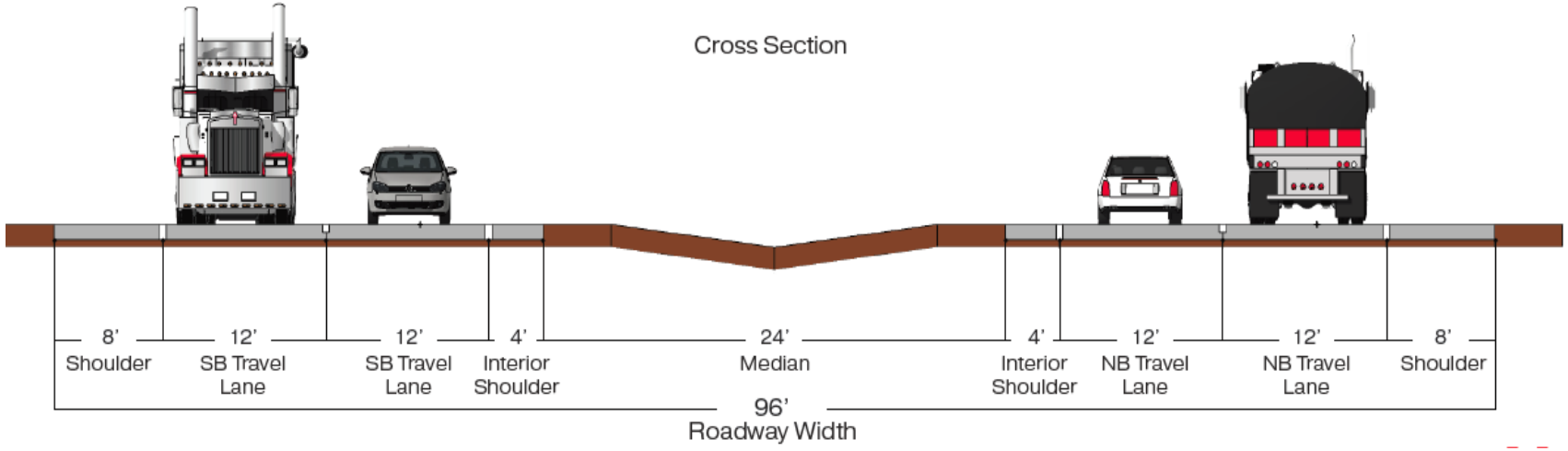


4 Lane Divided Alternative

Aerial View



Cross Section

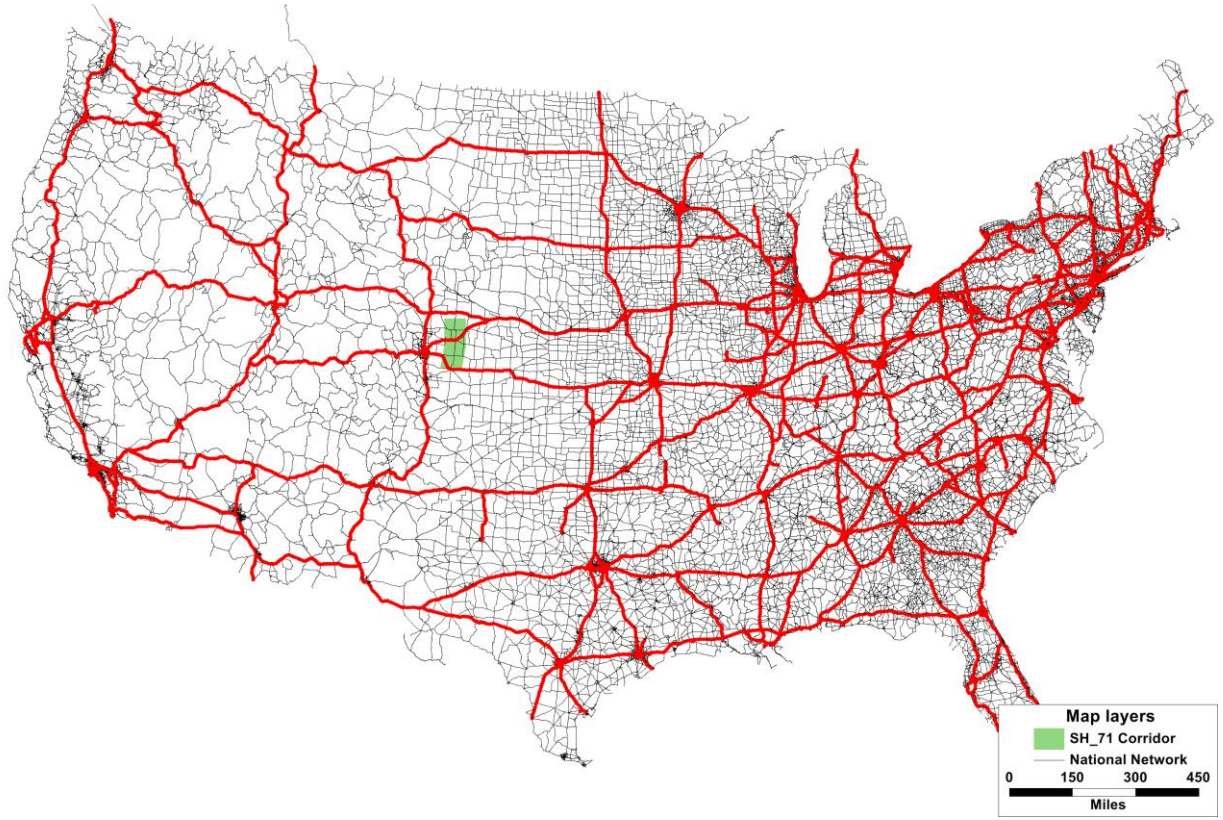


Proposed Improvements Analysis and Evaluation

- Model up to six scenarios of improvement packages, with a mixture of improvements to help differentiate their impact
- Use the model to predict potential freight increases based on proposed improvements
- Determine potential crash reductions on SH 71 and I-25 if improvements are implemented

Travel Demand Modeling

- Establish models to capture future growth of vehicles along the corridor
- Long term analysis through **2040**
- Additional analysis will coincide with CDOT's capital improvement plan
- Covers 43 commodities
- Based on Freight Analysis Framework (FAF), version 4.2



WSP National Truck Model Network
Includes all Interstates and State Highways

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Thank you

Questions?

Randy Grauberger

Deputy Project Manager

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SH 71 Truck Freight Diversion Feasibility Study

Colorado Motor Carriers Association (CMCA) Small Group Meeting

02/15/2018

Attendees: Tracy Sakaguchi (CMCA), Chris Mann (Great West), Steve Beckwith (Reddaway), Randy Grauberger and Myron Hora (WSP)

Purpose: To get trucking industry and truckers perspectives on SH 71 and truck routing

Discussion - time versus distance: 15 to 20 minutes of additional travel time and distance is negligible if it means you are running on better roads. These roads have 12 to 14 foot lanes and wide shoulders; preferably at least 10 foot shoulders.

Truckers will default to better roads when defining new routes. Some companies require their drivers to stay on the better roads.

Reddaway is paying tolls on E-470 instead of running on I-25 or other congested roads through Denver.

Trucks will take the quickest route to make deadlines.

If SH 71 is improved, yes, some trucks will run faster on it than they do currently. Look at WCR 49 and how you get passed going 5 MPH over the limit.

Improved Kersey Road (Weld Co. Road 49) is seeing traffic diverting off of I-70 at Bennett and going north.

Discussion - What makes a good road for trucking: Truckers, besides the full lanes and shoulders, need pullouts where they can stop, rest, stretch their legs, and check loads. Best case these would be every 15 to 20 miles. These pullouts can double as locations for portable weigh station locations. A good example is between Douglas and Casper/Glen Rock Wyoming on I-25.

Pullouts are more important in making route decisions than are services.

Rest areas – there aren't any on I-70 west of Burlington, and then there are three in Glenwood Canyon. The only spot on SH 71 is at Last Chance, and it's not good.

Discussion – Passing lanes: Passing lanes are important to truckers and other vehicles as well. The passing lanes need to be long enough to allow for safe passing and speeds. Good signage helps too in keeping people from getting impatient and making risky moves. SH 26 in Wyoming has good passing lane signage.

Helena to 3 Forks is a good example of alternating passing lanes

SH-71 AND US 385 UPDATE

ETPR

2019/1/24

AGENDA

1. SH 71 Status
2. US 385 Status
3. Intercept Survey Results

1. SH 71 Status

Completed:

- Gathered Current Conditions Data
- Conducted Environmental Scan

Initial Modeling Results

- Assembled a planning level Multi-Unit Truck (MUT) traffic mode
- Used a time-based assignment, with congestion assumptions along the Front Range and a 5 MPH speed increase on the 130 mile SH-71 corridor.
- The Limon to Brush segment of SH-71 consistently attracts the highest number of diverted MUT traffic. This outcome is due to this segments location between two interstates: I-76 and I-70, as well as to the specific north-south SH-71 market profile.

CDOT Actions

1. Identified Passing Lane Locations between Limon and Brush

2. Examined potential Routing Options in Limon and Brush

3. Continuing design for Programmed Projects

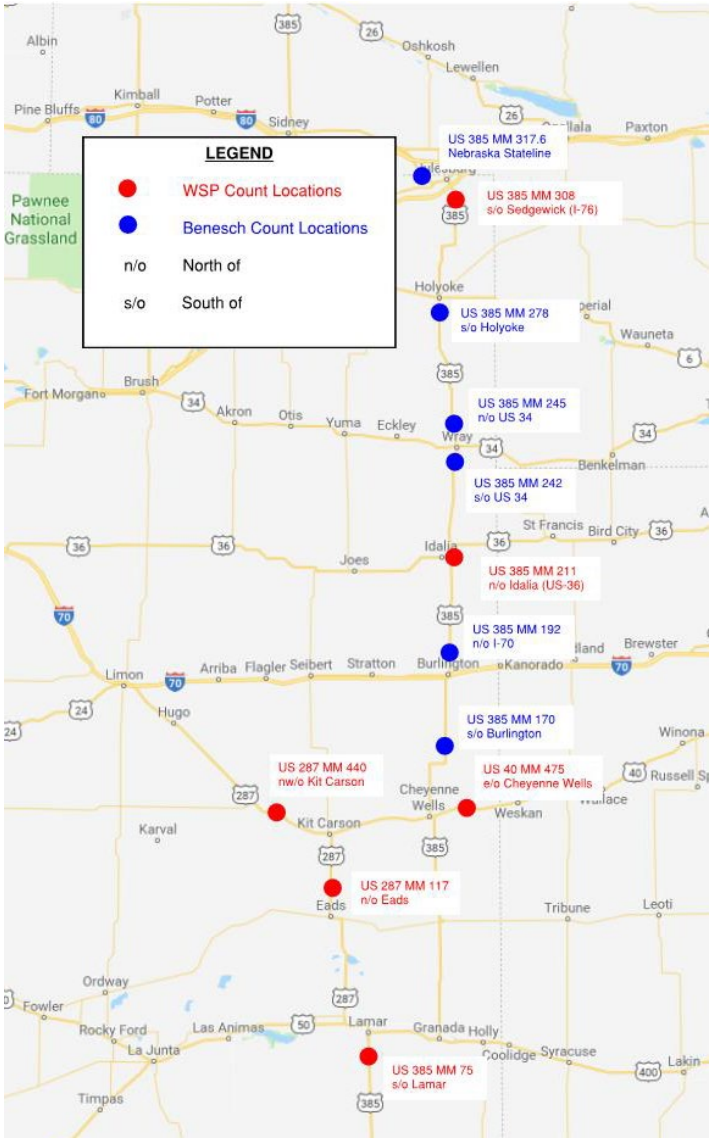
2. US 385 Status

Completed:

- Gathered Existing Conditions Data
- Conducted crash data analysis and prepared crash maps
- Issued prioritization methodology memorandum
- Analyzed improvement locations
- Prepared safety report
- Ranked segments and projects by need and priority throughout the corridor

Modeling

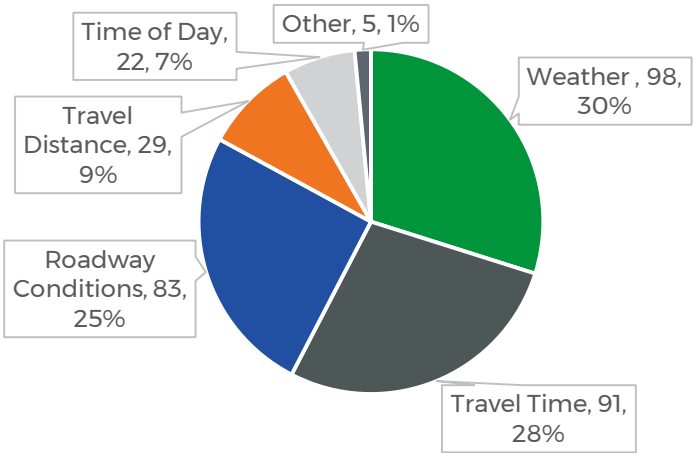
- Traffic count data collected during November 2018 (see map of locations)
- Traffic counts incorporated both WSP and Benesch data
- Model to incorporate US 385 and SH 71, as well as I-83 (Kansas)



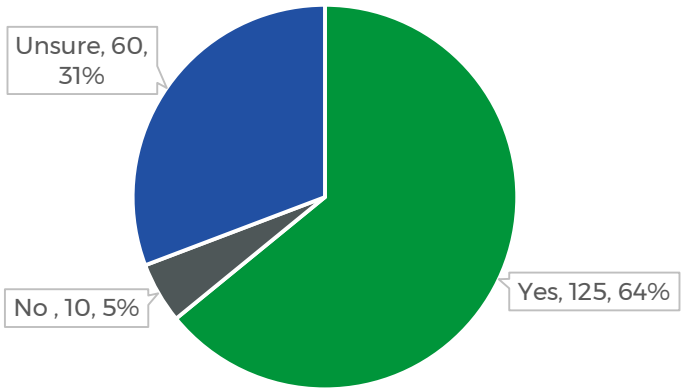
3. Sample Intercept Survey Results

Respondents that were traveling on SH 71, US 385, I-25, US 24/SH 71

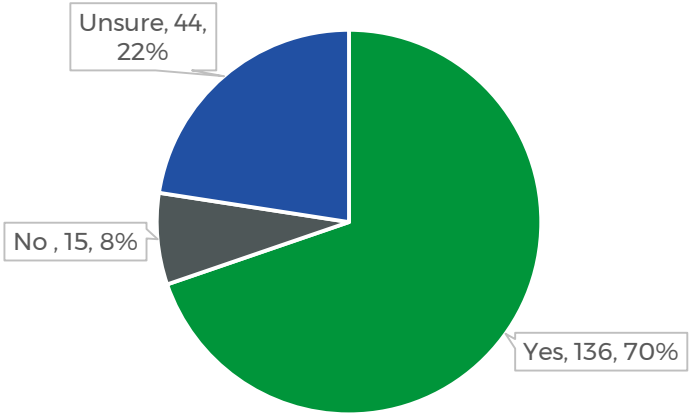
What Would Make You Change Your Route?



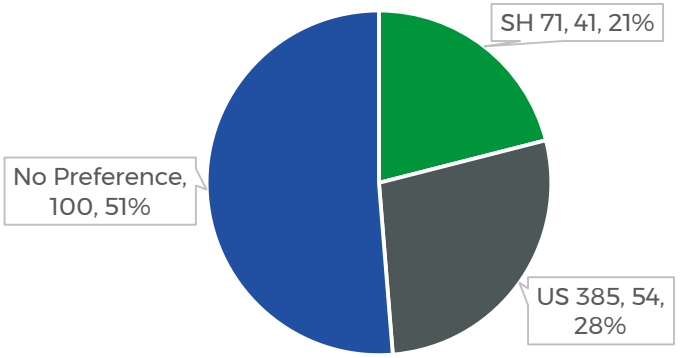
Would you use US 385 if Improved?



Would you use SH 71 if Improved?



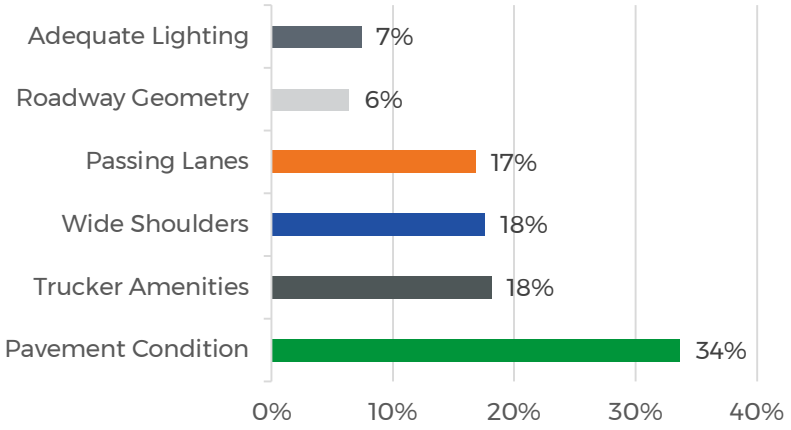
Which Route would you use if SH 71 and US 385 were Improved?



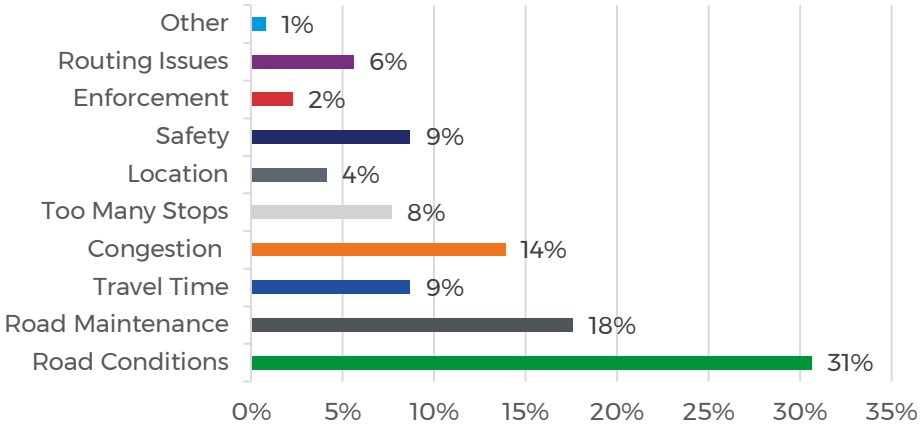
3. Sample Intercept Survey Results

Respondents that were traveling on SH 71, US 385, I-25, US 24/SH 71

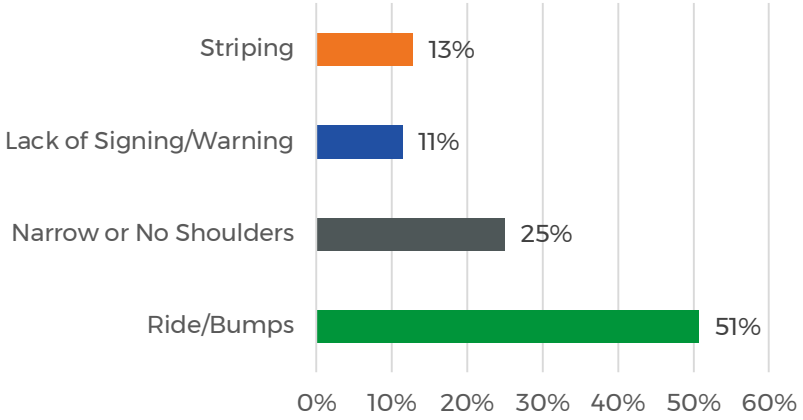
Important Road Features



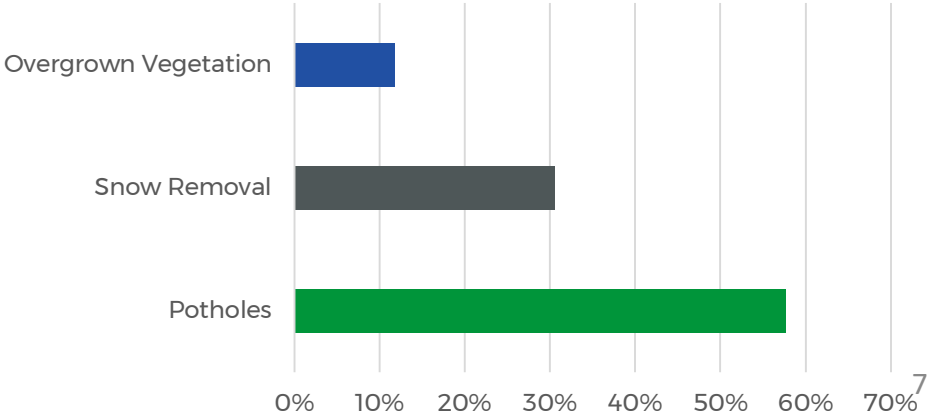
Reasons to Avoid Certain Roads



Reasons to Avoid Certain Roads - Road Conditions



Reasons to Avoid Certain Roads - Road Maintenance



Intercept Survey

Conclusions:

- Travel Time and Roadway Conditions cited as two of the most influential routing decisions
- SH 71 & US 385 both identified as favorable if improvements are made
- However, most drivers would stay on their preferred routes, regardless of improvements
- Origin and/or destination, employer direction, and travel time reliability determine most routing decisions
- Pavement condition identified as most important roadway feature
- Shoulders, trucker amenities and lighting all ranked evenly

Next Steps

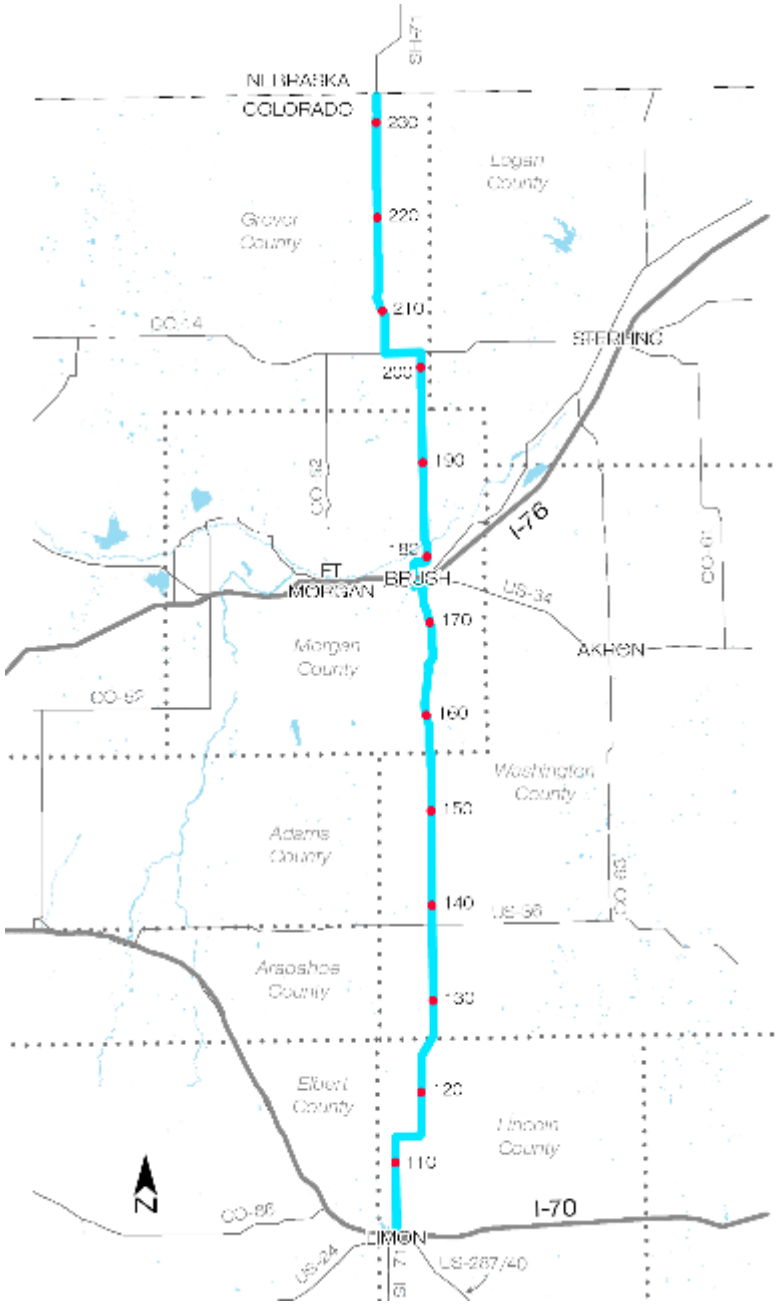
SH 71:

- Model SH 71 with US 385
- Incorporate Survey results
- Stakeholder Meeting #3 – TBD
- Conceptual Design of Potential Projects
- Finalize Study

US 385:

- Public Meeting Series # 1 – February 2019
  - Burlington, Wray & Holyoke
  - Present findings to date
- Group Overlapping Projects
- Identify Priority Segment
- Stakeholder Meeting #3 – TBD
- Conceptual Design of Priority Segment
- Finalize Prioritization Study

QUESTIONS?


NEBRASKA
COLORADO
230
220
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130
120
110
Logan County
Grover County
Morgan County
Washington County
Adams County
Arapahoe County
Elbert County
Lincoln County
STERLING
FT MORGAN
BRUSH
AKRON
LIMON
I-76
I-70
US-34
US-36
US-287/40
CO-14
CO-52
CO-61
CO-63
CO-86
N

Discussion – Truckers perception of less than full width shoulder: 10' shoulders are minimum, trucks are 8 ½ feet wide and mirrors hang out even farther. Truckers will put their outside wheels on the very edge, and still be extending into the lane with 8' shoulders.

What about 6' paved and 4' gravel? If it's signed or made known that it's a stabilized gravel? Truckers will not trust the gravel and will stay on the paved surface. Even if it's stabilized, after a few years it will become soft. Tanker trucks or swinging meat haulers will not use gravel at all, too easy to tip over when the load shifts.

Discussion – Oversize / Overweight: Oversize are generally 16' wide. Trucks need enough room to get over and not 'bang mirrors'. Oversized loads can be up to 24' wide but those have multiple pilot cars and move slower.

Discussion – Brush "Bypass": Height is an issue. It is nice to not have to go through town, but it's not a deciding factor on a long trip. Longer loads have dual steering so going through town and its 90 degree turns is not that bad. On a priority scale, having shoulders and passing lanes is more important than the bypass.

Discussion – Is time of day a deciding factor in routing?: Personally, they liked driving at night on less traveled rural highways with high beams on. But they admit that their perception is different than others. They run with other truckers that will not get off the interstate or four-lane roads at night. Some companies require their drivers stay on interstate or four-lane roads at night.

Discussion – Why aren't truckers using SH 71 now? It's not a good road for commercial trucks. A lot of trucks are staying east on US 385 or in Kansas and Nebraska. There are most likely livestock trucks and grain hoppers on SH 71 now due to the proximity of cattle and grain producers.

Discussion – What else would you like us to know:

Alternating 3 lane with wide shoulders would be a great improvement

Add variable speed limits. Trucks find they are very good at keeping travel at safe speeds, including passenger cars and the cars are less likely to push.

Fix the 90 degree curves north of Limon.

Truckers talk, and they will tell each other when roads are improved.

CMCA would do press releases or new letters to the industry about the improvements to SH 71.

Will this require that CDOT do increased maintenance, especially night-time plowing? It was noted that CDOT would most likely lift the restriction on night-time snow plowing if SH 71 improvements were made to improve freight traffic.

SH-71 AND US 385 UPDATE

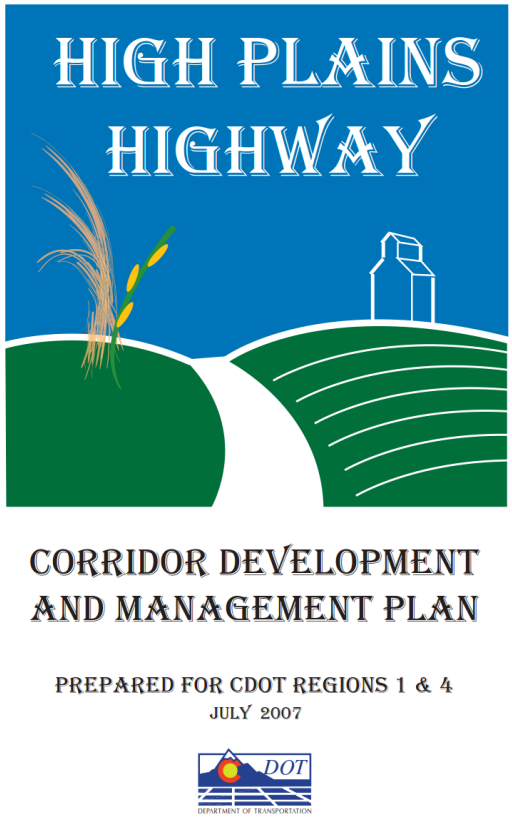
ETPR April 2019

AGENDA

1. Status
2. US 385 Initial Prioritization Results
3. US 385 Prioritization Results by Segment
4. Intercept Survey Initial Conclusions
5. SH-71 Freight Study Results
6. SH-71 Prioritization Results
7. SH-71 & US 385 Next Steps

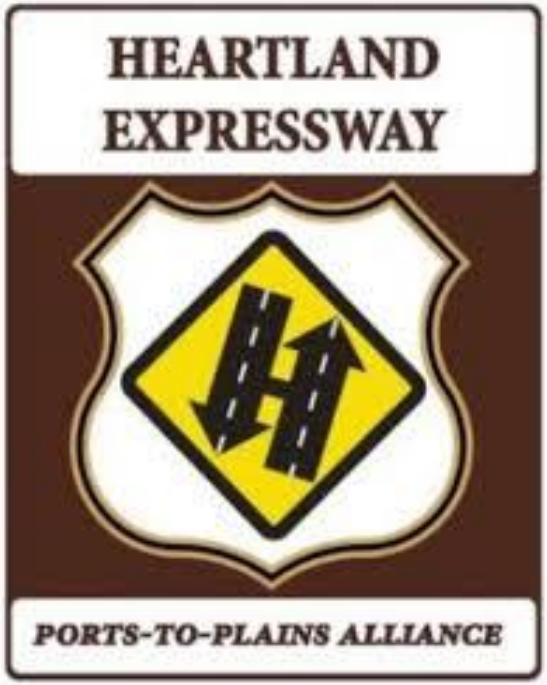
US 385 Status

- Preparing to meet with High Plains Highway Coalition to discuss final results



SH71 Status

- Preparing to meet with the Technical Advisory Group to identify priority projects and review discuss study results



US 385 Initial Prioritization Results

❖ Overall Top Projects:

1. MP 256-269 (Yuma County)

   Improve shoulders, intersection sight distance, signage and pavement rehab

2. MP 280-289 (Phillips County)

   Intersection sight distance improvements and pavement rehab

3. MP 227-238.6 (Yuma County)

   Improve shoulders, horizontal curves, signage and pavement rehab

4. MP 187.4 (Kit Carson County)

   I-70 overpass sight distance and profile improvements

US 385 Initial Prioritization Results

- Top **Roadway** Improvement Projects (pavement rehab, shoulders, intersection and/or alignment improvements):
  1. MP 263-269 (Yuma County)
  2. MP 228-230 (Yuma County)
  3. MP 163.1-167.5 (Cheyenne County)

- Top **Bridge** Improvement Projects
  1. MP 148.3 (Cheyenne County) – I-27-T over N Fork Ladder Creek
  2. MP 142.4 (Cheyenne County) – J-27-K over White Woman Creek
  3. MP 187.4 (Kit Carson County) – I-70 overpass
  4. MP 185.6 (Kit Carson County) – G-27-E over Sand Creek

US 385 Prioritization Results

Top projects within each segment

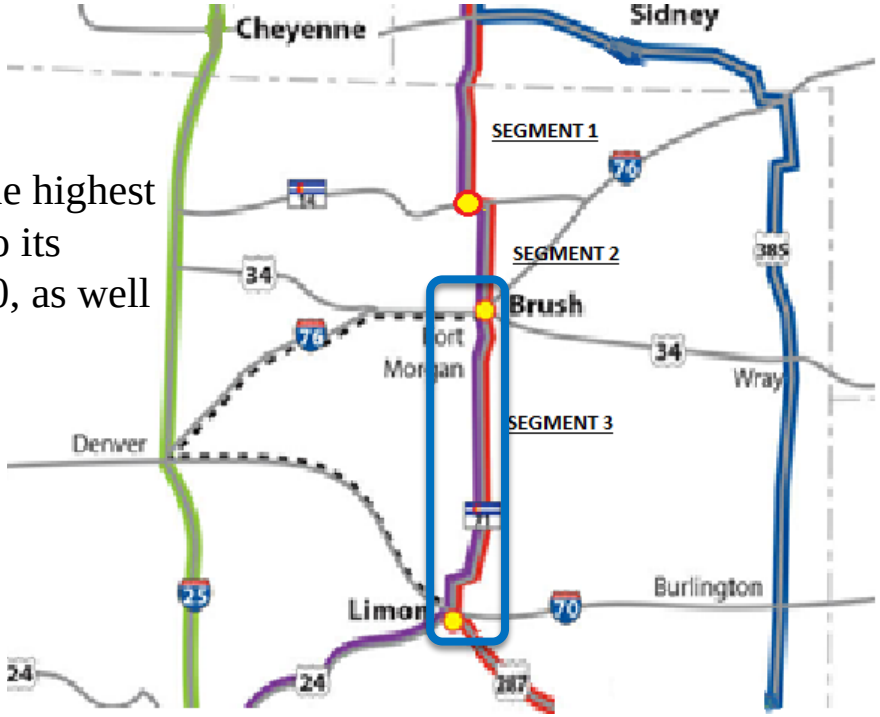
- Segment 1 (Kiowa-Cheyenne County Line to Burlington):
  1. MP 185.6 – Widen or replace structure G-27-E
  2. MP 157-172.7 – Pavement rehab, widen/replace structure over N Fork Smoky Hill River, improve curve signage
  3. MP 151.67-152.5 – Willow Creek/CR S drainage improvements
- Segment 2 (Burlington to Idalia):
  1. MP 187.4 – Replace I-70 overpass to improve profile
  2. MP 210 – Raise profile/replace bridge
  3. MP 199.8 – Intersection sight distance improvements at CR GG
- Segment 3 (Idalia to Wray):
  1. MP 227-238.6 – Pavement rehab, improve shoulders, curves, signage
  2. MP 221.9-230.6 – Improve shoulders, investigate superelevation and passing lane improvements
  3. MP 243.4 – Install dedicated southbound left turn lane at US 34 intersection
- Segment 4 (Wray to Holyoke):
  1. MP 256-269 – Pavement rehab, improve shoulders, intersection sight distances, and signage
  2. MP 273.5 – Intersection sight distance improvements at CR 12
  3. MP 273.4 – Intersection sight distance improvements at CR 10
- Segment 5 (Holyoke to CO-NE State Line):
  1. MP 280-289 – Pavement rehab and intersection sight distance improvements
  2. MP 55-57 on US 138 – Pavement rehab, westbound right turn lane at CO 11
  3. MP 314-318 – Pavement rehab

Intercept Survey Initial Conclusions

- An Intercept Survey was conducted for freight truck traffic traveling on I-25, SH 71, US 385, and US 24 / SH 71.
- Generally, results suggest improvements would lure north/south truck traffic moving through the state to either SH-71 or US 385, and away from I-25 and US 83 (Kansas):
  - Improved Travel Time and Roadway Conditions were cited as the most influential reasons to draw truck traffic to the state routes.
    - ❑ Rideability/Pavement Condition was identified as most important roadway condition
    - ❑ Passing lanes, shoulders, trucker amenities were evenly ranked as the next most important roadway condition
- The Intercept Survey Report is being finalized and utilized in the Freight Study and Modeling Efforts.

SH-71 Freight Study Results

- As a segment of the Heartland Expressway, the Ports-to-Plains (P2P) Alliance, SH-71 can potentially lure 8-10% of the freight truck traffic from I-25. The highway was split into three logical segments for modeling and prioritization:
  - Segment 1 (Colorado State Line to SH-14)
  - Segment 2 (SH-14 to Brush)
  - **Segment 3 (Brush to Limon):**
    - This segment of SH-71 consistently attracts the highest number of diverted MUT traffic. This is due to its location between two interstates: I-76 and I-70, as well as the connections to US 24 & US 287.
- Modeling efforts are incorporating all four corridors used by freight truck traffic: SH-71, US 385, I-25, and US 83 (Kansas).



SH-71 Prioritization Results

❖ Priority Segment is Segment 3 (Brush to Limon):

- ❑ **In the process of evaluating and prioritizing potential projects**
  - Re-align at Brush
  - MP 155 to MP 174 Pavement rehab, improve shoulders (Construction planned for 2020)
    - Note Maintenance Recently Completed Overlay/Chipseal MP 166.3-167.3, 170.6-171.6
  - MP102-174 - Improve shoulders, investigate turn outs
  - MP102-174 Add passing lanes (Limon to Brush) – initial stretches based upon speed/vertical:
    - MP166-168
    - MP159-161
    - MP152-154
    - MP145-147
    - MP138-140
    - MP131-133
    - MP123-125
    - MP116-118
    - MP108-110
  - MP 138- Install dedicated north & south bound right turn lanes at US-36 intersection
  - Add turn lanes for access to communities
    - Note Maintenance Recently Completed Overlay/Chipseal MP 123-138
  - Resurfacing at MP102-108
  - Bridge repair at MP 102.3
  - Re-align at Limon

SH-71 & US 385 Next Steps

SH-71:

- Finalize Freight Study and Ultimate Highway Section
- Meeting with Technical Advisory Group re: study and survey results
- Determine top priority projects for the Brush to Limon Priority Segment
- Stakeholder Meeting #3 - TBD

US 385:

- Determine priority segment with High Plains Highway Coalition
- Conceptual Design of Priority Segment and/or top priority projects
- Public Meeting Series #2 - TBD
- Finalize Prioritization Study

Both Corridors

- Provide final summary of Intercept Survey Results
- Finalize Modeling demonstrating benefits/draw from I-25 & US 83 (Kansas)
- Incorporation of Intercept Survey results in Studies, Models, and Conclusions.
- LiDAR Survey is being completed for both corridors
- Identify funding opportunities
- Develop grant writing materials

QUESTIONS?

CO 71 TRUCK FREIGHT DIVERSION STUDY

HEARTLAND EXPRESS

THURSDAY, MAY 16, 2019

AGENDA

1. Project Review
2. Intercept Survey
3. Travel Demand Modeling
4. Project Prioritization
5. Next Steps

1. PROJECT REVIEW

PROJECT REVIEW

- Analyze freight movement and the impact of SH 71 improvements on truck traffic
- Identify the types and cost of improvements to SH 71 that will draw additional truck traffic
- Determine the potential economic benefit to the trucking industry and local economies
- Develop funding options and implementation scenarios

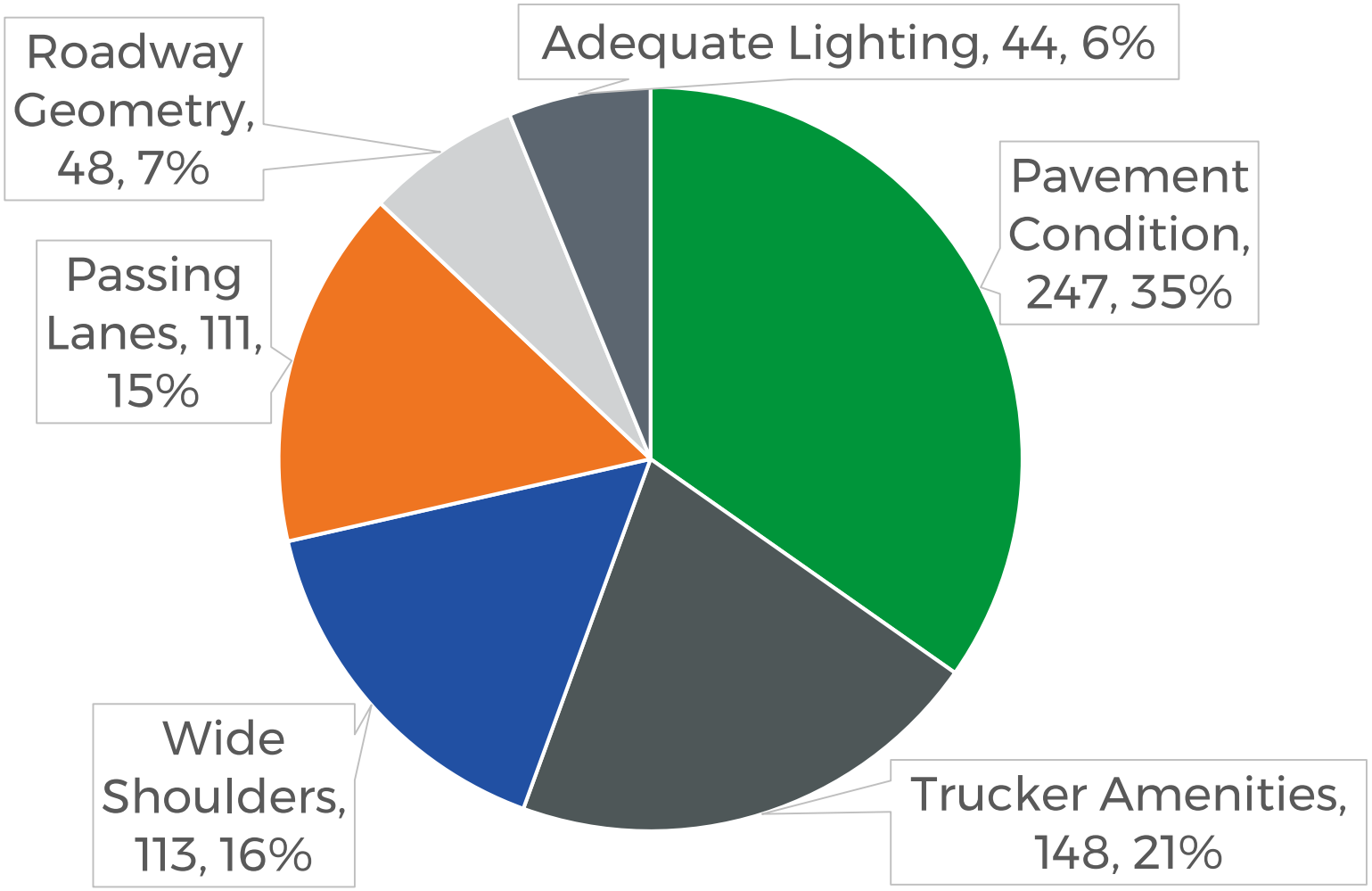
2. INTERCEPT SURVEY

INTERCEPT SURVEY

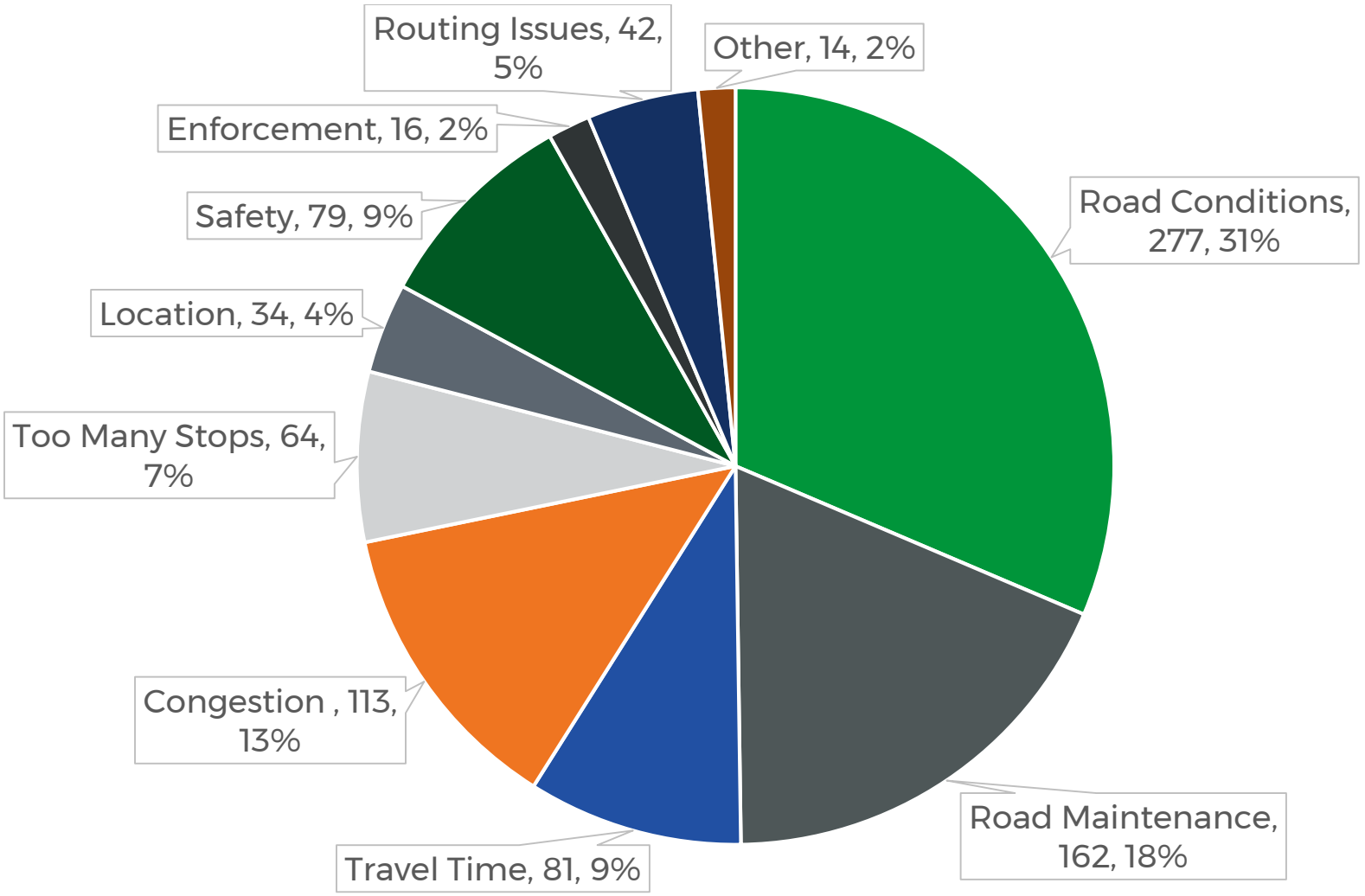
Survey Locations:

- Amarillo, TX
- Brush, CO
- Burlington, CO
- Cheyenne, WY
- Cheyenne Wells, CO
- Douglas, WY
- Dumas, TX
- La Junta, CO
- Lamar, CO
- Limon, CO
- Pueblo, CO
- Scottsbluff, NE
- Sidney, NE
- Trinidad, CO

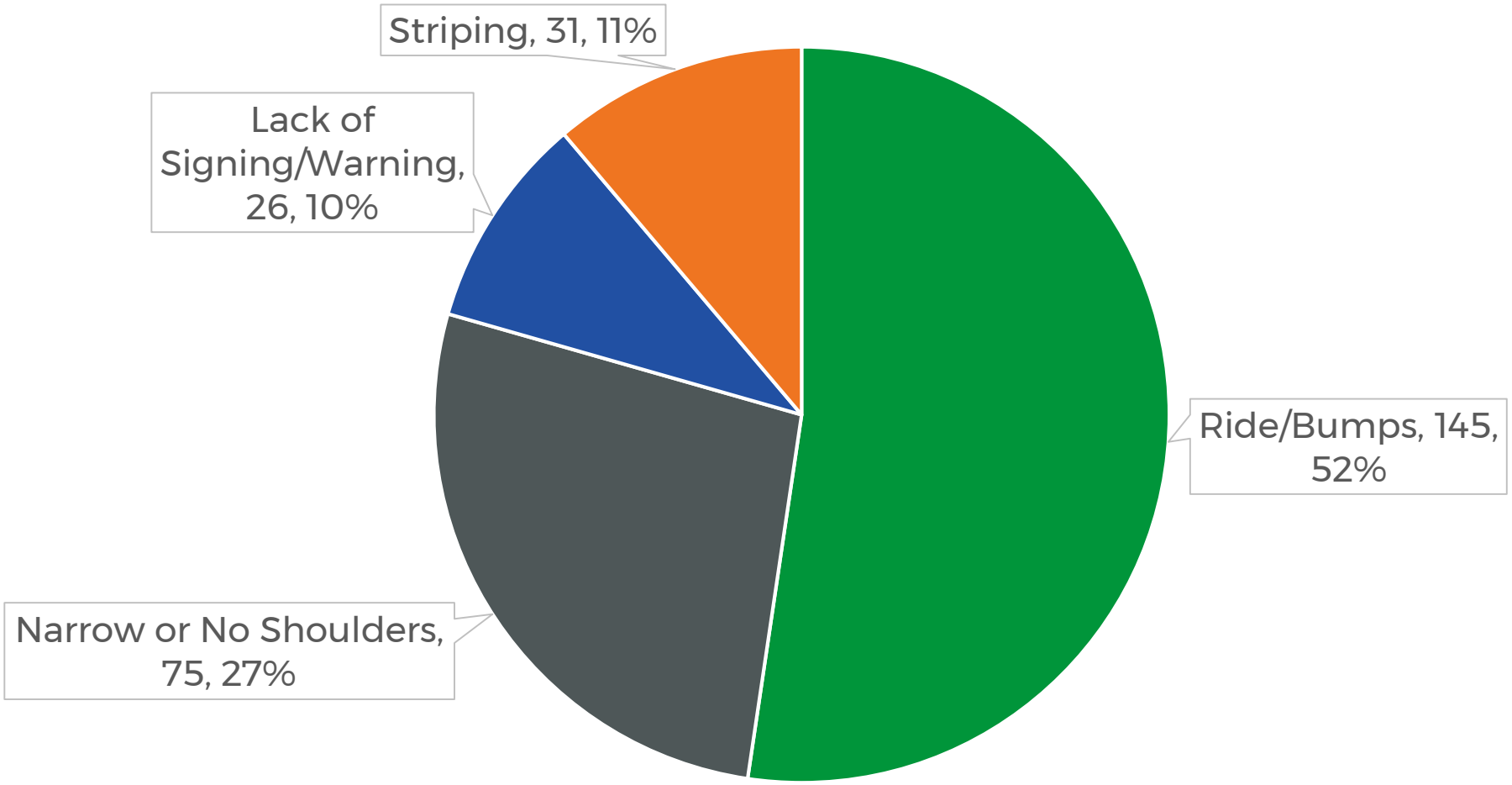
What road features are important to your choice route?



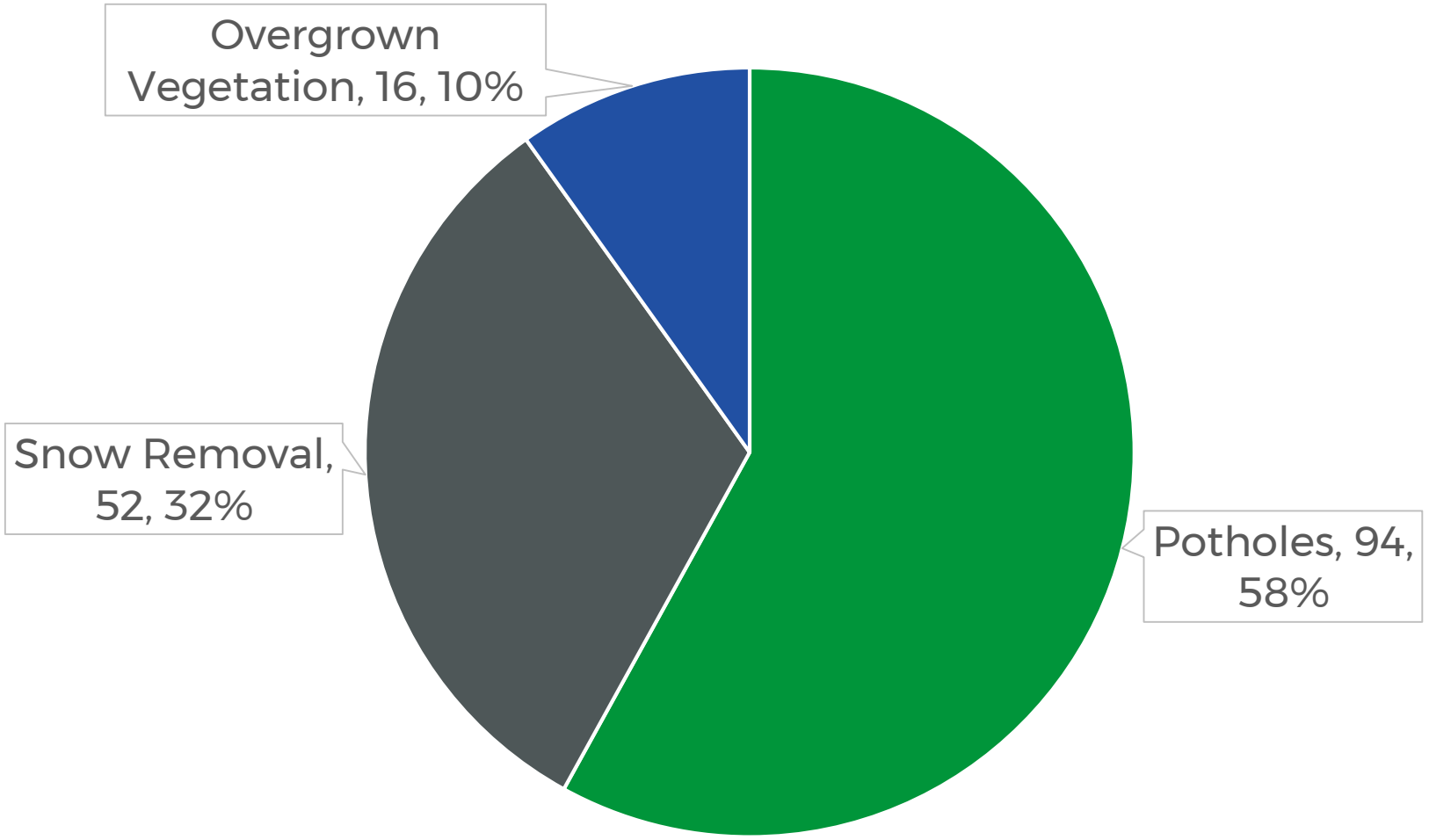
Why do you avoid certain highways?



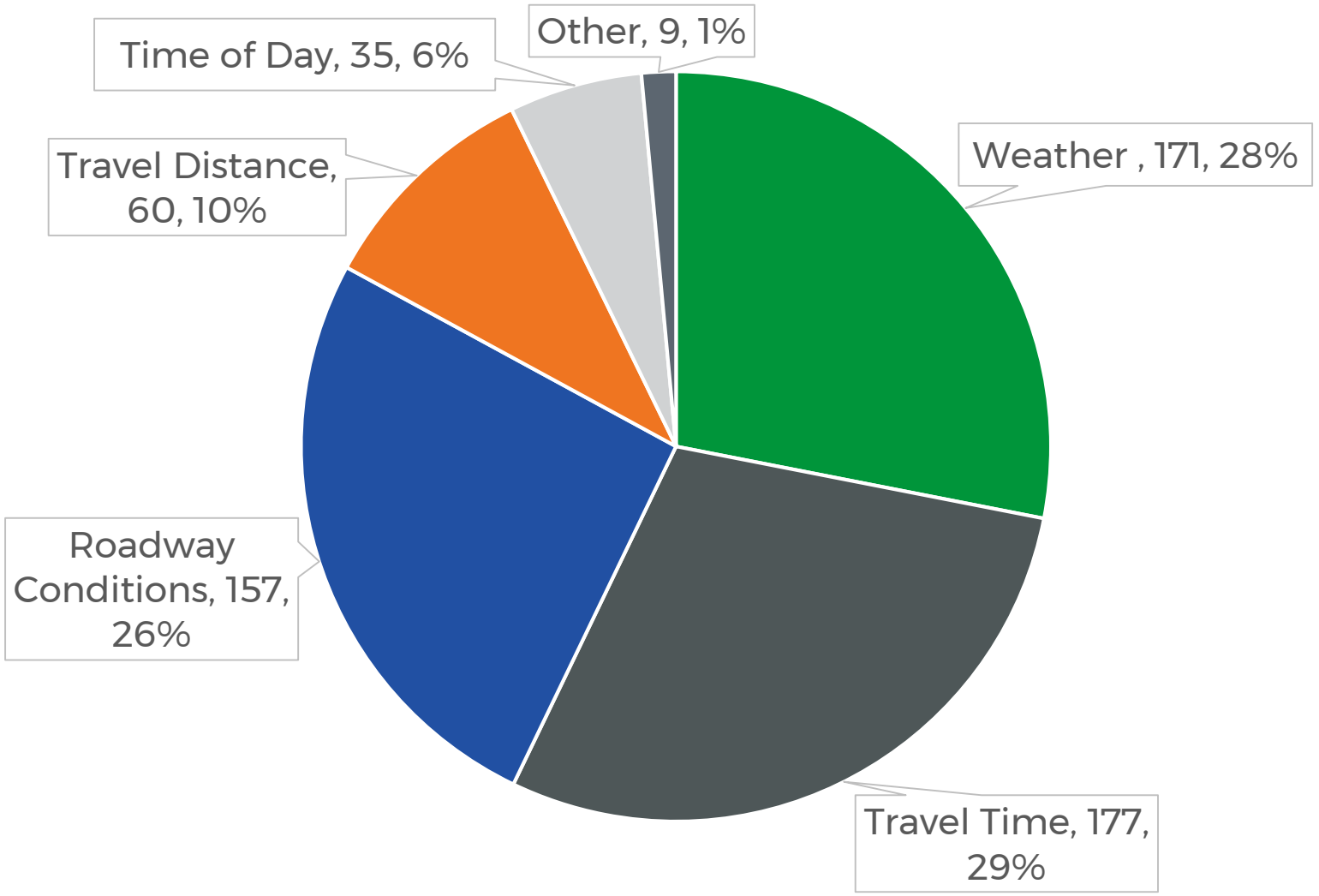
Why do you avoid certain highways? *(Road Conditions Detail)*



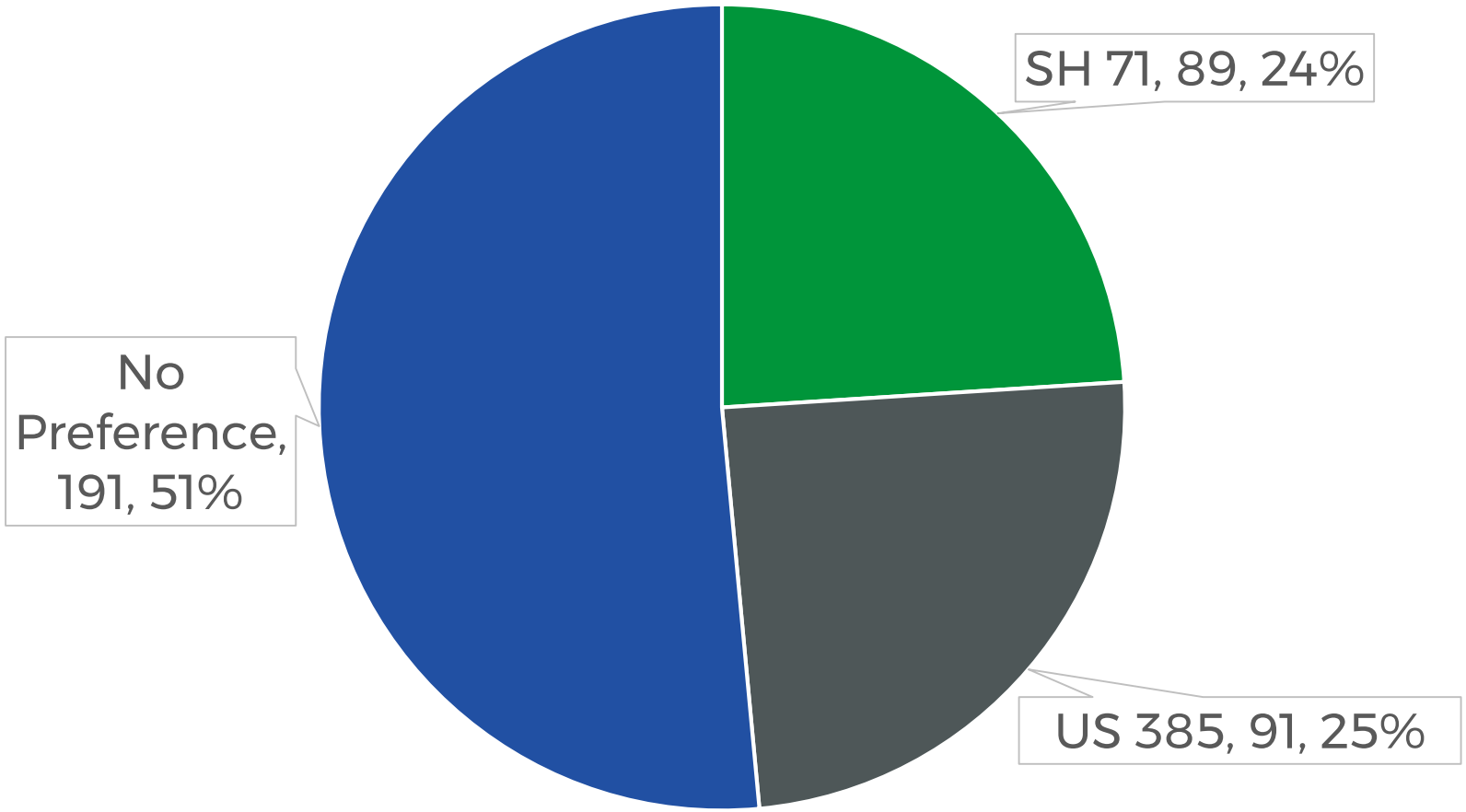
Why do you avoid certain highways? *(Road Maintenance Detail)*



All things equal, what factors would make you change your route?



If significant improvements were made to both SH 71 and US 385, which would you prefer?



INTERCEPT SURVEY

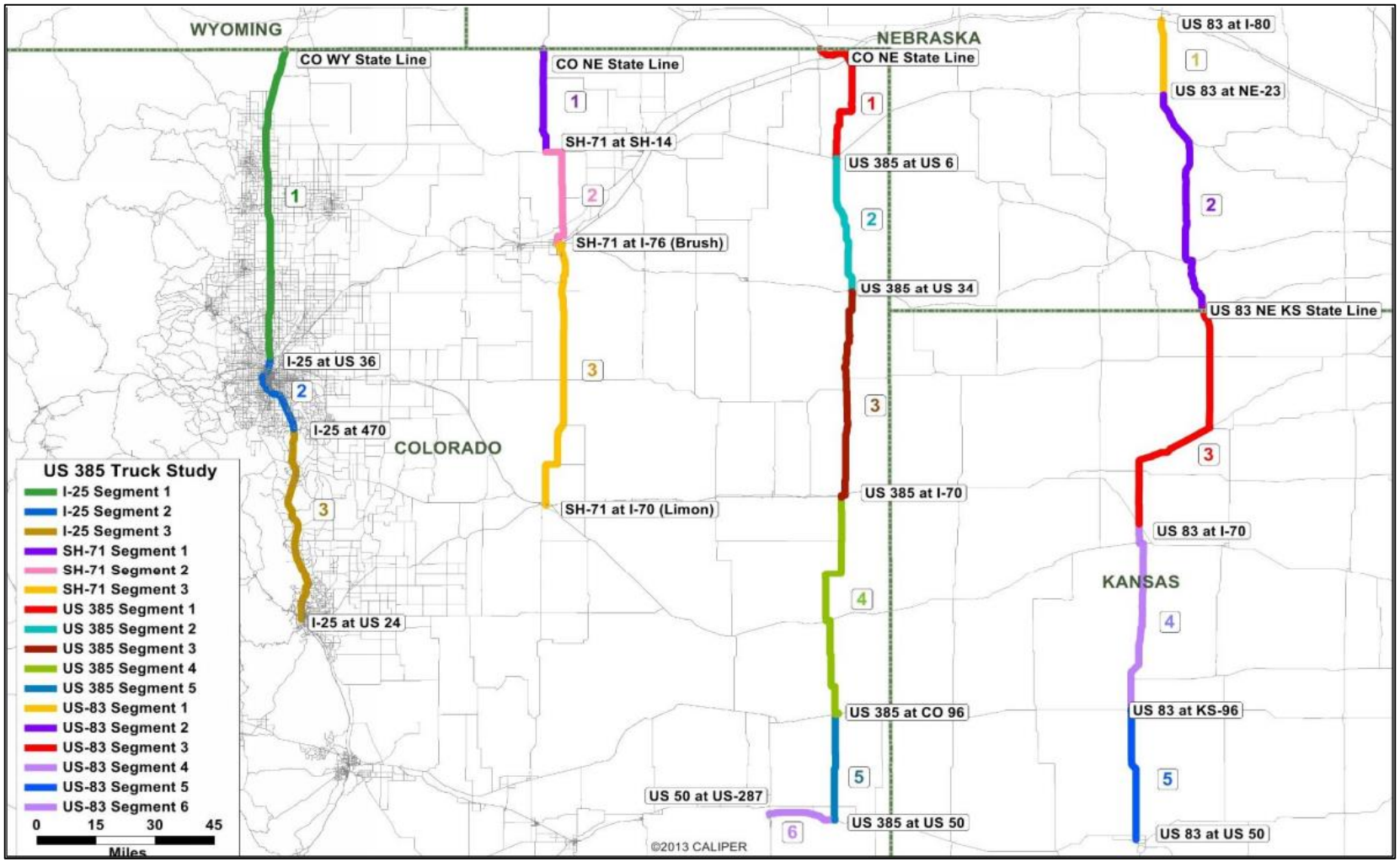
Conclusions

- Improvements could lure north/south truck traffic to either SH-71 or US 385
- Improved travel time and roadway conditions were most influential reasons to draw truck traffic
- Rideability/Pavement condition was identified as the most important roadway condition that draws truckers to a corridor
- Passing lanes, shoulders, trucker amenities were evenly ranked as the next most important draw for truckers

3. TRAVEL DEMAND MODELING

Travel Demand Modeling

Segments Used for Travel Demand Model



TRAVEL DEMAND MODELING

Methodology

- Establish model to capture future growth of Multi-Unit Trucks traffic
  - Utilize the WSP National Truck Model and the Colorado State Model
- Long term analysis through 2040
- Based on Freight Analysis Framework (FAF), version 4.2
- Covers 43 commodities
- Multi-Unit Trucks (MUTs) alone are modeled.
- Daily (24-hour) model

TRAVEL DEMAND MODELING

Methodology ctd.

- Shortest path using time is used for assignment
- 2016 base year was validated to recent MUT counts:
  - Over 130 CDOT counts
  - 10-15 Wyoming and Nebraska I-80 counts
  - Custom counts in the study corridors
- Model multiple scenarios of improvement packages and congestion growth, with a mixture to help differentiate their impact
- Use the model to predict potential freight traffic changes
- Highways divided into segments

Travel Demand Modeling

Preliminary Results

- CO 71 divided into 3 segments for modeling and prioritization
  - Segment 1: Colorado State Line to SH 14
  - Segment 2: SH 14 to Brush
  - **Segment 3: Brush to Limon**
- Segment 3 has been identified as the priority segment for improvements
  - (This segment consistently attracts the highest number of diverted MUT traffic)
- CO 71 can potentially lure 8%-10% of the freight traffic from I-25

4. PROJECT PRIORITIZATION

Project Prioritization

Project Types

- Categorize individual projects to align with potential funding opportunities
- Projects are also grouped into logical segments based on geography, compatibility, and other factors

Project Type		Example Projects
	Bridge	Bridge widening, bridge replacements, bridge repair, guardrail
	Maintenance	Pavement rehabilitiation, drainage improvements, culverts, asset replacement
	Safety	Signing, pavement markings, delineation, shoulder widening, flatten curves, superelevation, rumble strips
	Other	New roadway connections, closures, railroad crossings

Project Prioritization

Evaluation Criteria

- **Safety** – Makes the highway safer for all users
- **Freight Mobility** – Allows for the unimpeded flow of trucks, freight, and wide loads
- **Rideability** – Improve the overall ride quality
- **Economic Development** – Degree to which the project positively affects the local economy
- **Stakeholder Support** – Level of support for the project by local stakeholders and the project team
- **Ultimate Vision** – does this support the ultimate vision?

❖ *Are these criteria accurate?*

❖ *Are there other criteria?*

CO 71 Identified and Potential Projects

- Re-align at Brush
- **MP 155 to MP 174 Pavement rehab,** improve shoulders **(Construction planned for 2020)**
    - **Note Maintenance Recently Completed Overlay/Chipseal MP 166.3-167.3, 170.6-171.6**
- MP102-174 - Improve shoulders, investigate turn outs
- MP102-174 Add passing lanes (Limon to Brush) – initial stretches based upon speed/vertical
- MP 138- Install dedicated north & south bound right turn lanes at US-36 intersection
- Add turn lanes for access to communities
    - **Note Maintenance Recently Completed Overlay/Chipseal MP 123-138**
- **Resurfacing at MP102-108**
- **Bridge repair at MP 102.3**
- Re-align at Limon

- Note – Asset management projects are bolded

5. CO 71 NEXT STEPS

NEXT STEPS

- Complete Travel Demand Modeling
  - Finish updates to CO 71 travel demand model
  - Include proposed improvements
- Continue Design and Construction on Planned Projects
- Identify and Prioritize Segment 3 Area Projects
- Provide cost estimate
- Pursue Grant Opportunities
  - Federal Lands Access Program (FLAP) Grant?

QUESTIONS?