

## CHAPTER 7 EVALUATION OF ALTERNATIVES

This chapter summarizes the evaluation of alternatives and focuses on the advantages and disadvantages of the Preferred Alternative. The three build packages, including specific modal and geographic area components of each package, are described in detail in **Chapter 2**

*Alternatives*. Information is provided in terms of their ability to meet the purpose and need criteria presented in **Chapter 1 Purpose and Need**, key environmental and other impacts described in **Chapter 3 Environmental Consequences** and **Chapter 4 Transportation Impacts** (including both adverse impacts and benefits), as well as project costs, which are described in **Chapter 6 Financial Analysis** and **Chapter 2 Alternatives**.

### What's in Chapter 7?

#### Chapter 7 Evaluation of Alternatives

- 7.1 Evaluation Framework
- 7.2 Responsiveness to Purpose and Need
- 7.3 Environmental Consequences
- 7.4 Summary of Evaluation

### 7.1 EVALUATION FRAMEWORK

Factors used to evaluate the No-Action Alternative and build packages include:

- ▶ Responsiveness to purpose and need, including:
  - Effectiveness in improving mobility and accessibility
  - Effectiveness in improving safety
  - Effectiveness at replacing aging highway infrastructure
  - Effectiveness at expanding transportation modes of travel
- ▶ Environmental consequences, both adverse impacts and benefits
- ▶ Costs (both capital and operating)

### 7.2 RESPONSIVENESS TO PURPOSE AND NEED

This section discusses tradeoffs among the No-Action Alternative and the three build alternatives as they relate to the key factors used to measure responsiveness to Purpose and Need. These factors are defined in more detail in Chapter 1 *Purpose and Need*.

#### 7.2.1 Effectiveness at Improving Mobility and Accessibility

The No-Action Alternative would not meet the need of improving mobility or accessibility. When compared to the build packages, in 2035 it would have the most congestion on I-25, the longest travel time, the slowest average speeds and the most vehicle hours of travel.

The Preferred Alternative would have the highest average speed, the least regional vehicle hours of travel, the fastest highway travel time, the fastest bus transit time, the least miles of congestion on I-25, and a lower number of ramp terminals predicted to operate at LOS E or F as compared to the No-Action Alternative. All of these factors are indicative of improvements in mobility and accessibility.

1 The Preferred Alternative would result in more reliable, uncongested travel for users of the  
2 tolled express lanes over time. Anticipated travel time for the Preferred Alternative in the  
3 tolled express lanes (in 2035) would be 64 minutes, one minute faster than travel time for  
4 Package B and 38 minutes faster than Package A. This travel would be more reliable over  
5 time as well, compared to travelers using the general purpose lanes.

## 6 **7.2.2 Effectiveness at Improving Safety**

7 All three build alternatives have been designed to be safe. All three build alternatives would  
8 reduce the frequency and severity of crashes on I-25, when compared to the No-Action  
9 Alternative. Considering only I-25 in 2035, Package B would result in fewer crashes  
10 (4,061 average per year) than the Preferred Alternative (4,399) and fewer average crashes per  
11 vehicle miles traveled (1.32) than the Preferred Alternative (1.37). However when considering  
12 the entire regional system, the Preferred Alternative has the greatest reduction of crashes  
13 because of the reduced daily VMT on arterials compared to Package A or Package B. This  
14 reduced VMT is a result of the higher capacity provided by the Preferred Alternative on I-25  
15 making I-25 a more attractive route than the adjacent arterial network. The crash rate on  
16 arterials is higher than the crash rate on access controlled facilities such as I-25. This results in  
17 improved safety under the Preferred Alternative for the entire regional transportation system  
18 because of the transfer of VMT to I-25.

19 Rail transit improvements would provide generally safer operations. National data show that  
20 passenger rail systems result in noticeably fewer annual injuries per 100 million passenger  
21 miles traveled than highway facilities. Commuter rail had an average of 18 annual injuries  
22 over a four-year period (from 2002 to 2006) while highways resulted in an average of  
23 59 injuries. Bus facilities have similar statistics to highways. Anticipated annual injuries in  
24 2035 for the various transit components of the three Packages show:

- 25 ▶ Package A (commuter rail, bus service) with eight annual injuries
- 26 ▶ Package B (BRT) with 24 annual injuries
- 27 ▶ Preferred Alternative (commuter rail and express bus) with 11 annual injuries

## 28 **7.2.3 Effectiveness at Replacing Aging Highway Infrastructure**

29 Package B and the Preferred Alternative perform the best at replacing aging highway  
30 infrastructure because they include the most mileage of reconstruction along I-25.

## 31 **7.2.4 Effectiveness at Providing Modal Choices**

32 Package A would provide three different modes of travel (commuter rail, bus service, and  
33 general purpose lanes) on three different north/south corridors (US 287, I-25, and US 85)  
34 while Package B would concentrate travel improvements primarily on I-25 in two different  
35 modes (tolled express lanes and bus rapid transit). The Preferred Alternative would provide  
36 four different modes of travel (commuter rail, express or commuter bus, general purpose  
37 lanes and tolled express lanes) on three different north/south corridors (US 287, I-25, and  
38 US 85).

39 Bus or rail infrastructure improvements would be most responsive to the need to provide a  
40 choice of transportation modes and would be consistent with the NFRMPO goals to provide a  
41 multi-modal transportation system. Bus or rail improvements would provide a viable  
42 alternative for those people who are dependent on transit because they do not own a private

1 automobile or are elderly or disabled. Bus or rail improvements also can be more supportive  
2 of certain land use goals (related to inducement of transit oriented development) and goals  
3 related to reducing energy consumption.

## 4 **7.3 ENVIRONMENTAL CONSEQUENCES**

5 Compared to the Build Packages, the No-Action Alternative would result in very little physical  
6 impact to existing social and environmental resources. Noise impacts related to increased  
7 traffic would also grow. The build packages would have greater impacts as a result of  
8 residential and business relocations, and greater impacts to natural resources, such as  
9 wetlands, wildlife habitat, threatened or endangered species, historic resources, parks, and  
10 other resources. The build packages would provide increased transit ridership, enhanced  
11 mobility, and a positive influence on economic development in the regional study area.

12 The Build Packages would have varying effects to environmental, social, and economic  
13 resources. The Preferred Alternative and Package A would have the most number of  
14 residential and business relocations, primarily because these two packages would include  
15 major improvements on three different corridors.

16 The Preferred Alternative would result in the least environmental impacts to:

- 17 ▶ Wetlands and jurisdictional open waters
- 18 ▶ Parks and recreational properties
- 19 ▶ Sensitive wildlife habitat
- 20 ▶ Aquatic habitat
- 21 ▶ Preble's meadow jumping mouse habitat
- 22 ▶ Northern leopard frog and common garter snake habitat
- 23 ▶ Sensitive fish species habitat

24 The Preferred Alternative would also have the most impact to:

- 25 ▶ Bald eagle foraging habitat
- 26 ▶ Raptor nests

27 The Preferred Alternative and Package A both have the most impact from transit noise  
28 (without mitigation) and the most number of vibration impacts (without mitigation).

## 29 **7.4 CAPITAL AND OPERATING COSTS**

30 In Package A, highway components account for over half the capital cost of the package,  
31 \$1.097 billion, while commuter rail would cost about \$848 million and commuter bus about  
32 \$18.3 million. In Package B, highway components account for the majority of the capital cost of  
33 the package, about \$1.589 billion, while BRT components would cost about \$126 million. The  
34 Preferred Alternative highway components account for approximately \$1.403 billion of capital  
35 cost, over half of the capital cost. Commuter rail would account for \$649 million and bus  
36 service would account for \$126 million. However, highway components of the three packages  
37 would have a much lower cost per user than transit components, as operating and

1 maintenance costs are lower, and a far greater number of travelers use the highway. Annual  
2 operating and maintenance costs are greatest with the Preferred Alternative at \$52 million,  
3 compared with \$45 million with Package A and \$23 million with Package B.

4 The annualized cost per trip (without the cost to own and operate private auto) is greatest with  
5 the Preferred Alternative. When the cost to own and operate a private auto is included,  
6 Package A would cost the most.

## 7 **7.5 SUMMARY OF EVALUATION**

8 **Table 7-1** summarizes information about the relative responsiveness of the three alternatives  
9 to the factors used in this evaluation as shown in **Section 7.1**. Not all environmental factors  
10 are included, rather just those that show a clear difference among alternatives. **Section 3.28** of  
11 this Final EIS includes a summary of all impacts.

12 **Table 7-1** indicates which of the build alternatives performs the best relative to a specific  
13 evaluation factor. If a build alternative has the least environmental impact or responds best to  
14 a measurement of purpose and need, it is flagged as best performing. For the factor of  
15 regional VMT, the build alternative with the lowest number is flagged as performing the best  
16 since higher VMT has greater impacts on regional air quality.

17 The Federal Transit Administration has established a grant program called the New Starts  
18 (Section 5309) program. This program evaluates and rates candidate transit projects for FTA  
19 funding. FTA uses two major categories of rating a project: Project Justification and a Financial  
20 Rating. The Project Justification criteria are:

- 21 ▶ Mobility improvements
- 22 ▶ Environmental benefits
- 23 ▶ Cost effectiveness
- 24 ▶ Transit-supportive existing land use, policies, and future patterns
- 25 ▶ Other factors including economic development

26 The Financial Rating includes the local financial commitment and an assessment of the capital  
27 and operating financial plan for the project.

28 At this point in time, the North I-25 project does not appear to be a candidate for New Starts  
29 funding, for the following reasons:

- 30 ▶ Projected bus and rail daily ridership of 6,500 (2,700 for commuter rail, 3,400 for express  
31 bus and 400 for commuter bus) is relatively low. Assuming model updates increase  
32 ridership, projections could total as high as 10,850, but these are even low compared to  
33 corridors that typically receive New Starts funds. As a comparison, two FasTracks  
34 corridors that are receiving New Starts funding have the following estimated daily  
35 ridership:

- West Corridor...29,700
- Eagle P3..... 57,500

- 36 ▶ Lack of local financial commitment and lack of a capital and operating financial plan for the  
37 project.

38 Other sources of FTA funding are available and will continue to be pursued.

1 **Table 7-1 Summary of Alternatives Evaluation (2035)**

	No-Action Alternative	Package A	Package B	Preferred Alternative
<b>Improving Mobility and Accessibility</b>				
Regional Vehicle Miles of Travel (VMT)	52.41 million	52.76 million	52.62 million ✓	52.81 million
Regional Vehicle Hours of Travel (VHT)	1.72 million	1.70 million	1.69 million	1.68 million ✓
Freeway VHT	363,000	364,000	360,000 ✓	361,000
Daily Users (People) on I-25	871,700	947,300	921,000	990,200 ✓
Regional average speed	30.5 mph	31.1 mph	31.1 mph	31.4 mph ✓
Transit ridership (commuter services)	N/A	5,850	6,800 ✓	6,500
Transit market share (to downtown Denver)	<1%	55% ✓	45%	50%
Highway travel time (AM peak hour, SH 1 to 20th Street)	133 minutes (GPL) 116 minutes (TEL)	117 minutes (GPL) 102 minutes (TEL)	117 minutes (GPL) 65 minutes (TEL)	107 minutes (GPL) ✓ 64 minutes (TEL) ✓
Transit travel time (Fort Collins South Transit Center to DUS)	159 minutes (FLEX from Fort Collins to Longmont; then NW Rail Corridor to DUS)	93 minutes (rail) ✓	70 minutes (BRT)	94 minutes (rail) 77 minutes (express bus all-stop) 63 minutes (express bus with express service) ✓
Congested miles on I-25 (PM peak hour)	75 miles	44 miles	45 miles	17 miles ✓
Congested Miles on I-25 (AM peak hour)	56 miles	16 miles	30 miles	11 miles ✓
Interchange ramp merge/diverge locations operating at LOS E or F (AM)	58	30	34	13 ✓
Interchange ramp merge/diverge locations operating at LOS E or F (PM)	69	34	52	26 ✓
Travel reliability over time	Least reliable	Least reliable of build alternatives	More reliable than Package A	Most reliable ✓
Improving Highway Safety (annual crashes)	3,975 crashes	4,238 crashes	4,061 crashes ✓	4,399 crashes
Crashes per VMT	1.41	1.33	1.32 ✓	1.37
Transit Safety (annual injuries)	N/A	8 ✓	24	11
Overall system safety	Least safe	Improved over No-Action	Improved over No-Action	Safest ✓
Replacing Aging Infrastructure	64 minor rehabilitations	87 new structures	94 new structures ✓	94 new structures ✓

2

1 **Table 7-1 Summary of Alternatives Evaluation (2035) (cont'd.)**

	No-Action Alternative	Package A	Package B	Preferred Alternative
<b>Improving Mobility and Accessibility</b>				
Replacing Aging Infrastructure	64 minor rehabilitations	87 new structures	94 new structures ✓	94 new structures ✓
	4 major rehabilitations	15 modifications of existing structures	24 modifications of existing structures ✓	24 modifications of existing structures ✓
		0 major rehabilitations ✓	0 major rehabilitations ✓	0 major rehabilitations ✓
		22 minor rehabilitations ✓	16 minor rehabilitation	16 minor rehabilitations
Expansion of Transportation Modes of Travel	Does not expand	Commuter rail, commuter bus, and feeder bus added	BRT and feeder bus added	Commuter rail, express bus, commuter bus, and feeder bus added ✓
Responsiveness to Economic Development	Not responsive	Responsive to needs along I-25 and BNSF ✓	Responsive to needs along I-25	Responsive to needs along I-25 and BNSF ✓
Regional connectivity	Least responsive	Connects commuter rail and commuter bus	Only connects TELs	Connects commuter rail, TELs, commuter bus and express bus ✓
<b>Environmental Consequences</b>				
Relocations	None	59 residences 33 businesses	24 residences ✓ 16 businesses ✓	51 residences 23 businesses
Land use	Not responsive to community goals	Somewhat responsive to community goals	Not responsive to community goals	Most responsive to community goals ✓
Traffic noise sites impacted in Category B (without mitigation)	661 sites	673 sites ✓	685 sites	679 sites
Rail transit noise sites impacted (without mitigation)	N/A	2,192 residences, 15 schools and 7 churches	None ✓	2,192 residences, 15 schools and 7 churches
Rail transit vibration sites impacted (without mitigation)	N/A	40 residences	None ✓	40 residences
Wetlands and jurisdictional open waters impacted	None	21.9 acres	21.3 acres	18.2 acres ✓
Water Quality: acres of impervious surface area	1,257 acres	1,946 acres ✓	2,001 acres	1,982 acres
Floodplains impacted	None	12.8 acres ✓	13.5 acres	13.0 acres
Historic and archaeological properties adversely affected	None	6	1 ✓	4

1 **Table 7-1 Summary of Alternatives Evaluation (2035) (cont'd.)**

	No-Action Alternative	Package A	Package B	Preferred Alternative
<b>Environmental Consequences (cont'd.)</b>				
Parks and recreational properties impacted	None	8	6 ✓	6 ✓
Least harm to Section 4(f) resources used (not including <i>de minimis</i> )	Not prudent and feasible.	Most severe harm to significant Section 4(f) properties.	Similar remaining harm to Section 4(f) properties as the Preferred Alternative, but does not meet purpose and need as well.	Least overall harm to Section 4(f) properties, most responsiveness to project purpose and need and likeliest to be permitted under Section 404(b)(1). ✓
Wildlife and aquatic species habitat				
▶ No. of raptor nests	None	49	43 ✓	57
▶ No. of movement corridors	None	13	7 ✓	14
▶ Sensitive wildlife habitat (acres)	None	2.0 acres	2.4 acres	1.9 acres ✓
▶ Aquatic habitat (acres)	None	1.8 acres	2.3 acres	1.5 acres ✓
Threatened, endangered, state sensitive & protected species habitat affected				
▶ Preble's meadow jumping mouse habitat	None	0.8 acre	0.8 acre	0.7 acre ✓
▶ Bald eagle foraging	None	204 acres ✓	231 acres	231 acres
▶ Prairie dog colonies	None	60 acres ✓	97 acres	86 acres
▶ Northern leopard frog and common garter-snake	None	20 acres	21 acres	17 acres ✓
▶ Sensitive fish species	None	0.4 acre ✓	0.4 acre ✓	0.4 acre ✓

2

1 **Table 7-1 Summary of Alternatives Evaluation (2035) (cont'd.)**

	No-Action Alternative	Package A	Package B	Preferred Alternative
<b>Cost (2009 dollars)</b>				
Capital cost	\$57 million	\$1.963 billion	\$1.715 billion ✓	\$2.178 billion
Annual operating cost	\$5.8 million	\$45 million	\$23 million ✓	\$52 million
Annualized cost per user per trip (without cost to own and operate a private auto)	\$0.04	\$0.68	\$0.54 ✓	\$0.73
Annualized cost per user per trip (including cost to own and operate a private auto)	\$4.47	\$5.26	\$5.09 ✓	\$5.14

✓ ..... Build alternative that performs better  
N/A .... Not Applicable

2