



North I-25 EIS Northern Terminus Assessment

As defined in the Scope of Work for the North I-25 Front Range Environmental Impact Statement, the study area includes the area from SH 7 in the south to SH 14 (Mulberry Road) in the north. The eastern boundary was defined as SH 85, and the western boundary was defined as SH 287 and the Diagonal Highway between Longmont and Boulder. A map of previously identified study area is shown on the following page.

As part of the initial assessment of current and future conditions and needs, an evaluation of the northern terminus of the study area was undertaken to identify whether the northern terminus of the study at State Highway 14 adequately encompasses the needs of this area. This assessment included a review of travel patterns, roadway volumes, land use, and population and employment growth, and the ability to meet project goals. The project team identified three potential terminus options:

- Wellington Interchange
- City of Cheyenne
- SH 14

Wellington Interchange

The Wellington Interchange (Colorado 1 & I-25) is located approximately 8 miles north of the SH 14 interchange near Ft. Collins. The Town of Wellington currently has a population of approximately 3,000. Forecast projections, as shown on **Figure 1** and **Figure 2** do not show significant population or employment densities by 2025. However, significant traffic congestion is forecast in 2030 along I-25 to Wellington, as shown on **Figure 3**. Population and employment data are not yet available for 2030. It is recommended that the population and employment data for 2030 be reviewed to evaluate demand for trips north to the Wellington Area when it is available.

Cheyenne

Cheyenne, Wyoming is located 45 miles north of Fort Collins. Cheyenne has a current population of over 54,000 and a 2025 forecast population of 61,000. **Figure 3** does not show significant congestion between Ft. Collins and Cheyenne along I-25, even though I-25 serves as a secondary truck route in Eastern Colorado. Future traffic forecasts for 2020 indicate that I-



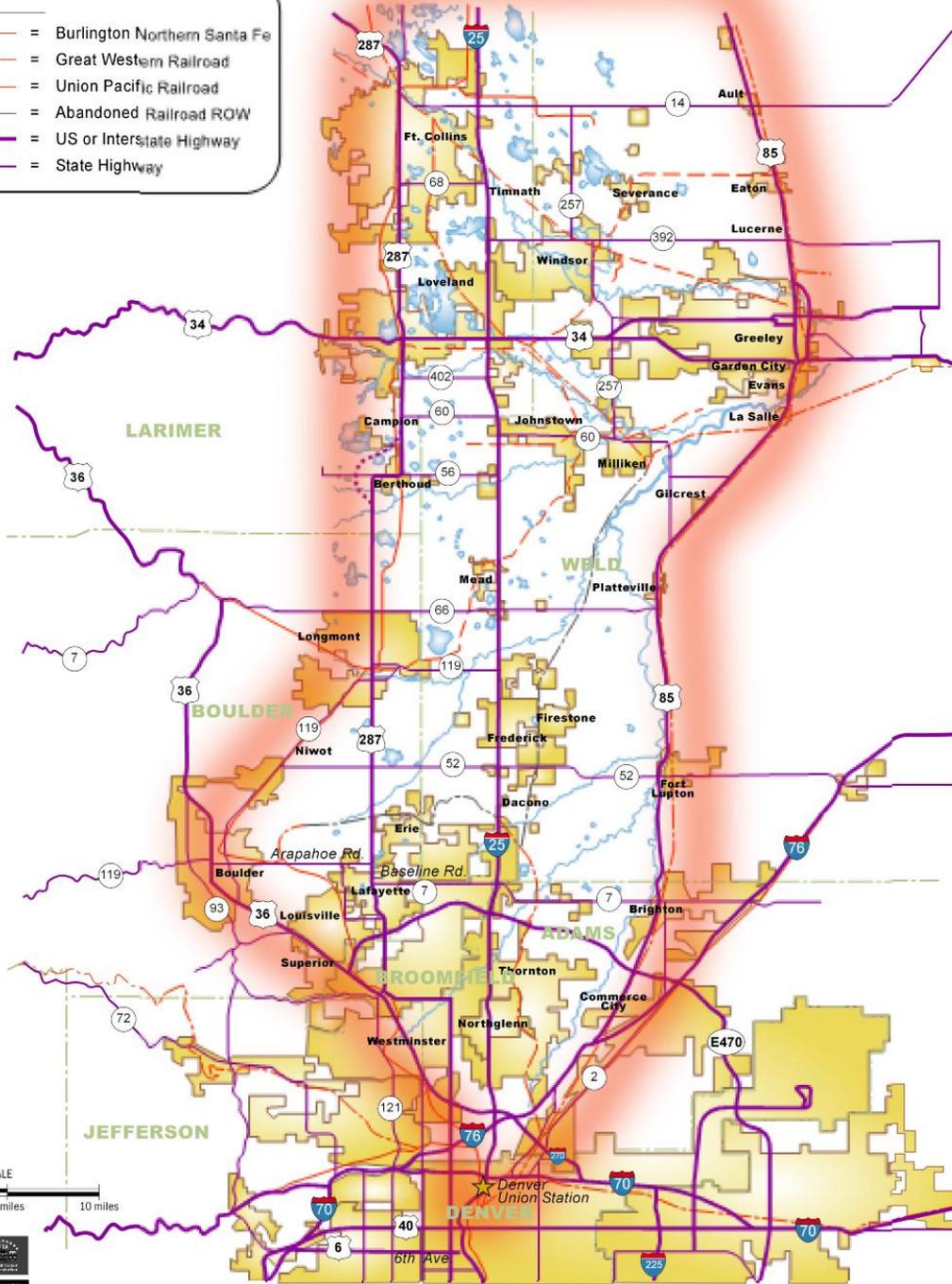
80, I-76, and I-70 will function as the primary truck routes through Colorado (*Eastern Colorado Mobility Study, CDOT & FHU, April 2002*). In addition, the *NFRMPO Household Survey* conducted in 2002, indicates that only 0.1 % of all daily trips from Northern Colorado communities are destined for Cheyenne. As a result, it is not recommended that the study area for the North I-25 Front Range EIS be extended to Cheyenne.



Study Area

LEGEND

- = Burlington Northern Santa Fe
- = Great Western Railroad
- = Union Pacific Railroad
- = Abandoned Railroad ROW
- = US or Interstate Highway
- = State Highway



APPROXIMATE SCALE
0 5 miles 10 miles



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SH 14

SH 14 serves Fort Collins, the northern most major traffic generator in the North Front Range. Forecast population and employment concentrations, as shown on *Figure 1* and *Figure 2* would be well served by transportation options to and near SH 14.

Ability to Serve Project Goals

In addition to the key indicators described above, terminus options were assessed within the context of serving project goals. The five project goals established early in the project were:

1. Improve safety
2. Improve regional mobility between communities and metro Denver
3. Provide a multi-modal transportation system
4. Replace aging infrastructure
5. Support local and regional land use plans

Crash data was evaluated to determine if any safety improvements may be warranted to meet the first goal. The Weighted Hazard Index (WHI) for the segment between SH 14 and Wellington shows a WHI that is much higher than most other segments, indicating possible safety concerns.

The second goal of the project is to improve mobility between communities and metro Denver. The area north of SH 14 to the Wyoming border contains very little population. In addition only 0.1 % of all daily trips from Northern Colorado communities are destined for Cheyenne. Options that provide connections between population concentrations south of SH 14 may meet this goal most effectively.

Providing a multi-modal transportation was also identified as a goal. Taking into consideration travel patterns and population centers, alternatives that reach as far north as SH 14 will serve the majority of trip needs

Replace aging infrastructure is an additional goal. The CDOT bridge inventory shows that the I-25 and SH 14 interchange is both structurally deficient and functionally obsolete. The conditions of structures along the segment from SH 14 to the Wellington Interchange have not been assessed. However, structures along the segment were constructed in 1966 or 1950 and are likely to be deficient. An assessment of the



infrastructure north of SH 14 will be undertaken as part of the existing conditions effort.

Support of local and regional land use plans was also identified as a project goal. According to Fort Collins City Plan, compact development as well as retaining an urban growth boundary are primary objectives. Providing transportation options that serve the core versus outlying undeveloped areas would better serve local land use plans.

Based on the ability to serve project goals, three of the five project goals can be met with a terminus at SH 14. The goal of improving safety indicates that extending the study area beyond SH 14 may be warranted. The ability to meet the goal of replacing aging infrastructure will be determined based on further data collection, however initial data collection indicates that aging infrastructure replacement is warranted to the Wellington Interchange.

Recommendation

The following table shows whether each measure of need is adequately served by a terminus at SH 14 or Wellington.

Based on information currently available, it is recommended that northern boundary of the study be extended to the Wellington interchange. Once 2030 population and employment forecasts, as well as updated travel demand forecast information, accident data, and an inventory of I-25 physical conditions is completed, it can be determined whether alternatives developed as part of the EIS process should extend to the Town of Wellington.



Table 1
Terminus Evaluation

	SH 14 Terminus	Wellington Interchange Terminus
Serve Travel Patterns	X	
Alleviate Congestion		X
Improve safety		X
Improve regional mobility between communities and metro Denver	X	
Provide a multi-modal transportation system	X	
Replace Aging Infrastructure		X
Support local and regional land use plans	X	



Figure 1

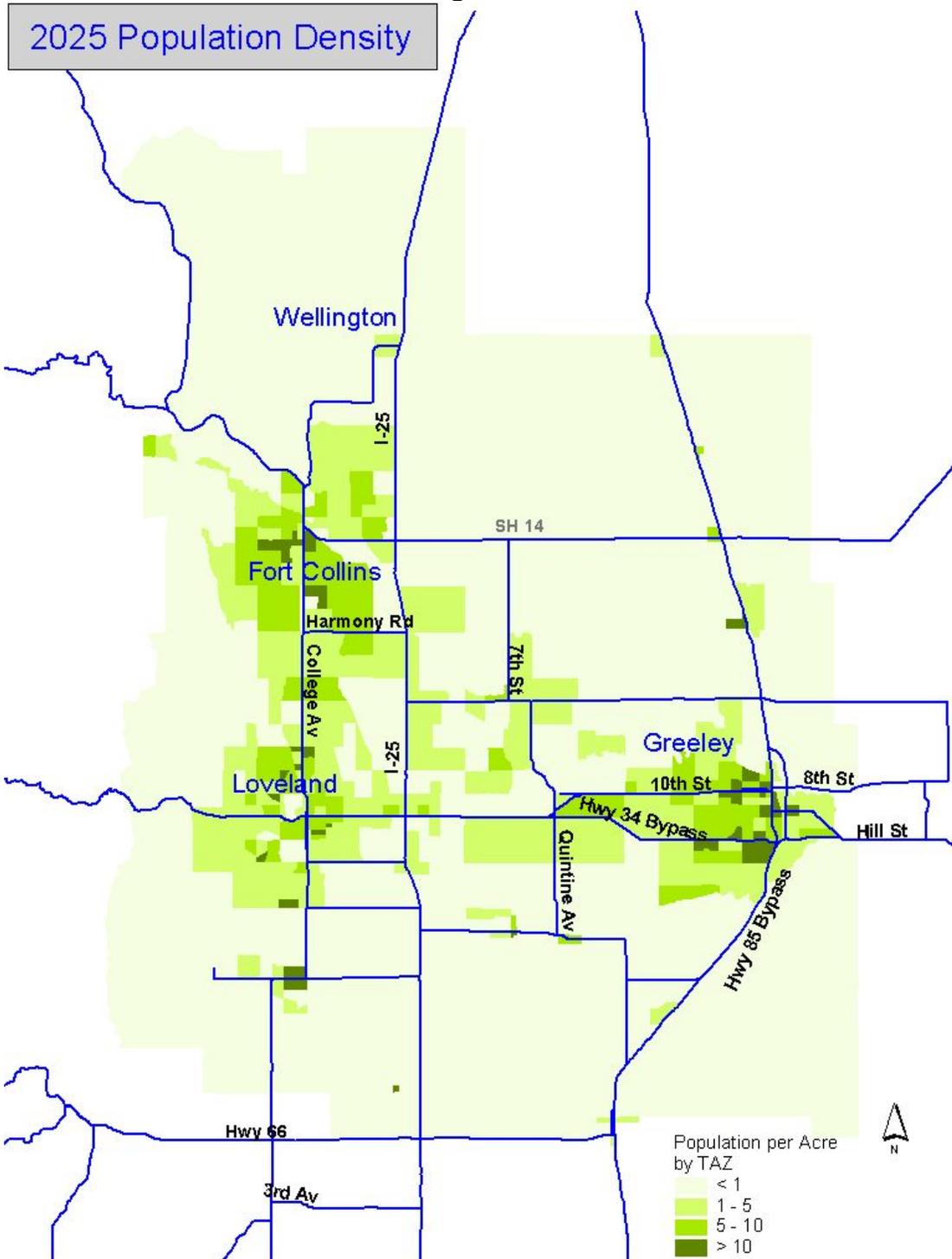




Figure 2

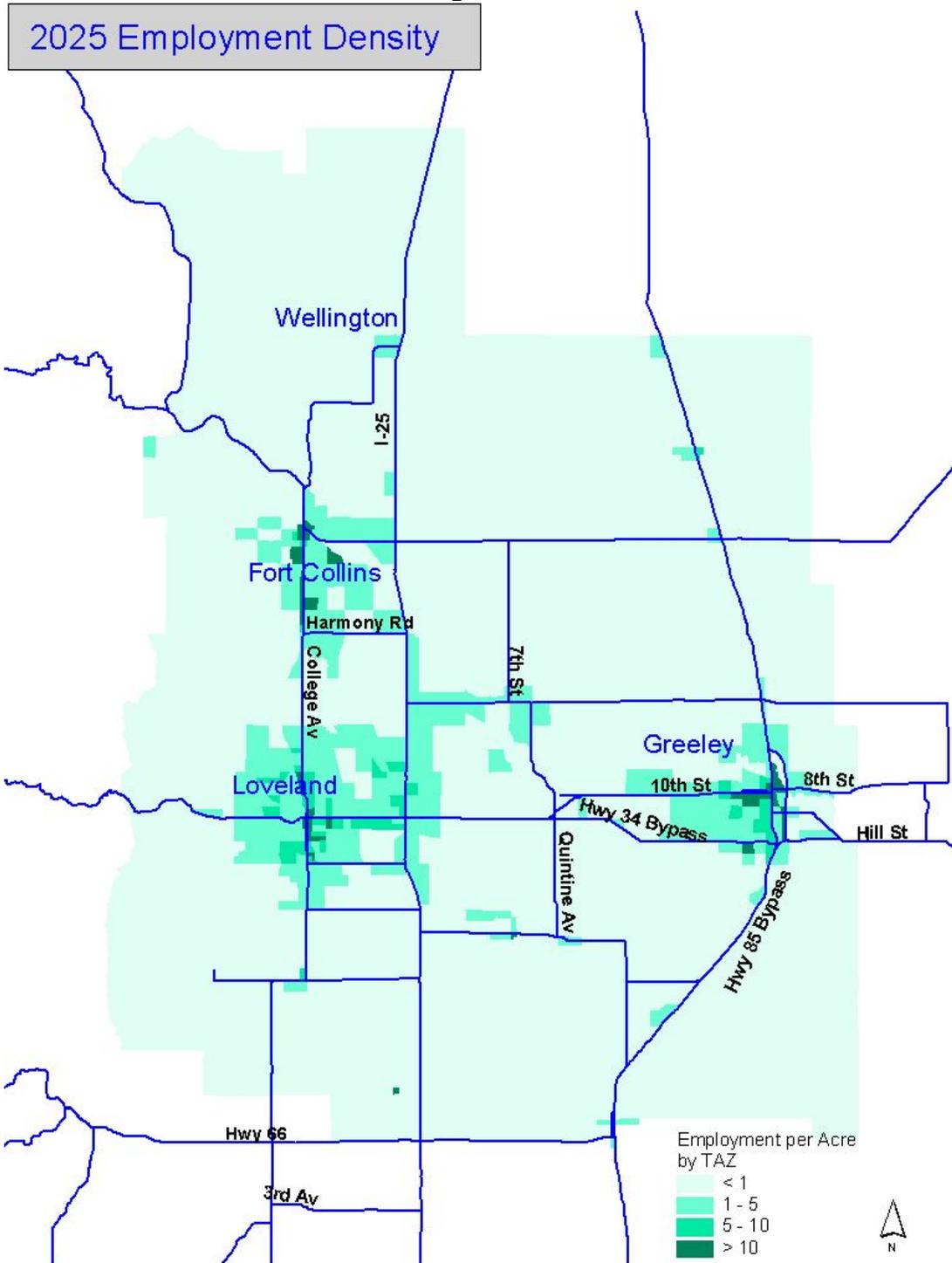
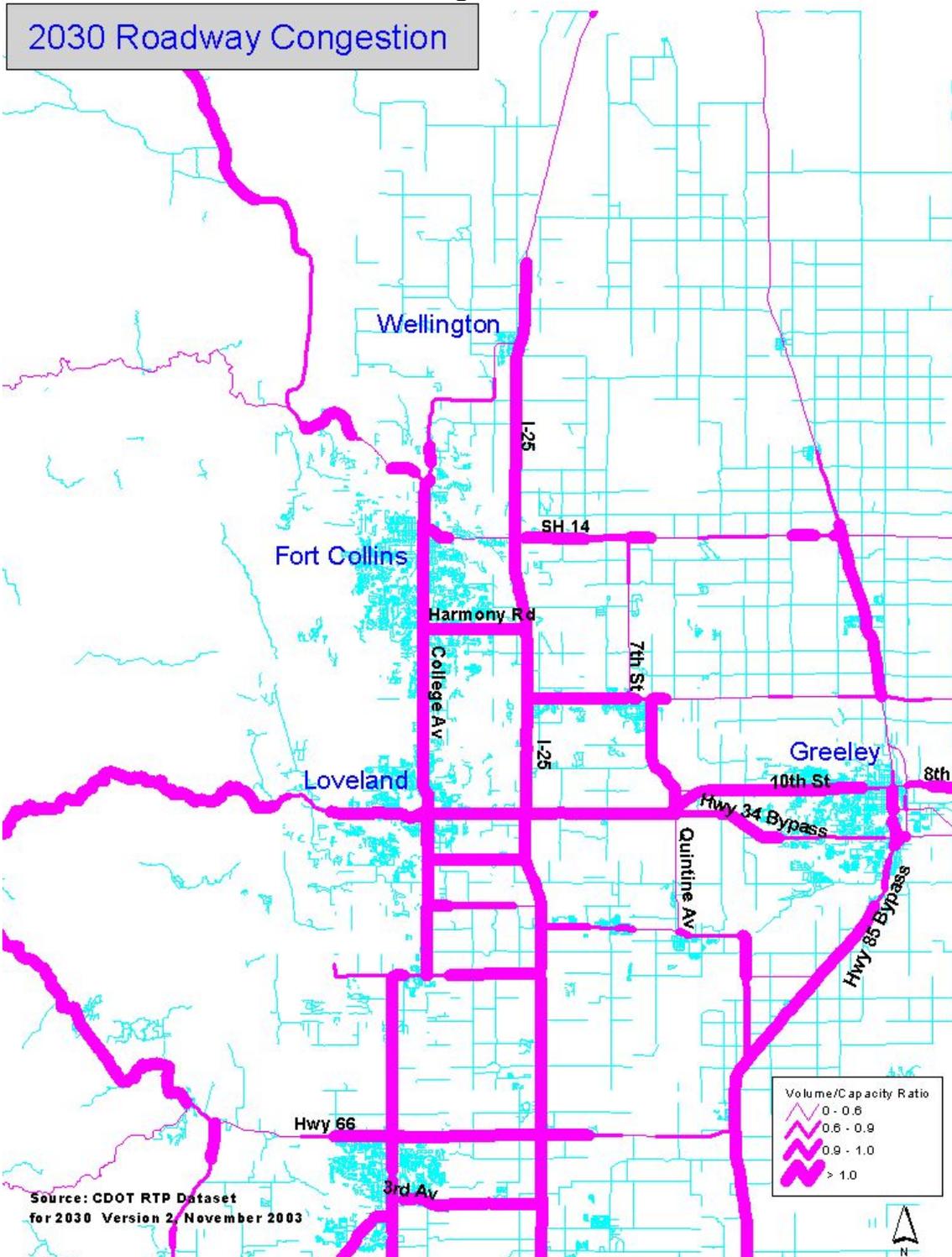




Figure 3



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Introduction

This paper summarizes data used for identification of a logical southern terminus for the alternatives being considered in the North I-25 Environmental Impact Statement. The Federal Highway Administration paper "Transportation Decisionmaking The Development of Logical Project Termini", November 5, 1993 and the project's combined DRCOG and NFRMPO travel demand forecasting model were used as a basis for verifying an appropriate southern terminus.

The North I-25 EIS Purpose and Need statement identifies the following needs: improving safety, replacing aging infrastructure, addressing mobility and accessibility issues, and providing multimodal transportation options. The purpose of the North I-25 EIS has been identified as "improving mobility between the northern Colorado communities and the Denver metropolitan area".

A key element to improving mobility between northern Colorado and Denver is providing connectivity to the metropolitan area. E-470 is the northernmost high-capacity roadway connection to I-25 that provides connectivity throughout the entire metropolitan area including major destinations such as the Denver International Airport, Broomfield, Boulder, the Denver Technological Center and Aurora. Freeway alternatives along I-25 from northern Colorado to E-470 have the ability to address the safety concerns on I-25, the aging infrastructure on I-25 and the mobility and accessibility issues identified in the Purpose and Need statement. To provide multimodal transportation options, transit alternatives would need to connect into a major destination or to a location where riders can transfer to another transit service to complete their trip within the metropolitan area. This memorandum will use FHWA's logical termini paper to verify that E-470 is a logical southern terminus for freeway alternatives and to analyze potential southern termini for managed lanes and transit alternatives.

Background

The regional system is a part of the consideration when identifying a logical southern terminus. Two key regional improvement projects are RTD's FasTracks transit plan and I-25 widening identified in DRCOG's Metro Vision.

RTD's planned FasTracks transit lines are shown in Figure 1. Three of these lines, North Metro, US 36 and the East corridor, are within or adjacent to the North I-25 EIS study area. The NEPA process for the North Metro line will begin in the next year and construction is expected to be complete in 2015. The US 36 commuter rail line is currently undergoing a NEPA process and construction is expected to be complete in 2014. Construction of the preferred transit alignment for the East Corridor line is also scheduled to be completed in 2014.

DRCOG's 2030 Metro Vision identifies widening of I-25 from US 36 to SH 7 with one general purpose lane in each direction and HOV/BRT lanes. DRCOG's fiscally

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constrained 2030 Regional Transportation Plan includes an initial portion of this corridor improvement, the general purpose widening between US 36 and Thornton Parkway. Identification of E-470 as the project's southern terminus may eventually necessitate a slight alteration of the recommendation in DRCOG's Metro Vision to extend improvements to E-470 instead of to SH 7. The southern terminus of E-470 would not however, preclude these identified, long-range improvements.

Principles for Selecting Termini

To identify a logical terminus, the Federal Highway Administration regulation 23 CFR 771.111 (f) outlines three general principles that are to be used to frame a project:

1. *Connect logical termini and be of sufficient length to address environmental matters on a broad scope;*
2. *Have independent utility or independent significance, i.e. be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and*
3. *Not restrict consideration of alternatives for other reasonable foreseeable transportation improvements.*

In addition, the courts have determined that another aspect to consider when evaluating related transportation improvements is that the project should not irretrievably commit federal funds for closely related projects.

The following section addresses the three general principles and the courts consideration for related projects in relation to identification of a logical southern terminus for the North I-25 EIS.

1. Connect Logical Termini

Logical termini are defined as 1) rational end points for a transportation improvement and 2) rational end points for a review of the environmental impacts. Specifically, the paper identifies points of major traffic generation as a common terminus.

Rational End Points for a Transportation Improvement

Numerous endpoints were considered to determine the best terminus for general purpose lane alternatives. E-470 was identified as the northernmost, high-capacity connection that provides accessibility to the greater metropolitan area. E-470 provides continuity of interstate and tollway travel through the metropolitan area and does not create an abrupt reduction in capacity along the I-25 freeway which could create a potential bottleneck.

US 36/84th Avenue is the northern terminus of the existing HOV facility on I-25. It is the closest high-capacity connection to a high-occupancy vehicle (HOV) lane and is the proposed terminus for high-occupancy vehicle lane and high-occupancy/toll lane



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alternatives. Connecting to the existing HOV lane would provide continuity of travel into downtown Denver for high-occupancy vehicles.

Rational end points for transit improvements would include major activity centers or a transit center where users could transfer to another transit system to complete their trip. Potential southern terminus locations for the transit alternatives are Denver Union Station, the north end of a FasTracks line, or the RTD Wagon Road park-n-Ride at 120th Avenue and I-25.

Rational End Points for Environmental Review

Rational end points as they relate to environmental issues are points which would retain the ability to address environmental matters on a broad scope. This is to ensure that transportation improvements are not developed in such a manner as to force an environmental impact on a resource that is just outside the study area. In the case of the North I-25 EIS, improvements may be made to I-25 south of E-470 in the future. However, similar to the North I-25 EIS project to the north, the horizontal alignment of I-25 improvements near E-470 would be directed by the location of the recently constructed directional interchange at I-25 and E-470. This interchange was completed in 2003 and was designed to accommodate the widening of I-25 without reconstruction. There are no plans or funds in the foreseeable future to reconstruct this interchange.

In general, a corridor length in excess of 40 miles, as with the North I-25 EIS, is clearly sufficient to address environmental matters on a broad scope.

2. Independent Utility

A southern terminus which provides independent utility will be usable without additional improvements and will be a reasonable expenditure even if no additional transportation improvements in the area are made.

General-Purpose Lanes

To examine the viability of E-470 as a southern terminus that provides independent utility to potential improvements, two tests were performed with the travel demand forecasting model. The first model tested only the No-Action Network improvements to I-25. The No-Action Network includes widening I-25 to six general-purpose lanes from SH 66 to SH 52 and widening to I-25 to eight general-purpose lanes from Thornton Parkway to US 36¹. In addition to these improvements, the second test model widens I-25 to 8 lanes between SH 14 and E-470. The results of these tests are described below and summarized in Table 1. The comparison of these two models was used to determine if improvements to I-25 north of E-470 would negatively impact I-25 south of E-470.

¹ No-Action Memorandum, May 5, 2006 describes projects included in the No-Action Alternative and the No-Action Network in more detail.

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As shown in the table, improving I-25 north of E-470 would have little influence on I-25 between Thornton Parkway and E-470. The largest difference is seen on the 1.5-mile segment immediately south of E-470 where the volume-to-capacity ratio would increase from 1.15 to 1.20 and from 1.08 to 1.13 in the AM and PM peak hours, respectively. These are still approximately 15% lower than those experienced farther south on I-25 either with or without improvements north of E-470. The difference in volume-to-capacity ratio and speeds diminishes at Thornton Parkway; the model indicates no change in volume-to-capacity ratios or speeds due to widening north of E-470.

For perspective, the increase in volume would equate to an increase of approximately one minute of travel time or less between E-470 and Thornton Parkway. Travel time between E-470 and Thornton Parkway would be approximately 20 minutes southbound in the AM peak hour and would increase to 21 minutes with I-25 improved north of E-470. Based on these data, improvements to I-25 north of E-470 are not expected to negatively impact I-25 operation south of E-470.

Table 1. 2030 No Action vs. E-470 Terminus

Southbound I-25 Segment Characteristics

	No Action		8-Lanes to E-470		VOC comparison		SPEEDS comparison	
	AM Peak Hour		AM Peak Hour		Difference		Difference	
	VOC	Speeds	VOC	Speeds	Absolute	%	Absolute	%
E-470								
144th	1.15	31	1.2	26	0.05	4.3%	-5	-16.1%
136th	1.06	41	1.08	39	0.02	1.9%	-2	-4.9%
120th	1.18	27	1.19	25	0.01	0.8%	-2	-7.4%
104th	1.26	20	1.27	19	0.01	0.8%	-1	-5.0%
Thornton Pkwy	1.38	12	1.38	12	0.00	0.0%	0	0.0%

Northbound I-25 Segment Characteristics

	No Action		8-Lanes to E-470		VOC comparison		SPEEDS comparison	
	PM Peak Hour		PM Peak Hour		Difference		Difference	
	VOC	Speeds	VOC	Speeds	Absolute	%	Absolute	%
E-470								
144th	1.08	39	1.13	33	0.05	4.6%	-6	-15.4%
136th	1.01	46	1.03	44	0.02	2.0%	-2	-4.3%
120th	1.10	35	1.12	33	0.02	1.8%	-2	-5.7%
104th	1.18	27	1.19	26	0.01	0.8%	-1	-3.7%
Thornton Pkwy	1.34	14	1.34	14	0.00	0.0%	0	0.0%

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Managed Lanes

While high-occupancy vehicle lane alternatives would still be usable with an E-470 southern terminus, terminating HOV lanes at E-470 would leave a large gap between the existing HOV facility at US 36 and E-470. To provide continuity for high-occupancy vehicle travelers, to ensure that this alternative has independent utility, and to ensure that selection of an HOV or HOT alternative does not force this improvement on the section of I-25 between US 36 and E-470, a US 36 southern terminus for HOV/HOT alternatives is considered a more logical choice.

Transit

To provide independent utility for transit alternatives, the southern terminus for transit improvements must be located at a major activity center (downtown Denver) or at a transit transfer location (North Metro end of line, US 36 end of line or Wagon Road park-n-Ride). To determine which of these potential southern terminus options would operate best and, therefore, be a reasonable expenditure and not require additional transportation improvements in the area, the 2030 travel model was run to determine the impacts of a forced transfer at the north end of a rail FasTracks line or at the 120th Avenue/I-25 park-n-Ride lot where RTD operates express bus service. Data from the model indicate that a forced transfer to an express bus at the Wagon Road park-n-Ride would result in a 70% reduction in regional transit ridership from northern Colorado when compared to ridership on a route directly into Denver Union Station. A cross platform transfer² at the north end of either of the two FasTracks lines would result in a smaller, but also substantial, reduction in ridership of about 50%. These data indicate that the best ridership would be obtained with a southern terminus at Denver Union Station.

3. Consideration for Other Reasonable Transportation Improvements

Foreseeable transportation improvements include bus and/or rail service and highway widening along the corridor and into Denver. The choice of E-470 as a southern terminus for highway improvements does not preclude or restrict consideration of other reasonably foreseeable transportation improvements along the corridor.

4. Evaluating Related Transportation Improvements

The courts have determined that a project should not irretrievably commit federal funds for closely related projects.

The North I-25 EIS is considering transportation improvements to accommodate growth in population and employment between Denver and Fort Collins in the year 2030. The size of the study area and the planning horizon year set the stage to ensure that recommended improvements provide a long-term solution for transportation in northern Colorado and will not irretrievably commit federal funds to closely related projects.

² A cross platform transfer refers to a rider transferring at a station from a commuter rail line in northern Colorado to a different rail line within the Denver Metro area such as the North Metro line or the proposed US 36 commuter rail line.

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Summary

Based on the analysis of data and the project's Purpose and Need statement, the southern terminus for all freeway alternatives (except HOV and HOT lanes) is recommended to be E-470. It is further recommended that HOV and HOT lane improvements extend south to connect into the planned reversible HOT lanes at US 36. It is recommended that transit alternatives extend south to Denver Union Station, to reduce the negative impact of a forced transfer and to best address the project purpose, thus providing a one-seat ride to downtown Denver for northern Colorado travelers.



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Figure 1. FasTracks

Rapid Transit Map

