

# I-25 North Managed Lanes Extension and Express Bus Project



HOV 2+, BUSES & MOTORCYCLES FREE	
<b>ExpressToll</b>	
DESTINATION	RATES
104 AVENUE	\$X.XX
US 36	\$X.XX
DOWNTOWN/DUS	\$X.XX



Cost-Effective Multimodal Mobility Improvements for Metropolitan Denver, Colorado

A TIGER Discretionary Grant Request for \$15 Million Submitted by the Colorado Department of Transportation

March 19, 2012

In Partnership with the North Area Transportation Alliance, the Regional Transportation District, the Denver Regional Council of Governments, Adams County, Weld County, City and County of Broomfield, City of Federal Heights, City of Northglenn, City of Thornton, City of Westminster and the Colorado High Performance Transportation Enterprise

## **In Partnership With**

**Adams County  
City and County of Broomfield  
Denver Regional Council of  
Governments  
City of Federal Heights  
City of Northglenn  
Regional Transportation District  
City of Thornton  
Weld County  
City of Westminster  
North Area Transportation  
Alliance**

## **Supported By**

**Adams County Economic  
Development  
A-Lift Adams County  
Community Transit  
City of Commerce City  
City of Fort Collins  
City of Loveland  
CO Assoc. of St. Transit Agencies  
Community Development Group  
Hyland Hills Park & Rec Dist.  
Jordan Purlmutter & Company  
Larkridge Shopping Center  
Metro North Chamber of  
Commerce  
North Metro Fire Rescue District  
North Suburban Medical Center  
North Washington Fire Support  
Town of Firestone  
Town of Johnstown  
Town of Milliken  
Town of Windsor  
Transit Alliance  
Urban Frontier  
and  
Colorado Congressional  
Delegation  
State Legislative Leadership  
State Transportation Advisory  
Committee**

## Shoulder Capacity Left Unused on I-25 Today



*Source: NATA*

# I-25 North Managed Lanes Extension and Express Bus Project

Cost-Effective Multimodal Mobility Improvements for  
Metropolitan Denver, Colorado

## APPLICANT INFORMATION

Project Name

I-25 North Managed Lanes Extension and Express Bus Project

Project Type

Multimodal

Location

Denver Urbanized Area

Applicant Name

Colorado Department of Transportation

DUNS/CCR Number – 960738771

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March 19, 2012

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## EXECUTIVE SUMMARY

The Colorado Department of Transportation (CDOT)<sup>11</sup> is seeking a \$15 million federal grant to complete the funding package for the I-25 North Managed Lanes Extension and Express Bus Project. The project offers a high-value, low-cost investment for the United States Department of Transportation (US DOT) that would ensure sustainable congestion relief in the northern Denver metropolitan area. A \$15 million TIGER Discretionary Grant would complete the funding package for a \$44 million investment to provide one new managed toll lane in each direction on a highly congested six-mile stretch of Interstate 25 (I-25). The project yields \$512 million in benefits, outweighing the cost by a factor of more than 10 to 1.

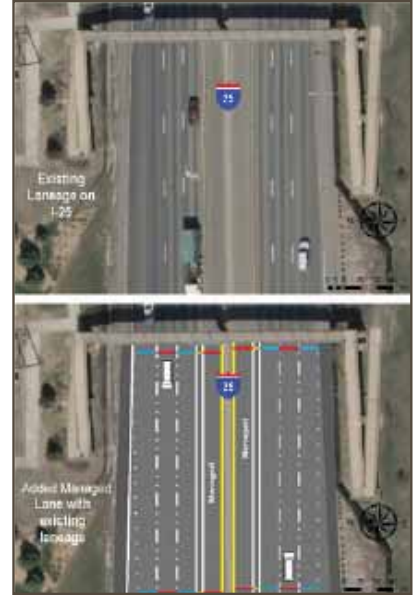
The Regional Transportation District's (RTD) Express Buses will have full access to the new managed lanes, increasing reliability and providing for system expansion. The lanes expand the regional network of transit and provide a direct link from Denver's northern metropolitan region into Denver Union Station, the region's primary multimodal hub and Amtrak station. These lanes also develop a coordinated system of managed lanes, connecting to the existing I-25 Express Lanes<sup>14</sup> to the south and soon-to-be-completed managed lanes between Denver and Boulder on US 36 to the west.<sup>70</sup>

Managed lanes on I-25 will provide a congestion-free alternative for travelers when they choose to carpool, take transit, or pay a toll to access the lanes. Charging tolls introduces an incentive for alternatives to single occupant travel. High Occupancy Vehicles (HOV) and public transit vehicles will have access to the managed lanes free of charge, while Single Occupant Vehicles (SOV) will pay a toll to use these lanes. The mixture of SOV-tolled and HOV/transit non-tolled vehicles using the lanes will be managed to maintain free flow conditions within the managed lanes at all times. Project sponsors will work with a North Area Transportation Alliance's Transportation Management Organization (TMO)<sup>51</sup> on the corridor to encourage and support non-single-occupant-vehicle travel choices.

The project provides meaningful relief for one of the most congested corridors in the Denver area<sup>78</sup>, currently traveled by 175,000 vehicles<sup>19</sup> and 4,300 bus transit riders<sup>81</sup> every day. Peak period traffic jams currently span four hours in both the morning and evening<sup>30</sup> with traffic operating at 15 miles per hour versus the posted 55-65 miles per hour<sup>25</sup>. I-25 is a critical part of the Western Transportation Trade Network<sup>93</sup> – a system of highway and rail routes through 14 western states, carrying the majority of freight through the western U.S. Left unimproved, I-25 congestion is a drain on the local, state, and national economy. Already challenging, congestion on I-25 in this growing area will steadily worsen if improvements are not made. Projections for 2035 show that building managed lanes on this stretch of I-25 would shave nearly 20 minutes off the daily commute from Adams County to downtown Denver.<sup>25</sup> Significantly, the project is projected to reduce vehicle accidents by an estimated 10%. The project supports economic recovery; enhances multimodal operations; provides more choice; and encourages smarter, sustainable transportation decisions.

A Record of Decision (ROD) on the North I-25 Final Environmental Impact Statement (FEIS)<sup>25</sup> was signed in December 2011. It identified a \$145 million priority project to extend managed lanes on I-25 north of US 36 into Adams County. The project's high price tag was based on

building the additional lanes by expanding the highway's overall footprint and is the reason the original project could not be funded in the region's Fiscally Constrained Transportation Plan until 2035.<sup>42</sup> Seeing a need for more immediate relief, CDOT recently determined that the inside shoulder on this portion of I-25 is sufficiently wide to accommodate the new managed lanes within the existing roadway template, eliminating the need for costly right-of-way or additional paved surface.<sup>79</sup> The resulting innovative project converts the inside shoulder into a new managed lane in each direction. This project is identified as the first priority improvements in the ROD and has demonstrated independent utility. The revised project could be built a decade earlier, 2024 versus 2035, and at a much lower cost as reflected in the amended long range plan below. A TIGER grant would further accelerate the project, allowing improvements to be built by 2015 – two decades earlier than originally planned and at a substantially lower cost.



*Concept of managed lanes on inside shoulders.<sup>77</sup>*

Extension of the managed lanes utilizing inside shoulders was recently amended into the 2035 Fiscally Constrained Transportation Plan<sup>49</sup> and is included in the I-25 ROD as the near term solution to corridor congestion. The project has broad local and regional support as the first logical and affordable improvements in the corridor with \$29 million in state and local funding already identified. A \$15 million TIGER Discretionary Grant would provide much-needed congestion relief for the Denver metropolitan area, allowing CDOT to complete the planned improvements at less than one-third of the cost and with an estimated \$512 million in benefits.

### Innovation and TIGER Allow Project Completion Decades Earlier at a Fraction of the Cost

Scope	Estimated Cost (YOE Cost)	Year Open	Benefit/Cost Ratio 7% Discount (3%)
<b>Initial Long Range Plan<sup>42</sup></b>			
Managed Lanes to full design standards	\$145 M (\$490 M)	2035	N/A
<b>Amended Long Range Plan<sup>49</sup></b>			
Managed Lanes using inside shoulder	\$44 M (\$87 M)	2024	4.4 (8.8)
<b>With TIGER IV Grant</b>			
Managed Lanes using inside shoulder	\$44 M (\$44 M)	2015	10.1 (12.3)

The project is a cost-effective investment, maximizing use of existing highway infrastructure to expand capacity of the corridor. The approach is consistent with an October 2010 Federal Highway Administration (FHWA) report to Congress,<sup>59</sup> which identifies examples from around the country where DOTs have optimized transportation facilities by squeezing more capacity out of existing paved rights-of-way. Future operating and maintenance costs are minimized since no additional paved surface is proposed. Nationwide, DOTs are searching for ways to squeeze more efficiency out of their systems and using pricing as a way to fund them.<sup>2</sup> The project is an in-

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novative model for other DOTs around the country, and will provide sorely lacking performance data for this new type of facility.

Extending the managed lanes offers many benefits:

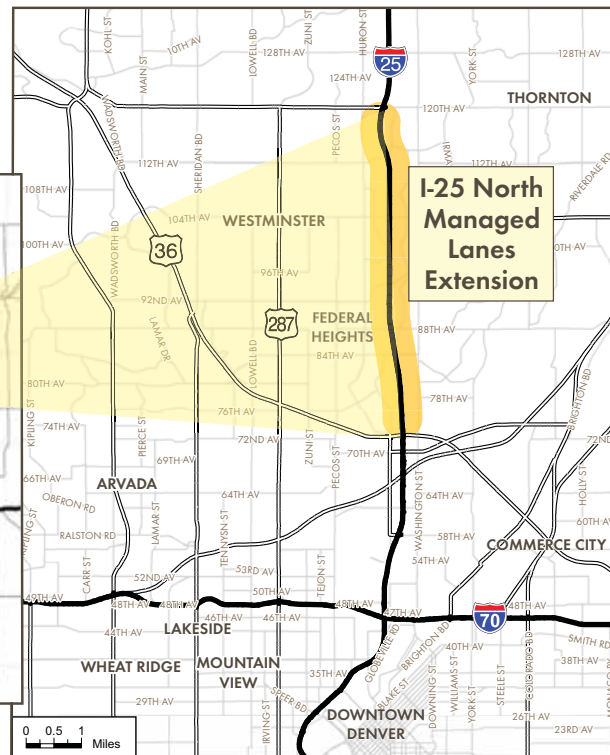
- Improves mobility for all travelers by providing a sustainable alternative to congestion two decades earlier than planned.
- Enhance existing Express Bus service by providing access to congestion-free managed lanes.
- Provides nearly 20-minute travel time savings for vehicles in the managed lanes, and a 4-minute savings for all others.<sup>25</sup>
- Gives travelers viable transportation choices: by allowing transit, carpools, and vanpools to bypass congestion.
- Improves mobility for freight carriers, businesses, and emerging energy industries – supporting long- term national economic recovery.
- Creates an estimated 576 critically needed jobs. Supports regional land use policies aimed at sustainable development patterns for the Denver area.
- Improves accessibility for thousands of affordable housing units located on this stretch of I-25.
- Provides additional capacity while minimizing long-term operating and maintenance costs.

*"In an era of tight budgets, it is an elegant, efficient and effective solution to use the shoulders. It is innovative – you use what you already have."*

Colorado Governor, John Hickenlooper



*Project location in the Denver Region*



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- Generates a new reliable revenue stream that offsets the cost of operations and maintenance of the new managed lanes.
- Reduces fuel consumption by 10 million gallons and greenhouse gas emissions by nearly 90,000 metric tons due to reduced vehicle delay and idling over a 10 year period.

Finally, it is important to note that this is CDOT's second TIGER application for this project. While this application includes the same basic project scope as the TIGER III request, there are some important differences that reflect the feedback we received from USDOT. For example, this application includes a 25-fold increase in local government (now at \$5.3 million) contribution, an additional \$5 million in highly sought after regionally directed funds, and the inclusion of new safety features and data. Further, Colorado's political leadership has joined together to choose the I-25 North Managed Lanes and Express Bus Project as Colorado's number one priority for TIGER funding.

## I. PROJECT DESCRIPTION

The project is located on I-25 between US 36 just north of downtown Denver and 120th Avenue in Adams County. I-25 is the primary north-south route through Colorado, providing access to, through, and from downtown Denver – the business, financial, government and cultural center of the state. North I-25 serves motorists traveling to the Denver area from Wyoming, neighboring Larimer and Weld Counties, and numerous Denver area suburbs. The six-mile segment of I-25 currently has three general purpose lanes in each direction. The project adds a fourth travel lane in both directions to be operated as a managed lane.

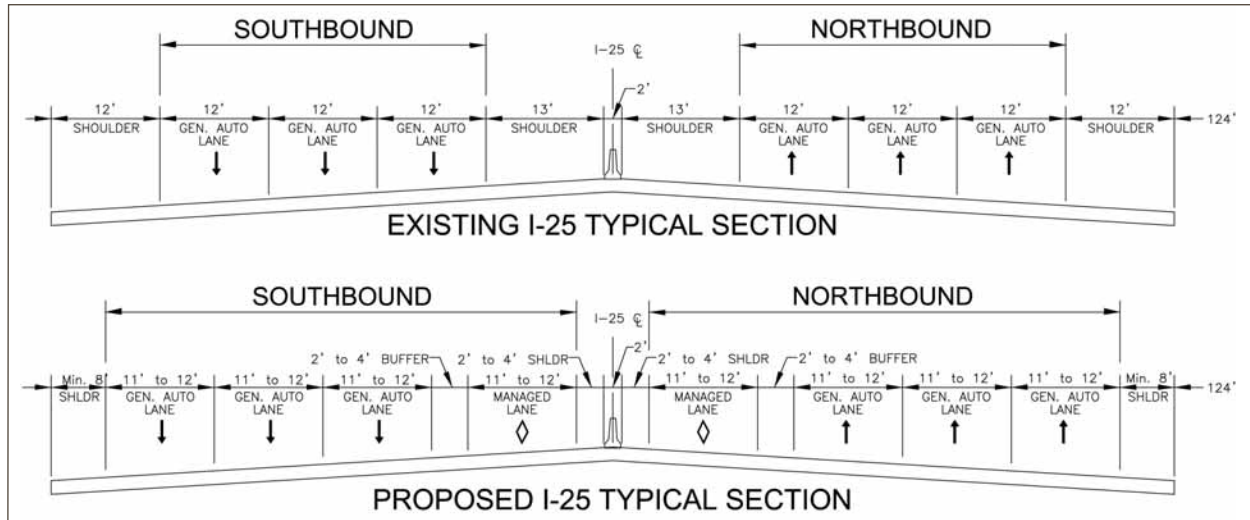
### Elements of Project Scope: Managed Lanes

- Provide one new managed lane in each direction on I-25 between US 36 and 120th Avenue utilizing existing pavement and narrowing the inside shoulder.



North I-25 Managed Lanes and network of bus transit and tolled facilities.





*Typical sections of existing and proposed managed lanes.*

- Provide a minimum 2 to 4 foot-wide painted buffer to separate the managed lanes from general purpose travel.
- Maintain minimum 8 foot-wide outside shoulders and provide additional emergency pullouts for vehicle refuge.
- Maintain 11 to 12 foot-wide lane widths and 2 to 4 foot-wide inside shoulders.
- Provide ingress and egress to the managed lanes at each major interchange.
- Provide a key link in a developing system of managed lanes by providing an extension of the I-25 Express Lanes, direct connection to US 36 to the west, and eventually I-270 to the southeast.
- Build a new connecting ramp to allow a seamless transition between the existing one-directional lanes and the new bi-directional lanes.<sup>79</sup>

## Express Bus / Transit / Carpooling

- Establish a continuous managed lane between Adams County and downtown Denver with connections to major regional transit hubs at north and south route termini. Express Bus, carpoolers and special transit patrons will use the seamless managed lanes system for a faster, more reliable trip.

## Pavement Repair

- Repave the entire six-mile stretch of I-25 within the project limits currently in “poor” condition.<sup>27</sup>

## Noise Walls

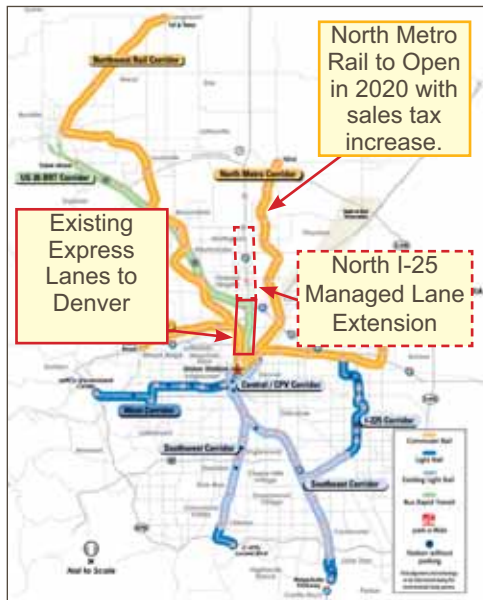
- Construct one mile of new noise wall and repair three miles of existing deteriorated noise walls.

## ITS/Traveler Information & Institutional Support

- Install state-of-the art tolling and Intelligent Transportation Systems (ITS) equipment and integrate it with regional traffic operations centers and a recently established North Area Transportation Alliance (NATA) TMO.

## I-25 North Managed Lanes Extension and Express Bus Project

- Apply Active Transportation Demand Management (ATDM) strategies that will enhance traffic efficiency and safety. The corridor will be equipped with lane use signs (LUS) to direct traffic during congestion and incidents, and back of queue warning systems along with LUS and Variable Message Signs (VMS) to alert drivers.



*Project connects to regional FasTracks mass transit system.*

The managed lanes will operate 24 hours a day, 7 days a week. HOV (2+) and public transit vehicles would have access to the managed lanes free of charge, while SOVs would pay a toll to use these lanes. Toll rates would be adjusted in real time based on the amount of traffic in the managed lanes so that the lanes operate at free-flow volumes at all times of the day. During peak hours, corridor-wide tolls will be set at not less than the Regional Transportation District (RTD) Express Bus fare to ensure continued competitiveness of transit in the corridor.

Currently, 4,300 patrons utilize RTD Express Bus routes 40X, 120X, and 122X every day with service between Adams County and downtown Denver.<sup>81</sup>

Together, the routes serve three well-utilized Park-n-Rides along the corridor, including Wagon Road, the most highly patronized Park-n-Ride in the region.<sup>82</sup>

To the north, the managed lane extension connects to

an existing northbound bus-only direct connect tunnel to RTD's Wagon Road Park-n-Ride. Using the managed lanes, Express Buses traveling south on I-25 terminate at the Denver Union Station, the region's primary multi-modal hub with connections to Amtrak, commuter rail, light rail, and bus connections to all parts of Denver, its suburbs and beyond.<sup>53</sup>

The project also expands the reach of a mass transit network already being built through RTD's FasTracks regional expansion program.<sup>57</sup> In addition, the project connects to a rapidly growing network of managed lanes, including the I-25 Express Lanes<sup>70</sup> on the south end of the project, and the soon-to-be-completed managed lanes on US 36 between Denver and Boulder on the west.<sup>57</sup> The lanes will allow a seamless transit, carpool, or tolled trip from Adams County continuously into downtown Denver.

Four automatic toll collection points are envisioned in each direction of travel. The operating system includes loop detectors, variable message signs, real-time digital



*To the north, project links to Wagon Road Park N Ride via direct-connect tunnel.*



*To the south, project connects to Denver Union Station in downtown Denver.*

video cameras, toll-collection and process units, and enforcement equipment to collect traffic data, support enforcement and disseminate real-time travel and pricing information to drivers.

CDOT will utilize existing contracts in place with the Colorado State Patrol for enforcement and E-470 Public Highway Authority (E-470)<sup>54</sup> for toll collection, processing, customer service and administration operations.

## II. PROJECT PARTIES

CDOT is the project sponsor. As listed below, CDOT's funding partners include seven local governments, the North Area Transportation Alliance, the Denver Regional Council of Governments (representing 9 counties and 54 municipalities in the Denver region) and RTD, Denver's transit agency. An additional 24 cities, businesses and organizations have provided letters of support. The High Performance Transportation Enterprise (HPTE) will manage and oversee operates of the tolling facility. A complete list of all organizations that support this application is included in Appendices G and J. Project funding partners include:

- Adams County
- Weld County
- City and County of Broomfield
- City of Federal Heights
- City of Thornton
- City of Westminster
- City of Northglenn
- Denver Regional Council of Governments (DRCOG)
- Regional Transportation District (RTD)
- North Area Transportation Alliance

## III. GRANT FUNDS AND SOURCES / USES OF PROJECT FUNDS

CDOT has assembled a funding package for the project anchored by \$29 million of state and locally directed funds – representing over 65% of total project costs. This includes \$5 million from DRCOG as well as \$5.3 million in contributions from cities and counties. These local contributions highlight the desire for the project's near-term completion. While not accounted for as local match in this application, toll revenues to be collected over time represent a large local funding contribution to the project. TIFIA financing was considered, but is ineligible given the \$50 million minimum project cost requirement of that program. Sources and uses of funding are outlined on page 8.

## I-25 North Managed Lanes Extension and Express Bus Project

Project Sources	Amount	Percentage	Cumulative %
Proposed Federal TIGER IV Grant	\$15 M	34%	34%
DRCOG Federal STP-Metro	\$5 M	11%	46%
State Highway Funds (\$10 M- Regional Priority Program; \$3.3 M Surface Treatment; \$2.2 M FASTER Safety)	\$15.5 M	34%	80%
State FASTER Transit Funds	\$3.5 M	8%	88%
Local RTD Transit Funds	\$0.8 M	2%	90%
Local Funds (\$1.5M- Adams County; \$50,000- City and County of Broomfield; \$150,000- City of Federal Heights; \$1.75 M- City of Thornton; \$550,000- City of Northglenn; \$500,000- City of Westminster; \$25,000- Weld County)	\$4.5 M	10%	100%
<b>TOTAL PROJECT FUNDING</b>	<b>\$44.3 M</b>	<b>100%</b>	

Project Uses	
Pavement Marking and Signing	\$1 M
Pavement Rehabilitation Inside Shoulder	\$4.8 M
Pavement Resurfacing	\$6.5 M
Tolling Equipment	\$5 M
Noise Walls	\$4.3 M
New Northbound Managed Lane at Connection to existing One-Direction I-25 Express Lane	\$0.9 M
Drainage/MS4	\$1.1 M
ITS	\$2 M
Construction Signing/Traffic Control	\$2.3 M
Mobilization	\$1.6 M
Force Account (including Utilities)	\$4.1 M
Construction Engineering	\$6.7 M
<b>Subtotal</b>	<b>\$40.3 M</b>
Contingency (10%)	\$4.0 M
<b>TOTAL PROJECT COST</b>	<b>\$44.3 M</b>

### The Importance of TIGER Funding to this Project

Without unique funding opportunities like TIGER, Colorado does not have the funds to build responsible highway expansion projects needed to move urban communities forward. Virtually all of the state's planned for funds are used to maintain the existing transportation system rather than to expand capacity.

Over the past five years, CDOT's budget has decreased by about 30 percent – from \$1.6 billion in 2007 to \$1.1 billion in 2012. CDOT's budget is less today than it was a decade ago but the demand on the transportation system continues to grow, with needs far outpacing available or anticipated resources on many fronts.<sup>1</sup> Fifty two percent of Colorado's state highways are rated in "poor" condition, up from just 40 percent rated poor in 2006, and 33 percent of the state's highways have deteriorated to the point of needing full reconstruction. Consequently, the state

has focused virtually all of its expected revenue toward attempting to maintain the existing transportation system.

But there is another reality in Colorado as well. Colorado's population has increased about 53% in the past two decades. Miles traveled on our federal and state systems have increased 57% over the same period. Yet the road capacity added to handle that growth, defined as new lane miles, increased only two percent over the same 20 years. As population continues to grow, more and more people will travel Colorado's outdated highways.

To support economic growth during a time when the state's business climate is suffering, Colorado relies on grant awards such as TIGER, unexpected funds, public-private partnership opportunities and tolling to grow the highway system with a fiscally responsible approach.

## IV. SELECTION CRITERIA

### A. LONG TERM OUTCOMES

#### (i) State of Good Repair

Currently, I-25 in this section is crippled daily by severe congestion. Pavement along the length of the project limits is currently in poor condition<sup>27</sup> and is being fully resurfaced with this project. This highway expansion project is different from most in that it provides capacity in an environmentally sustainable way. It adds capacity using existing infrastructure and uses managed lanes to encourage more environmentally responsible travel patterns over the long term. Congestion pricing ensures that the increased mobility provided by the project is sustainable long into the future. The project relieves congestion and rebuilds failing infrastructure in a way that minimizes project life cycle costs and generates new revenue to offset operating and maintenance costs.

#### **Improves Transportation Assets Consistent with State, Local, and Regional Plans**

The project is consistent with investment priorities in local, regional, and state plans, all of which place priority on maintenance of existing facilities and using operations and management techniques wherever possible for increased capacity.<sup>50,42,22</sup> It is consistent with the Preferred Alternative and the phased implementation approach defined in the FEIS ROD signed in December of last year.<sup>25</sup>

The project implements policies and guiding principles of DRCOG's 2035 Metro Vision Regional Transportation Plan, improving regional transit access, and utilizing congestion pricing for lane-addition projects in the most critically congested corridors.<sup>42</sup>

## Current and Projected I-25 North Facility Conditions

	Current Condition/ No Build			Condition after Project Completion		
Pavement Condition <sup>27</sup>	Poor			Good		
Peak Period Congestion <sup>25</sup>	3 General Purpose (GP) lanes operating at LOS E or F; No Managed Lane (ML)			3 GP lanes operating at LOS D or E; ML operating at minimum LOS C		
Travel Time, 120th Avenue to US 36 (South-bound AM Peak) <sup>25</sup>	2015	2024	2035	2015	2024	2035
	19 mins GP	23 mins GP	26 mins GP	16 mins GP 7 mins ML	19 mins GP 7 mins ML	22 mins GP 7 mins ML
Travel Time Savings (Current minus projected)	N/A	N/A	N/A	3 mins GP 12 mins ML	4 mins GP 16 mins ML	4 mins GP 19 mins ML
Daily Hours of Severe Congestion <sup>30</sup>	8 hours/day GP			0 hours/day ML		
Long-Term Sustainable Funding	None – Transportation Revenues on Decline			New Toll Revenue Covers O&M with \$15 M surplus in 2035 <sup>94</sup>		

## Repairs Roads and Improves Mobility – Supporting Economic Growth and Recovery

Reliable transportation options are often cited by companies as a decision-making factor in business location. Severe traffic congestion is a daily occurrence along I-25 north of downtown Denver negatively impacting productivity. The metro Denver area currently ranks 9th worst in the nation for traffic congestion.<sup>87</sup> Recent reports show that during times of severe congestion the average speed of traffic on this facility drops to roughly 15 miles per hour.<sup>74,25</sup>

Enhancing mobility for trade (both domestic and international) is key to supporting and promoting economic development. Colorado is strategically located as a “bridge” state in the national and international infrastructure for the movement of freight, resulting in large quantities of goods flowing through the state. The majority of freight in Colorado is being transported by trucks on the highway system, with the highest truck volumes in the state on I-25 between I-76 and US 36 within the project area.<sup>22</sup> According to the Freight Analysis Framework database, the value of goods shipped in Colorado in 2002 was over \$230 billion.<sup>22</sup> The value of goods imported from other states (supporting growth outside of Colorado) was about 10% higher than the value Colorado exported (supporting Colorado businesses and industries).<sup>96</sup> Freight movement in Colorado is anticipated to more than double by 2035, with imports growing by a factor of 3.2 and exports by a factor of 2.5.<sup>22</sup>

Current businesses along the corridor include federal laboratories and universities that are involved in progressive research, such as alternative fuels and climate change, and have a strong potential to influence our nation’s future. A 175-acre Applied Research and Science Park at I-25 just north of 120th Avenue is planned for research institutions and companies to locate together. The research center will be an incubator for new advances in medicine, renewable energy, applied research, technology and science and will rely on a commuting workforce, with a reliable travel time to and from work along I-25.<sup>102</sup> Left unimproved, unmanageable congestion on I-25

would be a strong deterrent for new businesses to locate here and could prompt relocation of current commerce away from the area, resulting in job loss and economic instability.

## Is Appropriately Capitalized and Will Utilize Asset Management Models

CDOT and its local and regional partners have identified a funding plan for \$29 million of the \$44 million estimated project cost. A \$15 million TIGER Discretionary Grant will complete the full funding package. ITS equipment and roadway components will be managed consistent with CDOT’s existing asset management programs. The Colorado Transportation Commission annually sets performance goals, based on optimizing value and minimizing long-term life cycle costs, guiding decisions on how to spend limited financial resources.<sup>21</sup> The asset management models have identified repaving of this stretch of I-25 in the next two years as a priority.<sup>27</sup>

## Generates Revenue to Pay for Long Term Operating and Maintenance Costs

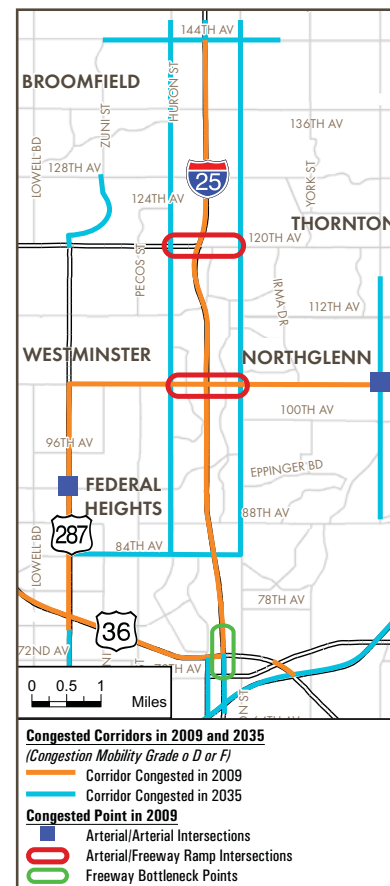
CDOT, like DOTs nationwide, is struggling to keep its facilities in good shape in times of declining transportation revenues.<sup>1</sup> Those travelling I-25 will pay for the proposed improvements over time in the form of tolls. Toll revenues, while not defined as “local match” in this application, constitute a significant local investment in transportation infrastructure. Projected toll revenues exceed the additional operations and maintenance costs resulting from the new managed lane in every full year of operations (see Appendix K). Between 2015 and 2035, locally generated toll revenues are projected to exceed cost by more than \$15 million. Excess revenues produced over the long term can be redirected to other areas of need along the corridor. In an era of tight transportation funding, establishing a new stream of revenue is significant.<sup>2</sup>

## Improves Capacity while Reducing Per Lane-Mile and Transit O&M Costs

This project is especially attractive because it adds capacity without increasing annual O&M costs. By converting existing paved shoulders to managed travel lanes, no additional pavement will need to be maintained. Due to the slope of the roadway, CDOT already plows the inside shoulders, meaning that snow and ice removal costs remain at current levels; other potential increases in annual maintenance activities are projected to be minimal. As a result, per-lane life-cycle costs of the roadway are actually reduced from what they are today. Similarly, RTD estimated that reduced travel times for buses in the managed lane will save approximately \$250,000 per year in transit operating costs.

## (ii) Economic Competitiveness

I-25 is a vital link in the regional, national, and international highway network. It is the primary north-south corridor link to and through Denver and is a primary route for the move-



*Project corridor experiences severe congestion<sup>42</sup>.*

ment of freight in the Western United States. I-25 is identified as High Priority Corridor No. 27 within the National Highway System<sup>89</sup>. Enhancing mobility for freight is critical for domestic and international trade and economic growth. Colorado imports larger value of goods than it exports, meaning that improving mobility on I-25 will have national, rather than just regional impact. I-25 is also a top corridor for job creation, and for emerging national economic sectors. The project provides more reliable and timely access for freight carriers, businesses, and residents commuting to and from employment centers, educational opportunities, and services. Building the managed lane extension reduces travel times for those using the managed lane between Adams County and Denver by nearly 20 minutes, and reduces travel time for all other vehicles by 4 minutes<sup>25</sup>. The project is estimated to decrease average travel times for automobile and bus riders by 34 million hours over 10 years valued at \$444 million.

## Supports a Vital Commuting Link to and from Downtown Denver

I-25 North is used by the greatest number of workers who commute into the metro area from outside the region.<sup>42</sup> Currently, I-25 entering Denver is congested for four hours in the morning, and outbound traffic is congested for four hours in the evening.<sup>30</sup> The Volume to Capacity ratio is currently at 85%, with demand expected to exceed capacity by 2030.<sup>19</sup> Future residential developments planned on I-25 north from Broomfield to Frederick (including Erie, Dacono and Firestone) will contribute significantly to the commuting travel shed south into Denver and beyond. Market research indicates residents of these new developments will be dual income families, with one family member employed locally and the other employed south of I-70. Constructing managed lanes in each direction will greatly improve access to employment centers, educational opportunities, and services.



*Most commuters to Denver come from northern suburbs<sup>42</sup>.*

## Improves Mobility that Generates Jobs

The six-mile stretch of I-25 from US 36 to 120th Avenue in Adams County is home to 370,000 residents.<sup>25</sup> Between 2010 and 2035 employment growth along the corridor is projected at 143%.<sup>50</sup> Because of its educated and diversified workforce, the I-25 corridor has recently attracted companies that can spur future economic growth and employment, especially in emergent industries.<sup>35,36</sup> The project corridor borders three Enterprise Zones. With close proximity to the University of Colorado medical centers and the Children's Hospital, the area has become an incubator of bio-technology enterprises, such as Idexx Laboratories and Allos Therapeutics. In addition to multiple medical campuses



*Enterprise Zones adjacent to the project<sup>4</sup>.*



within this corridor, numerous retail developments, hotels and mixed use industrial/commercial developments planned adjacent to I-25 just north of this project area will increase employment opportunities for a diverse workforce.

Traffic congestion on I-25 north of Denver is severe, crippling regional mobility. During congested periods, traffic operates at speeds less than one-third of the posted speed limit (15 mph compared to 55-65 mph).<sup>25</sup> The managed lane improvements will provide a better level of service (reduced travel times) which will enable the North Metro Communities to increase their market competitiveness in locating and identifying prospective businesses, and critical employment centers. The reduced travel times along the corridor will respectively enable the North Metro Communities to meet the critical site selection criteria for travel times to and from DIA, as well as connections to rail and transportation distribution hubs.

### **Supports the National New Energy Economy**

According to the Center for the New Energy Economy at Colorado State University, the Denver metro area has attracted over 30 renewable energy companies or ventures, creating over 4,000 jobs since 2007<sup>10</sup>. A number of these have involved expansions into the U.S. market from foreign manufacturers (e.g., Vestas, American Zephyr Corporation) or regional expansions by domestic companies. Several are now within or in close proximity to the I-25 corridor. I-25 North extends to rapidly growing Weld County, the site of newly discovered natural gas fields. Improved mobility in this corridor supports the success and growth of these emerging sectors that are so important to our national economy and global environment.



*I-25 serves renewable energy companies.*

### **Improves Capacity Supporting Reliable Freight Movements and Increasing National Productivity**

Colorado has an important role in moving goods throughout the Nation. I-25 is part of the Camino Real Corridor, which promotes trade between Canada, U.S. and Mexico.<sup>89</sup> Colorado is strategically located as a “bridge” state in the national and international infrastructure for the movement of freight, resulting in large quantities of goods flowing through the state. The majority of freight in Colorado is being transported by trucks on the highway system, with the highest truck volumes in the State on I-25 between I-76 and US 36 within the project area.<sup>22</sup> According to the Freight Analysis Framework database<sup>22</sup>, the value of goods shipped in Colorado in 2002 was over \$230 billion. The value of goods imported from other states (supporting growth outside of Colorado) was about 10% higher than the value Colorado exported (supporting Colorado businesses and industries).<sup>96</sup> Freight movement in Colorado is anticipated to more than double by 2035, with imports growing by a factor of 3.2 and exports by a factor of 2.5.<sup>22</sup> Colorado's largest export commodity is non-metallic minerals. The availability of these materials is key to the U.S. economy and global competitiveness, as these minerals are integral component in producing consumer goods such as cell phones, computer chips and semiconductors.<sup>98, 101</sup> Improvements to I-25 ensure continued nationwide access to these critical supply chain commodities.

## (iii) Livability

Every day, thousands of commuters and other travelers suffer through peak period congestion on I-25. Providing a lane that offers a choice to bypass congestion improves the quality of life of all travelers. Low-income families, seniors and the disabled stand to benefit considerably from an improved transportation system that increases travel options, and improves better access to jobs and support services. During peak periods, RTD Express Buses are caught in congestion on I-25, resulting in significantly slower travel times compared to free-flow conditions. The project enhances existing Express Bus service by providing access to congestion-free managed lanes at all times. The project significantly decreases travel times by 20 minutes resulting in \$49.3 million (see Appendix B) in monetized travel time savings for transit users over 10 years.

<b>HUD-DOT EPA Partnership for Sustainable Communities: Livability Principles</b>	
<b>Livability Principles</b>	<b>Project Benefits</b>
Provide more transportation choices	Provides one new managed lane in each direction which will be free for High Occupancy Vehicles (HOV) and express buses.
Promote equitable, affordable housing	Decrease travel times for users of the express buses, vanpools or carpools on the managed lanes improves access to nearly 7,000 affordable housing units located along the corridor. <sup>108</sup>
Enhance economic competitiveness	Improves mobility for freight along regionally significant N-S freight route.  Supports a vital commuting link to and from downtown Denver and improves mobility to support a corridor projected to see a 143% increase in employment growth by 2035.
Support existing communities	Supports economically distressed Weld County (unemployment rate of 9.1%) by reducing travel times and providing greater access to employment centers.  Supports three major Transit Oriented Development centers planned for development along the corridor.  Creates 576 new construction jobs.
Coordinate and leverage federal policies and investment	Incentivizes carpooling and express bus use along one of Colorado's most congested highway corridors, thereby helping reduce dependence on foreign oil.  Improves overall highway safety.  Implements a project that maximizes use of the existing infrastructure.  Leverages a \$15 million federal investment to accomplish a \$44 million project yielding \$512 million in benefits.
Value communities and neighborhoods	Improves access for elderly and disadvantaged populations by decreasing travel times for express buses, vanpools or carpools.  Implements improvements requested by over 20 local governments facing the daily economic and quality of life impacts of a congested highway.

## Supports Growth in Economically Distressed Areas

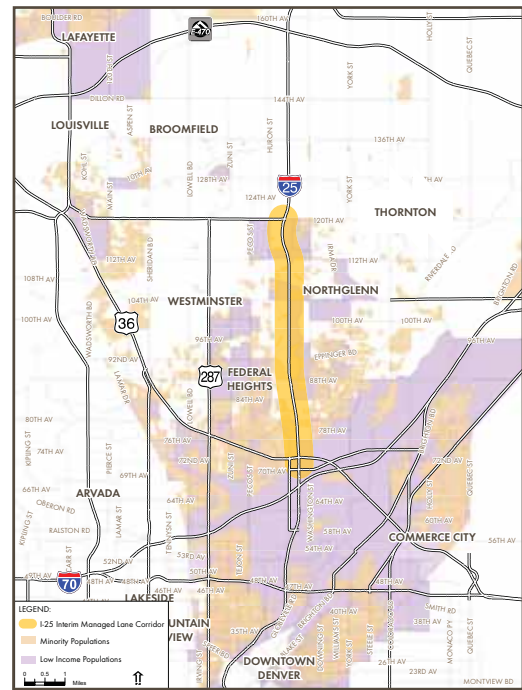
I-25 North is the transportation lifeline for neighboring Adams and Weld Counties. As of December 2011, Weld County has an unemployment rate of 9.1% and has been officially designated as an Economically Distressed Area (EDA).<sup>60</sup> Although not EDA-designated, the unemployment rate in Adams County is even higher at 9.5%.<sup>8</sup> By creating more convenient transportation options, including enhanced mass transit, the project will improve mobility for disadvantaged populations, and foster increased economic activity.

## Improves Access, Providing Intermodal and System Connectivity

Express Buses using the extended managed lanes connect passengers with Amtrack, commuter rail, and light rail lines destined for the remainder of the greater metropolitan area and the rest of the country.<sup>80</sup> Passengers will have access to the managed lanes from the three major Park-n-Ride facilities located adjacent to or in close proximity to the project. These facilities offer over 2,400 parking spaces along with secure bike racks and lockers.<sup>82</sup> Of these facilities, the Wagon Road Park-n-Ride at the project limit is the largest, with over 1,500 parking spaces.

## Improves Access for Low Income, Elderly and Disadvantaged Populations

The Denver area's low income, elderly and disabled populations rely heavily on the region's transit system and are growing at rates faster than the general population.<sup>39</sup> nearly 7,000 affordable housing units are located on the corridor.<sup>108</sup> About 67,000 households in the Denver region do not have an automobile available.<sup>25</sup> By decreasing travel times for users of the Express Buses, vanpools, or carpools on the managed lanes, the project improves accessibility and mobility for economically disadvantaged populations, non-drivers, senior citizens, and persons with disabilities.



Minority and low-income populations near project<sup>25</sup>.

Largest Affordable Housing Complexes in Close Proximity to the Project			
Aztec Village Apts. (164 Units)	Creekside Pl. Apts (208 units)	Waterview PKY Apts (82 units)	Overlook (160 units)
Carriage Hill Apts. (100 units)	Lamplighter Village (104 units)	Montair Apts (319 units)	North Creek Apts

## Supports and Encourages Transit Oriented Development

Within the project limits, the DRCOG's 2035 Metro Vision Regional Transportation Plan identifies several areas slated for transit-oriented development (TOD): The Wagon Road Park-n-Ride Mixed Use Center, the 104th-Northglenn Activity Center, and the Thornton Parkway & 92nd Center.<sup>42</sup> It is envisioned that these centers would be high-intensity, pedestrian-oriented, mixed-use locations, providing a range of retail, business, civic and residential opportunities. Designated as planned “urban centers”, these higher-density, mixed-use developments are an important component of sustainable land use patterns, important for jobs/housing balance that can reduce future growth in travel demand.

## Improves Access to Cultural Experiences

Downtown Denver is the cultural center for the region. It is home to more than 30 major attractions, including three major sports venues that host the Denver Broncos, the Colorado Rockies, the Denver Nuggets, and the Colorado Avalanche, an amusement park, a wide variety of popular restaurants and bars, several world-class museums and the Denver Center for the Performing Arts complex. People traveling from northern communities to these attractions regularly experience congestion on evenings and weekends. The project will provide more reliable options for travel and improve travel times to these venues.



*Project builds new/repairs aging noise walls.*

## Addresses Noise Impacts

The project also improves the quality of life of citizens who reside near I-25 along the project limits by constructing new noise walls and repairing the existing noise walls that are in a poor state of condition.

## (iv) Environmental Sustainability

This project occurs in the context of a region designated as an ozone non-attainment area and in a state with overall vehicle miles traveled (VMT) growth projected at an average rate of 2.1% per year between 2012 and 2020.<sup>9</sup> Recognizing that the transportation sector is currently the second

	<b>Net 2024 Reductions</b>
Greenhouse Gas Emissions	90,052 Metric Tons
Gasoline and Diesel Consumption	9,877,907 Gallons

largest source of greenhouse gas (GHG) emissions in Colorado – accounting for 28% of Colorado’s gross GHG emissions in 2005<sup>9</sup> – the benefits of reducing vehicle emissions in the Denver area is significant to our global environment. This project simultaneously expands capacity in a limited footprint and uses congestion pricing to manage the new capacity for sustainable congestion relief. It minimizes the environmental impacts of road construction by using the existing shoulder for the managed lanes and incentivizes environmentally-friendly transportation choices – all of which reduces future oil consumption and GHG emissions.

### **Incentivizes Travel Choices That Reduce Oil Consumption and Greenhouse Gas Emissions**

Today, HOVs and passenger buses on I-25 are trapped in gridlock along with long-haul trucks and SOVs. This project adds a new managed lane that exempts carpoolers and passenger buses from fees. By incentivizing carpooling and transit use with a fast, congestion-free commute, this project significantly increases the number of people who choose these options for their trips.

Increased carpooling and mass transit use come with real, measurable benefits in oil savings and GHG emissions. The benefit of reducing vehicle emissions in this area is significant to our local and global environment and its livability.

### **Implements a Sustainable Alternative for Capacity Expansion**

Because congestion can be priced in a managed lane facility, the project provides an alternative way to increase capacity beyond simply building more lanes. The project acknowledges that we cannot build our way out of congestion. We need to employ new management techniques, like the ones proposed in this project, to achieve sustainable options to congestion for the future.

### **Provides On-the-Ground Sustainability by Minimizing Environmental Footprint**

CDOT recognizes that sustainability in the transportation sector means making maximum use of existing infrastructure and minimizing the impacts of construction. The project uses the existing inside shoulder to create the new managed lanes, providing more capacity without increased environmental impact. This approach also minimizes the heavy-duty construction equipment needed for a full lane build-out, thereby minimizing the air quality impacts that often accompany construction of expanded facilities.



*RTD serves 4,300 Express Bus riders a day on the North I-25 corridor<sup>81</sup>.*



*Project shortens express bus travel time, attracting more riders, saving fuel, and reducing emissions.*

## Supports Sustainability at the Regional, State, and National Level

At the regional level, this project contributes directly to three key sustainability goals in DRCOG's 2035 Metro Vision Regional Transportation Plan:<sup>42</sup>

- Reduce the number of SOV trips to work to 65% by 2035
- Reduce daily VMT per capita by 10% by 2035
- Cut greenhouse gas emissions by 60% by 2035

At the state level, the project supports a CDOT policy directive on air quality (PD 1901.0)<sup>16</sup> committing the Department to “promote a transportation system that is environmentally responsible by working to research and promote actions and technologies that assist areas of the state which currently violate air quality standards to achieve compliance and to prevent the occurrence of new violations of air quality standards elsewhere in the state.” This project also supports a 2007 Executive Order, “Greening of State Government” (Executive Order D011 07)<sup>83</sup>, which established specific goals and objectives for reducing the impact of state resource management decisions. This Order requires state agencies to develop and implement strategies that minimize the public health and environmental impacts associated with agency land use and acquisition.

At the national level, the American Association of State Highway and Transportation Officials (AASHTO) recently issued a report, *Transportation: Invest in Our Future*,<sup>3</sup> which addresses the role of transportation as a major contributor to oil consumption and air pollution in addressing sustainability concerns. The report urges transportation decision makers to adopt a “triple bottom line” approach to sustainability<sup>3</sup> by evaluating performance on the basis of three principles: economic, social and environmental impacts. The table below describes the steps involved in the triple bottom line approach and details the features of this project that deliver on this approach.

AASHTO Triple Bottom Line Approach	I-25 North Project Features
Robust economic growth: Deliver a sustainable, high-performance transportation system in support of a robust economy by first optimizing existing infrastructure, then reshaping demand, and lastly expanding judiciously.	<ul style="list-style-type: none"> <li>• Addresses congested corridor that serves as a critical transportation route to the entire Front Range and provides a primary link to and through downtown Denver and access to hundreds of businesses.</li> <li>• Optimizes existing infrastructure by using paved shoulders to create new lanes.</li> <li>• Reshapes demand by offering carpoolers and transit users a free and uncongested ride.</li> </ul>
Improved quality of life for all citizens: Enhance quality of life by integrating transportation with the built environment by using the full tool kit, including CSS, land use policy, and diversified mode choice.	<ul style="list-style-type: none"> <li>• Provides congestion relief decades earlier than originally planned with emphasis on alternate modes.</li> <li>• Improves bus travel time to give riders more choices and better access.</li> </ul>
Better-than-before health of the environment: Embrace environmental stewardship as a preeminent approach to delivering transportation services that result in zero carbon footprint and a better-than-before environment.	<ul style="list-style-type: none"> <li>• No additional right-of-way and little or no additional paved surface are needed.</li> <li>• Minimizes the environmental impacts of construction, as well as the impacts associated with the production and placement of asphalt/paved surface.</li> <li>• Provides sustainable alternative to building more lanes.</li> </ul>

## (v) Safety

Recently a group from the Denver metro area participated in a peer exchange with the Minnesota Department of Transportation (MNDOT) and FHWA in Minneapolis. The purpose of the trip was to learn from the nearly ten years of experience MNDOT has with operating and maintaining buffer separated HOT lanes like those proposed with this project.

While a formal study of safety along the MNDOT HOT lane corridors is underway by the University of Minnesota, anecdotal conversations with operations,

maintenance and law enforcement personnel that actively work these roadways suggest the cumulative impacts on safety are acceptable. Lessons learned from this peer exchange were applied to the I-25 corridor to inform our conclusions on safety impacts of the proposed project outlined below.



*The project will implement dynamically priced managed lanes and Active Traffic Demand Management.*

Over a ten year period in the no-build scenario, there are expected to be approximately 4,394 accidents in the I-25 corridor.<sup>28</sup> By increasing capacity and utilizing innovative ITS and Active Transportation Demand Management (ATDM) equipment, the project is expected to result in a 10% overall reduction in accidents over a ten year period, valued at \$29 million.

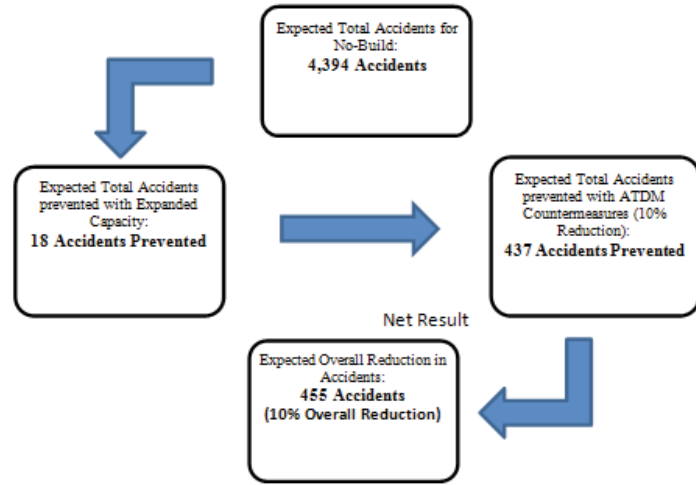
A review of accident records from 2006-2010 for the I-25 North corridor indicates the majority of crashes are congestion related, with rear-end and sideswipe same-direction collisions constituting 77% of all crashes.<sup>28</sup> This project proposes to address congestion with the addition of a managed lane in each direction increasing the capacity of the facility from six to eight lanes. There is a safety benefit with the increased capacity, but the benefit is reduced somewhat due to the increased speed differentials between the buffer-separated managed lanes and the existing freeway lanes.

Next, in conjunction with building the managed lanes, CDOT is taking additional steps to improve safety through the use of technology. The project will install ITS and ATDM equipment, such as variable message signs, lane use control signs and closed circuit cameras with the purpose of improving traffic management, traveler information and incident response. With the aid of operators this equipment will warn and direct drivers during times of congestion and is expected to reduce primary and secondary accidents corridor-wide. Data from the European experience<sup>99</sup> suggests an overall reduction in accidents of 3-30 % when a roadway is fully equipped with ATDM technology. The proposed Colorado concept is a scaled down version of the European system so accident reductions are expected to be more in the range of 10%.

Finally, buffers and shoulders<sup>5</sup> will be maximized throughout, with minimum eight-foot outside shoulders and additional emergency pullouts for vehicle refuge. Along with this, the I-25 Courtesy Patrol which provides towing and other services to disabled vehicles will also be extended in this area to further improve incident response and traveler safety. Considering all the improve-

ments, the estimated net safety benefit in the first 10 years of operations is an expected 10% reduction in crashes compared with the no-build scenario. See figure for net accident reduction calculation methodology.

Additional safety benefits from adding capacity to the freeway also may be realized on a regional level. Vehicles attracted to the added capacity of the managed lanes will most likely come from the surrounding arterial network. While difficult to quantify total accident reduction, Colorado statistics show the accident rate on the freeways to be approximately 200% less than on the arterials.<sup>13</sup> This effect was not included in the net accident reduction calculations; however, it could be considered a contributing factor to the safety benefits of a managed lane.



Finally, CDOT commits to monitoring and reporting on the accident history of this corridor after construction to further add to the safety knowledge base for these types of facilities. The “before” safety data provides a detailed and comprehensive understanding of the current conditions. CDOT will collect the same detailed accident data for the “after” condition to aid in any future decision making.

**B. JOB CREATION AND NEAR-TERM ECONOMIC ACTIVITY**

**Creates 576 New Construction-Related Jobs With Benefits to Economically Challenged Areas (EDA)**

As of December 2011, the unemployment rate in Adams County and Weld County was 9.5% and 9.1%, respectively.<sup>8</sup> Weld County has been officially designated as an EDA. The project will generate 576 new jobs over the next 36 months, many of which will benefit the economically challenged Adams and Weld Counties, because of their strong construction sector.<sup>8,4</sup>

**Benefits to Small and Disadvantaged Business Enterprises**

CDOT is committed to this project meeting or exceeding the Department’s statewide annual disadvantaged business enterprises<sup>17</sup> (DBE) goal for this project (currently at 13.29%) by awarding a target percentage of transportation contracts to DBEs. CDOT is strongly committed to employing DBE firms. CDOT's Denver Regional office last year hosted two open houses for small and disadvantaged businesses aimed at encouraging their continued participation in CDOT work.<sup>24</sup>

**Project Will Have Immediate Economic Impact**

Appendix C provides a quarter by quarter draw down schedule for the proposed work, indicating that 576 new jobs will be created by this project within next three years.



## C. INNOVATION

### Rethinking Standard Design Criteria to Accelerate Improvements

Demonstrating the benefits of innovative design and engineering is the hallmark of the project. The project is achievable in the near term only because it revisits standard design criteria to make use of what currently exists to yield new capacity. The innovative approach builds on ideas presented in an October 2010 FHWA report to Congress called Efficient Use of Highway Capacity.<sup>59</sup> The project expands the reach of existing managed lanes and increases the success and effectiveness of the overall system. The project is a high-value, low-cost investment that makes more efficient use of existing highway capacity.

### Putting Innovative Technology to Work to Improve System Operations

The project includes Active Transportation Demand Management (ATDM) strategies that will enhance traffic efficiency and safety and other innovative technologies to improve transit reliability and traveler information, and ensure that toll collection is accurate, with a high level of customer satisfaction. State-of-the-art equipment planned for the project includes:

- All-electric tolling systems
- Electronic payment technologies
- Electronic toll collections systems to allow seamless regional systems
- Automatic vehicle classification for the detection and determination of vehicle profile
- High resolution automatic license plate reading camera utilizing optical character recognition
- Video tolling for open road tolling
- In-vehicle computers or in-lane notification to officers of purported HOV status
- Capability for dynamic pricing of toll rates
- Integrated ITS systems to view traffic conditions, dispatch courtesy patrol, implement incident management plans, assess device status and initiate repairs and maintenance, and gather data from devices
- Spot volume, occupancy, and speed using microwave side radar
- Metrics for measuring and evaluating the facility's performance
- Lane use signs (LUS) to direct traffic during congestion and incidents
- Back of queue warning systems along with LUS and Variable Message Signs (VMS) to alert drivers

### Accelerating Project Delivery

In March 2009 state legislation created the High Performance Transportation Enterprise (HPTE) to seek out opportunities for innovative and efficient means of financing important surface trans-

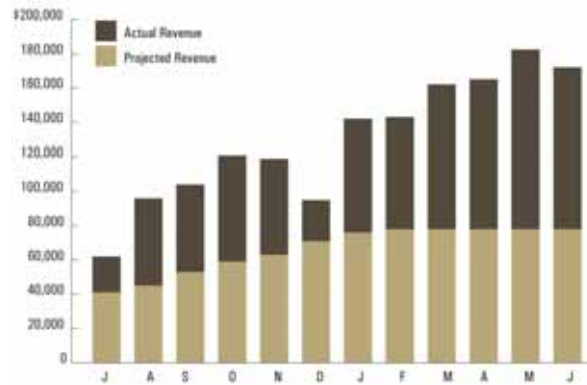
portation projects, and to ensure that such projects are also properly prioritized and accelerated.<sup>65</sup> HPTE is an important partner in the project and will assist in accelerating project completion.

## Managing a Regional System Based on a Proven History of Success

Managed lanes in the Denver area have a proven successful track record. CDOT and HPTE are experienced in operating similar managed lane facilities. Since opening in 2006, the I-25 Express Lanes, located at the south end of this project, have far exceeded initial traffic and revenue projections. The HPTE recently closed a \$54 million TIFIA Loan based on a TIGER Challenge Grant to build new managed lanes on US 36<sup>69</sup>. The new I-25 facility will utilize pre-existing HPTE agreements for toll collection, customer service, revenue processing, and enforcement with E-470 and the Colorado State Patrol. The project will benefit greatly from local experience with toll collections and supporting ITS equipment.

**Monthly Estimated Toll Revenue vs. Actual Revenue: July '06-June '07**

The I-25 Express Lanes have been overwhelmingly successful and have exceeded first-year revenue and user projections.



*Revenue of existing I-25 managed lanes exceeds forecasts.*

## D. PARTNERSHIP

### (i) Jurisdictional & Stakeholder Collaboration

#### Local Funding Contributions

DRCOG, the regional transportation planning agency, and local agencies along the corridor have committed more than \$10 million to the project. Particularly in the current economic climate, these contributions are evidence of the importance of the project and its impact on the regional economy. The project is Colorado's number one priority for TIGER Discretionary funding. Local residents' willingness to pay a toll for reduced travel times further demonstrates strong local commitment.



#### Community Involvement Helped Shape the North I-25 Environmental Impact Statement (EIS)

Local agency involvement in the EIS process began in early 2004 and continued through completion of the FEIS in August 2011. The process involved representatives from 32 cities and towns, 7 counties, and 4 regional organizations participating in committee work. More than 30 public meetings provided opportunities to solicit and collect comments in order to provide input

to CDOT, FHWA, Federal Transportation Administration (FTA), the project management team, and representatives from local jurisdictions. The current project was shaped by input from this diverse partnership.

### **NATA Brings Multiple Public and Private Entities Together on a Common Vision for the I-25 Corridor**



The North Area Transportation Alliance (NATA)<sup>77</sup> was formed in 2009 to champion mobility improvements to North I-25. NATA consists of representatives from economic development organizations and elected officials from 12 local governments in the north/northeast section of the Denver metro area. Congestion relief along the north I-25 corridor is NATA's top priority, and the group has established strong partnerships with CDOT, HPTE, and RTD to accomplish this goal. Although local government budgets are tight, NATA members and other local agencies have pledged \$5.3 million for this project (see Appendix J).

### **Transportation Improvements will be Supported by a New Corridor TMO**

NATA recently established a Transportation Management Organization (TMO) for the I-25 North corridor. The new TMO will work closely with CDOT as well as with employers, commuters and neighborhood groups as the project is built to ensure that the benefits of regional and local Transportation Demand Management (TDM) strategies are maximized. TDM strategies being pursued include carpool/vanpool matching, improved transit services, teleworking, and commuting support programs, all aimed at reducing congestion and improving air quality.

### **(ii) Disciplinary Integration**

The project offers a sustainable alternative to traditional surface transportation projects. The improvements are broadly supported by a wide variety of agencies with missions ranging from improving public health to providing critical emergency response. When implemented, the project will provide mobility and access to existing and non-transportation public service agencies along I-25 in Adams, Broomfield, Weld and Larimer Counties. Some of the agencies, organizations and non-transportation sectors that will benefit include:

<b>Medical and Emergency Services</b>	
North Suburban Hospital	Within project area @ 92nd & I-25
Colorado Children’s Hospital	Just north of project area east of I-25 at 160th
FUTURE Kaiser Permanente Hospital	Just north of project area west of I-25 at 160th
North Washington Fire District	I-25 splits the District’s service area
Thornton Police Department & Thornton Fire Departments	I-25 splits these respective Departments' service areas
North Metro Fire District	I-25 splits the District’s service area
Northglenn Police Department	I-25 splits the City of Northglenn
<b>Air Quality Agencies/Public Health</b>	
Colorado Department of Public Health and Environment - Air Pollution Control Division	State Public Health and Environmental Agency
<b>Economic Development Agencies and Special Transit Services</b>	
A-Lift	Shuttle Service for Adams County seniors and disabled community through metro area
Adams County Economic Development	Offices located within project area west of I-25 & 120th Concentrates on primary sector business retention
Metro North Chamber of Commerce	Offices located just north of project area west of I-25 & 144th
<b>Colleges and Professional Trade Schools</b>	
Kaplan College	Located within project area at I-25 & 88th Avenue
Everest College	Located within project area at I-25 and 88th Ave
Regis University	Located within project area east of I-25 & 88th
DeVry University	Located within project area west of I-25 and 120th
Westwood College	Located within project area at I-25 & U.S. 36

## E. RESULTS OF BENEFIT-COST ANALYSIS

To assess the potential benefits of the Project, a Benefit-Cost Analysis (BCA) was conducted. The project is expected to have a Benefit/Cost (B/C) ratio of 10.1 over 10 years (12.88 over 12 years). Non-monetized benefits include an increase of 115,920 Express Bus trips, a reduction of 10 million gallons of fuel, and a decrease of over 90,000 metric tons of vehicle emissions. Detailed information regarding the Benefit/Cost Analysis can be found in Appendix B.

The BCA was used to compare three options. In each option, the benefits to the affected population (transit users, carpools, personal and commercial vehicles) as well as the anticipated changes in the population are calculated on an annual basis. The benefits, costs and changes to the affected population are calculated through 2035.

The first option, which is the preferred alternative from the ROD, won’t be able to be built until approximately 2035 and therefore would have no benefit for the first 20 years. Because funding

Current Status/ Baseline & problem to be addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by Impacts	Economic Benefit	Summary of Results 10 Years with 7% Discount (3% Discount)	Page Reference in BCA
Traffic congestion during multiple times, especially AM/PM peak	Add a managed lane within the existing ROW	Reduced travel time, increased productivity	Business and personal travelers	\$16.70/hr. for personal travel, \$22.90/hr. for business travel	\$365,442,849 in time saved (\$505,783,215)	Pages 4/5
Traffic congestion during multiple times, especially AM/PM peak	Add a managed lane within the existing ROW	Reduced travel time, increased productivity	Trucks travelling on the corridor	\$23.70/hr. for truck and bus travel	\$78,431,879 in time saved (\$108,285,282)	Pages 4/5
Higher than desired traffic accidents due to heavy congestion	Adding a managed lane will reduce congestion related accidents	Reduced accidents	Travelers on the corridor	\$3,384, \$88,533 and \$6,200,000 for PDO, injury and fatality accidents respectively	\$29,432,357 in property, injury and fatality savings (\$39,571,104)	Page 7
Increase vehicle emissions due to idling, lower speeds and less efficient travel as a result of congestion	Managed lane will reduce congestion and consequently improve efficiency of travel and reduce emissions	Reduced emissions	Residents, employees and travelers within the region	\$1,280, \$5,217, \$285,469 and \$30,516 per metric ton for VOCs, NOx, PM and SOx respectively (2007\$)	\$1,918,965 in reduced pollutants (\$2,649,950)	Pages 6/7
Funds to improve the highway surface will not be available in the short term, causing cost inflation	Advancing construction of the managed lanes allows the facility improvements to be done earlier	Advanced roadway improvements	Travelers on the corridor	Increased cost to build the project in FY23/24 when funds are expected discounted to present value	\$11,140,690 in savings by advancing construction (\$17,945,524)	Page 4
Increased fuel usage due to less efficient driving conditions in congestion	Managed lane will reduce congestion and consequently improve efficiency of travel and reduce fuel consumption	Reduced fuel consumption	Travelers on the corridor	33% and 38% increased efficiency for autos and trucks respectively by travelling with less congestion. (\$3.50/gallon gas, \$4.00/gallon diesel)	\$25,837,186 in gasoline and diesel fuel saved (\$35,699,244)	Page 6

isn't available to build the preferred alternative until 2035, a second alternative emerged to utilize the existing footprint to build an additional managed lane. This option could be funded by 2024 and has a Benefit/Cost (B/C) ratio of 4.4 by 2035. Utilizing TIGER funds however, this project could be completed by 2015 with a B/C ratio of 10.1 over ten years (compared to the 2024 option) and 12.9 over 20 years. A discount rate of 7 percent has been used throughout this application; however, a sensitivity analysis was done for the alternatives at 3 percent as well showing a strong B/C ratio of 12.3 over 10 years. This project has strong user benefits and completing the needed work earlier further enhances those benefits.

Traffic data was drawn from the FEIS and the project benefits were monetized in accordance with guidance provided by FHWA.<sup>61</sup> Other non-monetized benefits include an increased transit mode share, providing a link between the EDA communities in Weld County and Metro Denver and enhancing the profile and public acceptance and use of a regional Managed Lanes system.

In the current climate of constrained transportation benefits, transportation agencies across the country have had to take innovative approaches to getting the most benefit out of existing infrastructure with the least cost. With the requested TIGER funds, this project will deliver much needed congestion relief to one of the most congested roadways in the Rocky Mountain West and will provide the desired benefit at a greatly reduced cost than previously planned. This project is a great example of innovation and analysis leading to a more efficient of constrained financial resources leading to maximized benefit to the public.

## Evaluation of Project Performance

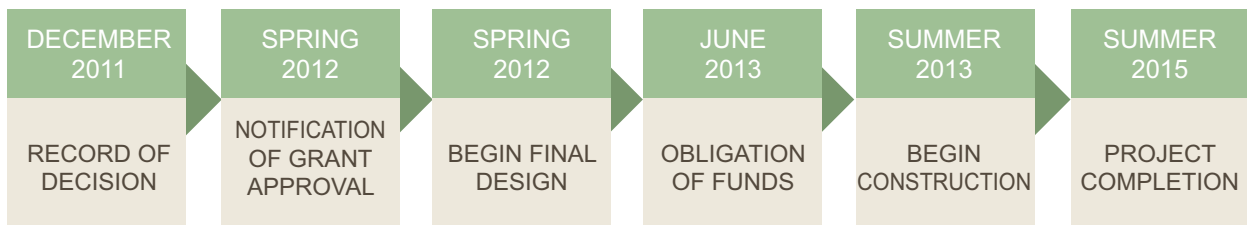
CDOT and HPTE are keenly aware of US DOT's interest in tracking the performance of TIGER projects and are committed to working with US DOT to establish metrics to evaluate benefits from travel time reductions, higher use of alternative modes, reduced GHG emissions, etc. Evaluation of project performance is critical and will highlight how this high-impact / low-cost approach to capacity expansion can be used as a model for other similar future opportunities throughout the United States.

## V. PROJECT READINESS AND NEPA

### (i) Project Schedule

CDOT plans to obligate all funding for the project by June 2013. A detailed quarterly draw down schedule of activities and associated quarterly jobs created is included in Appendix C.

#### Schedule



## (ii) Environmental and Other Approvals

A Record of Decision (ROD) on the North I-25 Final Environmental Impact Statement was signed in December 2011<sup>25</sup>. A standard storm water construction permit from the Colorado Department of Public Health and Environment is required prior to construction. No significant modifications to Interstate ramps are proposed which would require an FHWA interstate access approval. A design variance from the FHWA Colorado Division office has been secured (Appendix L) approving proposed shoulder and lane widths. On August 25, 2011, Colorado received toll authority under Title 23 U.S.C. 166 for the adjacent section of I-25. HPTE has submitted a request to FHWA to modify its existing toll agreement to extend I-25 managed lanes further north to 120th Avenue; now that the ROD is signed, an amended tolling agreement can be executed.

## (iii) Legislative Approvals

No legislative approvals are needed to deliver this project.

## (iv) State and Local Planning

This project is consistent with the Preferred Alternative identified in the FEIS which received a signed ROD in December 2011<sup>25</sup>. The project is a priority corridor improvement with independent utility.

The project is identified in the DRCOG's 2035 Fiscally Constrained Long Range Transportation Plan, as amended August 17, 2011<sup>49</sup> with funding anticipated two decades from now, in 2035. Action to include the project in the current DRCOG Transportation Improvement Program (TIP) is in process.<sup>51</sup> Pursuant to an agreement with local entities along the corridor, \$15.5 million currently included in the TIP will be redirected from other I-25 corridor improvements once a TIGER Discretionary Grant has been awarded (see Appendix J). DRCOG has pledged \$5 million in regionally competitive STP metro funding and local stakeholders have committed \$5.3 million for the improvements – contributions secured since submittal of this project for TIGER III funding.

## (v) Technical Feasibility

**Project Scope:** Survey work completed by the project team shows that the new managed lanes can be built utilizing existing pavement on the inside shoulder of the facility.<sup>79</sup> The improvements follow the model of similar facilities recently built in Florida<sup>63</sup> and Minnesota,<sup>75,76</sup> where inside shoulders were converted to managed lanes at relatively low cost to make maximum use of an existing transportation facility.<sup>31</sup>

**Project Schedule:** The project team would readily be able to obligate a TIGER Discretionary Grant by June 2013, with project completion targeted for summer of 2015. Design is anticipated to be fully complete by early 2013. No additional right of way will be needed to complete the project. Construction would be completed on an accelerated timeframe, with a goal of having the new lanes open to the traveling public by summer 2015.

## I-25 North Managed Lanes Extension and Express Bus Project

**Basis for Cost Estimate:** The estimate was prepared by experienced CDOT engineering staff, derived from quantities and CDOT average unit costs based on recent project data. A 10% contingency is included, which is appropriate given the straightforward nature of resurfacing and pavement striping work involved with this project. The estimate also includes a worst case assumption on the amount of inside shoulder pavement that needs rehabilitation. Radar survey equipment was used to determine the actual amount of shoulder pavement that needs improvement, which reduced the projected cost of pavement for the project.

**Operating and Maintenance (O&M) Costs:** Ongoing costs for care of the facility are minimized since the project utilizes an existing paved surface already maintained within established maintenance budgets. As a result, increased pavement related O&M costs are assumed to be negligible. In fact, since the project adds two new travel lanes, per-lane-mile O&M costs are reduced from current levels.

Incremental O&M related to the toll equipment and operation is estimated at \$774,000 in the first full year of operation and increases to \$3 million per year in 2035.<sup>94</sup> With anticipated toll revenues of \$790,000 in the first full year of operation increasing to over \$5 million per year in 2035, the sponsors are comfortable that O&M costs will be fully paid for by toll revenues.<sup>94</sup>

**Project Team:** CDOT is the lead entity on the project. Funding partners will have an oversight role to ensure the project meets established goals and objectives. As shown below, CDOT Region 6 engineering staff with direction from the Regional Director and North Program Engineer will design and construct the project following documented CDOT standard specifications and project management practices<sup>32</sup>. The Resident Engineer in charge will have a team of in-house and consultant design and construction engineers and subject matter support specialists dedicated to project completion. HPTE will provide technical guidance on tolling equipment to ensure compatibility with other regional toll facilities. HPTE will oversee toll operations of the managed lane and receive all toll revenues generated on the corridor. The operations will be managed utilizing HPTE's pre-existing agreements for toll collection and revenue processing.

Executive Oversight	Role	Yrs of Experience
Don Hunt, M.C.R.P.	CDOT Executive Director	40+
Michael Cheroutes, Esq.	HPTE Director	40+
Reza Akhavan, P.E.	CDOT Denver Region Director	25
Bill Van Meter, M.A.	RTD Assistant General Manager, Planning	22
Benson Stein, M.B.A.	CDOT Chief Financial Officer	22
Herman Stockinger	CDOT Deputy Executive Director	21
Project Engineering	Role	Yrs of Experience
John Schwab, P.E.	CDOT Denver North Program Engineer	30
Jay Hendrickson, P.E.	CDOT Denver I-25 Resident Engineer	18
Andrew Stratton, P.E.	Project Manager - CDOT & Consultant Engineering Team	10
Delivery Support	Role	Yrs of Experience
Steven Hersey, P.E.	CDOT Denver Region Traffic Engineer	15



## I-25 North Managed Lanes Extension and Express Bus Project

Diane Jacoby, B.S.	CDOT Denver Region Business Manager	20
Greg Jamieson	CDOT Denver Region Right-of-Way	11
Donna Haight	CDOT Denver Region Utilities	22
Elizabeth Kemp, M.C.P.	CDOT Denver Region Planning and Environmental	20
Rebecca White, M.P.A.	CDOT Denver Region – Policy & Government Relations Liaison	12
Kari Grant, M.P.C.D.	HPTE Innovative Project Delivery, Tolling, ITS	20

**Risk Mitigation:** Monthly cost, schedule and status reports will be produced by the project team and evaluated by CDOT management. Examples of items that will be tracked on a monthly basis include: total estimated project cost vs. latest approved budget with reasons for any deviations from approved budget and scope, critical path delays and any risks to final completion dates, significant scope of work changes, and any significant federal issues such as Buy America, and DBE compliance.

### (vi) Financial Feasibility


**Full Funding Plan:** A funding plan is in place to cover more than 65% of the \$44.3 million project cost. As outlined in detail in Section III (Sources and Uses of Funds), CDOT and the project team are seeking the \$15 million balance from the TIGER program in order to close the funding gap.

**Funding Secured for Operations and Maintenance Expenses:** Since the project does not create any additional pavement, existing CDOT maintenance funds are assumed to continue to cover all pavement related O&M costs. O&M costs associated with toll operations, enforcement and toll equipment maintenance estimated at \$774,000 in the first full year of operation, increasing to \$3 million per year in 2035.<sup>94</sup> Toll revenues -- an estimated \$790,000 in the first full year of operation increasing to over \$5 million per year in 2035<sup>94</sup> -- are more than sufficient to cover those additional costs over the long term. Initial traffic and revenue forecasting was prepared by Wilbur Smith and Associates (now CDM Smith), a nationally recognized consultant for investment grade projections. Results of their work give CDOT and HPTE confidence that the revenues will be sufficient to cover incremental toll-related O&M costs.

**Grantee's Ability to Manage Grants:** CDOT has a long standing relationship with US DOT managing hundreds of millions of dollars in Federal Aid grants for transportation projects every year. Under the Economic Stimulus program, CDOT was successful in obligating and spending all ARRA funds within the required timeframe leading to successful and timely completion of its recovery projects.<sup>34</sup> A TIGER Discretionary Grant awarded to CDOT for the US 36 managed lanes project was successfully obligated by the required deadline.<sup>68</sup> Each year, CDOT is a recipient of redistributed federal transportation funds from other states that were unable to obligate their funds within prescribed timeframes. CDOT has consistently demonstrated ability to deliver federal aid construction projects according to US DOT rules and regulations.

## VI. FEDERAL WAGE RATE CERTIFICATION

The Colorado Department of Transportation will comply with the requirements of subchapter IV of Chapter 31 of Title 40, United States Code (Federal wage rate requirements) as required by the FY 2010 Appropriations Act.

Signed:  Date: 3-19-2012  
Don Hunt  
Executive Director  
Colorado Department of Transportation

## VII. CHANGES SINCE PRE-APPLICATION

There are no changes to the I-25 North Managed Lanes Extension project proposal since submittal of the TIGER IV pre-application.

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