

# STATE OF COLORADO

## DEPARTMENT OF TRANSPORTATION

Russell George, Executive Director  
4201 East Arkansas Avenue, #262  
Denver, Colorado 80222  
(303) 757-9201  
(303) 757-9656 Fax



The Honorable Ray LaHood  
Secretary, U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, D.C. 20590

**RE: Colorado's U.S. 36 Managed Lane/Bus Rapid Transit (BRT) Project: A Sustainable Transportation Investment Generating Economic Recovery (TIGER) Grant Application**

Dear Mr. Secretary,

The Colorado Department of Transportation, in partnership with the Regional Transportation District, U.S. 36 Mayors & Commissioners Coalition, nine local governments and 36 Commuting Solutions respectfully submits the U.S. 36 Managed Lane/BRT Project for TIGER Discretionary Grant funding consideration.

Located in metropolitan Denver and Adams County, an Economically Distressed Area (EDA), the U.S. 36 Managed Lane/BRT Project offers a sustainable alternative from traditional surface transportation projects that attempt to "build their way out of congestion," providing a national model for future projects. This shovel-ready, multi-modal \$260 or \$160 project (depending on federal funding) includes construction of a managed lane, implementation of reliable BRT service, TDM, portions of an 18-mi. commuter bikeway, and replacement of poor pavement to a state of good repair.

U.S. 36 is economically diverse, home to the state's largest population of construction workers and nearly half of Colorado's federal laboratories and research centers. Supporting industries ranging from commercial freight to renewable energy and aerospace are located along U.S. 36, which is responsible for nearly 17% of the region's business and employment. The U.S. 36 Managed Lane/BRT Project will begin construction on the east end of the corridor, connecting to an existing 7-mi. managed lane system and yielding direct benefits to EDA Adams County. With a new 15-mi. reliable BRT system, EDA residents will see improved access to higher paying jobs and services throughout the corridor.

The entire corridor will see improved mobility and connectivity, expanding livability and reaping sustainable benefits by reducing fuel consumption and greenhouse gas emissions. BRT, HOVs and SOVs using the managed lane will see up to 25-min. of travel time savings. Near-term transit ridership will see an increase of 26%, which will double in the next two decades. Carpooling will also see a 5% increase through project implementation.

The Project will provide 7,234 short-term jobs and \$125 billion in long-term employment benefits that will contribute to Colorado – and the nation's – economic recovery. Analysis indicates a benefit-cost ratio for the \$260 million project of 40 to 1, yielding \$10.5 billion in cumulative net present value. The \$160 million project results in a 47 to 1 cost-benefit ratio, with a cumulative net present value of \$7.6 billion.

A U.S. DOT investment of \$200-\$100 million will leverage \$60 million in state/local funds for the Project and yield significant national and regional benefits that would otherwise not be realized until 2035, if at all. If you have any questions about this application, please contact Herman Stockinger, Director of Policy & Government Relations, at (303) 757-9077.

Sincerely,

A handwritten signature in black ink that reads "Russell George". The signature is fluid and cursive, with the first name being more prominent.

Russell George, CDOT Executive Director



## U.S. 36 Managed Lanes/Bus Rapid Transit

### A Sustainable Transportation Investment



**Applicant - Colorado Department of Transportation**, in partnership with:

Regional Transportation District

City of Louisville

Adams County

U.S. 36 Mayors & Commissioners Coalition

Town of Superior

Jefferson County

Boulder County

City & County of Broomfield

City & County of Denver

City of Boulder

City of Westminster

36 Commuting Solutions

**Contact: Herman Stockinger**, Director of Policy & Government Relations, Colorado Department of Transportation  
Office: 303-757-9077, Email: herman.stockinger@dot.state.co.us



## Table of Contents

Executive Summary .....	1
Project Description .....	2
Urban Transportation Challenges for Outdated Facility.....	2
Sustainable Alternative to Traditional Surface Transportation Projects .....	3
The Project is Scalable, Yielding Meaningful Benefits at Various Funding Levels.....	3
Project Elements: Managed Lanes.....	3
Project Elements: BRT.....	3
Project Elements: Bikeway, ITS & TDM Strategies.....	4
Integration with the Region’s Transit & Toll Infrastructure.....	4
Project Benefits.....	6
Significant State & Local Investments .....	7
TIGER Funding Request .....	7
1. Primary Selection Criteria (a) Long-Term Outcomes (i) State of Good Repair.....	8
Project is Consistent with State, Local & Regional Efforts to Maintain Transportation Facilities in a State of Good Repair .....	9
Project Will Rehabilitate, Reconstruct & Upgrade Surface Transportation Projects, Threatening Future Economic Growth & Stability Due to Poor Condition .....	9
The Project is Appropriately Capitalized Upfront & Uses Asset Management Approaches to Optimize Long-Term Costs .....	10
Two Sustainable Revenue Sources Are Identified for Long-Term O&M of U.S. 36 Highway Improvements & Transit Service .....	10
(ii) Economic Competitiveness .....	10
The Project Will Measurably Contribute Over the Long-Term to Growth in Employment .....	10
The Project Will Measurably Contribute Long-Term to Growth in the New Economy, a High Value Economic Activity.....	11
U.S. 36 Improvements Provides High-Quality Jobs, Spurring Private Sector Growth.....	11
Economic Benefits to Economically Distressed Area .....	12
Project Improves Long-Term Efficiency & Reliability of Moving Workers & Goods.....	12
(iii) Livability .....	13
Enhanced User Mobility through Creation of Transportation Options.....	13
Enhanced Modal Connectivity & Reduced Congestion on Existing Transportation Systems.....	14
Improved Accessibility for Senior Citizens, Economically Disadvantaged and the Disabled.....	15
Coordinating Transportation and Land-Use Decisions Improves Livability Along U.S. 36.....	15
(iv) Sustainability .....	16
Energy Efficient BRT Vehicles .....	16
Reduction of Oil Dependence .....	17
Minimizing Environmental Impacts through Thoughtful Transportation Planning .....	17
(v) Safety .....	18
(vi) Evaluation of Projected Cost/Benefits of the U.S. 36 Project.....	19
(vii) Evaluation of Project Performance .....	20
1. Primary Selection Criteria (b) Job Creation and Economic Stimulus .....	21
(i) Project Schedule .....	21
(ii) Environmental Approvals .....	22
(iii) Legislative/Agency Approvals .....	22
(iv) State & Local Planning .....	22
(v) Technical Feasibility.....	22
(vi) Financial Feasibility .....	23
2. Secondary Selection Criteria (a) Innovation .....	23
2. Secondary Selection Criteria (b) Partnership .....	23
Jurisdictional & Stakeholder Collaboration .....	24
Disciplinary Integration .....	24
Project Has Significant State & Local Funding .....	24





**Project Type:** Multimodal (highway, transit, other) surface transportation project.

**Project Location:** Denver, Colorado, metropolitan region, located in the 2nd and 7th Congressional districts. Project is located in and supported by Boulder County, City of Boulder, City of Louisville, Town of Superior, City and County of Broomfield, City of Westminster, Adams County, Jefferson County, City of Arvada, and the City and County of Denver.

**Project Area:** Urban.

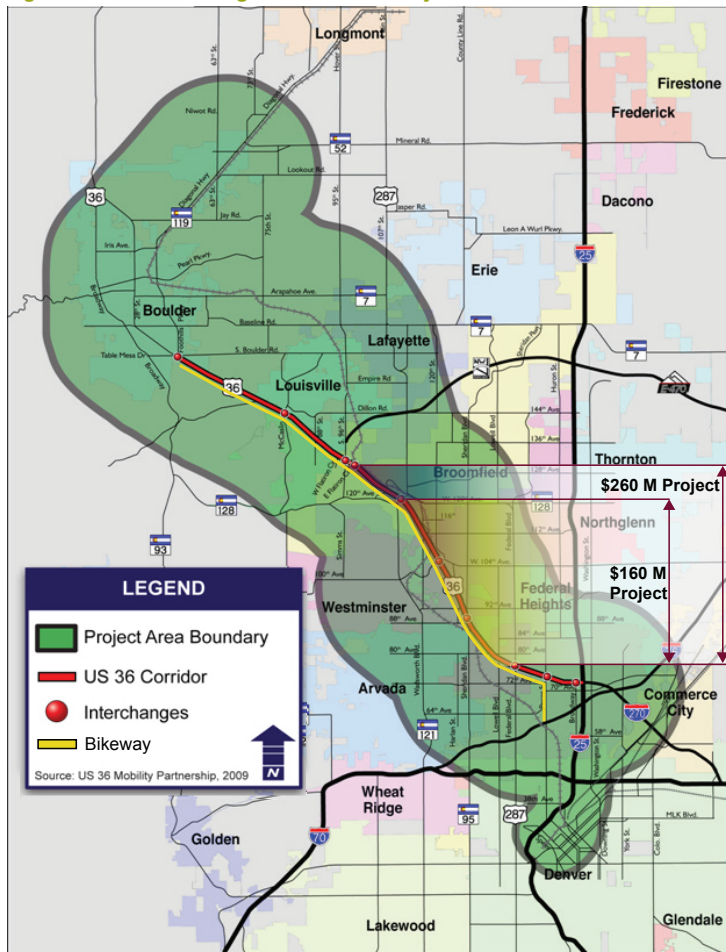
**TIGER Grant Request:** \$200 million - \$100 million.

## Executive Summary

The U.S. 36 Managed Lanes/Bus Rapid Transit (BRT) Project offers a sustainable transportation investment for the U.S. Department of Transportation (U.S. DOT) that achieves the goals of the Recovery Act. This 18.2-mi. urban surface transportation project provides an innovative alternative to historic attempts at “building our way out of congestion.” The project offers short- and long-term economic benefits and preserves community vitality and livability. A TIGER Discretionary Grant will allow these important improvements to occur 23 years earlier than planned, if future revenues are even realized.

The project is located in the Denver, Colorado, metropolitan region. U.S. 36 is a congested and rapidly growing corridor carrying between 80,000 and 100,000 daily vehicle trips. It currently operates at close to 90% volume to capacity; volume to capacity ratio is projected to exceed 1.0 by 2035.<sup>1</sup> Nearly 17% of the region’s business and employment is derived from the U.S.

**Figure 1. U.S. 36 Managed Lane/BRT Project Location & Elements.**



36 corridor, with corridor employment growth expected to increase by 53% in 2035.<sup>2</sup> U.S. 36 is economically diverse, anchored by Adams County to the east, an Economically Distressed Area (EDA)<sup>3</sup> and Boulder County to the west, which reaps more than \$700 million annually in benefit from federal laboratories.<sup>4</sup> The corridor has a high concentration of businesses in the renewable energy, high tech, aerospace and biotech industries, playing an important role in the emerging national economy.

The \$1.4 billion preferred alternative in the U.S. 36 Final Environmental Impact Statement (EIS) identifies a suite of sustainable transportation solutions, including:

- A new managed lane in each direction of U.S. 36, providing transit, High Occupancy Vehicles (HOVs) and paying Single Occupant Vehicles (SOVs) with travel time savings of up to 25 minutes one way,
- Repair and replacement of 14 bridges, five of which are considered poor, and 12 mi. of poor roadway surface,
- Implementation of a BRT system that connects to the regional transit system through Denver Union Station,
- Installation of Intelligent Transportation Systems (ITS) for tolling, transit information and incident management,



- Auxiliary lanes between interchanges to improve intra-corridor mobility,
- 18-mile commuter bikeway adjacent to the highway, and
- Transportation Demand Management (TDM) strategies to affect commuter behavior.

A Record of Decision (ROD) is scheduled to be signed at the end of 2009. Working with a diverse political coalition, the Colorado Department of Transportation (CDOT), in partnership with the Regional Transportation District (RTD), the U.S. 36 Mayors & Commissioners Coalition, Adams County, Jefferson County, City & County of Denver, City of Arvada, and 36 Commuting Solutions, identified a first phase of improvements that could construct the managed lanes, implement BRT service and the commuter bikeway for the full length of the corridor at a cost of \$550 million. While the region’s long-range transportation plan identifies more than \$700 million to build these improvements, full funding for this first phase is not expected to be available until 2035.<sup>5</sup> Given the unpredictability of transportation funding, these dollars are not guaranteed.<sup>6</sup>

A TIGER Discretionary Grant of \$200 - \$100 million will leverage \$60 million in state and local funds available today enabling the region to implement scalable projects from the identified \$550 million Denver-to-Boulder, managed lane extension. A larger discretionary TIGER Grant will allow the Department to complete the managed lanes the entire length of the corridor.

**Table 1. Proposed U.S. 36 Managed Lane/BRT Project Elements based on TIGER Investment Levels.**

Total Project Cost	TIGER Request	Local Funds	Project Length	Managed Lane System*	BRT**	Commuter Bikeway	O&M Funding Stream	Fix aging infrastructure	ITS	TDM	Complete by Feb. 2012
\$550M	n/a	n/a	18.2-mi.	26-mi.	✓	All	✓	✓	✓	✓	✓
\$260M	\$200M (77%)	\$60M (23%)	8.7-mi.	15.7-mi.	✓	Portions	✓	✓	✓	✓	✓
\$160M	\$100M (62%)	\$60M (38%)	6.8-mi.	13.8-mi.	✓	Portions	✓	✓	✓	✓	✓

\* Includes connection to the seven mile existing I-25 Express Lanes

\*\* Connects to regional transit system

Securing a TIGER Discretionary Grant will benefit the metro Denver region through immediate job creation and benefits to the environment, the economy and the traveling public. Investing in U.S. 36 today will yield up to \$10.5 billion in benefit, creating a maximum of 7,234 short-term jobs<sup>7</sup> and \$23 billion in long-term employment benefits (in \$260 million scenario).<sup>8</sup> Without TIGER, meaningful improvements to U.S. 36 will not occur until 2035, if at all, reducing the region’s ability to recover from the nation’s economic challenges.

## Project Description

The U.S. 36 Managed Lanes/Bus Rapid Transit (BRT) Project is a surface transportation project that will address the needs of the growing urban Denver metropolitan region, managing traffic capacity and providing a congestion-free alternative in a multimodal manner.

## Urban Transportation Challenges for Outdated Facility

The Denver metro region experienced record growth over the last 15 years – a trend projected to continue in the future. By the year 2035, population and employment within three miles of U.S. 36 will grow by 28% and 53% respectively.<sup>9</sup> This growth has been fueled by Colorado’s new energy economy, accounting for 6% of



the U.S. wind and photovoltaic markets and 5% of the U.S. biofuels market.<sup>10</sup> An improved U.S. 36 will not only support future growth, it will also provide region residents with access to jobs created by those investments – an important benefit for Adams County, an EDA.

Originally constructed in the 1950s as an 18.2-mi., four-lane toll road with one interchange between Denver and Boulder, toll collection on the Boulder Turnpike (as it was called), sunsetted in 1965 when the bonds were fully repaid. Today, U.S. 36 remains a four-lane general purpose lane facility, with 10 interchanges serving six of Colorado’s largest cities. The corridor handles a significant amount of bidirectional traffic, carrying between 80,000 and 100,000 trips on an average day.<sup>11</sup>

Average daily trips are estimated to grow by 50% by 2035, totaling 165,000 vehicles daily, with a projected volume to capacity ratio in excess of 1.0.<sup>12</sup> U.S. 36 commuters experience four hours of severe congestion daily, contributing to the annual 60-hr. delay average experienced by Denver regional drivers.<sup>13</sup> A long-term solution to manage congestion and traffic capacity is sorely needed.

## Sustainable Alternative to Traditional Surface Transportation Projects

The U.S. 36 Final EIS identifies an innovative alternative to the traditional approach of “building our way out of congestion.” Agencies and communities along the corridor deliberately sought a smaller footprint, ultimately agreeing on a \$1.4 billion solution that eliminated the need for new general purpose lanes, relying on managed lanes, transit, bikeway and auxiliary lanes between interchanges to manage future travel capacity. The smaller footprint, compared to the initial improvement packages evaluated during the Draft EIS, lessens environmental and property impacts. A \$550 million project will construct 18.2-mi. of managed lanes from the end of the existing I-25 Express Lanes in Denver all the way to Foothills Parkway in Boulder, for a 26-mi. continuous managed lane system. Managed lanes will be comple-

By 2035, population in the U.S. 36 corridor will grow 28% and employment 53% partly fueled by transportation related improvements.

mented by a comprehensive set of transit, carpooling ITS and Transportation Demand Management (TDM) improvements.

## The Project is Scalable, Yielding Meaningful Benefits at Various Funding Levels

A federal investment of \$200 or \$100 million will allow a \$260 million or \$160 million project to be implemented. At a minimum, these projects would construct a 6.8-mi. managed lane in each direction, offering a 13.8-mi. managed lane system for BRT/HOV and SOV users, full implementation of a BRT system and portions of the commuter bikeway. Geospatial data and maps for the respective projects are located in Appendix 2.

### Project Elements: Managed Lanes

The \$260 million project will construct one new, buffer-separated managed lane in each direction on U.S. 36 from the end of the existing I-25 Express Lanes in Denver all the way to the Interlocken Interchange, the gateway to Boulder County. The \$160 million project will construct one, new buffer-separated managed lane in each direction on U.S. 36 from the end of the I-25 Express Lanes to the Broomfield Interchange. Both projects will begin construction in the east end of the corridor, focusing on the EDA-portion of the project. BRT and HOVs will use the contiguous managed lane system free of charge, while SOVs will pay a toll to use the network.

### Project Elements: BRT

U.S. 36 BRT service will be operated by the RTD, Denver’s regional transit operator. The BRT will connect to Denver Union Station on the east, distributing riders to multimodal services, and to Boulder’s HOP, SKIP,



JUMP family of transit services on the west. Shifting trips from driving alone to other modes of travel is an important step in managing greenhouse gas emissions and other environmental transportation impacts. With more than 13,500 riders<sup>14</sup> using the existing corridor bus service – the highest in the region – the new BRT service will use the managed lanes to reduce trip time and maximize predictability for transit riders.

## Project Elements: Bikeway, ITS & TDM Strategies

Portions of an 18-mi. commuter bikeway, located adjacent to U.S. 36, with integrated access to BRT stations and local bikeways, creates a “mode rich” environment, further expanding travel choice.



Local transit ridership of 13,500 is expected to double over the next decade with the Project.

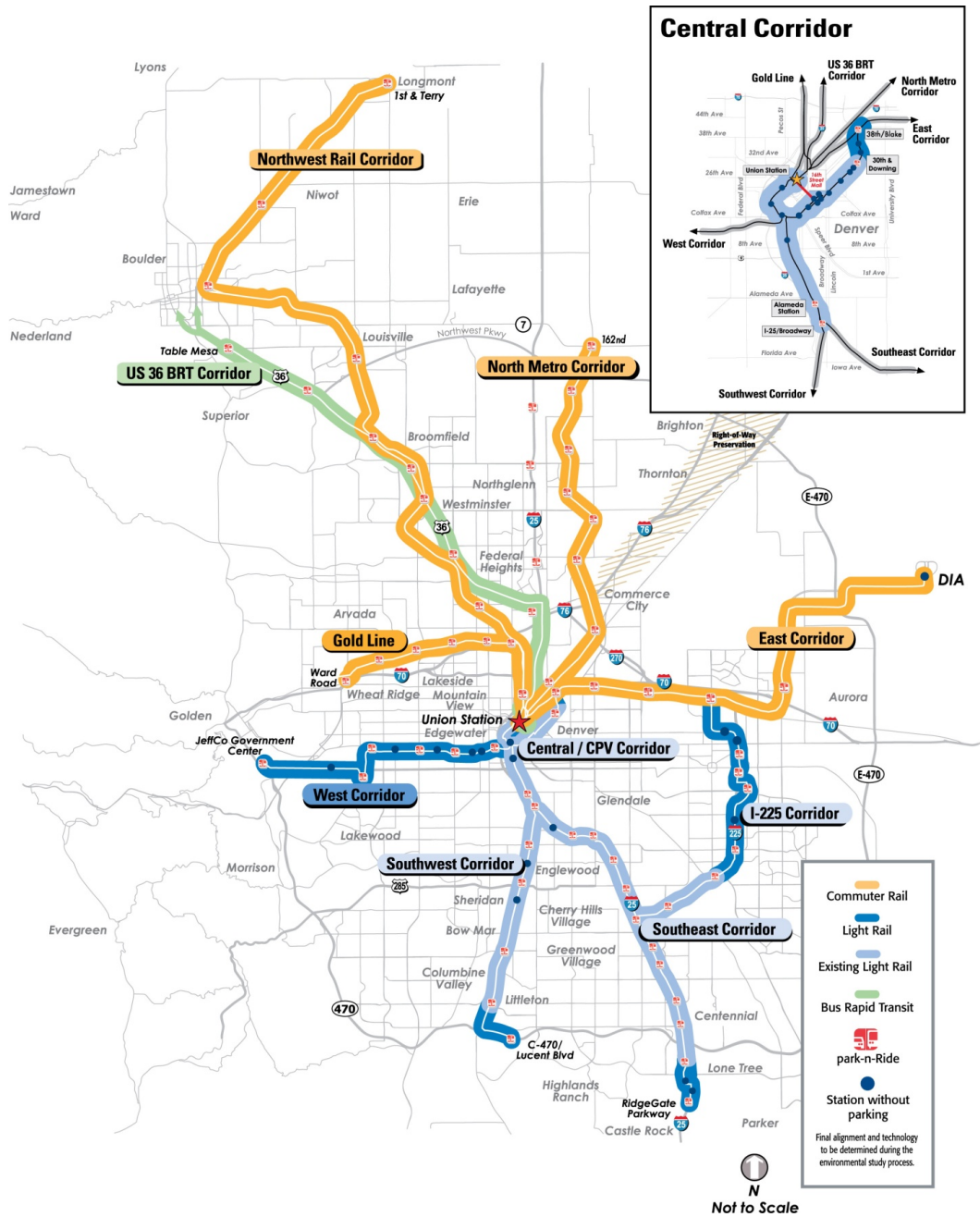
Real-time traffic, toll and carpool information will be provided via dynamic message signs along the corridor and variable message signs at BRT stations will provide information on the next scheduled bus. ITS will allow more effective implementation of the corridor’s incident management plan. CDOT and RTD will rely on existing telephone (511) and Web-based traveler information systems, allowing users to make more informed decisions about travel choices, especially during times of peak congestion. 36 Commuting Solutions, the corridor’s transportation management organization since 1998, will augment these efforts, relying on past success encouraging transit, carpooling and other alternative travel options for employees, employers and residents.

## Integration with the Region’s Transit & Toll Infrastructure

The U.S. 36 BRT service is an integral component of RTD’s 2004 voter-approved FasTracks program, a 12-year comprehensive plan to build and operate passenger rail lines and expand and improve bus service and park-n-Rides throughout the region. U.S. 36 BRT is one of nine new transit corridors that will converge at the renovated Denver Union Station, the central hub of the FasTracks system. Figure 2 illustrates how the U.S. 36 BRT (shown in green) will connect to the rest of the region, with Denver Union Station shown as the red star.



Figure 2. FasTracks Regional Transit Improvements

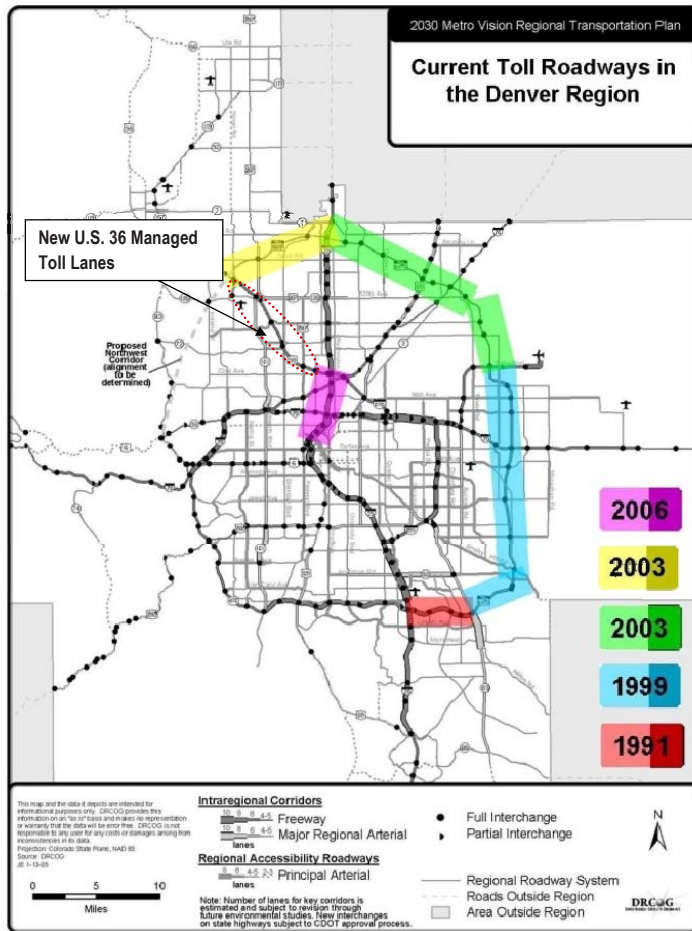


The new U.S. 36 managed lanes will expand upon an existing system of regional tollways. The new lanes will extend the reach of the highly successful I-25 Express Lanes all the way to Boulder, for a continuous 26-mi. managed lane facility. Implemented in 2006, through a conversion of an existing reversible HOV/Bus lane between the southern terminus of U.S. 36 and downtown Denver, the I-25 Express Lanes have seen the number of toll-paying SOV usage more than double original traffic and revenue estimates. Figure 3 illustrates how the new U.S. 36 managed lanes (shown with the red dotted line) will complement the entire system of Denver metro tollways, including the I-25 Express Lanes (shown in pink) and the Northwest Parkway (shown in yellow).





**Figure 3. Denver Regional Toll Facilities**



Investing in U.S. 36 to-day will yield \$10.5 billion in benefit, creating a maximum of 7,234 short-term jobs and up to \$23 billion in long-term

## Project Benefits

CDOT invested in the Federal Highway Administration’s DYNASMART-P travel model to identify the most appropriate performance measures and project benefits. Completion of the Project will address current transportation challenges by offering the following benefits:

- Improves mobility for all travelers by providing a sustainable alternative to congestion. Implementing the managed lanes offer users up to a 25-min. travel-time savings and a congestion-free trip from Boulder to Denver, with peak hour speeds up to 63 mph and a maximum of 2.4 million hours saved in 2012 with project implementation.<sup>15</sup>
- Expands mode choice for 165,000 daily commuters. Users can either use the general-purpose lanes or choose the option of a faster and more reliable trip by taking transit, carpooling, combining modes or paying to use the managed lanes.
- Reliable trip times yield a near-term 26% increase in transit ridership and a 5% increase in carpooling. Over the long-term, transit ridership is expected to double given RTD’s recent experience on the I-25 Express Lane.<sup>16</sup>
- 12-mi. of poor pavement will be reconstructed and five poor bridge structures will be replaced, correcting corridor safety issues and keeping the corridor in a state of good repair.
- The projected \$8,036,550 - \$4,990,250 in annual toll revenues (2012 dollars) will ensure stable funds for long-term operations and maintenance of the U.S. 36 managed lanes and BRT.<sup>17</sup>
- Implementing the U.S. 36 project would save a minimum 556,350 gallons of fuel annually, compared



to the no build scenario. The project would save at least \$142,899 annually by reducing greenhouse gas emissions.<sup>18</sup>

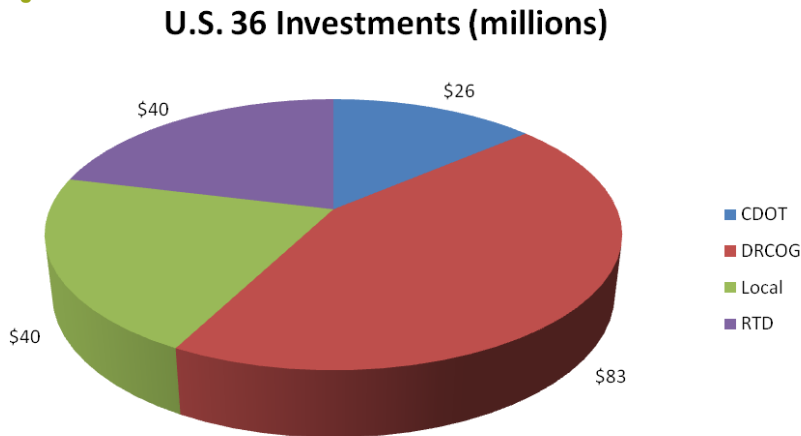
- Creates immediate economic benefit, with a maximum of 7,234 short-term jobs and approximately \$23 billion in long-term employment benefit.<sup>19</sup>

Additional discussion on U.S. 36 cost/benefit analysis and performance measures is located in 1. Primary Selection Criteria (a) Long-Term Outcomes, [sections vi](#) and [vii](#) of the application.

## Significant State & Local Investments

To date, the region has invested \$189 million in state and local resources to improve U.S. 36 in recent years. These funds have constructed infrastructure that support implementation of the Project.

**Figure 4. Prior Corridor Investments.**



CDOT and RTD each pledged \$30 million in state/local funds, over and above prior U.S. 36 corridor investments, to leverage any TIGER Discretionary Grant. Receipt of TIGER discretionary funds today will leverage future investments pledged to this corridor, enabling completion of the \$550 million project and ultimately the \$1.4 billion preferred alternative.

## TIGER Funding Request

CDOT, in partnership with RTD, 10 local governments and 36 Commuting Solutions, acknowledge the limited amount of TIGER funding available. As such, the application denotes a range of funding investments for the U.S. DOT that will yield meaningful improvements for the Denver metro region.

**Table 2. TIGER Funding Request and Proposed Improvements.**

Total Project Cost	TIGER Request	Local Funds	Project Length	Managed Lane System*	BRT**	Commuter Bikeway	O&M Funding Stream	Fix aging infrastructure	ITS	TDM	Complete by Feb. 2012
\$260M	\$200M (77%)	\$60M (23%)	8.7-mi.	15.7-mi.	✓	Portions	✓	✓	✓	✓	✓
\$160M	\$100M (68%)	\$60M (38%)	6.8-mi.	13.8-mi.	✓	Portions	✓	✓	✓	✓	✓

\* Includes connection to existing I-25 Express Lanes

\*\* Connects to regional transit system



## 1. Primary Selection Criteria (a) Long-Term Outcomes (i) State of Good Repair

Originally constructed in the 1950s as a four-lane toll road with one interchange, the 18.2-mi. U.S. 36 corridor remains a four-lane facility today, with 10 interchanges serving six of Colorado’s largest cities relying on aging infrastructure. The corridor carries between 80,000 and 100,000 trips on an average day, a number that is expected to increase 50% by 2035.<sup>20</sup> The Project will correct existing travel safety hazards in a manner consistent with established asset management programs. A sustainable funding stream supports ongoing costs of the managed lane.

**Table 3. Current and Projected U.S. 36 Facility Conditions.<sup>21</sup>**

	Current Corridor Condition	Projected Condition at Project Completion	
		\$260M Project	\$160M Project
Pavement Condition	<ul style="list-style-type: none"> <li>4-mi. with no remaining service life (RSL).</li> <li>8-mi. with 6-7 years RSL (Fair).</li> <li>6-mi. with 11-25 years RSL (Good).</li> </ul>	<ul style="list-style-type: none"> <li>Reconstruct 8.7-mi. of pavement, 14.7-mi. total with good RSL.</li> </ul>	<ul style="list-style-type: none"> <li>Reconstruct 6.8-mi. of pavement, 12.8-mi. total with good RSL.</li> </ul>
Structurally Deficient / Functionally Obsolete Bridges	<p>Three Structurally Deficient (SD) Bridges:</p> <ul style="list-style-type: none"> <li>Old Wadsworth over U.S. 36 (E-16-FL) *</li> <li>SH 121 over U.S. 36 (E-16-FK) *</li> <li>80th Ave. over U.S. 36 (E-16-FP) *</li> </ul> <p>Two Functionally Obsolete (FO) Bridges:</p> <ul style="list-style-type: none"> <li>U.S. 36 over Lowell (E-16-FR) *</li> <li>SH 95 Sheridan over U.S. 36 (E-16-FO) *</li> </ul>	<ul style="list-style-type: none"> <li>U.S. 36 over Lowell and</li> <li>80<sup>th</sup> Avenue over U.S. 36 are rebuilt to standard.</li> </ul>	<ul style="list-style-type: none"> <li>U.S. 36 over Lowell and</li> <li>80<sup>th</sup> Avenue over U.S. 36 are rebuilt to standard.</li> </ul>
Peak Period Congestion	<ul style="list-style-type: none"> <li>Nine General Purpose (GP) lane sections** operating at Level of Service (LOS) E or F.</li> <li>No Managed Lanes (ML) exist.</li> </ul>	<ul style="list-style-type: none"> <li>12 ML sections** operate at LOS B.</li> <li>8 GP sections operate at LOS E or F.</li> </ul>	<ul style="list-style-type: none"> <li>10 ML sections** operate at LOS B.</li> <li>8 GP sections operate at LOS E or F.</li> </ul>
Average Vehicle Speeds (Eastbound AM Peak)	<ul style="list-style-type: none"> <li>42 mph</li> </ul>	<ul style="list-style-type: none"> <li>Up to 62 mph and not less than 50 mph in ML.</li> <li>GP lanes at 43 mph.</li> </ul>	<ul style="list-style-type: none"> <li>Up to 63 mph and not less than 50 mph in ML.</li> <li>GP lanes at 41 mph.</li> </ul>
2012 Travel Time, Boulder to Denver (Eastbound AM Peak)	<ul style="list-style-type: none"> <li>42 minutes</li> </ul>	<ul style="list-style-type: none"> <li>ML: 17 min.</li> <li>GP: 38 min.</li> </ul>	<ul style="list-style-type: none"> <li>ML: 17 min.</li> <li>GP: 39 min.</li> </ul>
Long-Term Funding	<ul style="list-style-type: none"> <li>Insufficient federal, state, local funds to improve corridor safety, operations and maintenance</li> </ul>	<ul style="list-style-type: none"> <li>\$8,036,550 annual toll revenue.</li> <li>Annual O&amp;M is \$5,179,000.</li> <li>Projected \$2,857,550 in excess funds.</li> </ul>	<ul style="list-style-type: none"> <li>\$4,990,250 annual toll revenue.</li> <li>Annual O&amp;M is \$4,856,000.</li> <li>Projected \$134,250 in excess funds.</li> </ul>

\*Federal structure numbers

\*\* Section as defined in the Final EIS



## Project is Consistent with State, Local & Regional Efforts to Maintain Transportation Facilities in a State of Good Repair

- U.S. 36 tolling and roadway components will be managed consistent with CDOT's existing asset management programs – computer driven models that determine optimal times to repair/replace elements of our state's highway system.<sup>22</sup> 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.
- BRT transit vehicles and equipment will be managed with RTD's fleet management plan which conforms to Federal Transit Administration guidance on life cycle costs and maintenance standards. The aim of RTD's system is to perform routine maintenance and fleet replacement at optimal times to minimize long-term costs.

Corridor travelers currently experience four hours of severe congestion each day, resulting in 2.4 million annual person hours lost valued at 52 million.

- The state legislature gave CDOT the authority to toll new highway capacity. Since creation of the Colorado Tolling Enterprise in 2002 (now called the High Performance Transportation Enterprise), Colorado has implemented variable toll pricing on I-25 and has explored the expanded use of congestion pricing in other corridors as a way to better manage the transportation system and create a sustainable source of revenue for maintenance and operations costs. The Project will put those principles into practice.
- The Project is included in the Denver Regional Council of Governments' (DRCOG) 2035 Fiscally Constrained Regional Transportation Plan, though not funded until 2035.
- BRT service is one of nine regional transit corridor improvements recently approved by Denver area voters as part of the FasTracks program, funded by a dedicated, voter-approved sales tax increase.

## Project Will Rehabilitate, Reconstruct & Upgrade Surface Transportation Projects, Threatening Future Economic Growth & Stability Due to Poor Condition

- The Project will reconstruct and upgrade failing pavement, structurally deficient bridges and address crippling congestion. Significant improvements to those failing facilities will be accomplished in each of the funding packages presented.
- Businesses, federal laboratories and universities along the corridor are involved in progressive research such as alternative fuels and climate change, which will be influential on our nation's future. Since the corridor contributes significantly to the region's employment and population, failing to make these transportation investments will have a negative regional impact.
- Reliable transportation is often cited by companies as a decision-making factor in business location.<sup>23</sup> Left unimproved, poor system conditions and unmanageable congestion on U.S. 36 would be a strong deterrent for new businesses to locate here and could prompt relocation of current business.
- Adams County, one of the communities directly served by U.S. 36, is an EDA and home to a high concentration of construction workers.<sup>24</sup> The Project will significantly improve mobility and travel choices for businesses and residents of those communities, ensuring access to market and employment opportunities.
- The Project would significantly improve travel time and predictability,<sup>25</sup> benefiting businesses and individuals.
- Traffic congestion is costing the nation's freight transportation nearly \$8 billion annually.<sup>26</sup> For the 14.6% of truck trips on U.S. 36, the yearly cost of congestion totals nearly \$16 million.<sup>27</sup>
- A recent AASHTO report showed roads with poor pavement condition add an average of \$335 to the annual cost of owning a car due to damaged tires, suspension and fuel efficiency.<sup>28</sup> For U.S. 36 this equates to a staggering \$30 million in costs annually for the 90,000 vehicles traveling this roadway each day.



## The Project is Appropriately Capitalized Upfront & Uses Asset Management Approaches to Optimize Long-Term Costs

- This Project eliminates the need to construct additional lanes in the future. There is less pavement surface to maintain over the long-term compared to traditional highway capacity projects that add additional general purpose lanes, as congestion worsens further mitigating maintenance costs.
- CDOT pavement and bridge management systems<sup>29</sup> determine the optimal time for surface treatment repairs and reconstruction based on optimizing value and benefit cost ratios as well as minimizing life cycle costs.
- The projected toll revenues for each project identified in Table 3 provide a consistent revenue stream for the state to optimize long-term costs using asset management approaches.
- RTD's fleet management plan<sup>30</sup> will preserve useful BRT vehicle lifecycles.

Nearly 17 percent of the region's businesses and employment are located in the U.S. 36 corridor.

## Two Sustainable Revenue Sources Are Identified for Long-Term O&M of U.S. 36 Highway Improvements & Transit Service

- Projected toll revenues will exceed the estimated annual \$3.4 million operating cost of the Project, paying for ongoing managed lane operations, maintenance and enforcement.<sup>31</sup> This revenue stream is a far more reliable funding source than CDOT has now to meet maintenance costs statewide.
- Ongoing capital and operating costs of the BRT service will be paid for out of farebox and dedicated sales tax revenues for the RTD.

### (ii) Economic Competitiveness

#### The Project Will Measurably Contribute Over the Long-Term to Growth in Employment

U.S. 36 is a regionally significant employment corridor in the Denver metropolitan region that has spurred dramatic economic development within the state. The growth of Colorado's new energy economy contributes to the nation's economic bottom line; the lack of transportation investments will result in serious economic implications for the region, state and nation.

Long-term employment will grow by 129,580 workers with an average annual wages totaling \$520 billion by 2035.

The U.S. 36 corridor is anchored by two of the largest employment centers within the state, Denver and Boulder, with the eighth largest city, Westminster, in the middle.<sup>32</sup> The corridor houses 26,765 businesses and 200,278 jobs, representing 16.7% of the businesses and 16.3% of the employment in the Denver metro region.<sup>33</sup> The prospect of 25-min. travel time savings and a reliable travel time between Denver and Boulder are significant benefits. Improved efficiency in getting workers to and from their jobs is critical to the state's economy.

Employment growth in the corridor is expected to continue, with 53% growth expected by 2035.<sup>34</sup> With an average weekly wage of \$1,000 and an annual salary of \$52,000, long-term employment will grow by 129,580 workers with annual wages totaling \$520 billion by 2035.<sup>35</sup> Of this, \$125 billion in long-term employment benefits are a direct result of Preferred Alternative investment in the U.S. 36 corridor.<sup>36</sup>



**The Project Will Measurably Contribute Long-Term to Growth in the New Economy, a High Value Economic Activity**

U.S. 36 is a technology corridor of emerging business clusters that align with national goals and contribute to Colorado’s support of the nation’s new economy. While Colorado’s gross state product accounts for only 1.6% of the U.S. GDP, Colorado has about 6% of the U.S. wind market and photovoltaic market, and 5% of the U.S. biofuels market.<sup>37</sup>

**Table 4. U.S. 36 Employment Concentrations.<sup>38</sup>**

Employment Cluster	Business	Employment
Aerospace	24	1,248
Bioscience	116	3,835
Renewable Energy	203	2,602
IT/Software/Hardware	897	19,671
Services	11,688	83,731
TOTAL:	12,928	111,087

Due to the proximity to a well-educated workforce, complimentary services and access to Denver, many global companies such as the [Ball Corporation](#), [Level 3 Communications](#), [Hunter Douglas](#) and [Sun Microsystems](#) are headquartered along U.S. 36. The University of Colorado at Boulder is located at the west end of the corridor. In Louisville, [ConocoPhillips](#) is building its new corporate learning center and a global renewable energy technology center that anticipates supporting a few thousand new employees.

U.S. 36 also is integral to connecting Colorado’s bioscience and renewable energy triangle, with Fort Collins’s northern federal labs and [Colorado State University](#) to the [University of Colorado at Boulder](#) and federal labs to the west and the [Fitzsimmons Medical Campus](#) to the southeast. Colorado has one of the highest concentrations of federally funded science and research laboratories in the nation. Employing more than 4,500 scientists and engineers, the laboratories generate an estimated \$720 million annual regional economic impact and contribute to the evolution of metro Denver’s high tech industries.<sup>39</sup> The labs stimulate significant technical transfer opportunities among higher education and area companies in critical areas such as climate research, space science and renewable energy development. Half of all of [Colorado’s federal labs and research organizations](#) are located in [Boulder County](#) and rely on the U.S. 36 corridor as a key state and regional connection.

Corridor travelers currently experience four hours of severe congestion each day, resulting in 2.4 million annual person hours lost valued at 52 million.<sup>40</sup> Without this project, U.S. 36 will become even more congested, making development of the new energy economy in this area less attractive.

**U.S. 36 Improvements Provides High-Quality Jobs, Spurring Private Sector Growth**

The quality of jobs in the U.S. 36 corridor is another measurement contributing to the economy in the state of Colorado. The [City & County of Broomfield](#) has the highest average weekly wage in the state of Colorado at \$1,166. The average weekly wage for employees who work in Boulder County is \$1,045.<sup>41</sup> These high-quality jobs provide a base for strategic economic development.

Because of the high concentration of employment, U.S. 36 attracts workers who live throughout the Denver, Fort Collins and Colorado Springs metropolitan areas. Approximately 30% of all workers in the U.S. 36 corridor drive from other parts of the state.<sup>42</sup> Connecting the rest of the metro area workforce to these well-paying jobs is a key benefit of the Project.



## Economic Benefits to Economically Distressed Area

Adams County is an EDA and has been slated by the DRCOG to be the fastest growing county in the state of Colorado until 2010.<sup>43</sup> Adams County has the largest section of metro Denver Enterprise Zones (EZ) and has significant areas designated as a HUB Zone and federal designation for New Market Tax Credits. The EZ is a significant tool in attracting and retaining quality primary employers in the area.<sup>44</sup>

Adams County is also a growing cluster for the new energy economy, attracting Vestas, one of the world's largest wind turbine plants to Brighton, Colo., bringing 1,300 manufacturing jobs and attracting additional jobs as their suppliers locate to the area. In late 2008, Ascent Solar, one of the world's leading integrated and flexible photovoltaic cell manufacturers, located their headquarter operations in Thornton, Colo., bringing an additional 200 manufacturing jobs.

25 percent of the U.S. 36 corridor is located in Adams County, one of the state's largest Economically Distressed Areas.

Adams County workers would be most impacted without transportation improvements, as the worst LOS due to traffic congestion is experienced at the east end of the U.S. 36 corridor. LOS F is predicted for traffic eastbound from Sheridan Boulevard to I-25 in the a.m. peak-hour.<sup>45</sup> Because significant congestion negatively impacts this EDA area, the Project would implement improvements beginning at the east end of the corridor working to the west to provide benefit to the EDA population.

The Project also promotes the creation of job opportunities for low-income and minority workers. Twenty-five percent of the corridor is located in Adams County and has the highest percentage of minority and low-income populations in the project area. Adams County also has a very high concentration of employment in heavy and civil-engineering construction jobs. 2003 Census Designated Places (CDP) data indicates communities in close proximity to U.S. 36 have very high concentrations of construction workers.<sup>46</sup> According to the Colorado Department of Labor and Employment (CDLE), Adams County's employment base has consistently provided a larger share of employment in these construction jobs compared to the rest of the state.<sup>47</sup> Since the economic downturn, Adams County has seen a consistent decrease in the total number of employees in this subsector of the industry. Adams County has a 9% unemployment rate compared to the State of Colorado at 7.8%, which can be partially attributed to the downturn in construction.<sup>48</sup> Given the high density of construction workers located in Adams County, the Project will create high-quality jobs for EDA residents. In addition to short-term job access, Project improvements offer EDA residents access the high-quality jobs located in other areas of the corridor.

## Project Improves Long-Term Efficiency & Reliability of Moving Workers & Goods

Without continued investments in the U.S. 36 transportation system, long-term economic vitality will diminish. For example, the current travel time from Boulder to Denver in the evening on U.S. 36 is 25 minutes; without corridor improvements, the same trip is estimated to take 54 minutes – more than doubling travel time by 2035.<sup>49</sup> Travel time for buses would be similarly affected, as they are required to use general-purpose lanes for the majority of the corridor.

At some point before 2035, data indicates that U.S. 36 saturates, diverting traffic onto already congested arterial roadways, further reducing reliability. The economic benefits realized from improved mobility, decreased travel time and implementation of planned Transit Oriented Development (TOD) investments will occur with either Project.



### (iii) Livability

Communities along U.S. 36 are committed to building mode-rich places where people want to live and work. Federal investments will make corridor communities even stronger and create a model “livable” corridor.

- Quality of life is a strongly held value along this dynamic corridor connecting entry-level workers and world class scientists in support of the emerging new energy economy.
- The City of Boulder is becoming the first “[Smart Grid](#)” city in the nation. *Money Magazine* named the [City of Louisville](#) the #1 Best Place to Live in 2009, with the City of Westminster and [Town of Superior](#) also making the 2009 list.
- Quality TDM and adopted [TOD plans](#) are in place corridor wide. For more than 10 years, a regional coalition has been balancing trade-offs to support travel choices and mobility, reduce environmental impacts, and support a sustainable economy.



Broomfield’s Arista Development is a TOD model, with mixed-uses adjacent to a new BRT station.

### Enhanced User Mobility through Creation of Transportation Options

The TIGER Discretionary Grant will support new BRT service and construct managed lanes that incentivize use of transit and carpooling over SOV travel. The managed lanes will provide a congestion-free choice to all travelers – including toll-paying SOVs – at all times of the day, ensuring a reliable trip. Likewise, improved pedestrian and bikeway connections offer users with enhanced modal options. These improvements will help grow and reinforce the livable communities and sustainable plans already in place. Corridor employees and 36 Commuting Solutions are encouraging transit use through a variety of TDM programs. The Project will provide BRT service reliability, further incentivizing employees to use transit to access jobs.

The Project will improve connectivity for users of multiple modes. Transit riders, carpools and toll-paying SOVs will see up to 25 minutes travel time savings in each direction from Denver to Boulder.<sup>50</sup> Buses and HOVs currently stuck in general purpose lane traffic will now enjoy a congestion-free trip, with speeds up to 63 mph and a minimum travel speed of 50 mph.<sup>51</sup> Real-time information for transit riders will support rider confidence in choosing transit. U.S. 36 has the highest bus ridership in the region, exceeding 13,500 patrons per weekday. Building the managed lanes is projected to further increase transit ridership by 26% in the near-





term. Over time, a doubling of ridership is expected based on RTD’s experience with the I-25 Express Lanes over the last decade.<sup>52</sup> This is not calculated in the projected cost/benefits in Section vi, but certainly is an added benefit over time.

**Table 5. Contributing Factors to Livability.<sup>53</sup>**

Opening Day Estimates	No Build	\$260 million project	\$160 million project
AM Peak Bus/Managed Lane (ML) Average Vehicle Speed	N/A	60 mph	63 mph
Avg. AM Peak General Purpose (GP) Lane Average Vehicle Speed	48 mph	44 mph	43 mph
Avg. AM Peak Travel Time in ML	N/A	10 min.	11 min.
Avg. AM Peak Travel Time in GP Lanes	23 min.	20 min.	24 min.
<b>Avg. Time Saved</b>	N/A	10 min.	13 min.
Travel Time, Boulder to Denver	42 min. GP	38 min. GP 17 min. ML	39 min. GP 17 min. ML

## Enhanced Modal Connectivity & Reduced Congestion on Existing Transportation Systems

Implementation of the Project will connect six cities along U.S. 36. A family of express transit services will use the managed lanes to create rapid mobility between Denver and Boulder and to important locations in between. The Project will result in a maximum of 15.7 contiguous miles of preferential lanes for bus travelers, with connection to the entire regional transit system through Denver Union Station. SOV drivers will have the option of paying to use the congestion-free lane, freeing valuable space on the highway.



Louisville/Superior pedestrian bridge provides connectivity to BRT stations

Local and regional connections enhanced by the Project include:

- Eight regional bus routes that travel on U.S. 36, connecting to Denver International Airport, Denver



Union Station, the 16th Street Mall and employment centers throughout the metro area will experience reduced travel times. More than 22 local bus services provide a strong distribution throughout the corridor including Boulder's high-frequency transit network (HOP, SKIP and JUMP). Four call-n-Rides meet buses at park-n-Rides and take travelers to locations within a designated service area.

- Corridor infrastructure such as slip ramps, pedestrian overpasses or underpasses already implemented by local and regional funds will support the new BRT service. New bus slip ramps and a pedestrian bridge are under construction at the City & County of Broomfield's BRT station. These improvements will shave six to eight minutes off the bus commute time between Boulder and Denver. A similar improvement is being designed for Boulder's Table Mesa park-n-Ride, slated for construction next year.
- \$7.5 million in Recovery Act funds<sup>54</sup> will install queue jumps and signal prioritization at four existing interchanges along U.S. 36. These improvements will give buses a travel time advantage.
- At least \$40 million locally funded bike paths, underpasses and sidewalks already or will connect to regional transit stops, providing car-free connectivity to what was once a traditional highway corridor. The adjacent commuter bikeway will provide bike riders with a safer and faster way to ride between communities.
- Paid parking was recently instituted throughout the corridor as a congestion management tool.

## Improved Accessibility for Senior Citizens, Economically Disadvantaged and the Disabled

Modal choice is the hallmark of the Project. A convenient, affordable and safe mode of transport is available for everyone, depending on the mobility, economic and social needs of the traveler for the specific trip. For example, transit and vanpool services are available for a fast, convenient trip. Conversely, if a solo trip has a flexible departure time, travel in the general purpose lane is provided.

Providing convenient, reliable choices and greater accessibility supports the needs of our senior citizens, economically disadvantaged and persons with disabilities who cannot or choose not to drive. The managed lanes and BRT service will enhance access to employment centers, educational opportunities, services and other basic needs.

- The Denver region's elderly and disabled populations are growing at rates faster than the general population. 13% of the U.S. 36 population is over the age of 65.<sup>55</sup> Between 2005 and 2035, the number of residents aged 60 and older is expected to nearly triple.<sup>56</sup>
- About 67,000 households in the Denver region do not have an automobile available.<sup>57</sup>
- There are more than 8,524 people with disabilities served by Special Transit, a private non-profit organization in Boulder County and Broomfield.<sup>58</sup> According to the 2000 Census, the mobility-limited population in the Denver region makes up more than 6% of the total population 16 and older.<sup>59</sup>
- Low-income families in the U.S. 36 corridor stand to reduce their transportation to income ratio by 16% using an improved transportation system that increases travel options and provides better access to jobs and support services.<sup>60</sup>

## Coordinating Transportation and Land-Use Decisions Improves Livability Along U.S. 36

U.S. 36 communities are investing in over 560 acres of city council-adopted TOD plans.<sup>61</sup> This will reduce overall driving for the more than 13,200 residents and over 18,800 employees in these adopted transit area plans, generating substantial economic activity.

- A 2007 RTD-sponsored U.S. 36 TOD workshop found that BRT and rail investments will influence the market for new compact development by more fully connecting station areas. Given these new connections, pent-up market demand for housing or commercial development at one station could be accommodated at neighboring stations.



- Examples of new TODs that will be implemented concurrent with the Project include the 160-acre Transit Village Area Plan in Boulder, the 100-acre Westminster Urban Renewal Plan and the 189-acre Arista development in Broomfield. Refer to Appendix 3 for a list of planned corridor TODs.
- The success of RTD’s Southeast Corridor line has led to fast-pace TOD growth, furthering economic development and more compact land use patterns. While compact TOD-style development has obvious environmental benefits (reduced sprawl and VMT), it also provides a livability benefit to those who live and work in areas that are developed as walkable, transit-connected places.

With full implementation of BRT in all Projects, the modal connectivity and planned TOD investments will yield documented livability benefits.

## (iv) Sustainability

The Project embodies a 21st century sustainable transportation solution. Rather than perpetuate the typical cycle of expanding highways resulting in increased SOV travel and an eventual return to congestion, the project expands travel choices and actively manages demand. The Project offers a vastly different vision from the conventional surface transportation project, resulting in significant reductions in oil dependence, greenhouse gas emissions, and decreased environmental impacts.

Colorado’s gross greenhouse gas (GHG) emissions are rising faster than those of the nation as a whole. The state’s gross GHG emissions increased 35% from 1990 to 2005, while the national emissions rose by only 16% during this same period.<sup>62</sup> The principle sources of Colorado’s GHG emissions are electricity use and transportation, accounting for about 37% and 23% respectively.<sup>63</sup> This trend is largely due to rapid population and production growth within the state.

Acknowledging this significant issue, Colorado has taken numerous actions to address these trends,<sup>64</sup> including adopting a state Climate Action Plan,<sup>65</sup> and calling for new GHG emission vehicle standards.<sup>66</sup> The Project will support these polices and yield immediate and tangible benefits below, resulting in an immediate and positive impact.

**Table 6. Sustainable Benefits of the U.S. 36 Project Compared to No-Build in 2012.<sup>67</sup>**

	Projected VMT*	VMT Reduction	Annual Fuel Gallons Saved	Metric Tons of Emissions	Cost Savings of Emissions
\$260M Project	3,011,370	39,689	1,108,750	8,630	\$284,784
\$160M Project	3,036,798	14,261	556,350	4,330	\$142,899

\* For U.S. 36 subarea, including travel on connecting arterials and local roads.

A comparison of no-action to project build scenarios offers a clear indication of the negative environmental impacts that will occur if a TIGER Discretionary Grant is not secured. Little to no improvements will occur on the corridor, meaning that VMT, fuel consumption, CO2 emissions will rise for the next 23 years.

## Energy Efficient BRT Vehicles

RTD plans to replace its existing bus fleet with clean energy technologies. The new BRT vehicle profile will improve energy efficiency, in tandem with other fleet maintenance investments to improve effectiveness of BRT service.



## Reduction of Oil Dependence

According to DRCOG projections, construction of the proposed project would elevate ridership by 26% along the U.S. 36 in the near-term and more than double over the next two decades exceeding 27,000.<sup>68</sup> Carpooling will increase by 5% following construction of the managed lanes.<sup>69</sup> The following unique corridor programs help support the ridership and carpool projections noted above while further reducing oil dependence.

- Existence of robust and varied TDM programs along the corridor. Four organized TDM efforts along the U.S. 36 corridor offer a variety of successful programs ranging from BikePool and on-line bike routing assistance, to commuter cash programs and Eco Pass subsidies. Parking is managed and priced in downtown Denver, at CU Boulder, and in downtown Boulder, contributing to mode shift.
- High level of Eco Pass holders. The Eco Pass is an unlimited transit pass that is proven to increase transit use and shift trips from driving alone to transit. There are over 67,000 Eco Pass holders in Boulder and 120,000 in Denver alone.
- Intergovernmental agreement among Boulder County and municipalities commits to compact development. This “Super IGA”<sup>70</sup> creates a comprehensive development plan, establishing rural preservation areas, rural land areas and municipal areas of influence. The IGA ensures preservation of the unique character of each community while protecting them from the negative effects of urban sprawl in pursuit of increased revenues.
- Use of sustainable materials. CDOT developed new paving standards that allow up to 25% of asphalt materials to be comprised of recycled material. These standards resulted in 80,000 tons of recycled asphalt pavement used on Colorado state highways in 2008.<sup>71</sup> The Project will seek to implement this policy and other best management practices to ensure a sustainable design and construction.

Reliable trip times yield a 26% increase in transit ridership that will double over next two decades



## Minimizing Environmental Impacts through Thoughtful Transportation Planning

The U.S. 36 Final EIS identified a preferred alternative that eliminated the need for new general purpose lanes, relying instead on managed lanes, ramp-loading BRT transit, bikeway and auxiliary lanes between interchanges to manage future travel capacity. The smaller footprint, compared to the initial improvement packages evaluated during the Draft EIS, lessens environmental impacts, such as wetlands by up to 25%, Section 4(f) properties by up to 43% and property impacts resulting in displaced residences or businesses by 74%.<sup>72</sup> These larger transportation packages also would have induced increased VMT, resulting in far greater levels of greenhouse gas emissions and, ultimately, congestion.

**Table 7. Environmental Impacts Associated with the U.S. 36 Project.**<sup>73</sup>

	No. of Homes Displaced	No. of Businesses Displaced	Parks/ Open Space	Threatened & Endangered Species	Farmland	Wetlands	No. of Section 4(f) Properties	No. of Historic Properties
\$260M Project	10	6	23.7 acres	0	10 acres	8.58 acres	14	16
\$160M Project	10	6	22.2 acres	0	8.8 acres	7.45 acres	11	14

The cost of mitigating each of these items has been fully accounted for in the total project cost. Implement-



ing the preferred alternative in phases allows CDOT, RTD and local governments to evaluate the benefits of constructed improvements prior to building future phases. Thus, if the initial project successfully addresses safety and mobility needs, it is possible that additional expansions and their subsequent impacts will not be necessary.

In addition to the tangible reductions of CO2 and fuel consumption, the other sustainability benefits will be realized through implementation of any Project.

## (v) Safety

The Project will reduce the number, rate and consequences of crashes along the corridor. The Project will significantly improve traveler safety in a corridor that has been identified as one of the most hazardous in the state of Colorado.

**Table 8. 2002 – 2004 Crash History and Rates for the U.S. 36 Facility.<sup>74</sup>**

Crash Type	Number of Crashes	Rate Million VMT
Physical Damage Only	1,284	0.80
Injury	471 (673 persons injured)	0.29
Fatal	4	0.25 (100 MVMT)

In 2005, TRIP’s Heartburn Highways report identified and ranked 50 segments of roadway throughout Colorado that caused the greatest stress to the state’s motorist. The 18.2-mi. U.S. 36 corridor was ranked #1 on the list due to deteriorated pavement conditions, high rates of traffic congestion and serious traffic crashes.<sup>75</sup>

Similarly, CDOT safety assessments conducted in 2004 and 2005 showed worse than expected safety performance along the project corridor in comparison to similar urban four-lane highways. The assessments found patterns of read-end accidents attributable to congestion and barrier collisions attributable to narrow shoulders, which suggests potential for improved safety through geometric improvements planned for this heavily travelled highway.<sup>76</sup>

Reconstruction of the highway would allow new facilities to be built to current design standards, which would improve operations and provide higher levels of safety. Repairing 50% of the poor pavement along U.S. 36, will alleviate pavement roughness and rutting that leads to increased crash rates on urban highways.<sup>77</sup>

Some accident reduction is likely as a result of the additional two lanes to be constructed with this Project. Research shows four to six lane roadway expansions typically results in a 20-25% accident reduction.<sup>78</sup> This safety benefit is not included in the Project cost/benefit calculation, since safety benefits from adding lanes may largely be offset by the increased levels of merging occurring on the facility as drivers move from the general purpose to the managed lanes.

Many areas of the U.S. 36 corridor still use structures and geometry from the original construction in the early 1950s. Deficiencies include:<sup>79</sup>

- Three structurally deficient and two functionally obsolete bridge structures.
- 12-mi. of poor pavement with a remaining service life of less than six years.
- Sections of U.S. 36 have sub-standard vertical alignments with greater than 5% grades.
- Several locations where stopping sight distance, decision sight distance and highway cross-sections are not to standard.
- Several instances of lane imbalances along the corridor, including through lanes and acceleration/ deceleration lanes, causing disruption to traffic flow.



- Substandard shoulder widths affect emergency response and safety.

All of these conditions contribute to worse than expected safety performance on the U.S. 36 corridor. Re-construction of the highway would allow new facilities to be built to current design standards, which would reduce congestion and improve safety. Scalable Projects will add 12-ft. inside and outside shoulders, complete with a 4-ft. buffer between the managed and general purpose lane. Improvements to shoulder width and capacity are expected to bring safety performance in line with similar facilities in a 10 to 15% reduction in expected accidents in the Project area. Furthermore, the increase shoulder width will allow adequate emergency vehicle and toll enforcement access without undue disruption to traffic flow.<sup>80</sup>

Safety benefits will be seen with all Projects, ranging from accident reduction, roadway modernization, shoulder expansion and enforcement.

## (vi) Evaluation of Projected Cost/Benefits of the U.S. 36 Project

U.S. DOT’s investment in the Project will yield tangible benefits more than 23 years earlier than planned, allowing the region to achieve up to \$23 billion in long-term employment benefits.<sup>81</sup> Without a TIGER Discretionary Grant, these benefits will not occur until 2035 – when some funding is available – and the social costs will continue to escalate, reducing the regional benefits that can be deployed today.

To quantify the costs and benefits of the Project, CDOT used the latest FHWA Dynamic Traffic Assignment (DTA) model, known as DYNASMART-P. The model measures real-time traffic flow during peak hours and can predict travel patterns based on congestion and development along the U.S. 36 corridor.

The Cost/Benefit Analysis is based on scalable Projects implemented 23 years in advance. Scalable Projects rely on information from Table 3 for the length and footprints of transportation elements.

**Table 9. U.S. 36 Project Benefits Operational by 2012.**<sup>82</sup>

	\$260M Project Benefit (\$value)	\$160M Project Benefit (\$value)
1. Primary Selection Criteria (a) Long-Term Outcomes		
(i) State of Good Repair		
Toll Revenue (above basic O&M)	\$2,857,550	\$134,250
Vehicle Maintenance Cost Reduction	\$30,150,000	\$30,150,000
(ii) Economic Competitiveness		
Long-term Employment Benefits from Transportation	\$89,907,342	\$50,985,560
(iii) Livability		
Travel Time Savings	\$52,157,655	\$32,048,730
Reduced Household Costs for Transit Usage (low-income)	\$135,312,000	\$135,312,000
(iv) Sustainability		
Fuel Consumption	1,108,705 gallons	556,350 gallons
Emission Cost Savings Reductions	\$284,784	\$142,899
(v) Safety	-	-
1. Primary Selection Criteria (b) Job Creation & Economic Competitiveness		
Short-Term Job Creation	7,234 person-years	4,452 person-years



	\$260M Project Benefit (\$value)	\$160M Project Benefit (\$value)
Direct Job Wages	\$276,112,938	\$169,915,654
<b>TOTAL BENEFIT</b>	<b>\$586,782,269</b>	<b>\$418,689,093</b>

\* includes 2012 cost and O&M.

Using the DYNASMART program from the University of Arizona to predict numerous costs and benefits over time in a quantitative manner suggests a benefit-cost ratio for the \$260 million project of 40 to 1, with a 47 to 1 ratio for the \$160 million project. This clearly predicts the net benefits of pursuing the two build scenarios in 2012 versus 2035. The data also strongly supports the economic justification of the U.S. 36 Managed Lane/BRT Project, showing the cumulative net present value of the \$260 million project at \$10.5 billion and the \$160 million project at \$7.6 billion.

Information on cost/benefit evaluation methodology, the DYNASMART-P model, and data is located in Appendix 4.

## (vii) Evaluation of Project Performance

Using the DYNASMART-P travel model and historical data from existing I-25 Express Lanes, CDOT proposes the following performance goals, objectives and measures for the Project. Upon receipt of a TIGER grant, this initial proposal will be further refined based on additional modeling.

**Table 10. Proposed Goals, Objectives and Performance Measures for First Year of Full U.S. 36 Operation.<sup>83</sup>**

GOAL	OBJECTIVE	MEASURE	STANDARD
1. Ensure reliable travel times in priced lanes.	Maintain minimum speeds in managed lane at all times.	% time speed at or above 50 mph.	100%
2. Reduce Trip Time For Managed Lane Users.	Trip time less than current peak hour time for GP lanes.  Trip time always less than peak hour time for GP lanes.	2010 peak hour trip time (minutes).  % time managed lane trip time is less than GP lane trip time during peak. 20% less than 2010 peak hour trip time.	95%.
3. Encourage use of transit.	Increased transit mode share.	% trips on transit in 2010.	10% more transit trips than in 2010.
4. Encourage use of carpools.	Increased HOV mode share.	% trips in HOV 2010.	2% more carpools than in 2010.
5. Provide reliable transit service.	On-time transit vehicle trips.	% on-time performance transit vehicles.	90%.
6. Reduce harmful emissions as compared to projected levels.	Reduce greenhouse gas emissions	Gallons of fuel saved annually	500,000 gallons saved/year
7. Measure and report on performance of corridor to assist with future projects.	Provide annual and quarterly reports on system performance for first three years of operation.	% time quarterly and annual reports are prepared and provided to FHWA for information	100%

A description of input data and standards used to establish performance plans are located in Appendix 4.



## 1. Primary Selection Criteria (b) Job Creation and Economic Stimulus

The Project is poised to quickly create and preserve jobs within six months upon award, stimulating rapid increases in economic activity, particularly in Adams County, an EDA.

**Table 11. U.S. 36 Project Creates Direct and Indirect Jobs.<sup>84</sup>**

TIGER Request	Total Project Cost	Direct Construction Employment Person-Years	Indirect Employment Person-Years	Induced Employment Person Years	Total Person-Year Employment Created or Sustained <sup>1</sup>
\$200M	\$260M	2,479	1,124	3,630	7,234
\$100M	\$160M	1,526	692	2,234	4,452

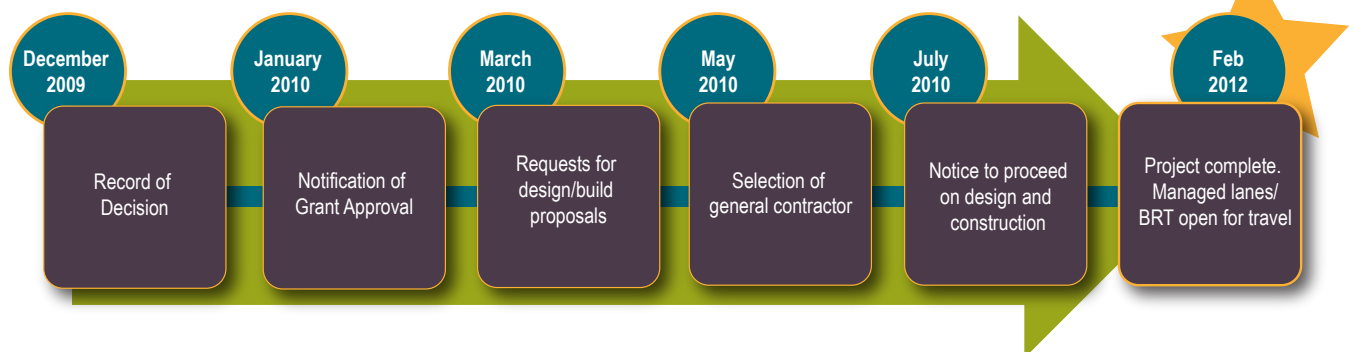
<sup>1</sup>2009, FHWA Employment Impacts of Highway Infrastructure Investment.

Twenty-five percent of the U.S. 36 corridor is located in EDA Adams County and has a very high concentration of employment in heavy and civil-engineering construction jobs. 2003 CDP data indicates communities in close proximity to the U.S. 36 corridor have very high concentrations of construction workers. For instance, the Sherrelwood and Twin Lakes neighborhoods adjacent to U.S. 36 have more than 1,500 people employed in the construction industry.<sup>85</sup> According to the CDLE, Adams County’s employment base has consistently provided a larger share of employment in these construction jobs compared to the rest of the state.<sup>86</sup> Since the economic downturn, Adams County has seen a consistent decrease in the total number of employees in this subsector of the industry. Adams County has a 9% unemployment rate compared to the State of Colorado at 7.8%, which can be partially attributed to the downturn in construction.<sup>87</sup> Given the high density of construction workers located in Adams County, the Project will create high-quality jobs for EDA residents.

The Project will adhere to CDOT policies that require implementation of best practices consistent with civil rights and equal opportunity laws, maximizing small and disadvantaged business participation.<sup>88</sup> Based on a preliminary understanding of the Project and possible subcontracting opportunities that include pavement, bridge work, concrete, lighting, guard rail, traffic control, and more; CDOT expects that the Project DBE goal will be at least 12% to 15%. Because of its location, this project will provide an excellent opportunity for DBE participation and the Department’s Business Programs Office will conduct extensive outreach to regional community-based organizations, such as county workforce development centers, connecting disadvantaged workers with economic opportunities and require an on-the-job training program. Additionally, CDOT and its contractors will comply with the requirements of subchapter IV of chapter 31, title 40 United States Code required by the Recovery Act; see Appendix 5 for certification.

### (i) Project Schedule

See Appendix 6 for a detailed Project schedules that demonstrate consistent job growth and creation.







## (ii) Environmental Approvals

- The ROD for the U.S. 36 Final EIS is anticipated in December 2009. Each of the project scenarios proposed is consistent with the Project that will be proposed in the ROD.
- All Clean Air Act, Section 4(f) and Section 106 requirements will be addressed in the Final EIS and ROD. A Programmatic Biological Opinion from U.S. Fish and Wildlife Service will be secured prior to the ROD.

## (iii) Legislative/Agency Approvals

CDOT has requested authority from FHWA to implement tolling for the Project's managed lanes; once a ROD is signed, a tolling agreement can be executed.<sup>89</sup> Colorado's legislature granted CDOT the ability to implement tolling on new capacity.<sup>90</sup> Colorado HB05-1148 requires approval of toll plans from the MPO, obtained Aug. 19, 2009.<sup>91</sup> SB-108, known as FASTER, expanded the State's ability to toll and further encouraged public private partnerships.

The following permits or approvals will be needed as the project proceeds to construction. None of these are anticipated to be problematic to achieve the proposed project schedule.

- Colorado State Department of Public Health & Environment (CDPHE) permits for structure demolition or for fugitive dust emissions during construction.
- The Endangered Species Act requires a specific mitigation plan for each project impacting threatened and endangered species for a site-specific Biological Opinion.
- A permit from CDPHE will be needed during final design for stormwater management during construction. A dewatering permit may also be needed under Section 402 for bridge pier construction.
- Variances from local agency noise ordinances for overnight work.
- A wetland/other waters (Clean Water Act, Section 404) permit will be required during final design, including development of a detailed wetland mitigation plan. The project team will work with Boulder who has their own wetland permitting process as well as the U.S. Army Corps of Engineers to develop this mitigation plan.
- If awarded funds, the Governor will complete a 1511 certification for the Project.

## (iv) State & Local Planning

The Project has been included in state and regional plans listed as follows:

- DRCOG [2035 Fiscally Constrained Regional Transportation Plan](#), amended in August 2009.
- RTD's FasTracks Program, a voter-approved 12-year [comprehensive plan](#) to expand the regional transit system.
- [U.S. 36 EIS](#): The Final EIS was released for public comment in Fall 2009.
- Grant award will also trigger inclusion of this Project in the STIP planning processes consistent with state and federal laws.

## (v) Technical Feasibility

As a result of the extensive NEPA process, 10% of preliminary engineering work has been completed. CDOT is advancing design on various project segments, to ensure an RFP release during the first quarter of 2010. The Project will be built using a streamlined design/build contracting method to accelerate project completion. Based on CDOT's past success implementing design/build projects ranging from \$30 million to \$1.67 billion, the applicant is committed to delivering the Project by February 2012.



## (vi) Financial Feasibility

Acknowledging the limited amount of TIGER funding available, CDOT prepared a range of project alternatives that would deliver meaningful improvements. CDOT adhered to FHWA's cost estimate review policy for projects over \$100 million, resulting in a realistic project cost estimate.

CDOT and RTD each pledged \$30 million to leverage a \$200-\$100 million TIGER Discretionary Grant for the \$260 and \$160 million improvements packages, making them immediately financially feasible.

## 2. Secondary Selection Criteria (a) Innovation

This proposal is innovative in every aspect and represents a departure from historic attempts to “build our way out of congestion.”

With the Project, the U.S. 36 corridor will become a “Smart Highway,” using active traffic management technology to dynamically control traffic based on real-time roadway conditions, as well as provide real-time information for congestion pricing in the managed lanes to maintain 50 mph travel speeds. Using integrated systems and a coordinated response, both everyday and incident-related congestion will be managed to improve roadway safety and traffic flows, while providing the dynamic information travelers need to decide which travel mode of choice they will select for a particular trip.

The dynamic message system will promote more effective incident management practices while alleviating congestion and improving safety. New technologies will be used to more evenly distribute traffic and alert drivers of problems down the road. So whether there is an accident downstream or a back up at an off-ramp, travelers will have the dynamic information to make informed choices about their commute. Our “Smart Highway” will also use congestion pricing to provide even greater choice to people traveling on the U.S. 36 corridor. The dynamic message system will manage the mixture of SOV-tolled and Bus/HOV non-tolled vehicles through variable pricing to maintain free flow conditions (50 mph) within the managed lanes, even during rush hours. Tolls will vary in real-time based on the level of congestion in the managed lanes, introducing an economic incentive for travelers to choose the optimal time of day and mode in making their trip. All tolls will be collected automatically either through electronic transponders or license plate video technology. Dynamic message signs along the corridor will announce the toll rates and carpool requirements and ultimately will be used to provide information on transit service in the corridor and capacity at nearby park-n-Ride lots. Approximately \$8 million annually generated from toll revenue will provide a sustainable source of funding to cover the long-term cost of operations, toll equipment maintenance, and enforcement of the managed lanes.<sup>92</sup>

The Project will be delivered using the innovative design/build contracting process to speed project delivery, quickly creating jobs and delivering the resulting project benefits sooner.

## 2. Secondary Selection Criteria (b) Partnership

The Project is a model that demonstrates the benefits of long-term, regional collaboration. Local governments, through the U.S. 36 Mayors & Commissioners Coalition, the business community, through 36 Commuting Solutions, CDOT and RTD have been working together for years to develop and implement a sustainable, multimodal vision for the corridor, captured as the preferred alternative in the Final EIS and in the voter-approved FasTracks program.



### Jurisdictional & Stakeholder Collaboration

Letters of support from various corridor partners signifies the strength and breadth of support the application has throughout the region and can be found in Appendix 7.

### Disciplinary Integration

The Project offers a sustainable alternative to traditional surface transportation projects and creates significant short and long-term economic benefits. As such, the Project is supported by local governments, workforce development centers, federal laboratories and research centers that share the same vision for sustainable projects, job creation and economic recovery.

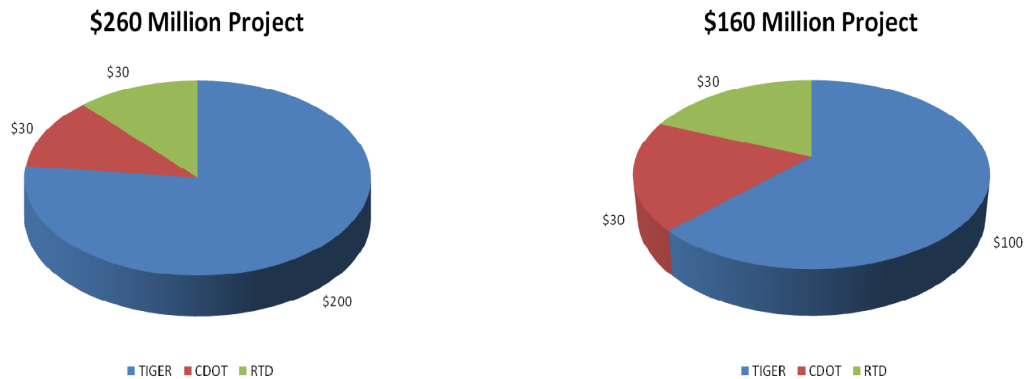
### Project Has Significant State & Local Funding

CDOT, RTD and the corridor communities are requesting a TIGER Discretionary Grant ranging from \$200 - \$100 million in support of a scalable set of project scenarios that would deliver meaningful improvements. CDOT has committed \$30 million in state surface treatment funds and RTD has committed \$30 million from FasTracks sales tax revenue to leverage TIGER funds.

Any level TIGER grant will ultimately leverage the balance of the FasTracks corridor commitment of \$183 million and a \$5 million local commitment. While those funds are not available today, the provision of a TIGER grant as seed money will accelerate the timeframe in which those funds become available. Bridge repairs in the corridor also are a strong candidate for future state funds recently authorized for that purpose.

Local and state contributions represents between 23% - 38% of the total Project cost, depending on the project funded.

Figure 5. U.S. 36 Project Financing Packages Leveraging Federal, State and Local Funds, in millions.



State and local resources invested in recent years along the U.S. 36 corridor reduce the cost of this and other future funding requests. These incremental improvements facilitate the long-term multimodal corridor vision, but are not included in the cost/benefits calculation.



**Table 12. Local and regional corridor investments made to date (in millions).<sup>93</sup>**

Project	CDOT	RTD	Local	DRCOG	Total
Cherryvale Bridge	\$4.20	\$4.20	-	-	\$8.40
80th Street Bridge	\$12.40	-	\$0.60	-	\$13.60
Church Ranch Slip Ramp/park-n-Ride	-	-	\$2.22	-	\$2.22
U.S. 36 Underpass at Westminster	-	-	\$3.00	-	\$3.00
Broomfield Pedestrian Bridge/park-n-Ride	-	\$13.50	-	-	\$13.50
120th Avenue Extension	\$2.50	-	\$11.60	\$65.90	\$80.00
Table Mesa Pedestrian Bridge	\$3.50	\$3.50	-	-	\$7.00
McCaslin Pedestrian Bridge/park-n-Ride	-	\$7.50	-	-	\$7.50
Boulder Transit Village (BTV) Property	-	\$2.50	\$7.00	-	\$9.50
BTV Station Design & Construction	-	-	\$3.30	\$7.80	\$11.10
BTV 30th/Pearl Street Intersection	-	-	\$0.40	\$0.40	\$0.80
BTV Bike and Pedestrian Connections	-	-	\$1.24	\$2.54	\$3.78
Broadway/Euclid	\$0.40	\$0.57	\$3.03	\$3.41	\$7.41
South 28th Street	\$2.50	-	\$5.00	\$2.50	\$10.00
U.S. 36 Bikeway		\$8.00	\$2.11	\$0.26	\$10.37
<b>Total</b>	<b>\$25.50</b>	<b>\$39.77</b>	<b>\$39.50</b>	<b>\$82.81</b>	<b>\$188.58</b>

### Project Cannot be Completed Without Federal Assistance

The state, the region and local governments are clearly committed to this project and to this corridor, but cannot complete the U.S. 36 corridor alone.

The Denver metro area experienced a 10-15% decrease in sale tax revenue over the past two years, which is the funding source for RTD’s FasTracks program and local contributions. CDOT also experienced a decrease in funding due to declining gas tax revenue and elimination of state general fund for transportation. From 2005 to 2009, CDOT’s budget has decreased by \$850 million, absent Recovery Act funds. This resulting budget is equivalent to the buying power the Department had in 1983.<sup>94</sup>

The U.S. 36 Final EIS identifies a \$1.4 billion preferred alternative in 2008 dollars. While the region’s long-range transportation plan identifies more than \$700 million to build these improvements, full funding is not expected to be available until 2035, when the project would cost \$6.5 billion.<sup>95</sup> The next update of the fiscally constrained regional plan will likely reduce funding available for U.S. 36 improvements.

In light of these economic realities, CDOT, in partnership with RTD, local governments and 36 Commuting Solutions, identified a more affordable first phase project that will cost approximately \$550 million to implement and will have significant mobility benefits to the corridor. For several years, project proponents have aggressively sought federal assistance. In 2007, U.S. 36 was a finalist for USDOT’s Urban Partnership Agreement and submitted a Congestion Reduction Demonstration Initiative Grant. U.S. 36 also submitted a Project of National or Regional Significance (PNRS) designation request for the next transportation authorization bill as well as a project-specific earmark.

The Project is the culmination of partnerships that will support the U.S. DOT in demonstrating the direction of the current administration. This model project is of regional and national significance and will exemplify the future of transportation in our region.