Mobility Investment Priorities Project

Final Report

December 2013

mobility INVESTMENT PRIORITIES

Texas A&M Transportation Institute

Establishing Mobility Investment Priorities

Under TxDOT Rider 42:

Final Report

Prepared for
Texas Transportation Commission
And
83rd Texas Legislature

Prepared by

Texas A&M Transportation Institute

The Texas A&M University System

College Station, Texas

Mobility Investment Priorities Project
December 2013

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Texas A&M Transportation Institute Report Authors

Primary Authors – Tim Lomax, Phil Lasley, David Ellis, and Bill Stockton

Metro Area Analysis Authors – (Austin) Ginger Goodin and Meredith Highsmith; (Dallas-Fort Worth) Jason Crawford and Mary Meyland; (Houston) Robert Benz, Roma Stevens, and Tony Voigt; (San Antonio) Steve Venglar

Authors and Analysts – Paul Adamson, Benton Arnett, Richard Baker, Kevin Balke, Curtis Beaty, Christopher Bratlien, Stacey Bricka, Tiffiny Britton, Darrell Borchardt, Marcus Brewer, Todd Carlson, Nadeem Chaudhary, Linda Cherrington, Kunhee Choi, Richard Cole, Scott Cooner, Jason Crawford, Liang Ding, Karen Dixon, Casey Dusza, Suzie Edrington, Bill Eisele, Zachary Elgart, David Ellis, Benjamin Ettelman, Robert Farley, Bernie Fette, Kay Fitzpatrick, Bill Frawley, Tina Geiselbrecht, Brianne Glover, Ginger Goodin, Greg Griffin, Meredith Highsmith, Joan Hudson, Kenneth Joh, Beverly Kuhn, Greg Larson, Phil Lasley, Wei Li, Karen Lorenzini, Roberto Macias, Robert Martin, Kristine Miller, Curtis Morgan, Daniel Morris, Nick Norboge, Kwaku Obeng-Boampong, Terri Parker, Marelina Perez, Chris Poe, James Pourteau, Michael Pratt, Tongbin Qu, Cesar Quiroga, Lupe Ramos, Steven Ranft, Cathy Reiley, Swapnil Samant, Matt Sandidge, David Schrank, Tom Scullion, Jeff Shelton, Christophe Simek, Debra Spillane, Shuman Tan, Jerry Ullman, Gabriel Valdez, Steve Venglar, Juan Villa, Tony Voigt, Jason Wagner, Melissa Walden, Brittney Weathers, Allison Weldon, Thomas Williams, Nicholas Wood, Xiaosi Zeng

Contributors – Michelle Benoit, Jordan Breeding, Chandra Caldwell, Linda Castillo, Mary Cearley, Sonia Chapa, Mark Coppock, Carol Court, Dustin Deere, Joanna Dickens, Bonnie Duke, Yannick Dwatie, Christophe Dykes, Ashton Evans, Heather Ford, Lauren Geng, Neil Going, Frederico Gutierrez, Michael Hardy, John Henry, Vanessa Hill-Schatz, Henry Kellumen, Tobey Lindsey, Daren Mieles, Debbie Murillo, Han Park, Alisa Patke, Tammy Pietrucha, Jose Rocha, Sherie Ruter, Elizabeth Sandefur, Jian Shen, Kaitlynn Simmons, Elizabeth Stevens, Sangita Sunkari, Martha Taylor, Shannon Turner, Juliet Vallejo, Diana Wallace, Tengxi Wang, Kelly West, Shanna Yates, Michelle Young, Siabil Zabihi, Yanfen Zhou

TxDOT Project Director

Dr. Shannon Crum

Contributions by Metropolitan Area Agency Working Groups

Austin

TxDOT–Austin District
Capital Area Metropolitan Planning Organization
Capital Metro
Central Texas Regional Mobility Authority
City of Austin
Greater Austin Chamber of Commerce
Downtown Austin Alliance
Movability Austin

Houston

TxDOT–Houston District
Houston-Galveston Area Council
City of Houston
Harris County
Houston METRO
Houston TranStar
Harris County Toll Road Authority

Dallas-Fort Worth

TxDOT–Dallas and Fort Worth Districts
North Central Texas Council of Governments
North Texas Tollway Authority
City of Dallas
City of Ft Worth
Dallas Area Rapid Transit
Fort Worth Transportation Authority
Denton County Transportation Authority
City of North Richland Hills
City of Richardson
City of Haltom City

San Antonio

TxDOT–San Antonio District
San Antonio-Bexar County Metropolitan Planning Organization
Alamo Area Council of Governments
City of San Antonio
Alamo Regional Mobility Authority
Bexar County
VIA Metropolitan Transit

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BACKGROUND

The most congested metropolitan highways in Texas are becoming even more crowded, resulting in lost time and wasted fuel topping $9 billion per year — approximately $1,150 for the average commuter in large- and medium-sized Texas metropolitan areas (http://mobility.tamu.edu/ums/). Two-thirds of Texas residents live in urban areas that are ranked in the 30 most congested U.S. metropolitan areas: Dallas-Fort Worth, Houston, San Antonio and Austin. Perhaps more concerning, however, is the fact that not only is congestion high, but Texas traffic problems are also increasing faster than in similar U.S. areas. Six of the 25 fastest congestion growth metropolitan regions with more than 500,000 population are in Texas — the four above plus El Paso and McAllen. These congested regions and corridors also cause problems in the movement of goods and services through the metro areas to the rest of Texas and to markets outside of the state.

Funding for many of the traditional solutions in Texas' large metropolitan regions is not expected to increase, and congestion will worsen. There is a generally accepted path toward improvement:

- First and foremost, state and local transportation agencies must be perceived as doing a good job with the funding, policies and priorities they have. They must be effective and efficient.
- The agencies must have a coherent and comprehensive plan with sufficient information to convince the public that any additional funding will generate significant benefits and be spent on the most important problems. They must be accountable and transparent.
- The financing plan must take maximum advantage of all the options that the public will support.
- The public must understand and support any set of projects, programs and plans that are developed from the process.

Recognizing the growing urgency of the traffic congestion problem, the 82nd Texas Legislature set aside $300 million in Proposition 12 funds to get the state's highest-priority roadway projects moving, beginning with those segments identified as the 50 most congested Texas roads in 2010. In order to accomplish this task, as a part of the General Appropriations Act (H.B. 1, TxDOT Rider 42), the Legislature directed the Texas A&M Transportation Institute (TTI) to provide assistance to the metropolitan planning organizations, the TxDOT District offices and other project partners in their development of projects and programs to address mobility concerns and to report to the Texas Legislature and the Transportation Commission.

Specifically, TTI served as facilitator and coordinator of studies to provide assurance that:

1. Projects had the greatest impact considering factors including congestion, economic benefits, user costs, safety and pavement quality.
2. The best traffic and demand management principles were applied to the projects.
3. Public participation in the concept development represented the most inclusive planning process possible.
4. The funding scenarios used all feasible options so that public funds provide the greatest "bang for the buck."
5. Recommendations were made to the Department of Transportation at each major decision point for the projects.

SIGNIFICANT ACCOMPLISHMENTS

Over the two years of the project, TTI delivered several major products and developed important analytical and communication techniques:

- Summarized the congestion problems and the status of traffic management, travel option and capacity increase projects to improve the most congested corridors, including intensive examination of **the 25 most congested corridors**. The summary includes text descriptions and a checklist to evaluate how much "bang for the buck" is being achieved. Also included is a set of **immediately implementable, low cost congestion mitigation strategies** that can be deployed rapidly for relatively low cost; these will improve response to crashes, stalled vehicles and other congestion causing events (http://mobility.tamu.edu/mip/congestion.php).
- Facilitated and coordinated regional transportation meetings, workshops and analyses with TxDOT, Metropolitan Planning Organizations, Regional Mobility Authorities, major city and county governments, transit agencies and others. In the first five months of the Mobility Investment Priorities project, these groups considered, analyzed and approved $248 million worth of right-of-way purchases, design contracts, planning studies and project feasibility analyses and studies to redesign roads and improve the operation of some of the most congested roadways in the state. An additional $54 million was allocated over the remaining months of the project. This report contains the **status of the recommendations**.
- Estimated economic and congestion benefits of five large transportation improvements identified by the local working groups in Austin, Houston and San Antonio. The projects (described in this report) are estimated to provide a return on investment of between three and seven times the construction, maintenance and operation costs.
- Developed a potential **funding plan** that blends state and local funding drawn from traditional transportation fees as well as express lane tolls and tax revenue from new development. The ideas presented are not a complete solution, but they should be a part of the conversation about new sources of revenue to improve corridors.
- **Improved public engagement** through summaries of state-of-the-art practices in public involvement, workshops, and assistance with applying innovative techniques such as virtual open houses and chat rooms. The specific practices will improve the discussion about possible congestion reduction projects and potential funding mechanisms (http://mobility.tamu.edu/mip/pdfs/MIP_PE-Report-5_15-FINAL.pdf).
- Developed an information resource of more than **80 congestion reduction, public engagement and funding strategies** written in easily understood terms to illustrate how, when, where, why and for what purpose the strategies should be deployed (http://mobility.tamu.edu/mip/strategies.php).

- Developed a **computer simulation model of the IH 35 corridor in Austin** that clearly describes the need to pursue more travel capacity in the most congested corridor in the state as well as implement a combination of traffic management strategies, travel options, flexible work hours, and new patterns of homes and jobs if the expected economic growth is to be supported (http://mobility.tamu.edu/mip/pdfs/MIP-Longterm-Improvement-Central-TX-ES.pdf).
- Developed a public education plan and materials to provide a starting point for a broad, statewide discussion to raise awareness of the state's mobility crisis and build consensus toward solutions. The education effort — **Rethinking our Path to Mobility (RPM)** — is based on the premise that the public is unlikely to support transportation improvements for which they see no urgent need or personal benefit. RPM follows a consistent narrative:
    1. The state depends on the transportation system to ensure a strong economy and high quality of life, but population growth and limited funding are straining the system to its limits.
    2. Growing congestion places a significant burden on the state and on individuals.
    3. Numerous solutions are available, and most of those solutions cost money.
    4. Investment in transportation infrastructure will pay off in significant benefits to the state and its citizens.
    5. Everyone should become engaged in the discussion on how best to move forward.

Changes in project analyses and status beyond the August 2013 end of the project have been incorporated as of the end of 2013. Work on some project elements will continue over the next several years. All of the project products are available on the Texas A&M Transportation Institute's Mobility Investment Priorities website: mobility.tamu.edu/mip.

THE TAKE-AWAYS

A few of the key outcomes of the Mobility Investment Priorities project are listed below. Prominent among these are topics where innovation, technology and analysis were combined to approach solutions in different ways.

- **All the solutions are needed** – There is no single project or program or policy or technology that can 'solve' the congestion problem. As has been demonstrated in computer models and in all Texas cities, the problem is too large and complex to rely on a single solution type. The mix of projects, programs and policies will be different in each city, and indeed will be different in downtowns and suburbs.
- **Agencies must involve their stakeholders** – In order for projects to be approved, the public must generally understand transportation funding, and specifically find value in the proposals. The public must play an active, and early, role in designing the projects as well as the methods to pay for them; there must be a match between enthusiasm for the project and enthusiasm for paying for the project.
- **Go meet them where they are** – Successful public engagement activities provide information to stakeholders in times and places that are convenient to the viewer. Public meetings in large rooms are not as effective as small meetings, online chat sessions, web-based techniques and other interactive methods that engage the public. TTI assisted agencies in all four metropolitan areas in expanding their public engagement activities. The June 2013 Austin IH 35 open houses were attended by dozens of people; the online virtual open house was visited by more than 3,200 different people.
- **Innovative designs and operating ideas** – Non-traditional concepts will need to play a more significant role because there are fewer traditional options. Ideas such as converting the Houston downtown freeway loop to a one-way roadway; encouraging transit ridership though the use of a narrow bus lane on the IH 610 West Loop to connect two high-occupancy vehicle lanes with a major activity center; using an improved computer model to forecast future Austin IH 35 congestion levels and other techniques are part of addressing the "best bang for the buck" requirement of Rider 42.
- **Multiple funding sources and new project designs will be necessary to move large projects** – A combination of Rider 42, Proposition 12 and traditional funds allowed improvements to a revised design on the US 290 Northwest Freeway in Houston, allowing it to be completed 20 years ahead of schedule. Funding for the IH 30/IH 35E Horseshoe Project in Dallas came from nine different sources of funding. This type of approach is the new normal in tackling large transportation construction projects.
- **Technology can play a role** – Information to travelers while they plan their trip and en-route to their destination can provide commuters with travel choices and alternate routes. Rapid responses to inoperative traffic signals, potholes, crashes and stalled vehicles can be provided with a combination of agency cooperation and technology. Many of these technologies have been deployed in Texas or other states.

- **New partnerships mean new procedures** – The public-private partnerships expanding two congested corridors in the Dallas-Fort Worth region were studied to learn how the relatively mundane, but important and complicated tasks of coordinating traffic control, enforcement, debris removal, road closure and traffic information were being handled. The findings will inform the next generation of public-private partnership arrangements. Many of the techniques can be applied to regular state projects, too. The innovative public information strategies, as well as the coordination and staging of the various contractors and innovative traffic control plans, can reduce congestion in many corridors.

- **Incentivize the market** – Encouraging a variety of travel options, work arrangements, employer incentives and other travel demand management practices should be explored. For example, a successful approach that has been used in Washington State pays individuals and private companies to remove vehicle trips from congested corridors prioritizing spending on the ideas that offer the most trips removed for the lowest cost.

STATUS OF REGIONAL CONGESTION REDUCTION PROJECTS

The Early Recommendations Report and the First Year Report (see mobility.tamu.edu/mip) identified TTI activities to coordinate studies for project identification and prioritization in the four most congested areas of the state. By legislative direction, funding was allocated by the Texas Transportation Commission to the four metropolitan areas using the formula for Category 2, Metropolitan and Urban Area Corridor Projects. The Rider 42 funds were used to support engineering, feasibility studies, right-of-way acquisition and utility relocation in the state's 50 most congested corridors as of the end of 2010. The recommendations moved several large congestion reducing projects closer to implementation and, in a few significant cases, provided the last key element of funding necessary to build an important project. All of the recommendations were approved by local working groups drawn from the transportation agencies and other organizations.

Thirty-eight of the 50 most congested corridors in 2010 continue to be in the top 50 in 2013 and 47 of them are in the 2013 top 100, suggesting an enduring quality among the worst of the worst. Several of the 2010 corridors both *had more congestion* and *improved in the ranking*; these corridors, in essence, "got worse slower" than other corridors. Exhibit 1 summarizes the funding allocated by the local Rider 42 working groups. The largest category of funding was allocated to projects that involved right-of-way purchases and utility relocations, along with engineering work for very large construction projects in Dallas-Fort Worth and Houston. Almost $75 million in funding was provided to a variety of other design and environmental studies. The total exceeds $300 million due to agreements in the TxDOT Districts in Houston and San Antonio to use local planning funds to complete the originally intended studies.

Exhibit 1. Rider 42 Project Development Funding

Metro Area	Preliminary Engineering, Right-of-Way, Utility Relocation	Design & Feasibility Studies	Environmental & Other Studies	Total
Austin	-0-	$30.48	$0.80	$31.28
Dallas-Ft Worth	$118.75	-0-	-0-	$118.75
Houston	$109.22	$7.00	$1.35	$117.57
San Antonio	-0-	$15.74	$18.60	$34.34
Total	**$227.97**	**$53.22**	**$20.75**	**$301.94**

Note: ($ Millions)

Appendix C of this report includes an update of the status of several large mobility projects in each region. These are in various stages of development and represent a range of opportunities for public engagement and additional planning, environmental and special consideration and detailed design.

Austin

Austin's population has nearly doubled in size every 20 years since World War II. The projections are that the region will again double — growing from 1.8 million to 3.6 million in 2035 (http://www.campotexas.org/facts-figures/). The city's rapid growth has exacerbated traffic congestion. All of the most congested sections in the metro area in the last several years (http://www.txdot.gov/inside-txdot/projects/100-congested-roadways.html) are parallel north-south routes — essentially describing the same problem. On the positive side, improvements made to IH 35, Loop 1 or US 183 will likely reduce congestion on those and other parallel streets. Highlighting the need for improvements, during the MIP project the portion of IH 35 through downtown Austin was ranked the most congested section of road in Texas in 2013.

The Austin area had $31,280,000 in Rider 42 funds available to support engineering, feasibility studies and right-of-way acquisition on the congested corridors in Austin ranking in the top 50 in the state in 2010. The Central Texas Working Group, a steering committee formed to address the needs of Rider 42, identified that almost all of the funding should be allocated to two corridors — IH 35 and Loop 1 (Exhibit 2). An environmental study and final design effort on Loop 1 South will analyze improvements that will connect to the Loop 1 North project that began construction in fall 2013. Almost $14 million was allocated to three efforts addressing IH 35 congestion. The studies built on work initiated by the City of Austin and have created several project options and a public engagement effort that will be necessary to continue progress toward congestion reduction solutions. The initial set of integrated traffic management study findings will be refined and ideas implemented over the next few years.

Elsewhere in this report is a description of an advanced computer model prepared to analyze the effect of several alternative IH 35 options. The most significant conclusion of that analysis was the need to implement several other improvements as well as add capacity. The congestion levels predicted in 2035 are not sustainable — Texans are not likely to accept commute times of two to three hours. The construction improvements that will be enacted as a result of the Rider 42 studies are vital, but there must be a significant effort at offering travel options and managing traffic as efficiently as possible. This need to do everything possible was a part of the environment that Rider 42 was designed to address; more Texas urban corridors will face this situation in the future.

Since 2010, all but one of Austin's six top-50 sections remain in the top 100, with IH 35 and Loop 1 climbing a significant number of places. Loop 360, US 290 West and North Lamar, on the other hand, dropped many places when congestion stayed the same or improved, further emphasizing the value of focusing on IH 35 and Loop 1.

Exhibit 2. Status of Austin Recommendations

2010 Rank	Corridor/ Project	Recommended Action *and Status* (August 2013)	Rider 42 Funding Allocation
39	**Loop 1 South Managed Lanes**	Tolled express lanes engineering (environmental clearance, final design and preparation for construction). *Detailed scheduling being finalized; data collection for environmental study underway; aerial survey for design was completed in June: traffic data are being collected.*	$16.5 Million
4	**IH 35 Study Extension**	Expand the City of Austin (COA) study limits and scope: express lanes, operations, and travel options. *Consultant report with detailed list of possible improvements delivered in August 2013.*	$1.2 Million
4	**IH 35 Implementation Plan**	Feasibility study will use output of the City of Austin study (see above) to develop an implementation plan for IH 35 from SH 45 North to SH 45 South, including critical components, designs, constructability, project construction costs, environmental process, project phasing plan, public involvement and revenue assessment. *Computer modeling and other analyses being conducted; public comments being analyzed; preparing for public meeting in October.*	$10.75 Million
4	**IH 35 Engineering - Two Options**	*Option A: (If COA $2 million match available from 2013 bond election). Planning and Environmental Linkages (PEL) study for the future transportation corridor [along IH 35 through the Austin area]. Option B: TxDOT continue work along IH 35 at Oltorf and Stassney to William Cannon. Potential purchase of right-of-way; engineering, environmental or operational studies.*	*$2.03 Million*
All Congested Corridors			
Integrated Traffic Management		Comprehensive system operation engineering study for integrated system management and operation; development of pre-positioning plan for incident management equipment, and preparation of incident diversion plans for most congested corridors. *Consultant draft report delivered August 2013.*	$0.8 Million
Total Allocated			**$31.28 Million**

IH 35: http://www.mobility35.org/

South Loop 1: http://mopacexpress.com/

Dallas/Fort Worth

Nineteen of the state's 50 most congested corridors were in the Dallas/Fort Worth Metroplex in 2010; 11 of them were studied during the course of the Mobility Investment Priorities project. Several improvements have been deployed, as the Metroplex has aggressively pursued large congestion reduction projects using a combination of traditional funding and innovative financing including comprehensive development agreements (CDA). The beneficial effect of these projects is illustrated by the recommendations offered by the Mobility Investment Priorities project working group; there are no recommendations about the CDA corridors because major roadway improvements are under construction by the private developers. Other corridors in the most congested list such as Woodall Rodgers, North Central Expressway and SH 360 either have few large scale improvement options due to physical, community or financial constraints or may have their congestion levels reduced by construction projects that have already begun. The already built-out corridors will largely rely on operational improvements, travel options and improvements to other roads or other modes to provide additional congestion relief.

Two large projects used the full Dallas/Fort Worth Proposition 12 project development allocation of $118,750,000. Public meetings were held on both projects in August 2012. A substantial amount of the right-of-way has been procured and construction began in August 2013 on the Horseshoe Project; Rider 42 was one of nine funding sources used on the project. Construction plans are being developed for Phase 1 of the Trinity Parkway.

All of the Dallas-Fort Worth 2010 top 50 congested sections list remain in the 2013 list of the 100 most congested sections, with 15 of the 19 remaining in the top 50. Ten of the Dallas/Fort Worth sections were in the top 20 of the 2010 list, and although the sections have changed, 10 are also in the 2013 top 20 list, several of them appearing to be a result of the construction activities designed to ultimately improve the corridors.

Exhibit 3. Status of Dallas/Fort Worth Recommendations

2010 Rank	Corridor/Project	Recommended Action *and Status* (August 2013)	Rider 42 Funding Allocation
12, 17, 29	**IH 30 & IH 35E Horseshoe**	Engineering, right-of-way (ROW) and adjust utilities. *Design-build contract awarded in November 2012; Notice to Proceed 1 issued February 2013; NTP2 authorizing construction issued August 2013.*	$100.75 Million
12, 16, 17, 29	**Trinity Parkway Phase 1**	Engineering, ROW and adjust utilities. *TxDOT continuing construction plans; environmental clearance received in September 2013.*	$18.0 Million
Total Allocated			**$118.75 Million**

Horseshoe Project: http://dallashorseshoe.com/

Trinity Parkway: http://www.trinityrivercorridor.com

Houston

Most of Houston's most congested sections in both 2010 and 2013 were located between downtown and the IH 610 Loop; nine of the 20 corridors in the top 50 in 2010 were intensively studied in the Mobility Investment Priorities project. The Houston metro area Rider 42 funds (totaling $116,224,000) were allocated by the local working group to right-of-way purchases, utility relocation, engineering studies and design efforts (Exhibit 4). US 290 right-of-way acquisition is substantially complete and the origin-destination survey to inform the downtown roadway study is complete. Most of the other environmental studies and design plans have made substantial progress with two interchange improvements (at US 59/IH 610 and US 59/IH 45) on schedule to begin construction by 2016. The two bang-for-the-buck studies — examining operational improvements on US 59 and improving the chances for implementing a variety of travel options — will be underway in the spring of 2014. The studies and related construction or implementation efforts sanctioned by Rider 42 will continue for the next several years.

The biggest success of Houston's Rider 42 funding was as a key part of the US 290 reconstruction; the right-of-way funding, combined with other Proposition 12 funding, a partnership with the Harris County Tollroad Authority (HCTRA) and a re-design of the previous project meant that substantial congestion relief can be delivered to corridor travelers 20 years ahead of the previous schedule with completion by 2017 (http://www.my290.com). The US 290 expansion from the IH 610 to SH 99 Grand Parkway consists of additional mainlanes, interchange improvements and reversible managed lanes that will provide travel options for corridor travelers. The project funding package includes more than one agency and more than one funding source; this is similar to the way most large projects are being accomplished.

The interchange redesign projects and the operational and travel option studies will assist the agencies in reducing congestion by getting more productivity out of the existing system. In some cases, these will improve conditions until larger projects can be implemented and, in other corridors with fewer construction options, the strategies may be the pilot tests to demonstrate the methods to reduce congestion in the next several years. The travel option study (which was sanctioned by the local working group as part of the MIP Early Recommendations Report, but will be funded separately by the Houston TxDOT District) will focus on Houston's dense activity centers (downtown, the Texas Medical Center, Greenway Plaza and Uptown) where many jobs can be at least partially accomplished using electronic means. The US 59 operational study will develop analytical techniques and identify smaller projects to squeeze more efficiency from a congested corridor that is unlikely to see substantial additional capacity; this will be a model for other congested corridors in Houston and the other large Texas cities.

Another major congestion relief project, the extension of the Hardy Toll Road from the IH 610 Loop to downtown, is estimated to begin construction in 2020 following projects to relocate the nearby railroad tracks and rebuild other roads. The $350 million Toll Road extension project is in the design phase.

Exhibit 4. Status of Houston Recommendations

2010 Rank	Corridor/Project	Recommended Action *and Status* (August 2013)	Rider 42 Funding Allocation
11, 25	**US 290**	Purchase right-of-way and adjust utilities in locations along US 290 (primarily at Beltway 8 interchange). *Right-of-way maps approved and acquisitions are underway; 48 of 56 parcels with approximately $52 million spent (66 percent).*	$78.0 Million
2, 6, 7, 10, 27, 31, 35	**IH 45, US 59, IH 10 & SH 288 – Downtown Redesign Study**	Feasibility study for long-term solutions to the downtown area and connecting freeways based on origin-destination travel patterns. *Origin-destination (O-D) study completed end of September 2013. Remaining study underway.*	$5.0 Million
1, 7	**IH 45 North**	Feasibility study and design of mobility improvements along major streets parallel to IH 45 North. *Initiated after downtown area O-D study was completed.*	$2.0 Million
2, 18, 20	**US 59 South at IH 610**	Purchase right-of-way, adjust utilities, and design for three direct connectors at US 59 South/IH 610 interchange. *Preliminary engineering complete for three projects – waiting on environmental clearance. Right-of-way acquisition not complete on two projects. Construction anticipated to begin in 2015 and 2016.*	$21.27 Million
6, 10	**IH 45 South at US 59**	Purchase right-of-way and adjust utilities for direct connector at IH 45 South/US 59 interchange. *Plans are complete, environmental clearance needed. Two right-of-way parcels being acquired. Construction begins 2014; completed in 2 to 3 years.*	$4.0 Million
6, 26	**IH 45 South at IH 610**	Purchase right-of-way, adjust utilities, and design for two direct connectors at IH 45 South/IH 610 interchange. *Design complete and environmental clearance approved; right-of-way acquisition underway. Construction could begin in October 2013 and in 2014 if construction funding available.*	$5.1 Million
All Congested Corridors			
Move up - 2,10, 18,20 US 59 Operational Improvements		Engineering study to identify locations and funding for new designs and operational treatments in US 59 South corridor. *Consultant procurement and contracting in progress; will start November 2013.*	$0.85 Million
Travel Options		Engineering study for implementing travel option strategies. *Begin in January 2014, coordinated between TxDOT and H-GAC.*	$0.5 Million**
Total Allocated			**$116.22 Million**

****Additional amount from TxDOT planning funds allocated to address Rider 42 issues.**

US 290: http://www.my290.com/

IH 45 North: http://www.ih45northandmore.com/

San Antonio

The $33,740,000 allocated to the San Antonio area was used for 11 studies and design projects (Exhibit 5); two additional studies initially approved by the local working group and included in the MIP Early Recommendations Report were subsequently funded by the TxDOT San Antonio District. Several of these efforts will continue for the next few years and will be monitored for findings that will be important to future actions in San Antonio as well as actions and ideas that might be used in other regions.

The scope of the largest Rider 42 project expenditure was finalized with the completion of a planning and environmental linkage (PEL) study on IH 35 that had begun before Rider 42; the PEL study used public engagement and design analyses to narrow the scope of following studies. An environmental assessment is being conducted based on the PEL that was completed in spring 2013. The PEL recommended that one concept be evaluated along with a no-build option in the environmental process. That process will examine the number of lanes, the method and location of any construction option and the method of funding or finance. Identifying a short list of corridor options resulted in greater focus on achievable projects and a time savings of at least two years. The PEL study approach examines previous planning and environmental documents to organize existing knowledge, determine the community views on the corridor needs and options, and allow agencies to rapidly move into more detailed planning and decision making. Three planning and environmental linkage studies are being used in other San Antonio corridors to examine alternative routes to the congested downtown section of IH 35.

Six other projects were allocated funding for design, engineering and/or environmental work. Most of these began in fall 2013, with the design of the connector ramps on the northern side of the US 281/Loop 1604 interchange beginning after a decision on the current environmental studies.

The three “bang-for-the-buck” studies — two of which are being funded outside of the Rider 42 funding — are in the early stages, but will provide valuable ideas for successful non-construction approaches to reduce congestion.

Two of the five 2010 San Antonio corridors in the 50 most congested corridors list have fallen off the 2013 100 most congested sections list following the implementation of relatively inexpensive designs that increase traffic flow by limiting the effect of crossing traffic. These projects provided information for other Rider 42 studies and illustrate interim improvements can offer substantial short-term benefits.

Exhibit 5. Status of San Antonio Recommendations

2010 Rank	Corridor/Project	Recommended Action *and Status* (August 2013)	Rider 42 Funding Allocation
49	**IH 35 Northeast**	Conduct environmental study as recommended by planning and environmental linkages (PEL) study. *PEL completed; Environmental Assessment underway.*	$13.0 Million
38	**US 281/Loop 1604 Interchange**	Design four northern direct connector ramps. *Will follow decision on environmental study; sometime in 2014.*	$6.0 Million
23	**Loop 1604 NW (FM 471 to SH 16)**	Preliminary engineering supporting the expansion to a four-lane freeway with frontage roads. *Environmental study complete; construction will begin early 2014.*	$0.6 Million
48	**IH 35 Central**	PEL study to define the needs and alternative improvements. *PEL study began in April 2013.*	$1.0 Million
48, 49	**South Alternative Routes to IH 35**	PEL study to define the needs and alternative improvements. *PEL study began in April 2013.*	$2.5 Million
48, 49	**IH 410 Southwest**	PEL to define the needs and evaluate alternative routes to IH 35. *PEL study began in April 2013.*	$0.5 Million
48	**IH 35 Central**	Design mainlane and ramp operational improvements and perform NEPA‡ study. *Work began in fall 2013.*	$2.0 Million
48	**IH 35 Southwest**	Design mainlane and ramp operational improvements and perform NEPA‡ study. *Work began in fall 2013.*	$4.14 Million
48, 49	**IH 410 at IH 35 Southwest**	Schematic design of priority direct connectors and perform NEPA‡ study. *Procurement for consultant is underway. Work began in fall 2013.*	$1.5 Million
48, 49	**IH 410 at IH 10 East**	Schematic design of direct connectors and perform NEPA‡ study. *Procurement for consultant is underway. Work began in fall 2013.*	$1.5 Million
All Congested Corridors			
ITS/Transportation Management		Project planning and feasibility study to facilitate traffic and incident clearance (infrastructure, policies and practices). *Notice to proceed given in June 2013.*	$1.0 Million
Parking Strategies		Parking management project planning and feasibility study. *Procurement for consultant is underway.*	$0.3 Million**
Travel Option Strategies		Project planning and feasibility study to identify possible travel option strategies and champions. *Procurement for consultant is underway.*	$0.3 Million**
Total Allocated			**$33.74 Million**

****Additional amount from TxDOT planning funds allocated to address Rider 42 issues.**

‡*NEPA-Design and environmental analysis with emphasis on public engagement.*

IH 35: http://www.drivefor35.com/

US 281: http://www.411on281.com/US281EIS/

Loop 1604: http://www.morefor1604ea.com/

ECONOMIC BENEFITS FROM CONGESTION REDUCTION PROJECTS

Developing an economic assessment of the improvement project benefits is an important practice that ensures public investments are spent wisely. The TTI Mobility Investment Priorities project analyzed the economic effects of the potential transportation investments. Five congested corridors were examined in Austin, Houston and San Antonio; four of the corridors are still being discussed with the public and construction funding has not been identified. The fifth corridor, US 290 in Houston, was funded in 2012 but was retained in this analysis. Economic benefits for these projects were estimated and possible funding options identified; the methodology and detailed results are available on the project website at: http://mobility.tamu.edu/mip/.

The estimates used here provide additional information to the public deliberations about project scale and about the various projects and programs that might provide significant economic returns. Readers should realize that the benefit values and the benefit/cost comparisons ***will change*** *as the project designs evolve*. Consider this analysis as part of the dialogue, not an end of the discussion.

Types of Economic Benefits

Infrastructure spending usually results in economic and social benefits. The design and function of a transportation project can determine the magnitude of the effect on the local and regional economy after it is constructed. The type of industrial, commercial and employment markets in the metropolitan area also affects the type and amount of benefit from a project. The following are the five major benefits that were evaluated for the transportation infrastructure investments.

- **Traveler Benefits (Out-of-Pocket):** More spending on transportation infrastructure can result in direct personal benefits to Texans. These include cost savings resulting from a reduction in travel time and fuel consumed for personal and business vehicle drivers.
- **Traveler Benefits (Not Out-of-Pocket):** Traveler benefits that do not affect out-of-pocket expenses include the value of personal time and travel time reliability, the amount of time a driver spends on the road rather than attending important family functions or spending time accomplishing personal activities. Some of these trips do not have a direct monetary effect on the U.S. gross domestic product, but they clearly have a value for the traveler or freight shipper.
- **Shipper/Logistics Cost Savings:** Reducing the travel time and shipping costs for industries that produce or consume the freight shipped on trucks traveling in congested corridors can have a positive effect on the economy. The consumer costs are decreased and the economic competitiveness of businesses is improved.
- **Economic Benefits:** An improved transportation network can mean increased business output, value added, more jobs, and increased wage income and can produce positive impact to Texas businesses. Conversely, traffic congestion can constrain the ability for goods and services to be shipped and delivered efficiently and may deter businesses from locating in Texas.
- **Societal and Environmental Cost Savings:** Reducing traffic congestion can also result in environmental cost savings such as improvement in air quality from the reduction of stop-and-go traffic and societal benefits such as more time for civic engagement and family time.

Taken together, these five major benefit categories can be used to estimate the total economic and societal benefit of transportation infrastructure investment to all Texans. The preliminary cost estimates were used in a comparison of the benefits and costs.

Mobility improvement costs are the total of the construction and right-of-way costs to build the project and 30 years of expenditures to operate and maintain the project. Constantly changing factors such as increases in construction material prices, labor, land, and raw materials mean that project costs are difficult to predict in the early stages. Therefore, it is important to note that the costs presented in this report are only preliminary estimates and are subject to change. In the case of the four unfunded projects the conceptual design stage is an ideal point for a benefit estimate, but it also means that the values will change as the public is engaged and project designs evolve. A project with total benefits of $1 billion and total costs of $600 million could be worthwhile to pursue. However, a two-fold increase in project costs could change the viability the project.

Project Findings Summary

Benefit/Cost Comparison

Exhibit 6 illustrates the benefit/cost comparisons for each of the five projects. The US 290 project is being funded from a variety of sources and construction has begun on several sections; the other projects are in early planning stages and the costs shown are estimates based on design options being studied. The benefit/cost ratio in Exhibit 6 includes the total cost of constructing and operating the project (and does not include any financing costs).

Exhibit 6: 30-Year Benefit and Cost Summary

Benefits and Costs				
Metro Area	**Project**	**Total Benefits ($mil)**	**Total Costs ($mil)**	**Benefit/ Cost Ratio**
Austin	IH 35	$9,490	$1,800	5.3:1
Austin	Loop 1	$1,320	$270	5.0:1
Houston	IH 45	$10,330	$2,170	4.8:1
San Antonio	IH 35	$6,470	$2,160	3.0:1
Houston	US 290	$5,990	$890	6.8:1

The five projects examined in this report have a combined benefit/cost ratio of greater than 4.6 to 1, returning $33 billion in estimated benefits as a result of the initial $7 billion capital investment. Further, of the $33 billion in benefits that Texans will see from the projects, over $20 billion in benefits result directly from the mobility improvements in the form of savings in travel time, fuel, shipping and logistics costs, and the associated economic benefits that result.

Paying for the Projects

The project costs are substantial, but so are the benefits. Many discussions will occur before specific funding packages are developed, even if the funding proposal in the November 2014 general election is approved by the voters. The Mobility Investment Priorities project was tasked with identifying funding options for the projects; more detailed explanations of a variety of strategies are included in separate project summary reports. All the strategies assume that the costs will be paid for by the residents or travelers in the region. These may be from an allocation of a statewide fund, a local option fee or from some other source. It could be from a newly enacted or increased fee or tax, or it could be from re-purposing an existing tax or fee.

The funding and financing ideas offered in this report use familiar practices as comparisons. The major sources of Texas state-level transportation funding comes from the 18.4 cents per gallon federal gas tax, the 20 cents per gallon state gas tax and the $50 average private vehicle registration fee (http://mobility.tamu.edu/mip/rpm.php). Values in this report for these sources are used as a "how much in relation to what I pay now?" type of comparison; they are not recommendations, advice or suggestions of public consent. Other, less familiar sources and the estimation techniques are described below.

Traditional approaches to fund all of these large, unfunded projects do not appear feasible. Paying for all four of the large, unfunded projects at the same time would require the equivalent of 16 cents per gallon of statewide fuel tax or $75 per year of vehicle registration fee. These could be reduced if the projects were scheduled for different years. Paying with 30-year bonds would require the equivalent of 4.5 cents per gallon of fuel or $27 per vehicle. Funding the projects individually at the local level would require higher allocations of fuel tax or vehicle registration fees.

But there are more sources of funding. Managed lanes are being considered for all four corridors; they will produce some revenue. When mobility is improved, there will be a more desirable development environment; some of the increased tax revenue raised from the new development could be applied to the project. If the November 2014 election is passed by voters, there will be a funding source that could be used for new projects.

A New Idea

A new, blended financing arrangement presented in the economic evaluation report uses state and local strategies to take advantage of certain attributes of each government level. This funding strategy could include:

- The state could issue a bond, backed by the credit of the state, to cover the cost of the project, thus obtaining a lower interest rate than a local agency could on its own.
- The state and local authorities could then agree to a repayment schedule that would benefit both parties.
- One approach could be for the local agencies to pay the financing costs (in recognition of the lower interest rate from state borrowing and the benefits to local residents from early project completion).

For example, Exhibit 7 illustrates the possible resulting funding shares if the state and local governments each pay half of the project construction, right-of-way, operation and maintenance cost, and the local governments pay all of the interest costs on a 30-year bond. For IH 35 in Austin, the state would owe $30 million annually. This payment could be made, for example, using funds from oil and gas fees should the measure be approved in the November 2014 election.[1] The remaining $74 million would be owed by the local governments or agencies. This annual payment could possibly be made using managed lane revenue, proceeds from a tax increment financing zone, and revenue received from an allocation equivalent to $30 per Austin registered vehicle. This strategy could also be implemented using a bond with a shorter term, thereby reducing the amount of interest owed by the local government over the term of the loan, but increasing the annual payment.

Exhibit 7: State and Local Cost Sharing Summary for Innovative Bonding Strategy

Paying for the Project In 30 Years Using State and Local Cost Sharing ($mil)				
	Austin		Houston	San Antonio
Revenue Source	**IH 35**	**Loop 1**	**IH 45**	**IH 35**
Annual State Owed Debt Service	$30	$4	$36	$36
Annual Locally Owed Debt Service	$74	$11	$89	$89
Total Annual Debt Service	***$104***	***$15***	***$125***	***$125***
Voter-Approved (Nov 2014) Funds from Oil and Gas Fees	$30	$4	$36	$36
Total Annual State Revenue	***$30***	***$4***	***$36***	***$36***
Managed Lane Revenue	$3 to $19	$5 to $25	$20 to $108	$9 to $51
Tax Increment Financing	$7 to $33	$3 to $12	$2 to $31	$10 to $42
Local Vehicle Registration Fee Revenue*	$57*	$0*	$25*	$49*
Total Annual Local Revenue	***$68 to $109***	***$7 to $38***	***$47 to $164***	***$68 to $142***
Total Revenue	***$98 to $139***	***$12 to $41***	***$83 to $200***	***$104 to $178***

**Allocation from the local vehicle registration fees (assuming median value of managed lane and tax increment zone revenue): Austin IH 35: $30, Houston IH 45: $5, San Antonio IH 35: $24*

A state and local cost sharing approach opens the project sooner, providing early congestion relief. In return for the earlier benefits to local travelers, the local funding pays for the state borrowing costs, allowing state funds to be spent on more congestion relief and roadway repair projects. Some aspects of the strategy will require legislative action (e.g., local registration fee) but an approach that uses multiple funding sources appears to have a better chance of success.

[1] The Texas Legislature recently passed a proposed constitutional amendment that would transfer up to $1.2 billion in revenues from oil and gas severance tax to the State Highway Fund. This amendment will be on the ballot in the November 2014 general election.

IMPLEMENTING THE BEST TRAFFIC AND DEMAND MANAGEMENT PRINCIPLES

Among the goals of Rider 42 was to ensure that the best congestion reduction practices are incorporated by Texas' large metropolitan regions to effectively and efficiently utilize the state's roadways. Congestion mitigation strategy deployment was evaluated during the Rider 42 study; the summary in Exhibit 8 outlines where the best practice standard is being met and where additional investment and attention is needed. Most of the "needs study" or "efforts not sufficient" notes in Exhibit 8 have been incorporated in the six studies that are being conducted as a result of each local working group's Rider 42 process.

Additional information on congestion relief strategies are presented on the Mobility Improvement Priorities website: http://mobility.tamu.edu/mip/strategies.php.

Exhibit 8. Congestion Reduction Strategy Checklist – Metropolitan Area Summary

Congestion Reduction Strategy	**Metropolitan Area Summary**			
Date: August 2013	**Austin**	**Dallas/ Ft Worth**	**Houston**	**San Antonio**
System Efficiency				
Aggressive Incident Clearance	E	G	E	G
Electronic Toll Collection Systems	E	BP	BP	SP
Reversible Traffic Lanes/Changeable Lane Assignments	S	S	N/A	S
Signal Operations & Management	E	G	N/A	SP
Special Event Management	G	G	SP	G
Traffic Management Centers	S	G	BP	G
Traveler Information Systems	G	G	BP	S
Truck Incentives & Use Restrictions	S	S	S	S
Truck Lane Restrictions	S	SP	S	S
Travel Options				
Flexible Work Hours	E	G	SP	S
Compressed Work Weeks	E	G	SP	S
Telecommuting	E	G	SP	S
Carpooling	E	G	SP	S
Real-Time Ridesharing	E	SP	BP	S
Vanpool	G	G	G	S
Transportation Management Associations	G	G	E	S
Trip Reduction Ordinances	S	N/I	S	S
Parking Management	S	SP	S	S
Pay-As-You-Drive Auto Insurance	S	G	N/I	S
Variable Pricing	S	G	SP	S

BP: Best National Practice is being used ***E***: Current efforts are not sufficient ***N/A***: Not applicable or needed
SP: Best State Practice is being used ***S***: Should be studied ***N/I***: Not enough information available
G: Current efforts are good

Exhibit 8. Congestion Reduction Strategy Checklist – Metropolitan Area Summary (cont.)

Congestion Reduction Strategy	Metropolitan Area Summary			
Date: August 2013	**Austin**	**Dallas/ Ft Worth**	**Houston**	**San Antonio**
Active Traffic Management				
Dynamic Merge Control	E	S	S	S
Dynamic Rerouting	E	S	S	S
Dynamic Truck Restrictions	E	S	S	S
Queue Warning	E	S	S	S
Ramp Flow Control (Flow Signals/Ramp Metering)	S	S	SP	S
Temporary Shoulder Use (Bus on Shoulder)	S	SP*	N/A	S
Variable Speed Limits	S	S	S	S
System Modification				
Access Management	S	S	S	SP
Bottleneck Removal	E	S	G	G
Freight Rail Improvements	N/A	N/I	N/I	N/A
Multimodal Transportation Centers	E	G	S	G
Ramp Configuration to Increase Queuing Capacity	S	G	G	G
Acceleration/Deceleration Lanes	S	G	G	S
Commercial Vehicle Accommodations	S	SP	N/A	S
Diverging Diamonds	S	SP	N/A	S
Intersection Improvements & Innovative Intersections				
Roundabouts	S	G	N/I	N/A
Intersection Turn Lanes	S	G	S	SP
Loop Ramps Eliminating Left Turns	S	N/A	N/A	N/A
One-Way Streets	S	N/A	S	N/A
Superstreet	S	N/A	S	SP
Express & Park-and-Ride Bus Service	G	S	BP	E
Park-and-Ride Lots	G	E	E	S
Additional Capacity				
Adding Lanes or Roads	E	E	E	E
Adding New Toll Lanes or Toll Roads	E	G	G	G
Exclusive (Managed) Lanes	S	G	SP	S
Grade Separation	S	BP	S	G
Construction Improvements				
Construction Contracting Options	S	NP	SP	SP
Reducing Construction/Maintenance Interference	S	S	SP	G
Pavement Recycling	S	N/I	N/A	N/I
Shoulder Pavement Upgrade	E	N/I	S	N/I
Sustainable Pavements	S	N/I	N/A	N/I

BP: Best National Practice is being used ***E***: Current efforts are not sufficient ***N/A***: Not applicable or needed
SP: Best State Practice is being used ***S***: Should be studied ***N/I***: Not enough information available
G: Current efforts are good

* Temporary use of shoulder by general purpose vehicles.

Operational Innovations in Public/Private Partnership Projects

TxDOT and its regional partners have employed a new type of large project construction for strategic metropolitan mobility projects in the Dallas-Fort Worth region. This involves the use of three unique public/private partnership project delivery models — concession, design-build and design-build-operate. The decision of the regional partners to utilize the new delivery models and leverage the value of projects' mobility assets has advanced the construction of the much needed mobility improvements by decades over traditional capabilities.

What are the innovations? The traveling public and local stakeholders are being introduced to new highway infrastructure construction technologies, communication methodologies and traffic management innovations that will define the future expectations of traditional highway project delivery practices. These innovations include the following non-typical and mobility improving construction project components that stakeholder interviews noted as important for future efforts:

- Dedicated full time project information office and professionals providing reliable project contact and update information to all interested parties.
- Business Owner and Maintenance of Traffic Task Forces working together continuously to ensure all operational issues are addressed satisfactorily.
- Real time traffic delay/detour mapping via mobile based or internet communication.
- Dedicated peak hour incident management/motorist assistance to keep available travel lanes open.
- All construction lane closures facilitated with rolling closures and restricted to nights and weekends (non-peak travel times).
- Technology driven construction methodologies reducing time, costs and possibly improving quality long term performance such as wireless paving, automated testing procedures, and three-dimensional design plans.

How do the innovations become the new standards? The public/private partnership project contract documents established baseline provisions that restrict lane closures, apply lane rental fees for closures during the peak period, and provide for public information professionals and peak period motorist assistance. The success of specific outreach methodologies, construction techniques, and design processes warrant further consideration by TxDOT or other agencies to develop new standard specifications and/or performance standards.

Is there additional room for innovation? In the very near future, two additional public/private partnership type projects will be breaking ground. Concern from all stakeholders has been raised regarding the ability of the owning agency, TxDOT, to coordinate the system level impacts of all the accelerated construction projects. Improved coordination within projects of significant length as well as between regional construction projects to minimize total trip delay is desired and expected.

Computer Model Analysis of IH 35 Austin Corridor

The 2013 most congested road sections list ranked the central Austin portion of IH 35 as the most congested road in the state. The Central Texas Rider 42 Working Group (see the front of this report for a list of members) recognized the severe congestion problems from the beginning of the Rider 42 process when IH 35 was *only* the fourth most congested road; they sanctioned a sophisticated computer modeling analysis. This big picture analysis of IH 35 travel patterns and congestion explored large-scale scenarios that have been discussed by local stakeholders since the late 1990s as well as new ideas involving design and technology options. This modeling effort provided an opportunity for Central Texas stakeholders to explore roadway design scenarios unbounded by the consideration of today's financial constraints. The project enabled stakeholders to identify the scale of improvements that will be needed to avoid the significant mobility problems that will occur if existing trends continue.

The modeling analysis technique refined during the MIP study complements and supports existing planning and development efforts underway in the region; it is not a replacement for local efforts. The report describing the analytical techniques and findings are available on TTI's Mobility Investment Priorities website: http://mobility.tamu.edu/mip/pdfs/MIP-Longterm-Improvement-Central-TX-ES.pdf TTI applied the Capital Area Metropolitan Planning Organization regional travel model together with DynusT, a traffic analysis software capable of examining driver behavior and choices in congested conditions. The scenarios examined the congestion effects from a range of improvement ideas adding capacity to IH 35, encouraging traffic to use SH 130 as a bypass route, and relocating the IH 35 mainlanes to improve east-west connectivity in downtown Austin.

The color-coded congestion diagrams in Exhibit 9 summarize the findings of the model analysis. Severe congestion (speeds around 10 mph) is shown in red, heavy congestion (speeds around 30 mph) in yellow and free flow conditions in blue for four scenarios representing the range of outcomes for northbound IH 35 in 2035.

- **Key Finding: Adding Capacity Is Important, but Cannot Solve the Entire Problem**
  The modeling research demonstrates that Central Texas cannot simply "build its way out of congestion" on IH 35. Scenario 6 Expanded, the only build-alone option that substantially reduced congestion, involved six tolled express lanes with eight access points between SH 45 North and SH 45 South. Although no cost estimate was developed, that design will be costly to build and likely to have community and environmental concerns.

- **Key Finding: Interim Improvements Are Helpful**
  Scenarios 2 and 7 most closely represent current local planning efforts toward an interim, short-term improvement — adding one lane in each direction for some yet-to-be-determined purpose within the existing right of way. These options reduced person-hours of regional travel by 5 percent, a substantial positive impact translating into roughly $1 billion in travel time cost savings annually.

- **Key Finding: All Solutions Will Be Needed**
  Nonetheless, the overarching and positive message of this examination is that Central Texas does have options to address IH 35 congestion. "The one solution" is to do everything: add

capacity, operate the system efficiently, enable new development patterns, and incentivize travel behavior changes. This everything-*including*-the-kitchen-sink approach will improve mobility, as well as support population and job growth and economic development potential in a way that the forecast 3-hour commute between Round Rock and Downtown Austin in 2035 will not.

- **Key Finding: The Kitchen Sink Approach Will Not Be Easy to Implement**
  The Central Texas Rider 42 Working Group concluded that the arrangement of land uses and transportation capacity that was modeled in the base case (which was based on the 2035 Capitol Area Metropolitan Planning Organization plan) is unlikely to occur. That is, the congestion levels predicted for IH 35 and the Central Texas region is not likely to occur. It is more likely that behavior changes would occur: jobs and homes would relocate to shorten commute times, travelers would avoid making peak period trips, and severe congestion would dampen the area's population and employment growth.

  A hybrid approach involving capacity increases and demand pattern changes (termed the "What Would It Take" scenario in Exhibit 9) was modeled with aggressive changes from the base case:
  - Adding and managing capacity similar to Scenario 2.
  - Shifting 40 percent of region-wide work commuter trips to work-at-home jobs.
  - Reducing university commuter trips by 30 percent region-wide, assuming, for example, technology options replace the in-class experience.
  - Reducing retail shopping trips by 10 percent region-wide, for example being replaced by online shopping.
  - Shifting trips to off-peak periods.
  - HOV, transit, and non-motorized usage were each increased by 25 percent, decreasing auto vehicle usage.

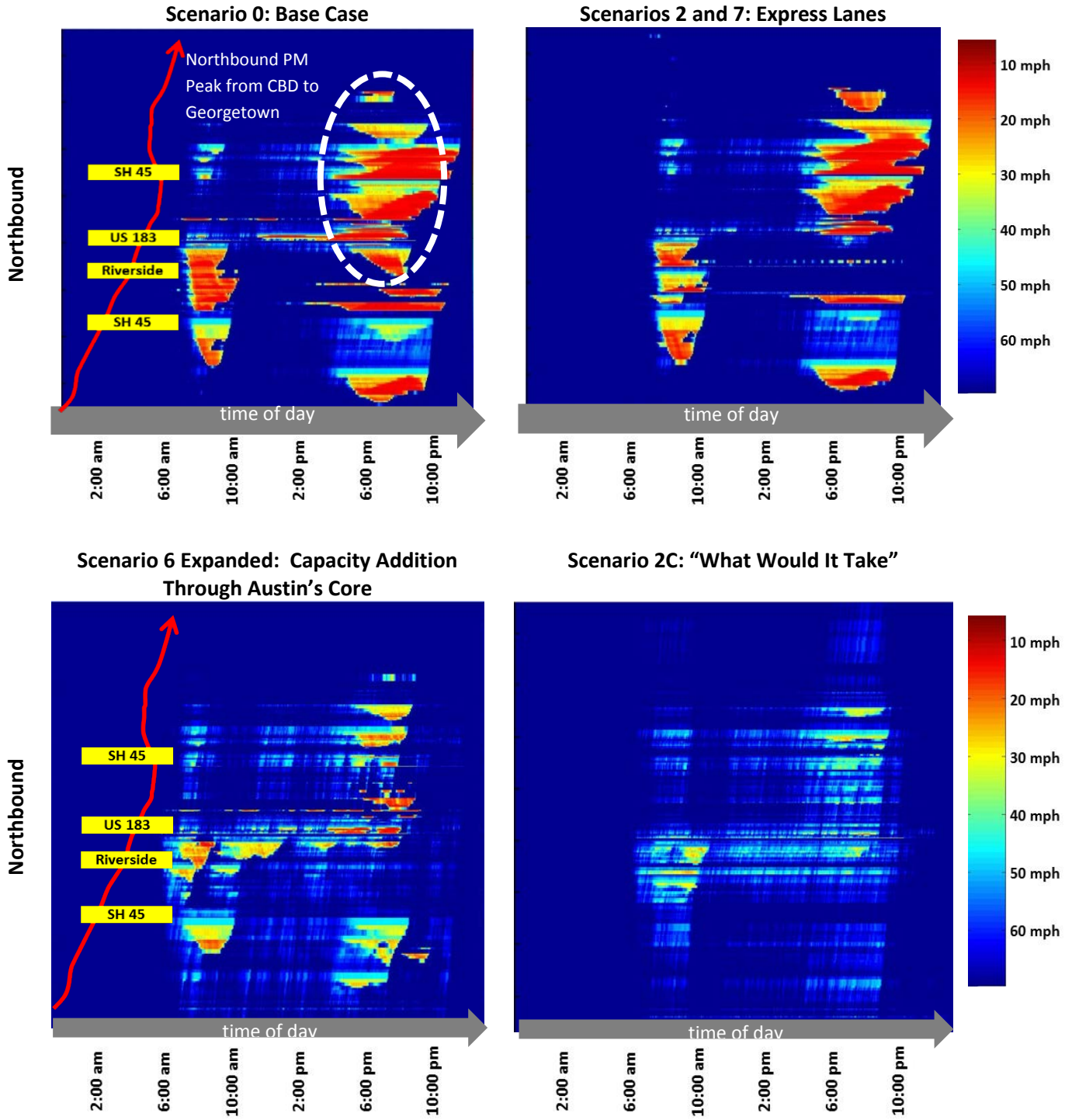
  As shown in the resulting congestion diagram (Exhibit 9), the hybrid strategy demonstrates that IH 35 traffic congestion can be substantially addressed by these significant changes: the red areas representing the lowest speeds have substantially disappeared, and the remaining red areas appear to represent localized bottlenecks that could be addressed individually through operational improvements. Yet, the changes to travel behavior necessary to effect such an improvement are significant.

The results of this examination indicate that Central Texas confronts a harsh impending reality should population and employment growth trends continue as projected. Many of the studied concepts had been held out as promising solutions that would address the long-term IH 35 mobility challenge, including shifting traffic to the SH 130 bypass route. However, Central Texans, especially commuters, represent a substantial part of IH 35 congestion. Few stakeholders are arguing against commuters — indeed, they represent jobs and a vibrant central city economy. However, it is clear that addressing IH 35 congestion must involve a fundamental shift in thinking that there is a build solution that can solve the congestion problem. What is needed, instead, is a publicly supported concept that blends aspects of building, operating and incentivizing travel option solutions. The central question is how to affect such a fundamental shift. The study findings should serve as motivation for approaching IH 35 congestion

solutions differently; the return on this effort could very well be preserving the quality of life and economic health of Central Texas.

Exhibit 9. Congestion Diagram Summary – Northbound IH 35 in 2035

24-Hour, IH 35 between South Hays County Line and North Williamson County Line on General Purpose Lanes



Analysis of Safety and Congestion Problems on IH 35 in Austin

The Austin IH 35 study corridor is characterized by high congestion levels and a substantial number of associated crashes. To begin to gain a better understanding of the potential safety and congestion concerns in this corridor the relationship between traffic volume, travel speed and crashes was analyzed for IH 35 through Travis County for 2009, 2010 and 2011. Traditional roadway corridor safety assessment focuses on the evaluation of crashes with particular attention directed to hot spots — locations where crashes have occurred in close proximity to each other. Network screening is a first step toward achieving this objective; the systemic analysis summarized in this report can be used in combination with a system-wide review of crash and congestion trends to help identify potential locations or operational configurations that warrant more detailed safety assessments. The best analyses examine physical infrastructure improvements as well as operational programs such as quick crash clearance and queue warning can reduce roadway congestion and crashes.

The study identified the following key issues that merit additional consideration in future safety and congestion evaluations on this and other roadways in the most congested sections list:

- Crash Location – Two methods were used to identify the sections with the biggest safety problems; both approaches consistently identified the section extending from Riverside Drive on the south to Clayton Lane/Koenig Lane on the north.
- Congestion and Crashes – Many of the observed crash types (rear-end and sideswipe collisions) are commonly associated with high-volume congested conditions.
- Time of day – Crashes peaked during the morning and afternoon rush hour periods. This observation suggests that the number of crashes is closely associated with prevailing traffic patterns. This association between crashes and congestion should be analyzed in greater depth with the detailed travel speed data now available.
- Secondary Crashes – Approximately 13 percent of the corridor crashes occurred within 2 hours and 2 miles of each other. This observation suggests that a substantial portion of the crashes are secondary crashes — the crash that occurs as a result of a first crash or stalled vehicle — and may benefit from rapid crash and stalled vehicle clearance initiatives.
- Crash clearance programs – The observed reduction in the number of secondary crashes corresponds to the timing of the HERO deployment during 2010.
- Other Crash Causes – Crashes during the time period from 2 a.m. to 3 a.m. were higher than the morning peak, suggesting there is a need for continuing driver education and enforcement to reduce impaired or distracted driving.

What Would a Comprehensive "Bang For The Buck" Transportation Program Look Like?

Texas' transportation problems are large and growing. Our vibrant economy and desirable quality-of-life presents great opportunity as well as significant challenges. Capitalizing on the opportunities over the next few years will require a discussion with an informed public, but they will also require that transportation agencies approach their operations in a different way.

There are public-private partnership project opportunities, but that model cannot be deployed across the entire network. Texas might borrow more funding for new projects. There may be support for a value-for-the-money proposition that involves higher taxes or fees for transportation. The chances for public support have been much greater in other states where the new investments are targeted to projects and programs that are well-defined, service-oriented and use objective performance measures to ensure the best "bang for the buck."

Improved performance and accountability are the twin precursors to increased support for transportation. Current systems must be optimized using innovative tactics, policies and procedures. The public must be engaged in a discussion about the existing service quality and funding, and the possible investment opportunities. In a growing state with so many rapidly developing metropolitan areas, increased capacity to handle more person movement must be a part of the solution. Several large projects in very congested corridors are described elsewhere in this report. Based on research conducted during the Mobility Investment Priorities project, the following set of actions appear to be a good start toward getting the most out of the transportation system Texas has now.

Incentivize Operations

Provide agency operators and private sector companies with incentives to reduce congestion.

- Private sector towing programs – Houston's SAFEClear program reduced crashes by 10 to 12 percent (with an additional congestion benefit) by paying tow trucks to remove crashed and stalled vehicles from the freeway mainlanes (http://www.houstontx.gov/council/1/bfacommittee/12.13.10/safeclear2008.pdf) The $5 million annual budget paid for the tows and police supervision of the operation. The cost was offset by a societal benefit of at least $30 million in crash reduction costs. At least 60 tow trucks patrolled the 250 miles of freeway. They responded within 6 minutes to 90 percent of the incidents and cleared vehicles within 20 minutes in 90 percent of the cases, dramatically better than similar services that rely on only a few government-run vehicles.

- Connected signal timing – Central control of signal timing (especially for the frontage road/major street intersections) can be used to dramatically improve the reaction to major crashes. Traffic can be routed to exit ramps before a crash site, along the frontage road through an intersection and then back onto the freeway mainlanes. The signal controller computers at the frontage road intersections can be adjusted by operators in the regional traffic management center to provide more green time to frontage road traffic and less time to the cross streets. Cross street traffic can be handled at intersections before and after the crash scene, with

dynamic message signs, radio, websites and smartphone applications used to broadcast the changes.

Improve Safety

Identify and address safety problems with projects, programs, policies and interagency coordination.

- Lists of safety problems – A list of the worst safety problems, when connected to the 100 most congested sections list, can provide planners and designers with more information to target improvements. Safety and congestion solutions will consist of design, operations, enforcement, and education elements. Understanding the linkage between the two concerns provides more focus to the benefits of the solution strategies.

Expand Travel Options

Increase the percentage of trips that are made in some way other than rush hour, single person auto travel.

- Traveler information – Getting commuters and other travelers to look for information such as congestion, weather, road work and special events, and then connecting them to travel choices are excellent ways to expand the use of travel options. Some of this will require technology expansions, but there is a need for more and better public education.

- Work with employers to expand work options – Telework, flexible work hours, parking cash-out programs (for example, allow employers to reward employees who do not use free parking) or transit allowances (for example, allow employers to support employee transit use) can reduce rush hour work trips.

- Service standards – Managed lanes (also called express lanes or high-occupancy/toll lanes) provide an excellent opportunity to set a service goal. For example, the LBJ Freeway Express lanes (in Dallas) has a goal of ensuring a 50 mph travel speed; if speeds fall below that level, adjustments are made to price or other operational characteristics so that travelers have a safe, fast and reliable trip. It is much easier to convince travelers to pay a premium for a trip if premium service is reliably delivered.

- Invest in creative entrepreneurs – The Washington State Legislature has a program that asks for proposals to remove peak-hour trips from congested areas. **Any** group is invited to make a proposal for payment in return for removing single-person vehicle trips (e.g., in return for the state paying me x dollars I will ensure that y trips are removed from this very congested corridor). The program ranks the proposals by the cost per trip removed and uses the annual budget for the program to identify the number of proposals that can be funded. Evaluations of the program effect show that more trips are removed than were in the proposals. Providing the private sector and individuals with an incentive to think creatively about transportation challenges not only solves problems, it also involves and educates the public.

PUBLIC ENGAGEMENT STRATEGIES

The Mobility Investment Priorities project is designed to identify which roadway projects and programs promise the biggest "bang for the buck" in the state's most congested regions and to lay the groundwork to help make those projects and programs happen. But for them to happen, it is essential that the public support them and support the manner in which they will be paid for.

The Public Engagement Reports and the supporting activities in each metropolitan area emphasize the importance of effective public engagement and its place in transportation planning and development. The reports review current metropolitan area engagement efforts, present best practices and case examples and offer recommendations to help agencies ensure that their public engagement activities are meaningful, credible, productive and successful. The Public Engagement Report and subsequent updates are on the MIP website (http://mobility.tamu.edu/mip/pdfs/MIP_PE-Report-5_15-FINAL.pdf).

Voters and the public in general are more likely to support increased investment in the transportation system if they clearly recognize and understand the need for and benefits of that investment (http://mobility.tamu.edu/mip/pdfs/State-Funding-Initiatives-Summary-5-Pg.pdf). That understanding is difficult to achieve without a significant investment in communications that achieves the educational component of identifying the need **and** allows the public to make informed choices about their transportation systems. Consequently, when transportation agencies are working to address needs in Texas' most congested corridors, **each effort should include a robust public engagement element**. This element should be funded at a level sufficient to ensure that the public has ample opportunity to participate early and meaningfully, to understand the state's transportation problems and the effect of the solutions and to contribute to the discussion of which strategies to implement and how to pay for them. This effort should begin when the engineers and planners begin thinking about the project. By contacting the public early, public engagement specialists can find the thought leaders and potential project champions that will be beneficial throughout the project development process. They can also identify challenges and opportunities that planners and engineers can use in developing the best project.

This early and significant effort is at the heart of achieving the open and transparent public participation called for in Rider 42. An agency's ability to achieve its goals depends heavily on the relationships it has with its many publics, and these relationships are built upon public engagement. Effective engagement not only helps an agency build public support for individual programs and projects, but it helps establish and reinforce a foundation of trust and credibility for future interaction. The recommendations outlined in this report provide a list of steps designed to achieve the goals of Rider 42. Those steps include:

1. Initiate a broad public discussion to raise awareness of the state's mobility crisis and to begin building public consensus toward solutions. See the Rethinking our Path to Mobility (RPM) presentation developed for each of the four metropolitan areas in the Mobility Investment Priorities (http://mobility.tamu.edu/mip/rpm.php).

2. Sustain the discussion through means of an assertive public education campaign to help citizens and voters understand the magnitude of the state's mobility crisis and the consequences of inaction.

3. Communicate with all stakeholder groups; content is based upon polling results and project information produced through the Mobility Investment Priorities project.
4. Continue polling to ensure that changes in public opinion are understood and reflected in ongoing public engagement efforts.
5. Enlist and continually expand community-based networks of movers and doers (both elected and non-elected) to assist in educating various community segments.
6. Ensure that leader/educator networks have ongoing, meaningful interaction with citizens in a manner that accurately reflects the input and opinions of those whose lives are affected daily by worsening traffic congestion.
7. Ensure that public engagement efforts at all levels are sufficiently funded to ensure that communication efforts with all audiences are thorough and that feedback from those audiences is accurate, meaningful and reflected in the project development process.
8. Expand the use of technology in public engagement.

Summary and Recommendations

In the four regions in the Mobility Investment Priorities study, there are clearly as many different approaches for public engagement as there are projects. This flexibility of approach is desirable to ensure that the needs of each respective community and corridor are best met.

Overall, this summary of best practice activities should provide an opportunity for self-assessment and reflection on current and planned public engagement efforts in each region. An examination of practices in other regions should provide new ideas, as well. The following perspective on key challenges is proffered, followed by recommendations for next steps for these efforts.

Key Challenge: Staying Focused While Seeing the Big Picture

A significant challenge for the metropolitan areas where these most congested corridors are located is in arriving at a programmatic approach, which addresses transportation needs at a local or regional level while also addressing cross-state travel needs, including the needs of commercial freight. That is, while the most congested corridors list appropriately identifies target improvement areas for examination, creative solutions and funding, it remains critical that these corridors also be considered in their larger or super-corridor context in the state. This larger context may include a corridor's service to national and international travel needs, such as IH 35 and IH 10.

A good public engagement process includes four principles of effective public involvement.

Accessible Events

There are many challenges to successfully involving the public, but the first is getting people involved in the event. This can be remedied by providing easy access to the event for anyone who might want to attend. Widely publicize the event and have the event at a time and location that is convenient and familiar or have it online. Accessibility can also mean providing food, daycare or translation for non-English speakers. Marketing the opportunities for public involvement to the community through a variety of methods can inform individuals and increase attendance.

Engaging Interactions

Once the event is accessible, the search for successful involvement shifts to "How do I best convey information *to* and receive feedback *from* those in attendance?" The literature recommends that events should be collaborative, engaging and fun, and should provide a learning experience rather than being confrontational, stale and static. When community members engage and buy in to the process, the result will more likely be one of collaboration and mutual consent. It is important that the working environment encourages discussion and feedback, rather than stifling dissent and comment.

Multi-Platform Strategies

Employing a range of techniques encourages more people and different people to participate. Demographic groups that may not attend traditional public meetings, people with hectic schedules and those who are reluctant to voice options can respond when their schedule allows and in a way that is comfortable. A key aspect of this strategy is first knowing your audience, and then providing a variety of mediums through which they can easily communicate their opinions and ideas. Agencies should couple traditional strategies such as public meetings and notices, with innovative strategies such as a project website, social media sites, blogs or text message updates on important project milestones. They should also complement these strategies with focus groups, stakeholder interviews and opinion surveys.

A multi-platform communication strategy allows a more in-depth and comprehensive approach to public involvement. Using multiple, complementary strategies can facilitate greater participation levels by decreasing the barriers to public engagement.

Outcome-Oriented Process

The public engagement process should strive for continuous involvement that results in meaningful decision making that reflects community values. **This principle touches all aspects of the public engagement activities**. Agencies must recognize that engagement is more than simply fulfilling a regulation or checking a box on a list of tasks.

One part of the process is genuinely listening to community members and using their input in a practical manner. This does not mean that an agency must implement every opinion, but it does mean engaging with the community in such a way that individuals know their input was valuable and their contributions were a factor in the process. Individuals should be treated in a respectful and courteous manner. This can be especially difficult in electronic formats and may mean responding individually to comments or questions.

Another aspect of outcome-focused engagement is soliciting involvement early in the process, before all the decisions are made. If the public perceives that engagement is an afterthought and comments will have no bearing on decisions, participation will suffer and cynicism will spread. Agencies must be prepared to change policies or designs if there is clear public backing for a change. If the agency fails to acknowledge public sentiment and make modifications, even when it is not entirely clear that there is consensus behind a specific alternative, it will appear that the agency is unresponsive or does not care about the public's opinion.

Finally, consistent with a focus on outcomes, resources must be dedicated to the public involvement activities if the efforts are to be successful. Organizational priorities can often be measured by the amount and quality of resources dedicated to a specific purpose. If an agency starves the public involvement department of the necessary resources, it will be evident and likely result in poor outcomes.

Key Challenge: Enabling All Voices to Be Heard, Yet Finding Elements of Consensus

A myriad state of practice and best practice tools are being employed to reach the many different segments of Texas' population. The trend of diversifying approaches to reach different audiences has both positive and negative implications. As an example, using technological approaches, such as websites, to reach broader audiences is a positive step; at the same time, these websites should be accessible to everyone. The desired outcome of all of these engagement strategies is to make transportation decision making an open and transparent process for as wide an audience as possible.

As the diversity of approaches blooms, it is also more difficult to maintain a consistent message, or keep webpages updated. The attention focused upon the most congested corridors is no exception; as new and varied engagement strategies are explored, key agencies in each region must continue to coordinate a consistency of regional context, project-specific history, contemporary and engaging messaging, and follow-up activity to proactively manage the overall regional message and avoid the confusion that can result from these efforts across multiple agencies and over time.

Key Challenge: Linking Studies and Findings over Time and across Varied Efforts

In many cases, understanding the history of a corridor and previous study findings, including public and stakeholder input and concerns, is critical to understanding the current context of the corridor. The most congested Texas corridors list provides an opportunity for key agencies in these regions to link new and old studies together in an active, web-based repository, ideally identified by geographic location in addition to corridor name.

Enduring Challenge: Reaching the State's Traditionally Underserved Populations

Adoption of technology solutions for populations such as visually impaired, hearing impaired or non-English speakers enables many more users to be engaged. This may involve translatable formats and brochures, video subtitles and notes — ideas that benefit all users given the increasing role that the web plays in being the primary information conduit for most transportation agencies. The public engagement community should continue to work with technology and other tools to ensure that more of the web-accessible information is accessible.

Recommendations

The public engagement guidance provides many national best practice approaches that are being used across Texas, solid state-of-the-practice implementation is in place in a wide variety of agencies, and there are improvement opportunities. The attention focused upon the most congested corridors offers a prime opportunity to demonstrate best practice strategies for public engagement. Yet, in many cases, these corridors also demonstrate similar challenges to minor transportation improvement efforts: maintaining websites, coordinating messaging across multiple agencies, and managing the past studies to maximize their value.

The Mobility Investment Priorities project yielded the following recommendations:

- Continue to advance the statewide public engagement efforts on the importance and relevance of transportation for the state's continued economic development and prosperity, goods and services delivery, and jobs, including aspects of how transportation affects individuals' everyday lives.
- For each region, one of the key agencies should coordinate a single web page location referencing the most congested corridors list (with its location), as well as other references to advance public information and regional coordination, for example:
    - Develop consistent, corridor-level summaries such as those developed for the Mobility Investment Priorities project and described earlier in this report.
    - Document current improvement efforts and the agencies involved.
    - Provide links to project-specific web pages.
    - Link to previous studies (to the extent they are relevant and available for public consumption), starting with efforts already available online.
    - Acknowledge region-wide efforts that may play a role in improving the corridor.

Individual project teams come and go, but it is the key agencies in each region that play the most critical role in advancing these recommendations. As this document demonstrates, much progress has been made to date. There are additional opportunities for engaging the public, communities and stakeholders.

CONTINUING ACTIVITIES

TTI's Mobility Investment Priorities delivered several recommendations, reports and analyses to the Legislature and the Texas Transportation Commission over the past 24 months. The main conclusions of the research were described in the Significant Accomplishments and Take-Aways sections of this report. The two years of the Mobility Investment Priorities project are a good start on solving the congestion issues in the state, but there is additional work to do.

The Mobility Investment Priorities project initiated several activities that will continue beyond August 2013. Practices are in place at local and state agencies to focus efforts on reducing congestion, improving safety and increasing efficiency using a variety of strategies. TTI will continue to assist agencies with congestion mitigation strategies, calculating congestion reduction estimations and engaging the public in a discussion about the benefits to be accrued and possible funding mechanisms to accomplish transportation projects.

Monitor Progress of Studies Funded by the $300 Million in Project Development Funding

Six studies were begun under Rider 42 to support project development activities in the top 50 congested corridors in Austin, Houston and San Antonio. The working groups in these three areas will remain engaged in reviewing the findings and products and developing recommendations based on these studies. TTI will continue to facilitate and coordinate these activities.

Assist in the Implementation of Travel Option and Traffic Management Strategies

Agencies in all four metropolitan areas are engaged in assisting companies and commuters in the implementation of travel options and in improving traffic operations actions. These might be part of a company's employee support program that allows flexibility in the method and location that job tasks are accomplished, or they may be oriented at reducing company costs for office space, parking and operations. Advancements in traffic management are a combination of technology and institutional relationships that use performance data and aggressive action to deliver improvements. TTI will continue to provide information developed during the MIP project that can be used at the local level to improve these programs.

Improve Public Engagement Practices for Project Development

The TTI staff will assist transportation agencies in each metropolitan area as they work to actively engage the general public and travelers to ensure that transportation improvement projects reflect local needs and wants. In part, this will be achieved by bringing project development staff and public engagement staff together early in the project development process, thereby allowing more flexibility to proactively address issues and concerns that may arise. This will result in fewer project schedule delays and increased cost savings.

Increase Transportation Funding Knowledge

TTI staff will use a variety of techniques to identify information awareness and education needs to better inform the public and decision makers in determining how the state's most urgent transportation needs will be met and how they will be paid for. These efforts will communicate the ways in which transportation conditions influence life quality and employment on both a community level and an individual, personal level.

Estimate Congestion Reduction Investment Benefits

TTI will assist transportation agencies in estimating two important components of congestion reduction projects — travel delay benefits and economic effects. The economic effects that result from the project construction and the improved travel conditions can be developed for projects that affect both commuters and freight shippers.

Expand the List of Travel Option and Traffic Management Strategies

The Rider 42 research that developed a comprehensive list of congestion mitigation strategies will be expanded to include additional strategies including alternate modes (including transit), additional travel option strategies, and other new strategies.

Summary

Central to each of these efforts will be the development and/or use of information that helps travelers better understand transportation funding requirements and options in a way that contributes to well-informed viewpoints and choices.

Other reports, additional recommendations and other project ideas will be produced in 2014 and 2015 as part of projects begun under Rider 42; all of the studies and purchases meet the Rider 42 standards to "significantly reduce congestion in a cost-effective manner with a project that makes maximum usage of the possible management and financial options and allow agencies to continue with project development activities."

APPENDIX A - STATUS OF TEXAS CONGESTION

Exhibit A-1 identifies the status of the 2010 most congested sections list in each of the four metropolitan areas. Almost all of the 50 most congested sections in 2010 remain in the top 100 list; three sections are outside of the top 100, and only nine are between 51 and 100. Ranking changes in many other sections belie the estimated congestion levels; as noted in the delay per mile values, many sections are ranked better, but have worse delay values.

Exhibit A-1. 2013 Status of the 50 Most Congested Road Segments in 2010

County	Roadway	From	To	2010 Rank	2013 Rank	Change	2010 Annual Hours of Delay per Mile	2013 Annual Hours of Delay per Mile
Travis	IH 35	SH 71	US 183	4	1	⇨ -3	421,778	788,649
Travis	No. Lamar	W 45th Street	W 6th Street*	24	71	⇩ 47	195,573	136,751
Travis	SL 1	US 183	US 290 West	39	27	⇧ -12	146,130	282,066
Travis	SL 360	SL 1*	US 290	42	64	⇩ 22	137,546	141,154
Travis	US 290 West	SL 1	RM 1826	43	102	⇩ 59	136,493	113,038
Travis	So. Lamar/ 1st Street	West of US 290	IH 35	44	42	⇨ -2	135,550	192,680
Dallas	IH 635	IH 35E	US 75	3	5	⇨ 2	432,244	674,537
Dallas	SS 366 Woodall Rodgers Freeway	IH 35E	US 75	5	8	⇨ 3	397,861	479,864
Dallas	US 75	IH 635	SS 366 Woodall Rodgers Freeway	9	7	⇨ -2	337,201	590,059
Dallas	IH 35E	IH 30	SH 183	12	9	⇨ -3	313,318	476,605
Dallas	US 75	PGBT	IH 635	15	15	⇨ 0	257,055	397,767
Dallas	IH 30	IH 35E	SH 12 East	16	13	⇨ -3	254,440	414,513
Dallas	IH 35E	US 67	IH 30	17	23	⇩ 6	251,532	312,734
Dallas	IH 35E	SL 12 West	IH 635	19	25	⇩ 6	242,208	305,743
Dallas	IH 30	Hampton Road*	IH 35E	29	77	⇩ 48	167,825	130,731
Dallas	IH 345	SS 366 Woodall Rodgers Freeway	IH 30	30	16	⇧ -14	162,567	375,863
Dallas	IH 635	SH 78	IH 30*	32	97	⇩ 65	159,692	117,699
Dallas	SL 12 West	SH 356	IH 35E	36	58	⇩ 22	154,540	152,955
Dallas	IH 635	US 75	SH 78	40	45	⇨ 5	145,212	179,516
Dallas	IH 35E	IH 635	BS 121	41	33	⇧ -8	142,654	235,473
Dallas	SL 12 West	SH 356	IH 30	47	58	⇩ 11	117,636	152,955
Tarrant	IH 35W	IH 30	SH 183	8	4	⇨ -4	339,507	685,043
Tarrant	IH 820	IH 35W*	SH 183	14	11	⇨ -3	288,238	434,470
Tarrant	IH 35W	SH 183	US 81	21	14	⇧ -7	234,810	402,680
Tarrant	SH 360	SH 183	IH 20	37	40	⇨ 3	150,086	200,306

⇧ Congestion worsened. ⇩ Congestion improved. ⇨ Congestion remained about the same relative to other segments.

County	Roadway	From	To	2010 Rank	2013 Rank	Change	2010 Annual Hours of Delay per Mile	2013 Annual Hours of Delay per Mile
Harris	IH 45	SL 8 North	IH 610 North	1	10	↓ 9	484,630	455,615
Harris	US 59	IH 610 West	SH 288	2	3	→ 1	440,416	730,665
Harris	IH 45	IH 10	IH 610 South	6	12	↓ 6	366,486	416,393
Harris	IH 45	IH 610 North	IH 10	7	43	↓ 36	342,303	186,405
Harris	US 59	IH 10	SH 288	10	2	↑ -8	314,106	743,006
Harris	US 290	FM 529	IH 610 West	11	18	↓ 7	313,584	368,680
Harris	IH 610 North	IH 10	IH 45 North	13	20	↓ 7	303,228	335,973
Harris	IH 610 West	South Main	IH 10 West	18	6	↑ -12	245,117	613,897
Harris	US 59	SL 8 South	IH 610 West	20	24	→ 4	235,349	309,710
Harris	IH 10	SL 8 West	IH 610 West	22	21	→ -1	205,249	329,107
Harris	US 290	FM 1960	FM 529	25	32	↓ 7	187,048	239,080
Harris	IH 45	SL 8 South	IH 610 South	26	76	↓ 50	174,824	132,335
Harris	SH 288	IH 45*	IH 610 South	27	22	↑ -5	172,958	324,466
Harris	FM 1093	SH 6	Post Oak Boulevard	28	35	↓ 7	168,249	220,249
Harris	IH 10	IH 45	US 59	31	30	→ -1	161,898	242,185
Harris	IH 45	FM 528/NASA 1	SL 8 South	33	26	↑ -7	157,824	299,531
Harris	FM 1960	US 290*	IH 45	34	36	→ 2	157,776	211,695
Harris	IH 10	IH 610 West	IH 45	35	17	↑ -18	157,762	370,436
Harris	Bellaire Boulevard	Eldridge Road	US 59	45	84	↓ 39	133,919	126,781
Harris	Bissonnet Street	US 59	Dairy Ashford Road	46	69	↓ 23	128,943	139,951
Bexar	SL 1604	SH 16	FM 471	23	231	↓ 208	197,021	63,583
Bexar	US 281	SH 1604	Comal County Line*	38	28	↑ -10	149,368	252,330
Bexar	IH 35	Loop 353/ Nogalitos Street	US 281	48	39	↑ -9	116,342	204,931
Bexar	IH 35	FM 1518*	SL 1604	49	37	↑ -12	116,202	211,593
Bexar	FM 3487	SH 471	IH 410	50	281	↓ 231	115,093	51,748

*Segment endpoints have changed and may be reflected in delay per mile.

↑ Congestion worsened. ↓ Congestion improved. → Congestion remained about the same relative to other segments.

Source: http://www.txdot.gov/inside-txdot/projects/100-congested-roadways.html

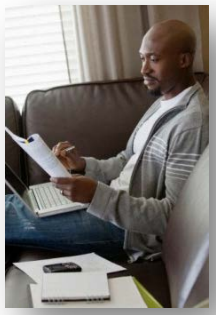
APPENDIX B - TRAFFIC AND DEMAND MANAGEMENT STRATEGIES, FUNDING OPTIONS AND PUBLIC ENGAGEMENT OVERVIEW

The mobility investment priorities website (http://mobility.tamu.edu/mip/strategies.php) has more information about congestion relief strategies, funding options and approaches to improve public engagement; the descriptions below offer a quick summary.

Traffic Management

Traffic management is an essential component of congestion mitigation and primarily an agency responsibility. It can help improve the efficiency of the system by actions such as rapidly clearing collisions and stalled vehicles or improving signal coordination so drivers experience green lights as they move in the peak travel direction. While many of these are primarily agency actions, several of them will benefit from collaboration with businesses, commuters and neighborhoods.

Travel Options



Reducing single occupant vehicle trips by encouraging practices such as ridesharing or vanpooling can reduce roadway congestion. Private companies play the key role in offering employee options, such as flexible work hours, compressed work weeks and telecommuting. Shipping companies may also participate by, for example, choosing to transport goods overnight in an effort to meet deadlines, while also reducing roadway congestion during peak travel periods.

Additional Capacity

Constructing new roadways reduces congestion; however, limited right-of-way in congested urban corridors makes this a costly approach. Exclusive or managed lanes can mitigate congestion by designating lanes for trucks or buses, or through the use of High Occupancy Vehicle (HOV)/High Occupancy Toll (HOT) lanes.

Construction Improvements

There are well accepted methods for reducing the effect of construction projects. These include the use of design techniques that require less new construction, doing the construction in ways that reduce the time or the amount of road closures and accommodating construction techniques that also mean less maintenance over the many years of pavement life.

Funding Strategies

Funding is a critical aspect of transportation improvements. Projects and roadway improvements will not become reality without a funding mechanism in place. Traditional funding mechanisms, such as the motor fuel tax, general revenue funds and bonds still fund many transportation improvement projects; however, other funding opportunities should be identified in an effort to maximize flexibility in financing improvements.

Public Engagement Strategies

Public engagement is a crucial aspect of transportation planning, particularly when voter-approved funding mechanisms are considered to finance project costs. Public opinion of a proposed project can determine the success or failure of the project. Furthermore, public outreach is a necessary component of successful project planning and can ultimately benefit the decision-making process. Public engagement strategies are implemented by the public agency or a private consulting firm hired to conduct project meetings. There are a range of strategy costs and implementation mechanisms that vary according to the budget and project type.

APPENDIX C - THE POTENTIAL BIG PROJECTS

The first-year Mobility Investment Priorities report presented several large projects involving construction, operation, management, and travel option strategies to reduce congestion on the worst corridors in the state. This appendix provides an update to listings of the larger projects that were mentioned in the August 2012 report. This is not a comprehensive compilation of the possible large transportation improvements, nor is it a list that is already supported by the public or included in the official long-range plans. They are examples of the large solutions that may be needed for the significantly congested travel corridors in the four largest metropolitan areas.

Austin

The two largest unfunded congestion problems in Austin are not yet projects in the sense that the specific designs have not been determined, but Exhibit C-1 identifies the possible projects on Loop 1 South and IH 35, the amount of funds and the project implementation timeframe. Both projects are being reviewed with the public for acceptable options, environmental and community issues, design feasibility and constructability. Several medium-sized projects that could be opened in the near-term are also included in the IH 35 cost.

Exhibit C-1. Summary of Possible Large Projects for Austin Congested Corridors

2010 Rank	Corridor	Large Projects	Estimated Additional Implementation Funds Needed*	Open By (If Fully Funded Today)
4	IH 35 Study Extension	Potential tolled express lanes, new ramp and frontage road designs, operational improvements, and travel option strategies.	$1.0B to $2.0B	2014 to 2019
39	Loop 1 South Express Lanes	Tolled express lanes.	$253M†	2020
43	US 290 West	Oak Hill Expressway; tolled express lanes.	$680M	2020
TOTAL PUBLIC FUNDS REQUIRED			**$2.0 Billion to $3.0 Billion**	

*Source of funds noted if known.

†CTRMA Toll Funding

Dallas/Fort Worth

Exhibit C-2 identifies several large possible projects in the Dallas/Fort Worth Metroplex and the amount of funds and timeframe for project implementation. The Rider 42 project development funds were focused on two projects: the Horseshoe and Phase 1 of the Trinity Parkway, but there are several others that might be accomplished if additional project development work was engaged and funding was available. There are also other large projects that are being completed through comprehensive development agreements (which should not require additional public funds).

Exhibit C-2. Summary of Possible Large Projects for Dallas/Fort Worth Congested Corridors

2010 Rank	Corridor	Large Projects	Estimated Additional Implementation Funds Needed*	Open By (If Fully Funded Today)
5	IH 45/IH 345	Reconstruct freeway.	$600M	TBD
12, 16, 17, 29	Trinity Parkway	Trinity Parkway construction.	$1.8B	2019 to 2028
12, 16, 17, 29	IH 30, IH 35E	Project Pegasus.	$1.7B	TBD
17	IH 35E South	Southern Gateway - two additional mainlanes and managed lanes.	$3.9B	2019 to 2028
32	IH 635 East	Reconstruct freeway and add managed lanes	$1.0B	TBD
37	SH 360	Construct IH 30 interchange, widen from IH 30 to IH 20 and add mainlanes south of IH 20	$1.0B	TBD
TOTAL PUBLIC FUNDS REQUIRED			**$10.0 Billion**	

*Source of funds noted if known.

Projects listed as TBD are not listed in the MTP, but would likely be able to be completed in 5 years.

Houston

Exhibit C-3 identifies several possible large construction projects in the Houston metropolitan area along with the amount of funds and timeframe for project implementation. A large project in the IH 45 North corridor is being discussed with the public and current cost estimates are in the range of $2 billion; several other large construction projects — particularly around downtown and the freeways leading into it — have not yet reached the environmental impact study stage.

Exhibit C-3. Summary of Possible Large Projects for Houston Congested Corridors

2010 Rank	Corridor	Large Projects	Estimated Additional Implementation Funds Needed*	Open By (If Fully Funded Today)
1, 7	IH 45 North	Reconstruct mainlanes and add managed lanes.	$2.0B	2019
1, 7	Hardy Toll Road	Extend from IH 610 into downtown.	$400M (HCTRA)	2020
2, 10	US 59	Widen to 12 lanes from IH 10 East to IH 45 South.	$190M (HGAC RTP/TIP)	2030 to 2035
		Widen to 8 and 10 lanes with managed lanes from IH 45 to SH 288.	$622M (HGAC RTP/TIP)	2030 to 2035
		Reconstruct to 6 mainlanes and 4 managed lanes from SH 288 to Spur 527.	$233M (HGAC RTP/TIP)	2030 to 2035
		Direct connectors from IH 610 West (both NB and SB) to US 59 SB.	$81.5M (HGAC RTP/TIP)	2030 to 2035
TOTAL PUBLIC FUNDS REQUIRED			**$3.5 Billion**	

*Source of funds noted if known.

San Antonio

Exhibit C-4 identifies possible projects in the San Antonio metropolitan area, the amount of funds and timeframe for project implementation. Many large projects are awaiting the results of recommended planning or environmental studies before a specific project option, cost and implementation timeframe can be determined. The most significant funding needs will be in the IH 35 corridor, but there are also large unfunded projects in the US 281 and Loop 1604 corridors.

Exhibit C-4. Summary of Possible Large Projects for San Antonio Congested Corridors

2010 Rank	Corridor	Large Projects	Estimated Additional Implementation Funds Needed*	Open By (If Fully Funded Today)
23	SL 1604	Managed lanes from SH 16 to IH 35 Northeast. Construct 4-lane freeway from Bandera Rd to Culebra Rd.	$840M (Alamo RMA) $82M funded by TxDOT and Advanced Transportation District	2019 2019
38	US 281	Construct 4-lane tollway and frontage roads from Stone Oak Parkway to Bexar/Comal County line; add two managed lanes and four freeway lanes from SL 1604 to Stone Oak Parkway.	None – Funds committed in early January 2014 (TxDOT, Advanced Transportation District, Alamo RMA, San Antonio Bexar County MPO, and City of San Antonio)	2019
48, 49	IH 35 Northeast	Expand to 10-, 12-, or 14-lane expressway from US 281/IH 37 to FM 1103.	$2.0B	2020
48, 49	SL 1604 East	Expand to 4-lane expressway from IH 35 Northeast to IH 10 East.	$495M	2020
48, 49	IH 35 Alternate Routes	Expanded capacity and interchange improvements on routes linking to SH 130 in Seguin: IH 10 from SH 130 to IH 35, IH 410 from IH 35 South to IH 10 East, and SL 1604 South from IH 10 East to US 90 West.	$3.2B to $4.7B+ROW	2020
TOTAL PUBLIC FUNDS REQUIRED			**$6.5 Billion to $8.0 Billion+ROW**	

*Source of funds noted if known.